प्रगति प्रतिवेदन

PROGRESS REPORT

2022-23

संसाधन प्रबंधन

RESOURCE MANAGEMENT

अखिल भारतीय समन्वित गेहूँ एवं जौ अनुसंधान परियोजना

AICRP on Wheat and Barley

भा.कृ.अनु.प.–भारतीय गेहूँ एवं जौ अनुसंधान संस्थान, करनाल

ICAR-Indian Institute of Wheat and Barley Research, Karnal

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Tripathi

Dated: 11th August, 2023

S.C. Tripathi

(Resource Management)

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SUMMARY

Presently, there are two main approaches working simultaneously for increasing the profit of farmers i.e. increasing the wheat productivity and decreasing the cost of cultivation. First one was adopted to test new high yielding wheat varieties/entries at different sowing time and irrigation levels in different wheat growing zones (NHZ, NWPZ, NEPZ, CZ and PZ) to enhance the productivity per unit of acreage and second one was aimed to reduce the production cost by efficient application of nutrient, water, microorganisms, herbicides, etc. to achieve the same or higher productivity in wheat based cropping systems.

India produced 112.74 million tonnes of wheat grains during 2022–23. This target was achieved by popularization of new technologies such as high yielding wheat varieties for different zones and climatic conditions, advancing the sowing time in NWPZ, cultivation of modern wheat varieties at high fertility levels and most importantly hard work of Indian farmers. The increase in wheat acreage and policy support from government agencies supported this growth trajectory of wheat production. To match the pace of increasing food demand with rise in population, the researchers, planners and farmers will have to overcome the hurdles in the way of achieving the maximum yield potential. However, imbalanced nutrients application and intensive tillage are still matters of concern leading to degradation of the natural resources. The micro nutrient deficiencies are being reported from various parts of the Indo-Gangetic plains, food basket of the country, as a result of continuous mining of the soil coupled with imbalanced fertilizer application and mono-cropping systems. Farmers in NWPZ apply excess quantity of nitrogen in the quest of higher grain yield whereas situation in NEPZ is just reverse due to low purchasing power and small land holdings pattern. For instance, potash and micronutrients are rarely applied by the farmers. Alarming situation arises when crop residues burnt, which causes loss of essential nutrients and environmental pollution, affecting the human health. In order to provide the food security and to reverse the trend in natural resource degradation, technological advancements including developing better varieties suited to different cropping systems and growing conditions in various agro-ecological zones is a must. The higher agricultural productivity has to be achieved along with the improvement or at least without further detrimental effect to the environment and natural resources for long-term sustainability. In addition to varietal improvement, research efforts are focused on refinement of the technologies, diversification/intensification by including leguminous crops, and integrated and precise management of nutrient, water and weed to minimize the input cost with greater profitability to farmers.

The Resource Management group of the “All India Co-ordinated Wheat and Barley

Improvement Project" (AICW&BIP), in addition to evaluating the performance of newly developed genotypes, is also actively engaged in developing and refining the eco- friendly, location-specific and cost-effective wheat production technologies for higher productivity and profitability to the farmers. The work on input responsive technologies is being executed through special trials depending on the priorities of various wheat growing zones. The results of the multi-locations varietal evaluation and special co- ordinated trials are summarized here under.

In four wheat growing zones, eight varietal evaluation trial series were conducted at 52 locations under different growing conditions. The newly developed genotypes were evaluated against the existing varieties used as checks. In addition, five special coordinated trials were also conducted at 68 locations to address the zonal/ across the zone problems and priorities.

The zone-wise details of the varietal evaluation trials conducted are given in Table 1. In total, 52 trials were proposed and all were conducted. Out of the conducted trials, nine trials were not included into pooled analysis due to low yield and improper data reporting. The zone-wise details of number of trials allotted, conducted and rejected are mentioned in Table 1.

Table 1. Zone-wise details of the coordinated varietal evaluation trials

Trial Series	Locations	Trials conducted	Trials not conducted		Rejected	
			Number	Centres	Number	Centres
North Western Plain Zone						
IR-DOS-LS	10	10	-	-	2	Durgapura, Jammu
RIR-TS-TAS	10	10	-	-	2	Durgapura,Sriganganagar
Total	**20**	**20**			**4**	
North Eastern Plain Zone						
IR-DOS-TS	09	09			03	RPCAU Pusa, Sabour, Shillongani
Total	**09**	**09**			**03**	
Central Zone						
IR-DOS-TAD	07	07			01	Bilaspur
RIR-TS-TAD	05	05				
SPL-IR-ES-HYPT	04	04				
Total	**16**	**16**			**01**	
Peninsular Zone						
IR-TS-DOS-TAD	04	04			01	Akola
RIR-TS-TAD	03	03				
Total	**07**	**07**			**01**	
Grand Total	**52**	**52**			**09**	

The performance of different entries in various zones is highlighted against the best check varieties. None of entries performed significantly better than the best check in any zones/trials. In NWPZ, entry HD 3386 was numerically better than the best check variety PBW 826 in date of sowing trial and in CZ under high yield potential trial, test entry DBW 377 was numerically better than the best check variety DBW 187 (Table 2).

Table 2. Performance of new genotypes in various agro-climatic zones

Zone wise trial	Test entries	Entry sowing superiority		Best check	Yield gain, %	Locations
		Numerical	Significant			
North Western Plain Zone						
IR-TS-DOS-TAS	HD 3386	HD3386	-	PBW 826	-	08
RIR-TS-TAS	WH1402	-	-	HI 1653	-	08
North Eastern Plain Zone						
IR-TS-DOS-TAS	HD 3388	-	-	PBW 826	-	06
Central Zone						
IR-TS-DOS-TAD	GW 547, NWS 2194	-	-	MACS 6768	-	06
RIR-TS-TAD	DBW 359, CG 1040	-	-	CG 1036	-	05
SPL-IR-ES-HYPT	DBW 377	DBW 377	-	DBW 187	-	04
Peninsular Zone						
IR-TS-DOS-TAD	MP 1378	HI8826(d)	-	HI 8826	-	03
IR-LS-DOS-TAS	NIAW 4028, DBW 359, HI 1665, HI 8840 (d)	-	-	NIAW 3170	-	03

Table 3. Zone-wise details of the special agronomic trials

Trial Series	Locations	Trials conducted	Trials not conducted	
			Number	Centres
Northern Hill Zone				
SPL-1: Efficacy of herbicides against diverse weed flora of wheat	02	02	-	-
SPL-2: Effect of nano urea under irrigated conditions	01	01	-	-
SPL-3: Effect of nano urea under restricted irrigated conditions	02	02	-	-
SPL-5: Effect of NPK solubilizing microbial consortium on productivity	01	01	-	-
Total	06	06	-	-
North Western Plains Zone				
SPL-1: Efficacy of herbicides against diverse weed flora of wheat	05	05	-	-
SPL-2: Effect of nano urea under irrigated conditions	08	08	-	-
SPL-3: Effect of nano urea under restricted irrigated conditions	03	03	-	-
SPL-4: Agronomic interventions for quality enhancement in wheat	04	04	-	
SPL-5: Effect of NPK solubilizing microbial consortium on productivity	04	04	-	-
Total	24	24	-	-
North Eastern Plains Zone				
SPL-1: Efficacy of herbicides against diverse weed flora of wheat	04	04	-	-
SPL-2: Effect of nano urea under irrigated conditions	05	05	-	-
SPL-3: Effect of nano urea under restricted irrigated conditions	05	05	-	-
SPL-4: Agronomic interventions for quality enhancement in wheat	01	01	-	-
SPL-5: Effect of NPK solubilizing microbial consortium on productivity	02	02	-	-
Total	17	17	-	-
Central Zone				
SPL-1: Efficacy of herbicides against diverse weed flora of wheat	03	03	-	-
SPL-2: Effect of nano urea under irrigated conditions	04	04	-	-
SPL-3: Effect of nano urea under restricted irrigated conditions	04	04	-	-
SPL-4: Agronomic interventions for quality enhancement in wheat	01	01	-	-
SPL-5: Effect of NPK solubilizing microbial consortium on productivity	03	03	-	-
Total	15	15	-	
Peninsular Zone				
SPL-1: Efficacy of herbicides against diverse weed flora of wheat	02	02	-	-
SPL-2: Effect of nano urea under irrigated conditions	03	03	-	-
SPL-5: Effect of NPK solubilizing microbial consortium on productivity	01	01	-	-
Total	06	06	-	-
Grand Total	68	68		

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North Western Plains Zone

The performance of test genotypes was evaluated under different sowing conditions and restricted irrigation conditions at different locations and the results are summarized here under;

Irrigated Timely Sown

One test entry, HD 3386 was evaluated against five checks viz. HD 3086, DBW 322, HD 2967, DBW 187 and PBW 826 at ten locations (Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar and Sriganganagar) under timely (5th November to 11th November) and late (10th December to 16th December) sown conditions. For pooled analysis, data of Durgapura and Jammu centres were not considered due to low mean target yield and improper data, respectively. Timely sowing gave higher productivity of all genotypes compared to late sowing and on an average, yield declined by 22.1% when sowing was delayed from timely to late condition (Fig. 1). The test entry HD 3386 was found the top yielder (55.38 q/ha) which was followed by check variety PBW 826 (C) and DBW 222 (C).

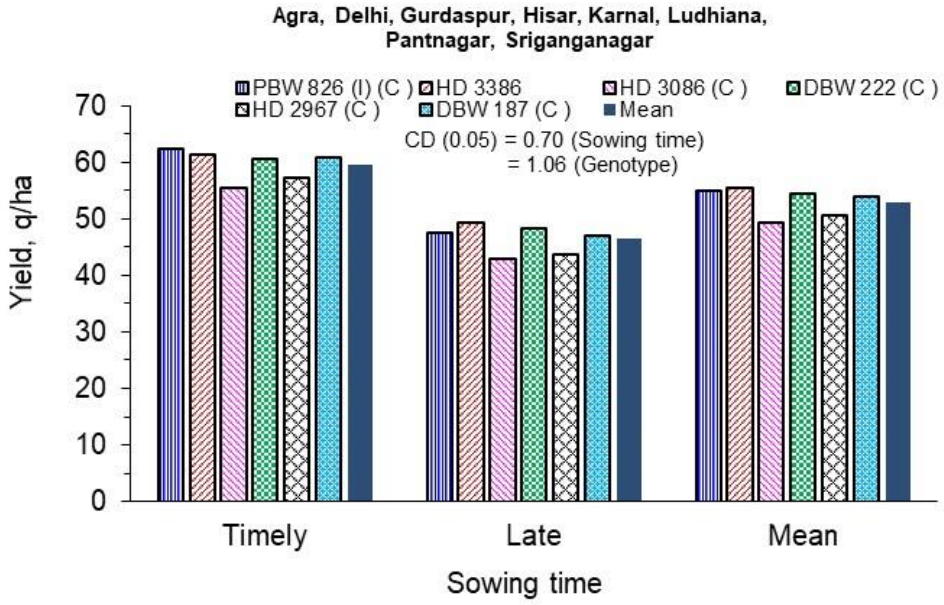

Fig. 1. Genotype performance under timely and late sown conditions in NWPZ

Restricted Irrigation

The restricted irrigation trial was conducted with the objective to evaluate one *aestivum* test entry WH 1402 against six checks (HD 3369, DBW 296, HI 1653, PBW 644, NIAW 3170 and HI 1654) at ten locations (Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar and Sriganganagar). For pooled analysis, the data of Durgapura and Sriganganagar centres were excluded due to low mean yield and improper data, respectively. The results revealed that the test entry WH 1402 produced an average yield of 43.60 q/ha, which was at par with all the check varieties except PBW 644 (Fig. 2).

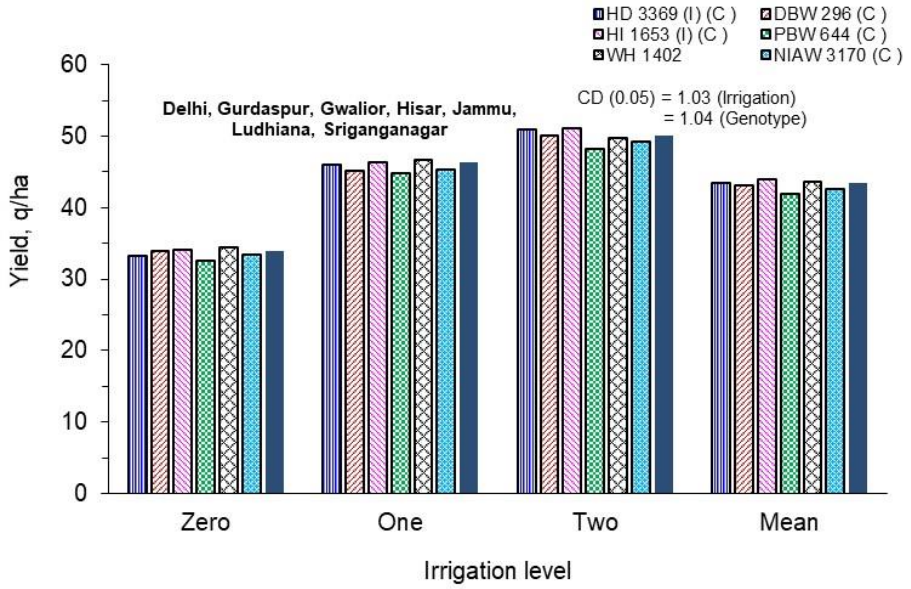

Fig. 2. Genotype performance under restricted irrigation conditions in NWPZ

North Eastern Plains Zone

The performance of test genotype was evaluated under timely sown conditions at different locations and the results are summarized here under;

Irrigated Timely Sown

One test entry HD 3388 was evaluated against six checks viz. HD 3249 (c), HD 3086 (c), PBW 826 (I)(c), DBW 222 (c), DBW 187 (c) and HD 2967 (c) at nine locations (Ayodhya, Coochbehar, Kalyani, Kanpur, Ranchi, RPCAU Pusa, Sabour, Shillongani and Varanasi) under timely (05th November to 11th November) and late (10th December to 16th December) sown conditions. The data of RPCAU Pusa, Sabour and Shillongani centres were not included in pooled analysis due to low mean yield under timely sown conditions. The test and check entries demonstrated comparatively higher yield under timely sown conditions and mean yield reduced by 15.3% on shifting the sowing time from timely to late conditions (Fig. 3). The mean yield of test entry HD 3388 was found to be 52.23 and 41.90 q/ha under timely and late sown conditions, respectively. However, it was inferior to the yield of best check variety PBW 826.

CENTRAL ZONE

In this zone, the performance of test genotypes was evaluated under different sowing conditions and restricted irrigation conditions at different locations. High yield potential trial also conducted to maximize the wheat yield and the results are summarized as under:

Irrigated Timely Sown

In irrigated timely sown conditions, two test entries (GW 547 and NWS 2194) were evaluated against five check varieties (MACS 6768, HI 1650, GW 513, HI 1636 and GW 322) at seven

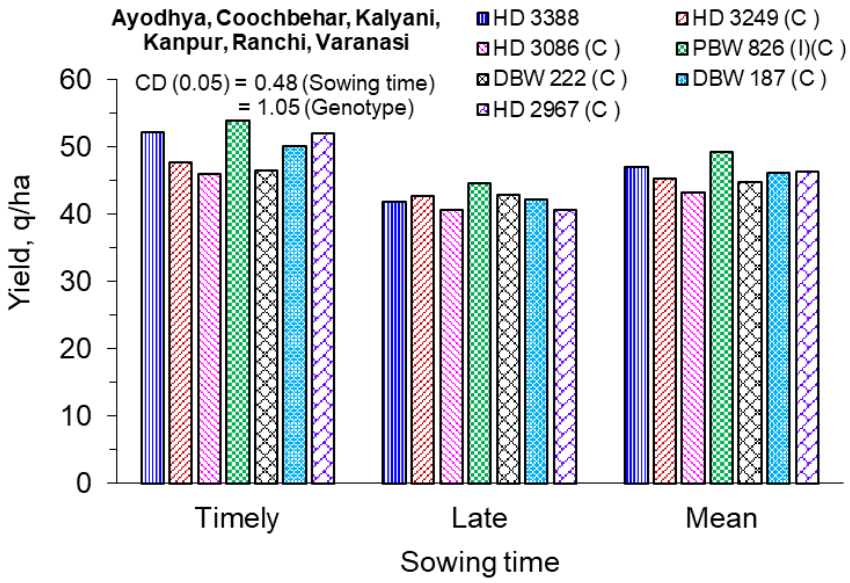

Fig. 3. Genotype performance under timely and late sown conditions in NEPZ

locations (Bilaspur, Gwalior, Indore, Junagadh, Powarkheda, Udaipur and Vijapur) under timely (12th November to 18th November) and late (03rd December to 09th December) sown conditions. For pooled analysis data of six centres were considered and Bilaspur centre data was not included due to low centre mean yield. The results showed that there was a significant decline in yield from normal (51.04 q/ha) to late (43.05 q/ha) sown condition (Fig. 4). The grain yield decline in late sown condition was 15.7% as compared to normal sown condition. On average basis, the test entry GW 547 ranked fourth with a mean yield of 46.64 q/ha and the other test entry NWS 2194 ranked seventh with a mean yield of 44.27 q/ha.

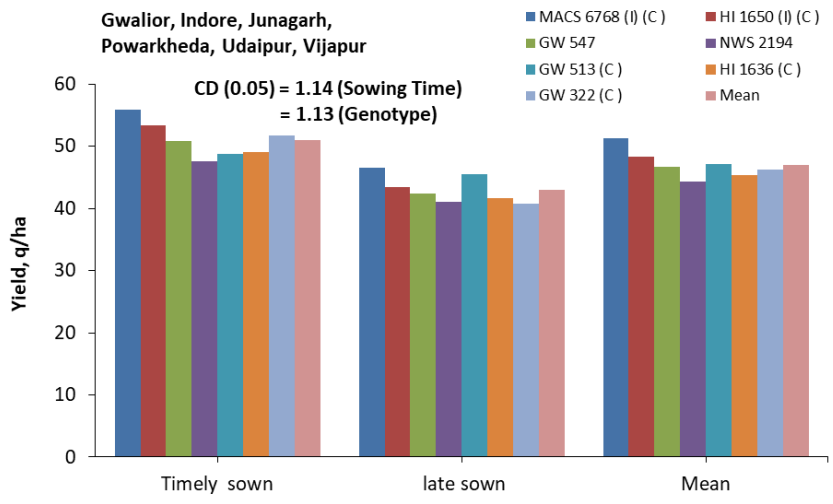

Fig. 4.Genotype performance under timely and late sown conditions in CZ

Restricted Irrigation

The restricted irrigation trial was conducted with the objective to evaluate two test entries DBW 359 and CG 1040 against four checks (MP 3288, DBW 110, HI 1655 and CG 1036) at five

locations (Bilaspur, Gwalior, Indore, Jabalpur and Udaipur). The pooled analysis showed that increasing the irrigation level significantly increased the grain yield due to increase in earhead/m^2, grains/earhead and thousand grain weight (Fig. 5). The maximum and significantly higher grain yield (41.08 q/ha) was obtained with two irrigations as compared with zero and one irrigations levels. The test entry DBW 359 produced an average yield of 35.08 q/ha, which was significantly higher than all checks and test entry CG 1040 but CG 1036 was found to be the highest yielder.

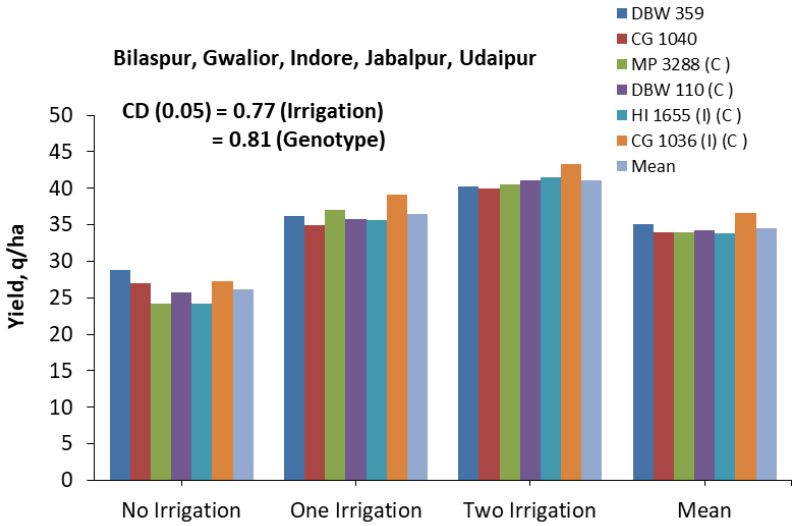

Fig. 5.Genotype performance under restricted irrigation conditions in CZ

High Yield Potential Trial

This experiment was conducted to maximise the wheat yield using higher level of inorganic and organic fertilisers and spraying of growth retardant for control of lodging. The trial was conducted at four centres namely BISA Jabalpur, Jabalpur, Udaipur and Vijapur. The pooled analysis showed significant effect of fertiliser application and growth regulators on grain yield and yield attributes (Fig. 6). The grain yield enhanced significantly with increasing fertiliser doses. Addition of 15 t FYM/ha with 150% RDF significantly increased the grain yield (72.62 q/ha) as compared to RDF (66.56 q/ha). This increase was to the tune of 9.1% as compared with RDF. The application of growth retardant significantly decreased plant height (86.3 cm) over no use (93.4 cm). This showed that growth retardant in combination with fungicide tebuconazole was effective for control of lodging and enhancing the grain yield owing to more tillering. On mean basis DBW 377 recorded highest grain yield (70.62 q/ha).

Peninsular Zone

In Peninsular zone, the performance of test genotypes was evaluated under two trials on sowing time (timely & late) and at different soil moisture (restricted irrigated conditions) at different locations. The results of these trials are summarized below.

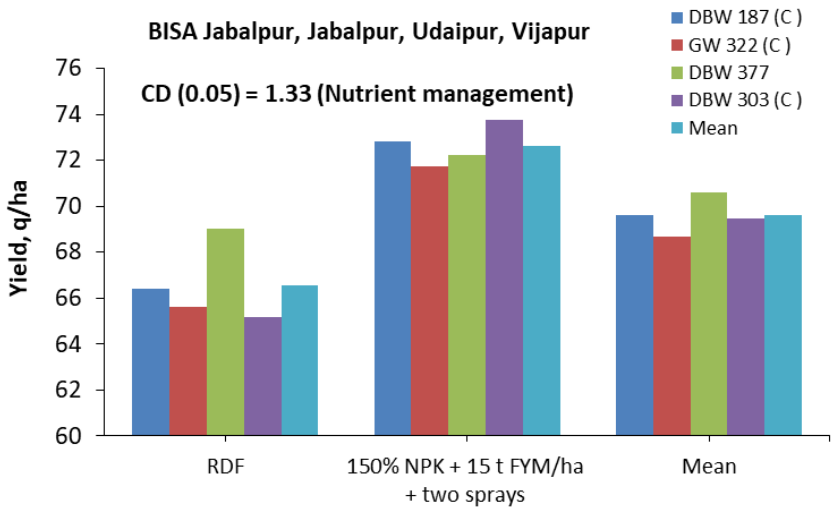

Fig. 6. Maximizing the wheat productivity through fertilizer in CZ

Irrigated Timely Sown

In irrigated timely sown trial, the performance of one test entry (MP 1378) against five check varieties (HI 8826 (d) (I), MACS3949 (d), MACS 6222, GW 322 and MACS 4100 (d) (I)) was evaluated under timely and late sown conditions at four locations *i.e.* Akola, Dharwad, Niphad and Pune. The data of Akola centre not included due to low mean yield. The perusal of pooled data of Dharwad, Niphad and Pune indicated that grain yield reduced significant in changing the sowing from timely to late condition (Fig. 7). The mean grain yield under time and late sowing conditions was recorded to be 51.90 q/ha and 45.90 q/ha, respectively. Under timely sowing condition, test entry MP 1378 yielded less (52.31 and 44.92 q/ha under timely and late sown conditions, respectively) than best check variety HI 8826 (54.88 q/ha) but both were statistically at par. On the basis of mean yield, test entry scored third rank after check varieties HI 8826 (d) and GW 322.

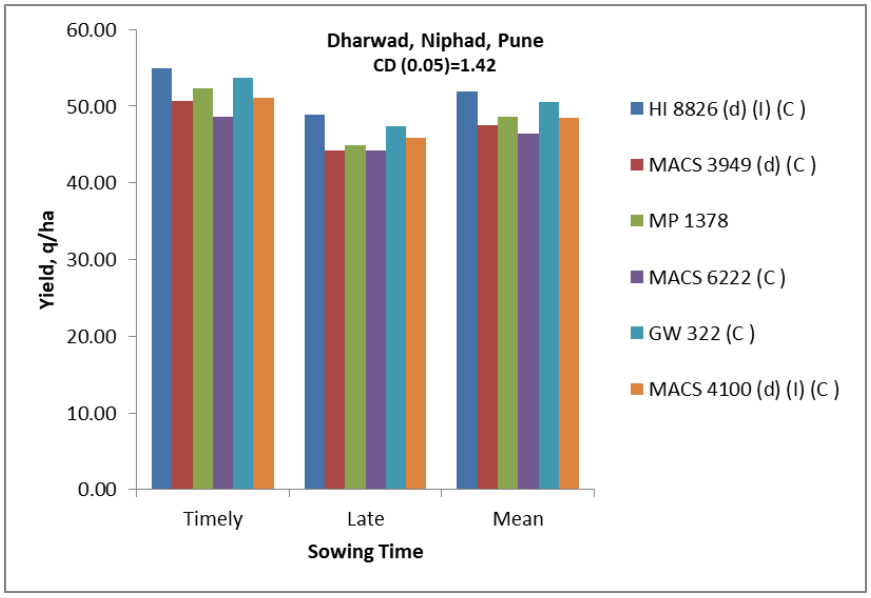

Fig. 7.Genotype performance under timely and late sown conditions in PZ

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Restricted Irrigated Conditions

In PZ, the performance of five test genotypes [NIAW 4028, DBW 359, HI 1665, HI 8840 (d), UAS 478 (d)] was evaluated under restricted irrigation conditions (zero, one and two irrigation levels) against four checks [UAS 446 (d), NIAW 3170, HI 1605, NIDW 1149 (d)] at three locations (Dharwad, Niphad and Pune). The data presented in Fig. 8 showed that increasing irrigation levels significantly increased the grain yield. Maximum and significantly higher grain yield (36.18 q/ha) was obtained with two irrigations as compared with zero (22.75 q/ha) and one irrigation level (27.66 q/ha). Check variety NIAW 3170 produced maximum yield (31.95 q/ha) followed by test entry HI 1665 (30.88 q/ha) and NIAW 4028 (30.78 q/ha) but these three genotypes remained at par.

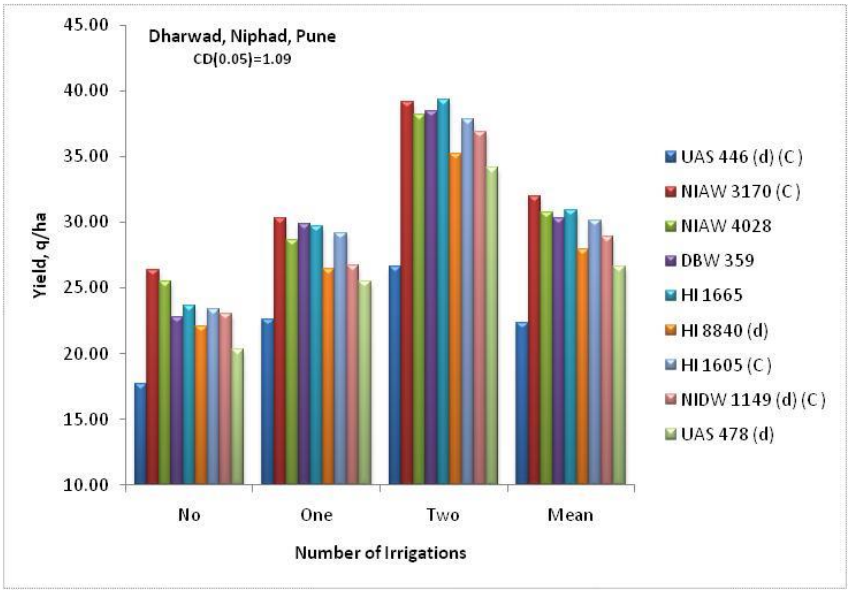

Fig. 8.Genotype performance under restricted irrigation conditions in PZ

Barley

One coordinated trial was proposed and conducted at four locations (Durgapura, Hisar, Karnal and Ludhiana) and results revealed that test entry DWRB 219 recorded the highest yield (52.90 q/ha) at 120 kg N/ha which was numerically better than the best check RD 2849 (two row) and DWRB 137 (six row). The increase in nitrogen level significantly improved the grain yield on mean basis. The genotypes DWRUB 52, RD 2849 and DWRB 219 responded up to 120 kg N/ha while rest of entries responded up to 90 kg N/ha.

PRODUCTION TECHNOLOGIES

In this section, the results of various experiments on updating the package of practices of various wheat growing zones are presented. Various special coordinated trials on weed control, nano urea, NPK solubilizing microbial consortium, maximizing productivity,

biofortification and fertigation in wheat were conducted to address the various issues in different wheat growing zones of the country.

SPL -1: Efficacy of herbicides against diverse weed flora of wheat.

Weeds are major problem in wheat production. Chemical weed control is preferred over other weed control methods in wheat. Moreover, wheat is infested with diverse weed flora and for control of complex weed flora herbicide combinations are required. Therefore, keeping these in view an experiment involving twelve weed control treatments was conducted across zones at 16 locations.

In NHZ, this trial was conducted at two locations (Bajaura and Malan). The pooled analysed yield and yield attributes data of two centres are presented in Fig. 9. The maximum grain yield (42.93 q/ha) was recorded with pre-em. tank mix combination of pendimethalin + metribuzin at 1250 + 280 g/ha followed by with pre-em. tank mix combination of pendimethalin + pyroxasulfone at 1250 + 127.5 g/ha which produced grain yield of 41.26 q/ha. The lowest weed density and dry weight were recorded with pre-em. tank mix combination of pendimethalin + metribuzin at 1250 + 280 g/ha.

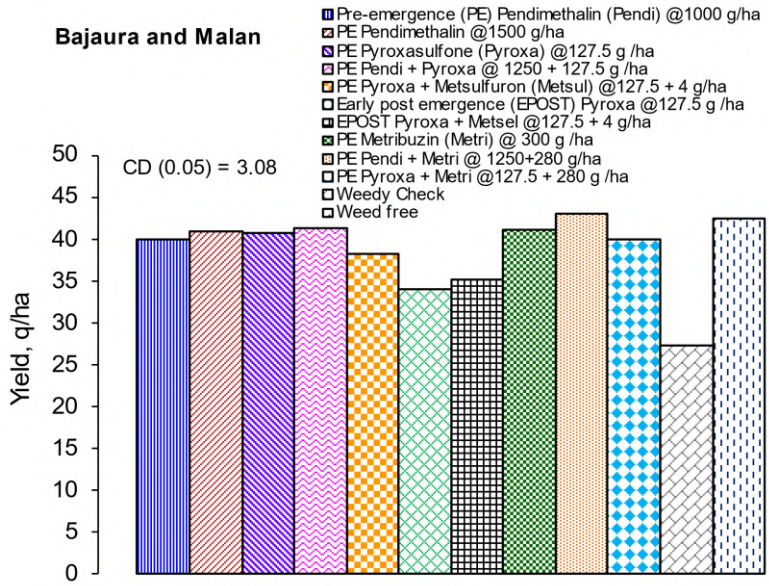

Fig. 9. Grain yield of wheat under different herbicides application in NHZ

In NWPZ, this trial was conducted at five centres namely Durgapura, Gurdaspur, Hisar, Jammu and Ludhiana. The analysis of pooled data as shown in Fig. 10 revealed that herbicide application produced significant effect on grain yield. The highest yield was obtained under weed free situation (55.50 q/ha) which might be attributed to higher and better use of moisture, light, nutrients and space by the crop plants. Among herbicides, pre-emergence application of pendimethalin + pyroxasulfone 1250+ 127.5 g/ha showed the least number of weed count of 12.5 and weed dry weight of 18.1 g/ sq. m. at 90 DAS. Pyroxasulfone applied

as early post emergence was also found effective in reducing the population and dry weight of weeds.

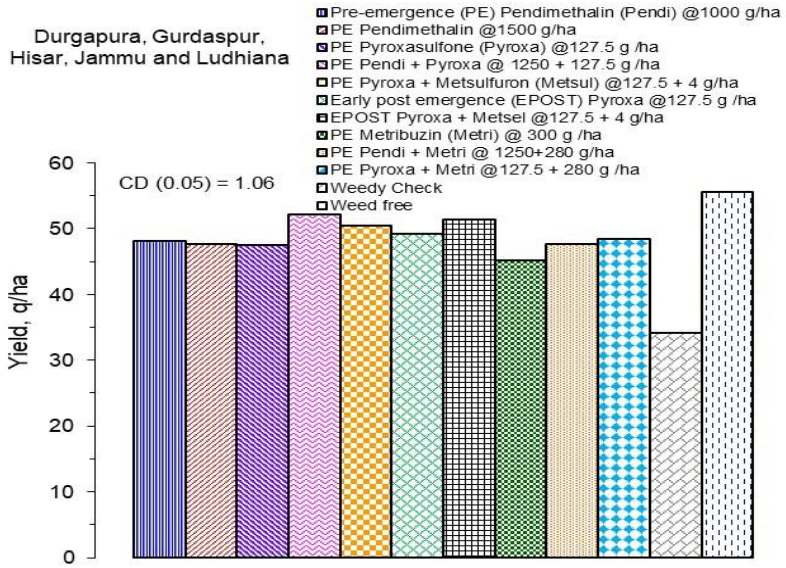

Fig. 10. Grain yield of wheat under different herbicides application in NWPZ

In NEPZ, this experiment was conducted at four locations (Ayodhya, Ranchi, RPCAU PUSA and Shillongani). The maximum grain yield (52.87 q/ha) was obtained in weed free condition followed by treatments having pre-emergence tank mix application of pyroxasulfone + metribuzin @127.5 + 280 g a.i./ha, pre-emergence tank mix application of pendimethalin + pyroxasulfone @ 1250 + 127.5 g a.i./ha and early post emergence tank mix application of pyroxasulfone+ metsulfuron @ 127.5 + 4 g a.i./ha (Fig. 11). The weed count and weed dry weight at all growth stages reduced significantly by pre-emergence tank mix application of pyroxasulfone + metribuzin @127.5 + 280 g a.i./ha and early post emergence tank mix application of pyroxasulfone+ metsulfuron @ 127.5 + 4 g a.i./ha.

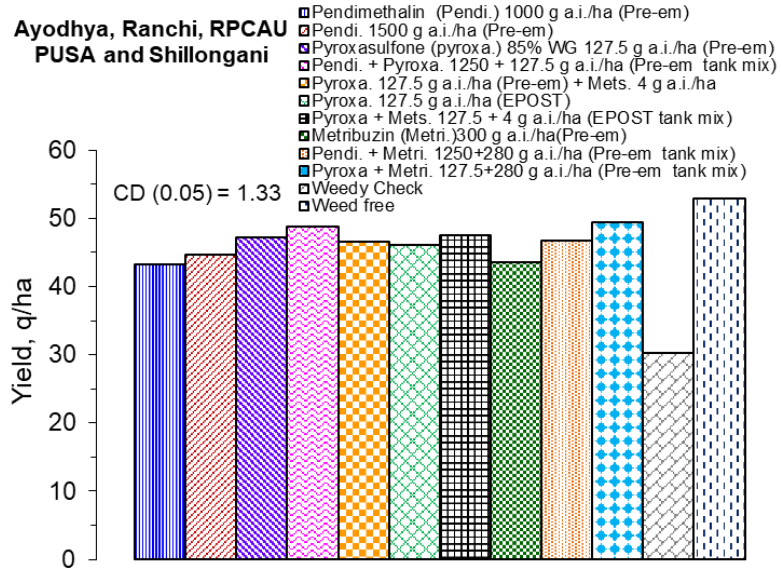

Fig. 11. Grain yield of wheat under different herbicides application in NEPZ

In CZ, this trial was conducted at three centres namely Indore, Powarkheda and Udaipur. The analysis of pooled data revealed that the highest yield was obtained under weed free situation (55.30 q/ha) as shown in Fig. 12. Among herbicides, EPOST Pyroxa + metsul @ 127.5 + 4 g/ha showed the least number of weed count of 15.8 and weed dry weight of 24.6 g/ sq. m. at 90 DAS.

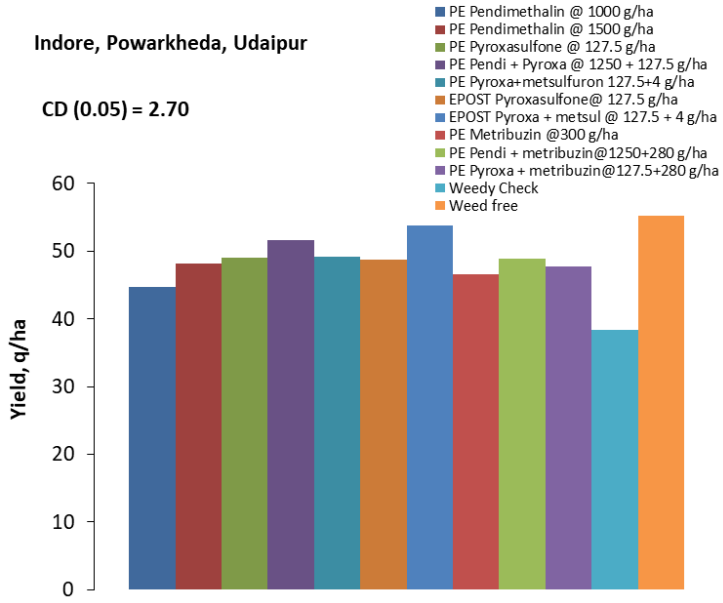

Fig. 12. Grain yield of wheat under different herbicides application in CZ

In PZ, this trial was conducted at Dharwad and Pune centres. Pyroxa + metsulfuron 127.5+4 g/ha treatment produced the maximum grain yield (49.91 q/ha) followed by 49.29 q/ha under PE Pendi + Pyroxa @ 1250 + 127.5 g/ha treatment (Fig. 13). Pre-emergence application of Pyroxa + metsulfuron 127.5+4 g/ha resulted into minimum weed count (23.83) and weed dry weight (8.7 g/sq.m.).

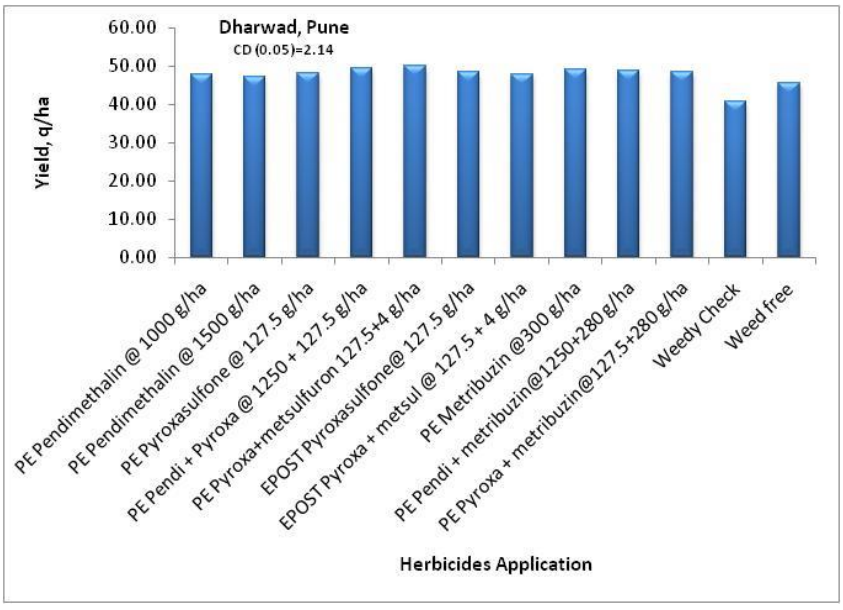

Fig. 13. Grain yield of wheat under different herbicides application in PZ

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SPL-2: Wheat productivity with nano urea under irrigated condition

This experiment was conducted to explore the possibility of maximizing wheat productivity by integrated use of nano urea. The experiment was laid out in randomized complete block design with thirteen treatments viz. control (No N) and 50, 75 and 100% of Rec N rates along with either one spray of nano urea or two spray of nano urea or two spray of urea. One third nitrogen as per treatment, full phosphorus and potash as basal dose and the remaining 2/3rd nitrogen as 1/3rd at first irrigation and 1/3rd at second irrigation were applied. Irrigation and weed control measures were followed as per recommended package of practices for the concerned zone.

In NWPZ, this experiment was conducted at eight locations (Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana and Pantnagar). The perusal of pooled analysis data presented in Fig. 14 showed that application of recommended N and two spray of nano urea at tillering and jointing stage produced the maximum grain yield of 53.91 q/ha. However, the grain yield with rec. N + two spray of simple urea (5%) at tillering and jointing stage (53.44 q/ha), rec. N + one spray of nano urea at tillering (52.81 q/ha), 75% rec. N with two nano spray and 75% rec. N with two 5% urea spray were at par with rec. N + two sprays of nano urea. The addition of two spray of nano urea at tillering and jointing stage with recommended N fertilization brought an increase of 6.2% in grain yield over rec. N treatment.

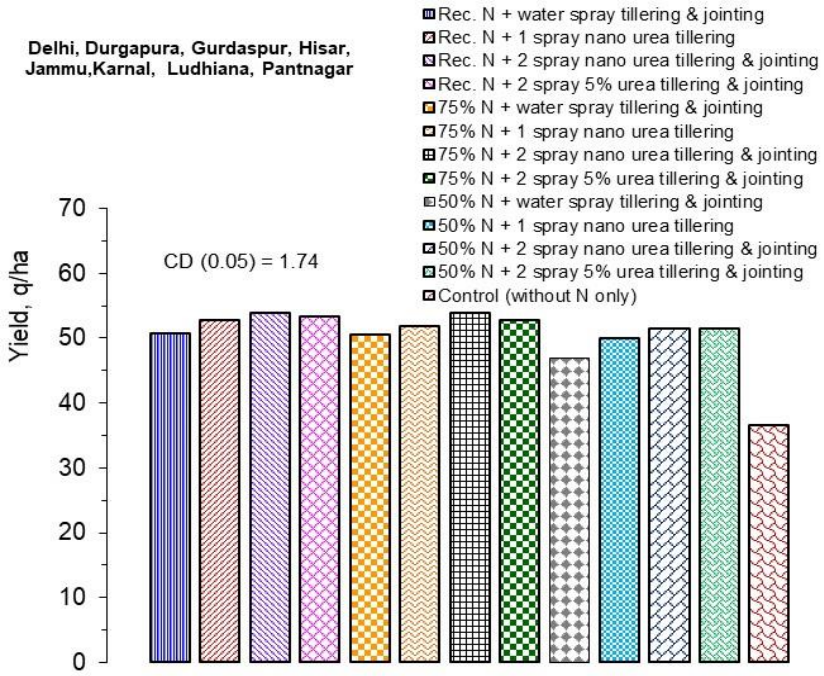

Fig. 14. Effect of nano urea on productivity of wheat under irrigated condition in NWPZ

In NEPZ, this experiment was conducted at five locations (Burdwan, Coochbehar, Ranchi, Sabour and Varanasi). The maximum grain yield (48.62 q/ha) was obtained under recommended N Dose + two spray of nano urea at tillering & jointing stage treatment; however, it was statistically at par

to recommended N Dose + two spray of urea (5%) at tillering & jointing stage. The grain yield with under recommended N Dose + two spray of nano urea at tillering & jointing stage was significantly higher than all other treatments except recommended N Dose + two spray of urea (5%) at tillering & jointing stage (Fig. 15).

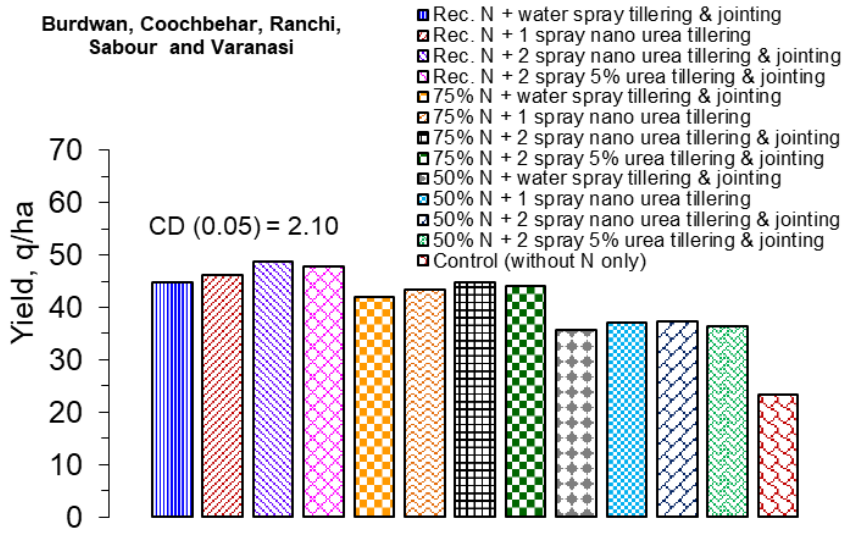

Fig. 15. Effect of nano urea on productivity of wheat under irrigated condition in NEPZ

In CZ, this experiment was conducted at four locations (Gwalior, Indore, Junagarh and Vijapur). The perusal of pooled analysis data showed that application of recommended N and two 5% urea spray at tillering & jointing stage produced the maximum grain yield of 55.8 q/ha which was at par with rec N + two nano urea spray at tillering & jointing stage (55.4 q/ha), rec N + two water spray (54.6 q/ha) and rec N + one nano urea spray at tillering stage (54.3 q/ha) as shown in Fig. 16.

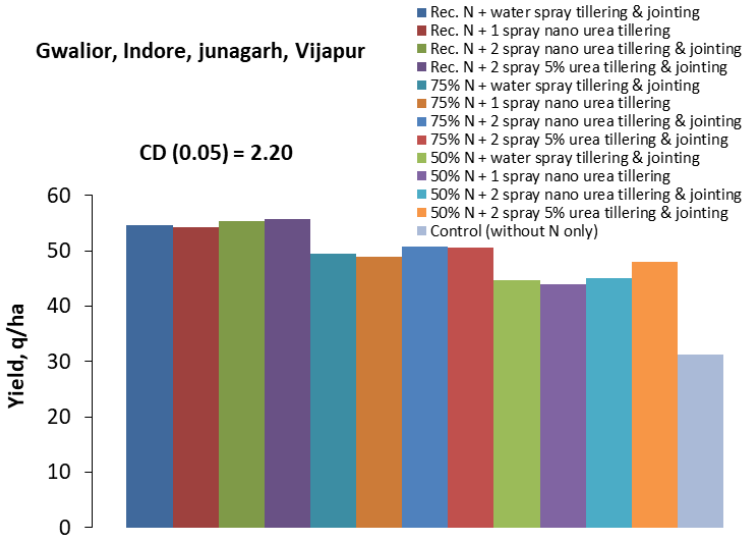

Fig. 16. Effect of nano urea on productivity of wheat under irrigated condition in CZ

In PZ, this experiment was conducted at three locations (Dharwad, Niphad and Pune). Recommended N and two spray of nano urea at tillering and jointing stage produced the

maximum grain yield of 48.73 q/ha (Fig. 17). However, the grain yield with recommended N and two spray of urea (5%) at tillering and jointing stage was (48.07 q/ha) which was at par to two spray of nano urea. The addition of two spray of nano urea at tillering and joinitng stage with recommended N fertilization brought an increase of 11.07% in grain yield over base treatment.

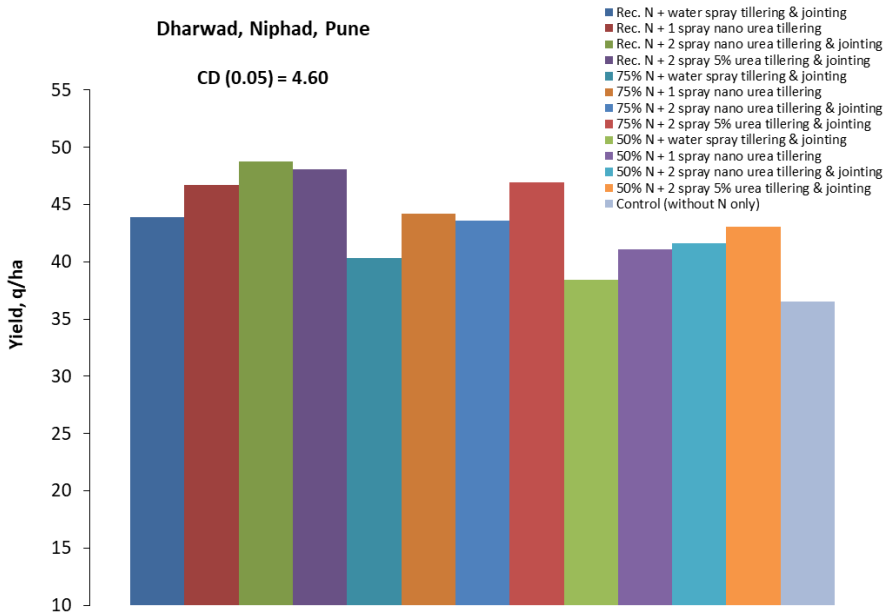

Fig. 17. Effect of nano urea on productivity of wheat under irrigated condition in PZ

SPL- 3: Wheat productivity with nano urea under restricted irrigation

This experiment was conducted to explore the possibility of maximizing wheat productivity through sole and integrated use of nano urea with recommended N under restricted irrigation. The experiment was conducted in randomised complete block design with nine treatments viz. control (no N), control + nano urea spray (one and two), recommended N (Rec. N), rec. N + one (at tillering) and two spray (tillering and jointing) of nano urea and urea (5%) and Rec. N + one spray of nano urea at tillering + one spray of urea (5%) at jointing stage. One third nitrogen as per treatment was applied as basal dose and the remaining 2/3rd nitrogen at CRI stage of wheat. Weed control measures were followed as per recommended package of practices for the concerned zone.

In NHZ, this trial was conducted at two locations namely Bajaura and Malan. The pooled data revealed that significantly highest wheat grain yield (41.06 q/ha) was obtained by applying recommended dose of N along with spray of urea (5%) + nano urea at tillering stage (Fig. 18). Also, compared to recommended N, one or two spray of either nano urea or urea did not significantly improve the grain yield.

In NWPZ, this experiment was conducted at three locations (Hisar, Karnal and Pantnagar). The perusal of pooled analysis data presented in Fig. 19 showed that application of

recommended N {Rec N (1/3rd basal, 2/3rd CRI)} and two spray of 5% urea at tillering and jointing stage produced the maximum grain yield of 51.47 q/ha and it was statistically at par with recommended N and one spray of 5% urea + one spray of nano urea at tillering stage(49.57 q/ha) but was significantly superior to rest of the treatments.

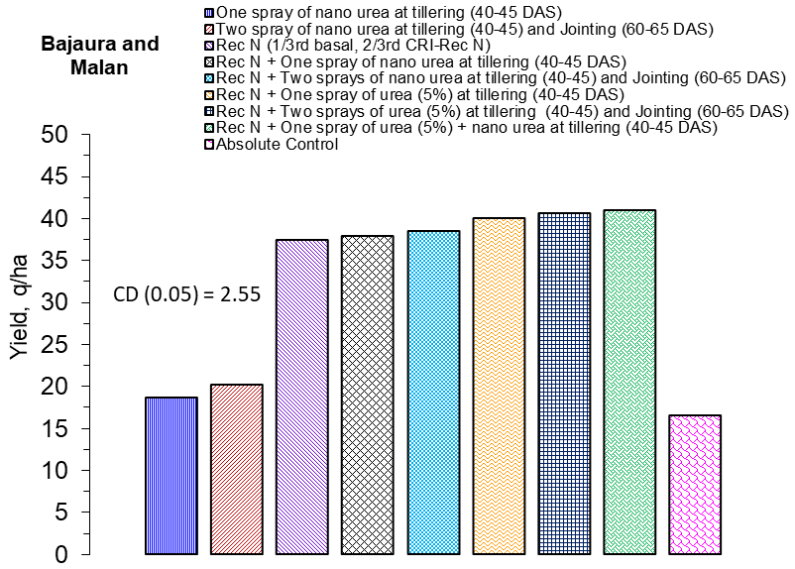

Fig. 18. Effect of nano urea on wheat productivity under restricted irrigation in NHZ

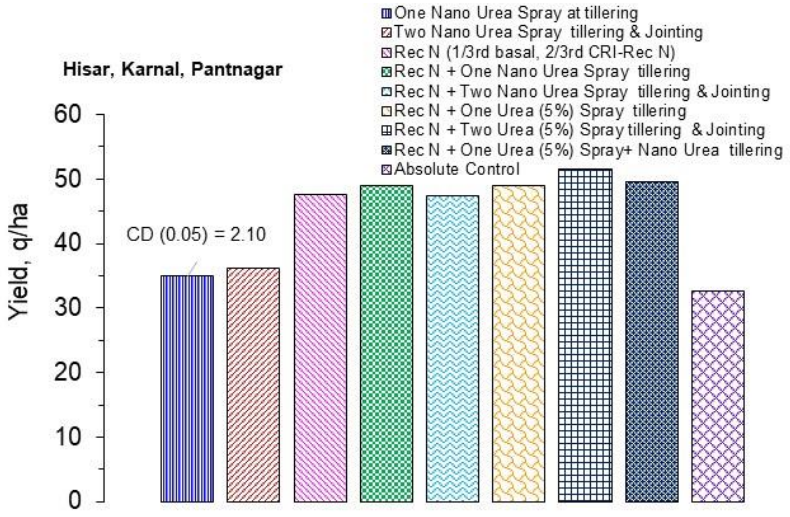

Fig. 19. Effect of nano urea on wheat productivity under restricted irrigation in NWPZ

In NEPZ, this experiment was conducted at four locations (Burdwan, Kanpur, RPCAU PUSA and Shillongani). The maximum grain yield (45.24 q/ha) was obtained under recommended N Dose + two spray of urea (5%) at tillering & jointing stage treatment and it was significantly higher than all treatments except Rec. N + one spray of urea (5%) at tillering + one spray of nano urea at jointing stage (Fig. 20).

In CZ, this experiment was conducted at four locations (Gwalior, Indore, Udaipur and Vijapur). The perusal of pooled analysis data presented in Fig. 21 showed that application of

recommended N (1/3rd basal, 2/3rd CRI) and two spray of nano urea at tillering & jointing stage produced the maximum grain yield of 42.4 q/ha. It was statistically at par with Rec N + one urea (5%) + nano urea spray at tillering, Rec N + two urea (5%) spray at tillering & jointing and Rec N + one urea (5%) spray at tillering but was significantly superior to rest of the treatments.

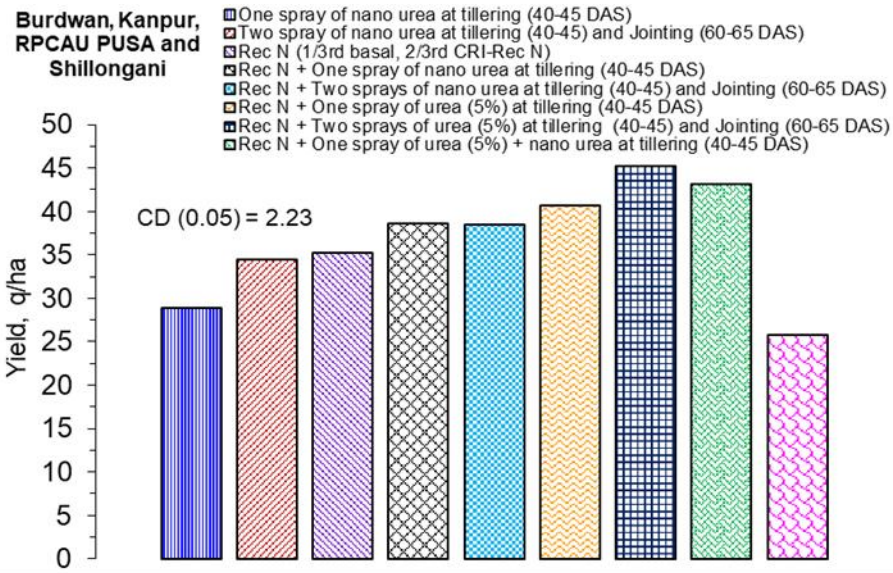

Fig. 20. Effect of nano urea on productivity of wheat under restricted irrigation in NEPZ

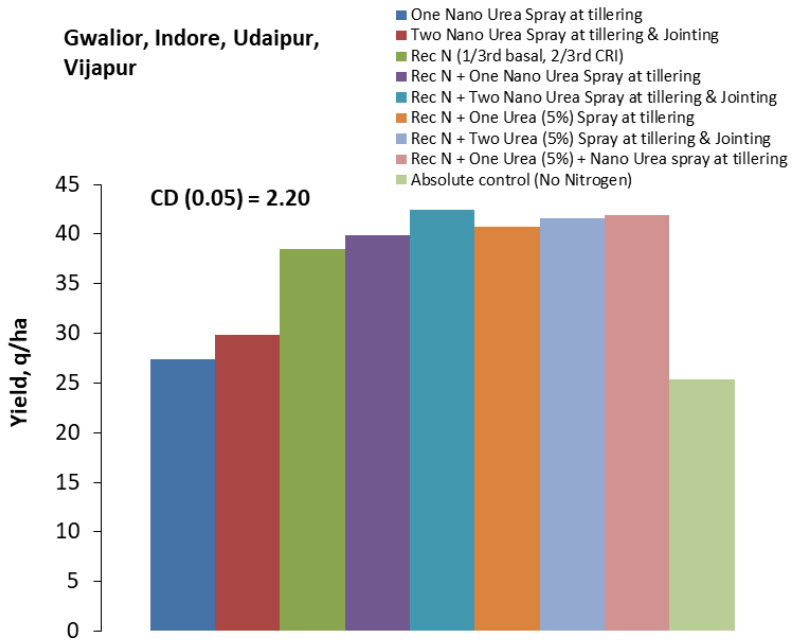

Fig. 21.Effect of nano urea on wheat productivity under restricted irrigation in CZ

SPL-4: Agronomic interventions for quality enhancement in wheat

This trial was conducted with an objective to enhance quality of wheat varieties by foliar spray of sulphur (S), nitrogen (N), zinc (Zn), potash (K) and their combinations. The experiment was

conducted with four genotypes (HD 3226, HI 1544, DBW 187, and PBW 1 Zn) and six combinations of foliar fertilization having split plot design and three replications.

In NWPZ, this trial was conducted at four centres (Gurdaspur, Hisar, Ludhiana and Pantnagar). The pooled analysis of data presented in Fig. 22 revealed that the maximum mean grain yield (60.03 q/ha) was produced under the treatment of 2% urea spray, which remained statistically significant over all other treatments. Among varieties, DBW187 produced the maximum and significantly higher grain yield (60.28 q/ha) than all the other varieties. Maximum iron (Fe) content (40.99 ppm) and Zn (36.62 ppm) were recorded in PBW 1 Zn genotype. However, there was no significant difference due to varieties. The foliar fertilization produced significant effect on Zn content of the grains (Fig. 23). Among foliar sprays, maximum zinc content (38.40 ppm) was observed in treatment of foliar fertilization Zn followed by the treatment of S (38.83 ppm). Maximum protein content (11.99%) was recorded in genotype HD 3226. Among foliar

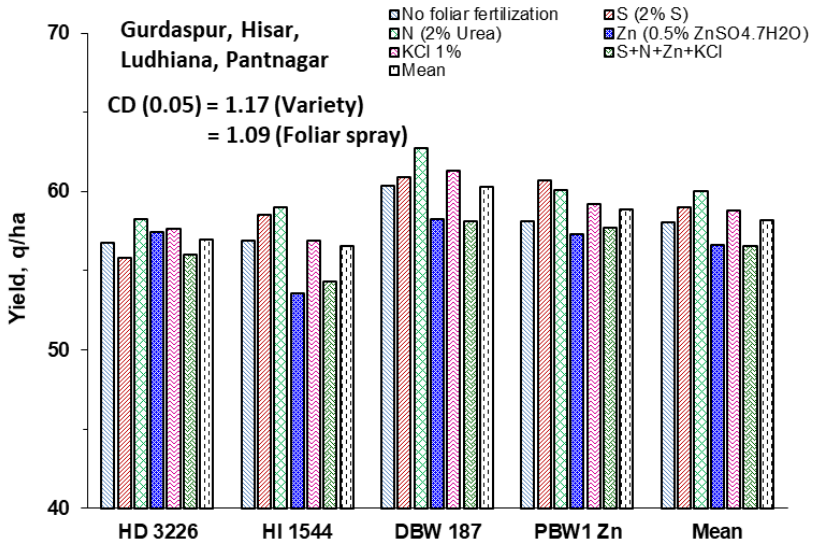

Fig. 22. Effect of foliar spray of nutrients on wheat yield in NWPZ

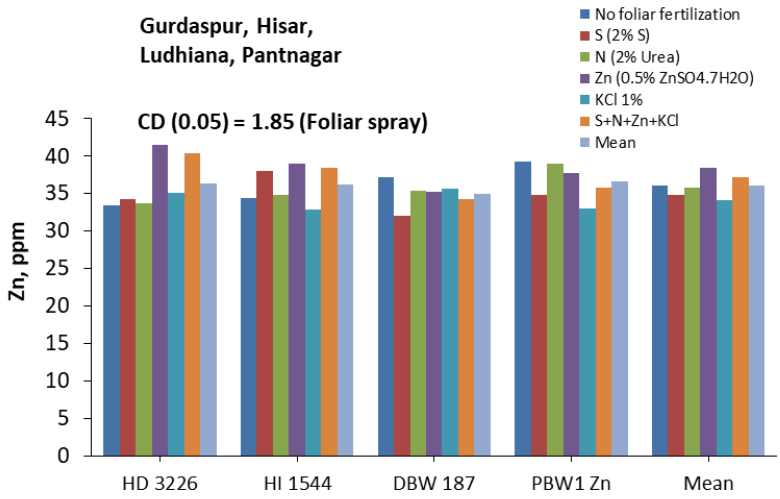

Fig. 23. Effect of foliar spray of nutrients on Zn content of wheat in NWPZ

fertilization, maximum protein was recorded in 2% urea application, which was at par with all the treatments except 1% KCl spray.

SPL- 5: Effect of NPK solubilizing microbial consortium on wheat productivity

In NWPZ, this experiment was conducted at four centres viz., Gurdaspur, Hisar, Jammu and Ludhiana. The pooled data of all the four centres presented in Fig. 24 showed that the maximum grain yield of 52.27 q/ha was recorded with 100% NPK + seed treatment with Bio NPK @2.5 ml/kg followed by 51.98 q/ha with 100% NPK + seed treatment with Bio Grow @2.5 ml/kg. The seed treatment with either Bio NPK @2.5 ml/kg or Bio Grow @ 2.5 ml/kg seed brought about significant improvement in grain yield only under control (no NPK) treatments.

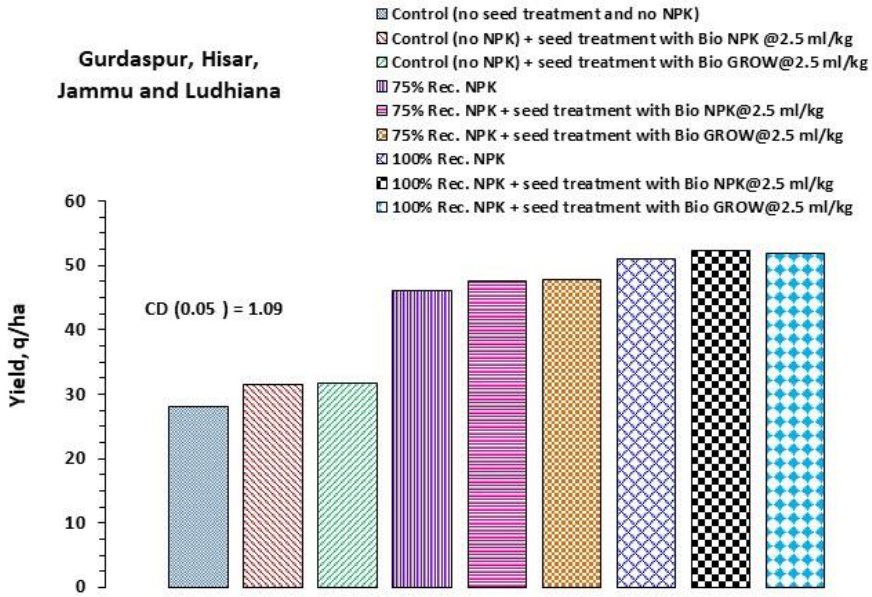

Fig. 24. Wheat productivity under NPK solubilizing microbial consortium in NWPZ

In NEPZ, this experiment was conducted at two locations (RPCAU PUSA and Varanasi). The maximum grain yield (41.63 q/ha) was obtained under 100% recommended NPK + seed treatment with Bio GROW @ 2.5 ml/kg which was at par to 100% recommended NPK + seed treatment with Bio NP @ 2.5 ml/kg but significantly higher than all other treatments (Fig. 25).

In CZ, this experiment was conducted at three centres *viz.,* Indore, Junagarh and Vijapur. The pooled data analysis showed that the maximum grain yield of 54.2 q/ha was recorded with 100% Rec NPK + seed treatment with Bio GROW @ 2.5 ml/kg (Fig. 26). It was followed by 100% recommended NPK (53.1 q/ha) and 100% recommended NPK + seed treatment with Bio NPK @2.5 ml/kg (52.5 q/ha) which were significantly superior to all other treatments.

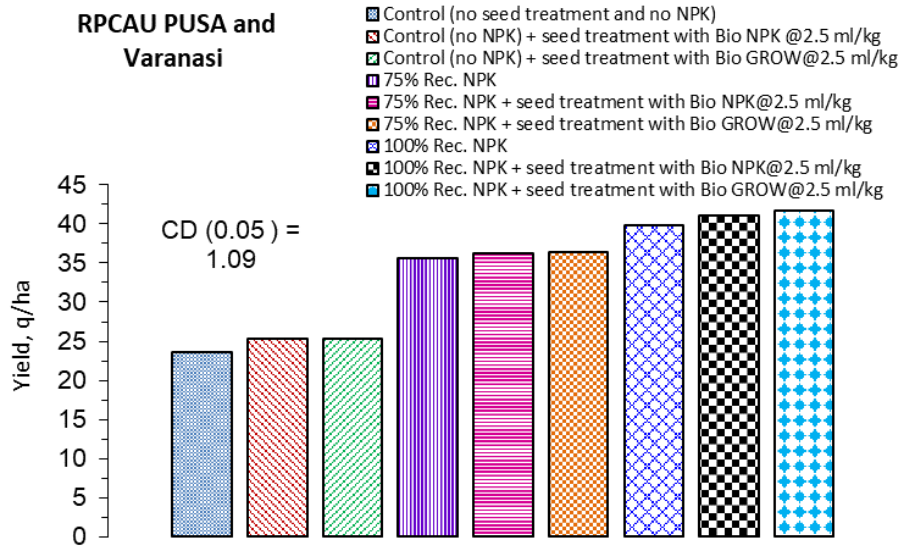

Fig. 25 Effect of NPK solubilizing microbial consortium on wheat productivity in NEPZ

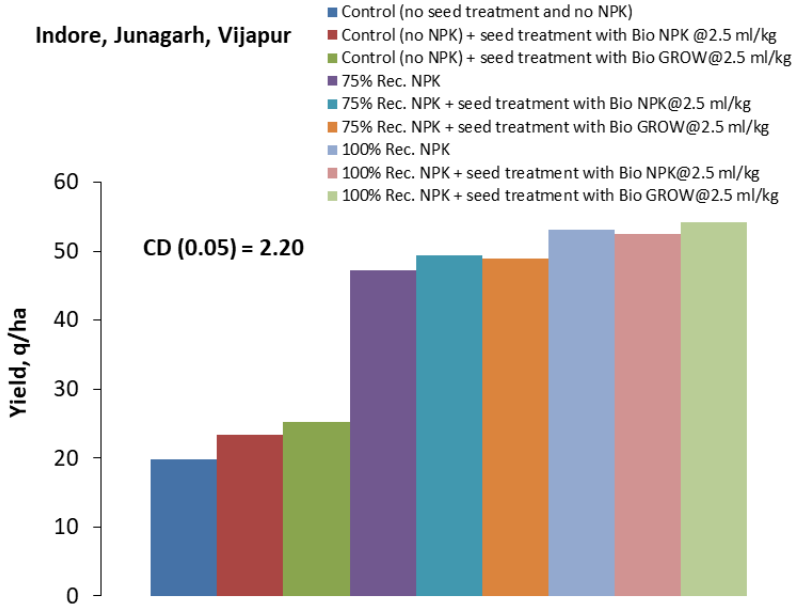

Fig. 26.Wheat productivity under NPK solubilizing microbial consortium in CZ

Barley

- **Productivity enhancement of barley through nitrogen and zinc scheduling:**

  This trial was conducted with the aim of enhancing the barley productivity through nitrogen scheduling and foliar application of urea and zinc at five locations (Agra, Durgapura, Hisar, Karnal and Ludhiana). Three year results revealed that the maximum grain yield was recorded to be 51.42 q/ha with recommended nitrogen (half at basal + half at tillering) and foliar spray of 5% urea + 0.5% $ZnSO_4.7H_2O$ at anthesis stage. However, similar yield (50.96 q/ha) was obtained with treatment having half rec nitrogen applied at basal+1/4 at tillering (35-40 DAS) +5.0% urea + 0.5% ZnSO4.7H2O spray at flag leaf (65-70DAS) and

5% urea spray at anthesis stage (80-90DAS). These treatments registered 8.6-9.5% increase in grain yield as compared to rec. N.

- **Enhancing nutrient use efficiency through nano urea in barley:** This trial was conducted at five locations in NWPZ, three in NEPZ, one in CZ and two in NHZ to optimise nano nitrogen dose for barley using different combinations of nano urea. The grain yield increased with increase in nitrogen level. The maximum productivity (52.08 q/ha) of barley was recorded with rec. N level. The foliar application of different combination of nano urea with rec. N did not produce any significant effect on grain yield. The productivity at 75% RDF + nano urea and RDF were at par in CZ and NHZ.

- **Sowing method and seed rate on barley productivity**: This trial was conducted at five locations in NWPZ (Agra, Hisar, Ludhiana, Karnal and Durgapura) in split plot design. The results revealed that barley productivity was similar with normal sowing and paired row method. The grain yield with 100 kg seed/ha and 87.5 kg seed rate/ha were at par but superior to 75 kg seed rate/ha, thereby suggesting a savings of 12.5 kg seed/ha.

North Western Plains Zone

In the North Western Plains Zone, the areas covered are the states of Haryana, Punjab, Delhi, Western UP, part of Rajasthan and Jammu area of J&K. Ten centres in this zone namely Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar and Sriganganagar are actively engaged in wheat research activities under All India Coordinated Wheat and Barley Improvement Project (AICW&BIP). The data on soil and various meteorological parameters for various centres are given in Annexure-II and Annexure-III, respectively. Soils of this zone are sandy loam to loam. The soil organic carbon at various locations varied from 0.24% at Durgapura to 0.70% at Pantnagar. Soils of this zone are low in available nitrogen, medium to high in available phosphorus and potash. The maximum rainfall was received at Jammu (223.4 mm) followed by Ludhiana (150.2 mm), Gurdaspur (147.1 mm), Karnal (139.6 mm), Pantnagar (137.4 mm), Agra (108.3 mm), Sriganganagar (47.8 mm), Delhi (27.5 mm) and the lowest amount of rain (26.9 mm) during the wheat crop season 2022-23 was received at Hisar. The maximum and minimum temperatures at different locations were 35.4 ºC and 4.6 ºC at Agra, 32.3 ºC and 3.6 ºC at Delhi, 35.3ºC and 3.6ºC at Gurdaspur, 37.4 ºC and 3.6 ºC at Hisar, 35.1 ºC and 3.9 ºC at Jammu, 36.3 ºC and 4.5 ºC at Karnal, 36.1 ºC and 4.3 ºC at Ludhiana, 34.9 ºC and 6.0 ºC at Pantnagar, 37.4 ºC and 4.6 ºC at Sriganganagar, respectively. In this zone two coordinated trials were conducted to evaluate second year AVT genotypes for different growing conditions at various locations.

EVALUATION UNDER DIFFERENT GROWING CONDITIONS

The performance of genotypes was evaluated for sowing time and restricted irrigation conditions at different locations and the results are summarized here as under;

Irrigated Timely Sown

The performance of one *aestivum* test entry HD 3386 against five checks (HD 3086, DBW 322, HD 2967, DBW 187 and PBW 826) was evaluated at ten centres *i.e.* Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar and Sriganganagar under timely and late sown conditions. For pooled analysis data of eight centres were considered and Durgapura and Jammu centres data were not included due to low centre mean yield and improper data, respectively. The timely sowing time was from 5th to 11th November and late sowing was from 10th to 16nd December. The trial was laid out in a split plot design with sowing time in main and genotypes in sub plots with three replications. The sowing was done using the normalized (adjusted considering 1000 grains weight of 38 g) seed rate of 100 kg/ha at a row-to-row spacing of 20 cm. Nitrogen was applied in three splits

(1/3rd at sowing and remaining 2/3rd nitrogen as 1/3rd at first irrigation *i.e.* at 20-25 days after sowing and 1/3rd at second irrigation *i.e.* 40-45 days after sowing), whereas full phosphorus and potash was applied as basal.

The centrewise yield and zonal mean yield are given in Table 2.1. The pooled data are presented in Table 2.2 and the centrewise data are in Annexure-1 as Tables 2.2.1 to 2.2.10. The perusal of pooled data in Table 2.1 and 2.2 revealed that there was a significant decline in yield from normal (59.63 q/ha) to late (46.48 q/ha) sown condition. This yield reduction was due to significant reduction in earhead/m^2, grains/earhead and thousand grain weight under late sown conditions. Yield decline in late sown condition was 22.1% as compared to timely sown condition. On average basis, the test entry HD 3386 ranked 1st with mean yield of 55.38 q/ha and second-best yielder was recently identified check variety PBW 826 (I) (C) with a mean yield of 54.89 q/ha. PBW 826 (I) (C) produced the highest yield of 62.34 q/ha under timely sown conditions whereas, under late sown conditions HD 3386 produced the highest yield of 49.27 q/ha. On mean basis test entry HD 3386 recorded the maximum earhead density (393/m^2) and 1000 grain weight 42.62 g). The interaction effect was non-significant for yield and yield attributes except 1000 grains weight. The centre wise data are presented in Tables 2.2.1 to 2.2.10 in Annexure-I.

Restricted Irrigation

The restricted irrigation trial was conducted with the objective to evaluate one *aestivum* test entry WH 1402 against six checks (HD 3369, DBW 296, HI 1653, PBW 644, NIAW 3170 and HI 1654) at ten locations (Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar and Sriganganagar). For pooled analysis eight centres data were considered while Durgapura and Sriganganagar centres' data were not included due to low centre mean yield and improper data, respectively. The trial was laid out in a split plot design with number of irrigations in main and genotypes in sub plots with three replications. The sowing was done using the normalized (adjusted considering 1000 grains weight as 38 g) seed rate of 100 kg/ha at a row-to-row spacing of 20 cm. Nitrogen, phosphorus and potash (90:60:40 kg N, P_2O_5 and K_2O) were applied as full basal was applied in I_1 treatment *i.e.* no irrigation, whereas 1/3 N and full phosphorus and potash was applied as basal at sowing and remaining 2/3 nitrogen at first irrigation *i.e.* at 20-25 days after sowing in I_2 and I_3 treatments. The pooled analysis is presented in Table 2.2 and the centre wise data are in Annexure-I in Tables 2.2.1 to 2.2.10.

The centrewise yield and zonal mean yield are presented in Table 2.3. The perusal of pooled data in Table 2.4 indicates that increasing the irrigation level significantly increased the grain yield, earhead/m^2, grains/earhead and thousand grain weight. Significantly higher grain yield

Table 2.1. North Western Plain Zone		**IR-DOS-TAS**			**Centrewise**	**Yield, q/ha**				**2022-23**
Sowing Time	Genotype	**Agra**	**Delhi**	**Gurdaspur**	**Hisar**	**Karnal**	**Ludhiana**	**Pantnagar**	**Sriganganagar**	**Zonal mean**
Timely	PBW 826 (I) (C)	52.22	63.67	67.13	65.83	63.77	67.83	58.16	60.07	62.34
	HD 3386	60.66	56.87	65.60	60.87	63.17	68.28	58.79	57.76	61.50
	HD 3086 (C)	59.32	52.87	58.68	46.77	56.90	58.64	49.27	60.61	55.38
	DBW 222 (C)	51.30	57.27	60.63	62.95	65.32	69.72	54.56	62.46	60.53
	HD 2967 (C)	61.99	62.97	62.50	45.32	56.39	61.67	44.43	62.54	57.22
	DBW 187 (C)	58.33	55.10	68.04	56.07	63.37	68.03	50.27	67.08	60.79
	Mean	57.30	58.12	63.76	56.30	61.49	65.69	52.58	61.75	59.63
Late	PBW 826 (I) (C)	44.38	54.07	53.08	54.26	53.41	43.83	42.84	33.66	47.44
	HD 3386	51.63	50.83	57.36	53.18	54.37	54.81	42.39	29.59	49.27
	HD 3086 (C)	49.47	49.93	55.32	41.38	40.75	48.36	34.09	25.06	43.05
	DBW 222 (C)	43.19	49.63	62.06	55.12	55.63	52.22	43.07	25.47	48.30
	HD 2967 (C)	54.26	48.30	55.58	33.49	46.87	43.14	34.71	33.97	43.79
	DBW 187 (C)	47.95	48.80	57.04	46.88	52.54	50.36	40.88	31.66	47.01
	Mean	48.48	50.26	56.74	47.38	50.60	48.79	39.66	29.90	46.48
Mean	PBW 826 (I) (C)	48.30	58.87	60.10	60.05	58.59	55.83	50.50	46.87	54.89
	HD 3386	56.15	53.85	61.48	57.02	58.77	61.54	50.59	43.67	55.38
	HD 3086 (C)	54.40	51.40	57.00	44.08	48.83	53.50	41.68	42.83	49.21
	DBW 222 (C)	47.25	53.45	61.34	59.03	60.48	60.97	48.82	43.97	54.41
	HD 2967 (C)	58.13	55.63	59.04	39.40	51.63	52.40	39.57	48.25	50.51
	DBW 187 (C)	53.14	51.95	62.54	51.48	57.96	59.19	45.58	49.37	53.90
	Mean	52.89	54.19	60.25	51.84	56.04	57.24	46.12	45.83	53.05
CD (0.05)	Sowing (A)	0.50	NS	4.38	2.70	3.11	2.26	1.65	1.48	0.70
	Variety (B)	1.29	2.72	NS	2.54	1.75	4.23	2.65	1.14	1.06
	B within A	NS	3.85	NS	NS	2.48	NS	NS	1.62	NS
	A within B	NS	5.15	NS	NS	2.91	NS	NS	1.72	NS
Date of Sowing:	Timely	08.11.2022	08.11.2022	10.11.2022	11.11.2022	11.11.2022	05.11.2022	05.11.2022	05.11.2022	
	Late	16.12.2022	16.12.2022	10.12.2022	12.12.2022	16.12.2022	12.12.2022	13.12.2022	15.12.2022	
Date of Harvesting:	Timely	11.04.2023	11.04.2023	21.04.2023	16.04.2023	07.04.2023	26.04.2023	11.04.2023	18.04.2023	
	Late	13.04.2023	13.04.2023	30.04.2023	21.04.2023	17.04.2023		24.04.2023	29.04.2023	

Table 2.2. North Western Plain Zone	IR-DOS-TAS				Pooled	2022-23
Variety	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
PBW 826 (I) (C)	62.34	1	47.44	3	54.89	2
HD 3386	61.50	2	49.27	1	55.38	1
HD 3086 (C)	55.38	6	43.05	6	49.21	6
DBW 222 (C)	60.53	4	48.30	2	54.41	3
HD 2967 (C)	57.22	5	43.79	5	50.51	5
DBW 187 (C)	60.79	3	47.01	4	53.90	4
Mean	59.63		46.48		53.05	
	Sowing (A)	Variety (B)		B within A		A within B
CD (0.05)	0.70	1.06		NS		NS
			Earhead/sq.m.			
PBW 826 (I) (C)	410	3	361	5	386	4
HD 3386	415	2	370	2	393	1
HD 3086 (C)	406	5	373	1	389	3
DBW 222 (C)	407	4	360	6	384	5
HD 2967 (C)	403	6	363	4	383	6
DBW 187 (C)	416	1	368	3	392	2
Mean	410		366		388	
	Sowing (A)	Variety (B)		B within A		A within B
CD (0.05)	6.04	NS		NS		NS
			Grains/earhead			
PBW 826 (I) (C)	36.11	4	33.57	6	34.84	4
HD 3386	33.44	6	34.41	4	33.92	6
HD 3086 (C)	34.30	5	35.06	3	34.68	5
DBW 222 (C)	37.39	1	36.87	1	37.13	1
HD 2967 (C)	37.25	2	35.35	2	36.30	2
DBW 187 (C)	36.35	3	34.26	5	35.31	3
Mean	35.81		34.92		35.36	
	Sowing (A)	Variety (B)		B within A		A within B
CD (0.05)	0.82	1.48		NS		NS
			1000 grains weight, g			
PBW 826 (I) (C)	43.71	2	39.55	2	41.63	2
HD 3386	45.59	1	39.64	1	42.62	1
HD 3086 (C)	41.07	4	34.68	6	37.88	5
DBW 222 (C)	40.66	5	37.04	4	38.85	4
HD 2967 (C)	38.99	6	35.29	5	37.14	6
DBW 187 (C)	41.50	3	38.16	3	39.83	3
Mean	41.92		37.39		39.66	
	Sowing (A)	Variety (B)		B within A		A within B
CD (0.05)	1.41	1.09		1.86		1.87
Centres: Agra, Delhi, Gurdaspur, Hisar, Karnal, Ludhiana, Pantnagar and Sriganganagar						

of 49.91 q/ha was obtained with two irrigations as compared to zero and one irrigations levels. Increasing irrigation level enhanced the grain yield mainly due to significant increase in earhead density, grains/earhead and thousand grain weight except grains/earhead at two irrigation level compared to one irrigation. The test entry WH 1402 produced an average yield of 43.60 q/ha, which was at par with all the check varieties except PBW 644. However, test entry ranked first for grain yield at zero and one irrigation level. The interaction effect was non-significant for yield and yield attributes except tiller density. HI 1653 (I) (C) had bolder grains. The centre wise data are presented in Tables 2.4.1 to 2.4.10 in Annexure-I.

Table 2.3. North Western Plain Zone		RIR-TS-TAS			Centrewise		Yield, q/ha			2022-23
Irrigation	Genotype	**Agra**	**Delhi**	**Gurdaspur**	**Hisar**	**Jammu**	**Karnal**	**Ludhiana**	**Pantnagar**	**Zonal mean**
Zero	HD 3369 (I) (C)	29.35	34.35	53.45	31.06	42.30	26.62	23.29	25.80	33.28
	DBW 296 (C)	28.32	34.52	53.78	34.56	42.14	25.19	24.28	29.19	34.00
	HI 1653 (I) (C)	29.92	29.29	54.33	36.34	43.50	30.79	22.06	27.23	34.18
	PBW 644 (C)	24.48	34.35	53.62	31.39	41.37	26.25	25.21	24.19	32.61
	WH 1402	27.14	32.24	53.32	39.21	44.64	25.46	21.39	31.78	34.40
	NIAW 3170 (C)	25.54	30.95	53.75	34.32	42.07	24.17	26.32	30.69	33.48
	HI 1654 (I) (C)	23.52	35.20	52.46	35.75	44.25	22.04	25.32	33.35	33.99
	Mean	26.90	32.99	53.53	34.66	42.89	25.79	23.98	28.89	33.70
One	HD 3369 (I) (C)	44.28	39.97	61.48	44.70	43.07	44.86	42.06	47.98	46.05
	DBW 296 (C)	42.67	39.29	57.69	43.03	42.43	43.33	44.24	48.16	45.10
	HI 1653 (I) (C)	46.23	41.19	60.32	46.94	44.72	44.44	41.57	45.42	46.36
	PBW 644 (C)	40.49	43.37	57.38	41.97	42.26	43.29	39.95	50.10	44.85
	WH 1402	41.80	42.86	58.77	46.46	46.17	44.26	42.52	50.35	46.65
	NIAW 3170 (C)	41.63	38.10	59.63	45.78	42.33	43.66	43.38	47.59	45.26
	HI 1654 (I) (C)	39.01	41.19	58.66	45.03	44.65	45.32	44.19	53.14	46.40
	Mean	42.30	40.85	59.13	44.85	43.66	44.17	42.56	48.96	45.81
Two	HD 3369 (I) (C)	51.58	53.91	59.61	49.63	44.01	48.43	48.73	51.80	50.96
	DBW 296 (C)	49.97	52.21	57.97	50.07	43.35	47.87	46.33	53.47	50.16
	HI 1653 (I) (C)	54.15	51.56	59.77	50.64	45.36	48.06	45.14	54.13	51.10
	PBW 644 (C)	45.93	45.07	58.98	47.62	44.06	46.46	46.04	51.09	48.16
	WH 1402	47.66	46.77	58.73	51.26	47.92	47.41	47.29	51.08	49.77
	NIAW 3170 (C)	46.24	48.30	58.31	50.34	43.10	48.47	48.50	50.70	49.24
	HI 1654 (I) (C)	45.05	50.00	59.70	48.71	46.46	48.33	47.23	54.62	50.01
	Mean	48.65	49.69	59.01	49.75	44.89	47.86	47.04	52.41	49.91
Mean	HD 3369 (I) (C)	41.74	42.74	58.18	41.80	43.13	39.97	38.02	41.86	43.43
	DBW 296 (C)	40.32	42.01	56.48	42.55	42.64	38.80	38.28	43.60	43.09
	HI 1653 (I) (C)	43.43	40.68	58.14	44.64	44.52	41.10	36.26	42.26	43.88
	PBW 644 (C)	36.97	40.93	56.66	40.33	42.56	38.67	37.07	41.79	41.87
	WH 1402	38.87	40.62	56.94	45.65	46.24	39.04	37.07	44.40	43.60
	NIAW 3170 (C)	37.80	39.12	57.23	43.48	42.50	38.77	39.40	42.99	42.66
	HI 1654 (I) (C)	35.86	42.13	56.94	43.16	45.12	38.56	38.91	47.04	43.47
	Mean	39.28	41.18	57.22	43.09	43.82	39.27	37.86	43.42	43.14
CD (0.05)	Sowing (A)	1.10	2.27	7.33	1.98	1.92	2.78	9.17	4.89	1.03
	Variety (B)	1.35	NS	NS	1.83	2.75	NS	NS	2.73	1.04
	B within A	NS	NS	NS	NS	NS	NS	NS	NS	NS
	A within B	NS	NS	NS	NS	NS	NS	NS	Ns	NS
Date of Sowing:		05.11.2022	04.11.2022	05.11.2022	31.10.2022	27.10.2022	01.11.2022	28.10.2022	29.10.2022	
Date of Harvesting:		31.03.2023	27.03.2023	24.04.2023	04.04.2023	10.04.2023	18.04.2023	12.04.2023	08.04.2023	

Table 2.4. North Western Plain Zone	RIR-TS-TAS				Pooled		2022-23	
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	33.28	6	46.05	4	50.96	2	43.43	4
DBW 296 (C)	34.00	3	45.10	6	50.16	3	43.09	5
HI 1653 (I) (C)	34.18	2	46.36	3	51.10	1	43.88	1
PBW 644 (C)	32.61	7	44.85	7	48.16	7	41.87	7
WH 1402	34.40	1	46.65	1	49.77	5	43.60	2
NIAW 3170 (C)	33.48	5	45.26	5	49.24	6	42.66	6
HI 1654 (I) (C)	33.99	4	46.40	2	50.01	4	43.47	3
Mean	33.70		45.81		49.91		43.14	
	Irrigation (A)		Genotype (B)		B within A		A within B	
CD (0.05)	1.03		1.04		NS		NS	
			Earhead/sq.m.					
HD 3369 (I) (C)	306	3	359	4	368	4	344	4
DBW 296 (C)	304	4	362	2	365	6	344	5
HI 1653 (I) (C)	318	1	362	3	363	7	348	3
PBW 644 (C)	295	7	340	7	367	5	334	7
WH 1402	307	2	354	5	391	2	351	2
NIAW 3170 (C)	298	5	351	6	378	3	342	6
HI 1654 (I) (C)	298	6	365	1	395	1	352	1
Mean	304		356		375		345	
	Irrigation (A)		Genotype (B)		B within A		A within B	
CD (0.05)	6.49		8.81		15.25		15.52	
			Grains/earhead					
HD 3369 (I) (C)	28.15	6	31.90	4	33.89	1	31.31	2
DBW 296 (C)	28.35	5	31.02	6	33.59	2	30.99	3
HI 1653 (I) (C)	26.29	7	30.28	7	32.16	4	29.58	7
PBW 644 (C)	29.49	1	33.66	1	32.63	3	31.93	1
WH 1402	28.84	4	32.66	2	31.42	5	30.97	4
NIAW 3170 (C)	29.08	3	32.05	3	31.39	6	30.84	5
HI 1654 (I) (C)	29.34	2	31.31	5	30.54	7	30.40	6
Mean	28.50		31.84		32.23		30.86	
	Irrigation (A)		Genotype (B)		B within A		A within B	
CD (0.05)	0.98		NS		NS		NS	
			1000 grains weight, g					
HD 3369 (I) (C)	39.38	6	41.98	2	42.30	5	41.22	6
DBW 296 (C)	40.12	2	41.13	6	42.72	3	41.32	4
HI 1653 (I) (C)	42.62	1	44.37	1	46.24	1	44.41	1
PBW 644 (C)	38.11	7	40.19	7	41.21	7	39.84	7
WH 1402	40.02	3	41.84	3	42.23	6	41.36	3
NIAW 3170 (C)	39.45	5	41.54	5	42.69	4	41.22	5
HI 1654 (I) (C)	39.54	4	41.72	4	42.92	2	41.40	2
Mean	39.89		41.82		42.90		41.54	
	Irrigation (A)		Genotype (B)		B within A		A within B	
CD (0.05)	0.57		0.62		NS		NS	

Centres: Agra, Delhi, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana and Pantnagar

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North Eastern Plains Zone

The North Eastern Plains Zone (NEPZ) is the second most important wheat growing zone of the country consisting of Assam, Bihar, Jharkhand, Orissa, eastern parts of UP and West Bengal. Eleven centres namely Ayodhya, Burdwan, Coochbehar, IARI Pusa Bihar, Kalyani, Kanpur, Ranchi, RPCAU Pusa, RAU Sabour, Shillongani and Varanasi are actively involved in coordinated research activities. Soils of this zone are sandy to clay loam having organic carbon contents varying from 0.31 per cent at Kanpur to 1.15 per cent at Shillongani. The soils of this zone are low in available nitrogen, medium in available phosphorus and potash. Wheat production and productivity in this zone are more dependent on weather conditions during the crop season. The temperature is an important factor affecting the wheat productivity. Rainfall received varied from 11.4 mm at Ranchi to 351.4 mm at Shillongani during the wheat season starting from November 2022 to April, 2023. The rainfall (November to April) received in decreasing order was Shillongani (351.4 mm) followed by Sabour (204 mm), Kanpur (144.3 mm), Burdwan (110.2 mm), Varanasi (105.8 mm), Coochbehar (14.9 mm) and Ranchi (11.4 mm). The maximum and minimum temperatures at different locations from November to April were 41.4 ºC and 10.4 ºC at Burdwan, 31.3 ºC and 6.7 ºC at Coochbehar, 39.6 ºC and 4.1 ºC at Kanpur, 38.1 ºC and 3.6 ºC at Ranchi, 40.4 ºC and 5.0 ºC at Sabour, 33.2ºC and 9.9 ºC at Shillongani and 38.1 ºC and 4.8 ºC at Varanasi, respectively.

EVALUATION UNDER DIFFERENT GROWING CONDITIONS

The performance of test genotypes was evaluated under irrigated timely sown conditions at different locations and the results are summarized here under;

Irrigated Timely Sown

One test entry HD 3388 was evaluated against six checks viz. HD 3249 (c), HD 3086 (c), PBW 826 (I)(c), DBW 222 (c), DBW 187 (c) and HD 2967 (c) at nine locations (Ayodhya, Coochbehar, Kalyani, Kanpur, Ranchi, RPCAU Pusa, Sabour, Shillongani and Varanasi) under timely (5th November to 11th November) and late (10th December to 16th December) sown conditions. The trial was conducted in split plot design with dates of sowing in main plots and genotypes in sub plots. The sowing was done using the normalized (adjusted considering 1000 grains weight of 38 g) seed rate of 100 kg/ha at a row-to-row spacing of 20 cm. Nitrogen was applied in three splits (1/3rd at sowing, 1/3rd at first irrigation i.e. at 20-25 days after sowing and 1/3rd at second irrigation i.e. 40-45 days after sowing), whereas full phosphorus and potash was applied as basal. During the pooled analysis, the data of RPCAU Pusa, Sabour and Shillongani centres were not considered due to low mean yield.

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The centrewise yield and zonal mean yield are shown in Table 3.1. The pooled data are presented in Table 3.2 and the centre wise data are in Annexure-I as Tables 3.2.1 to 3.2.9. Timely sowing registered higher yield of all genotypes compared to late sowing and on mean basis, yield declined by 15.3% when sowing was delayed from timely to late sowing condition. The yield decline was due to significant reduction in 1000 grains weight under late sown condition as compared to timely sown condition. On mean basis, the check variety PBW 826 was the highest yielder (49.31 q ha^{-1}) and recorded significantly higher grain yield compared to all checks and the test entry HD 3388. The check variety PBW 826 also recorded the maximum effective tillers/m^2 (386) under timely sown. The maximum number of grains/earhead were observed for check variety HD 2967 (37.7) followed by DBW 187 (36.6) and DBW 222 (36.5) under timely sown condition. The test entry HD 3388 produced the boldest grains having mean 1000 grains weight of 40.32 g under timely sown condition. Whereas, under late sown conditions check variety DBW 187 had the boldest grains (37.66 g).

Table 3.1. North Eastern Plains Zone IR-TS-DOS-TAS Centrewise Yield, q/ha 2022-23

Time of Sowing	Genoypes	Ayodhya	Coochbehar	Kalyani	Kanpur	Ranchi	Varanasi	**Zonal mean**
Timely	HD 3388	50.00	55.87	43.89	46.51	67.70	49.40	52.23
	HD 3249 (C)	51.22	40.87	35.56	46.03	65.63	47.58	47.82
	HD 3086 (C)	49.35	38.37	38.69	47.34	59.00	43.21	45.99
	PBW 826 (I)(C)	52.56	59.80	45.79	47.49	66.13	52.17	53.99
	DBW 222 (C)	49.45	43.47	35.32	46.24	60.23	44.83	46.59
	DBW 187 (C)	54.23	48.90	46.29	45.43	59.07	46.58	50.08
	HD 2967 (C)	51.43	62.63	45.64	45.12	63.77	44.09	52.11
	Mean	51.18	49.99	41.60	46.31	63.08	46.84	49.83
Late	HD 3388	46.88	52.20	27.38	35.57	55.83	33.50	41.90
	HD 3249 (C)	45.21	40.37	35.28	36.55	57.33	42.09	42.80
	HD 3086 (C)	47.35	38.33	27.14	35.74	57.87	37.09	40.59
	PBW 826 (I)(C)	45.00	50.20	36.51	36.91	56.80	42.31	44.62
	DBW 222 (C)	47.00	47.17	29.57	36.93	54.23	42.30	42.87
	DBW 187 (C)	49.14	48.27	31.43	36.11	50.87	37.51	42.22
	HD 2967 (C)	45.01	55.17	27.46	37.02	39.03	39.82	40.58
	Mean	46.51	47.39	30.68	36.40	53.14	39.23	42.23
Mean	HD 3388	48.44	54.03	35.64	41.04	61.77	41.45	47.06
	HD 3249 (C)	48.21	40.62	35.42	41.29	61.48	44.83	45.31
	HD 3086 (C)	48.35	38.35	32.92	41.54	58.43	40.15	43.29
	PBW 826 (I)(C)	48.78	55.00	41.15	42.20	61.47	47.24	49.31
	DBW 222 (C)	48.22	45.32	32.45	41.59	57.23	43.57	44.73
	DBW 187 (C)	51.69	48.58	38.86	40.77	54.97	42.04	46.15
	HD 2967 (C)	48.22	58.90	36.55	41.07	51.40	41.95	46.35
	Mean	48.84	48.69	36.14	41.36	58.11	43.03	46.03
CD (0.05)	Sowing (A)	0.54	1.46	0.70	1.33	2.50	3.87	0.48
	Genotype (B)	0.92	3.52	3.10	N.S.	2.94	1.64	1.05
	B within A	1.3	4.98	4.38	N.S.	4.16	2.33	1.49
	A within B	1.25	4.69	4.08	N.S.	4.12	3.14	1.47
Date of Sowing	Timely	11.11.2022	11.11.2022	11.11.2022	11.11.2022	11.11.2022	09.11.2022	
	Late	16.12.2022	10.12.2022	16.12.2022	15.12.2022	10.12.2022	16.12.2022	
Date of Harvesting				09.04.2023	23.04.2023	20.04.2023	08.04.2023	

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Table 3.2.	North Eastern Plains Zone		IR-TS-DOS-TAS		Pooled	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	52.23	2	41.90	5	47.06	2
HD 3249 (C)	47.82	5	42.80	3	45.31	5
HD 3086 (C)	45.99	7	40.59	6	43.29	7
PBW 826 (I)(C)	53.99	1	44.62	1	49.31	1
DBW 222 (C)	46.59	6	42.87	2	44.73	6
DBW 187 (C)	50.08	4	42.22	4	46.15	4
HD 2967 (C)	52.11	3	40.58	7	46.35	3
Mean	49.83		42.23		46.03	
	Sowing (A)		Genotype (B)		B within A	A within B
CD (0.05)	0.48		1.05		1.49	NS
			Earhead/sqm			
HD 3388	383	2	339	3	361	2
HD 3249 (C)	364	4	329	6	346	5
HD 3086 (C)	353	6	331	5	342	6
PBW 826 (I)(C)	386	1	342	2	364	1
DBW 222 (C)	351	7	324	7	337	7
DBW 187 (C)	357	5	353	1	355	4
HD 2967 (C)	373	3	337	4	355	3
Mean	367		336		351	
	Sowing (A)		Genotype (B)		B within A	A within B
CD (0.05)	2.13		7.51		10.62	NS
			Grains/Earhead			
HD 3388	35.2	5	35.4	6	35.3	6
HD 3249 (C)	34.7	7	38.0	3	36.3	4
HD 3086 (C)	34.8	6	36.5	4	35.6	5
PBW 826 (I)(C)	36.1	4	38.2	2	37.2	2
DBW 222 (C)	36.5	3	39.1	1	37.8	1
DBW 187 (C)	36.6	2	33.4	7	35.0	7
HD 2967 (C)	37.7	1	35.7	5	36.7	3
Mean	35.9		36.6		36.3	
	Sowing (A)		Genotype (B)		B within A	A within B
CD (0.05)	N.S.		1.48		2.09	NS
			1000 Grains Weight, g			
HD 3388	40.32	1	36.60	5	38.46	3
HD 3249 (C)	39.28	4	37.39	2	38.33	4
HD 3086 (C)	38.78	5	36.62	4	37.70	5
PBW 826 (I)(C)	39.90	3	37.08	3	38.49	2
DBW 222 (C)	37.64	7	36.32	6	36.98	7
DBW 187 (C)	40.01	2	37.66	1	38.84	1
HD 2967 (C)	38.22	6	35.77	7	36.99	6
Mean	39.16		36.78		37.97	
	Sowing (A)		Genotype (B)		B within A	A within B
CD (0.05)	0.23		0.51		0.72	NS
Centres:	Ayodhya, Coochbehar, Kalyani, Kanpur, Ranchi, Varanasi					

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Central Zone

In central zone, nine centres namely Bilaspur, Dhanduka, Gwalior, Indore, Jabalpur, Junagadh, Powarkheda, Udaipur and Vijapur are actively involved in the coordinated wheat programme of Resource Management during the year 2022-23. The data on soil and various meteorological parameters have been reported under Annexure II and Annexure III, respectively. The soils in this zone vary from sandy loam (Vijapur) to black cotton soils (Dhanduka). Soil was sandy clay loam at Bilaspur and Gwalior, Vertisols at Indore, medium black at Junagadh and clay loam at Udaipur. Soils were neutral to slightly alkaline in reaction (pH: 7.4 to 8.26). Soils of all the centres were low to medium in organic carbon (0.24-0.75 per cent), low to medium available N (125.7-307 kg/ha), low to high phosphorus (12.5-89.25 kg/ha) and high in potassium (248-413 kg/ha) at different locations. The rainfall in this zone during the wheat growing season 2022-23 was recorded as 42.20 mm at Bilaspur, 12.4 mm at Dhanduka, 127.6 mm at Gwalior, 67.7 mm at Indore, 101.0 mm at Jabalpur, 14.8 mm at Junagadh, 128.2 mm at Powarkheda and 115.4 mm at Udaipur. The average maximum and minimum temperatures were 34.54 and 9.63 ºC at Bilaspur, 36.3 and 10.8.0 ºC at Dhanduka, 41.5 and 2.8 ºC at Gwalior, 39 and 6.3 ºC at Indore, 34.4 and 5.2 ºC at Jabalpur, 39.3 and 9.4 ºC at Junagadh, 41.5 and 5.1 ºC at Powarkheda, 38.4 and 3.1 ºC at Udaipur and 40.2 and 10.5 ºC at Vijapur.

EVALUATION UNDER DIFFERENT GROWING CONDITIONS

In this zone, the performance of test genotypes was evaluated under different sowing conditions and restricted irrigation conditions at different locations. High yield potential trial was also conducted to maximize the wheat yield and the results are summarized here as under:

Irrigated Timely Sown

In irrigated timely sown conditions, two test entries (GW 547 and NWS 2194) were evaluated against five check varieties (MACS 6768, HI 1650, GW 513, HI 1636 and GW 322) at seven locations (Bilaspur, Gwalior, Indore, Junagadh, Powarkheda, Udaipur and Vijapur) under timely (12th November to 18th November) and late (03rd December to 09th December) sown conditions. For pooled analysis data of six centres were considered and Bilaspur centre data was not included due to low centre mean yield. The trial was laid out in a split plot design with sowing time in main and genotypes in sub plots with three replications. The sowing was done using the normalized (adjusted considering 1000 grains weight of 38 g) seed rate of 100 kg/ha at a row-to-row spacing of 20 cm. Nitrogen was applied in three splits

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(1/3rd at sowing and remaining 2/3rd nitrogen as 1/3rd at first irrigation i.e. at 20-25 days after sowing and 1/3rd at second irrigation i.e. 40-45 days after sowing), whereas full phosphorus and potash was applied as basal.

The centre wise yield and zonal mean yield are given in Table 4.1. The pooled data are presented in Table 4.2 and the centre wise data are in Annexure-1 as Tables 4.2.1 to 4.2.7. The perusal of pooled data in Table 4.2 revealed that there was a significant decline in yield from normal (51.04 q/ha) to late (43.05 q/ha) sown condition. This yield reduction was due to significant reduction in earhead/m^2 and thousand grain weight under late sown conditions. The grain yield decline in late sown condition was 15.7% as compared to normal sown condition.

On average basis, the test entry GW 547 ranked 4th with mean yield of 46.64 q/ha and the other test entry NWS 2194 ranked 7th with mean yield of 44.27 q/ha. Check variety MACS 6768 (I) (C) yielded of 51.23 q/ha on mean basis which was significantly higher than all other varieties/entries. This also ranked first in timely (55.93 q/ha) as well as late sown (46.54 q/ha) conditions. On mean basis test entry GW 547 recorded maximum tiller density (374). The centre wise data are presented in Tables 4.2.1 to 4.2.7 in Annexure-I.

Restricted Irrigation

The restricted irrigation trial was conducted with the objective to evaluate two test entries DBW 359 and CG 1040 against four checks (MP 3288, DBW 110, HI 1655 and CG 1036,) at five locations (Bilaspur, Gwalior, Indore, Jabalpur and Udaipur). The trial was laid out in a split plot design with number of irrigations in main and genotypes in sub plots with three replications. The sowing was done using the normalized (adjusted considering 1000 grains weight as 38 g) seed rate of 100 kg/ha at a row-to-row spacing of 20 cm. Nitrogen, phosphorus and potash (90:60:40 kg N, P_2O_5 and K_2O) were applied as full basal was applied in I_1 treatment *i.e.* no irrigation, whereas 1/3rd N and full phosphorus and potash was applied as basal at sowing and remaining 2/3rd nitrogen at first irrigation *i.e.* at 20-25 days after sowing in I_2 and I_3 treatments. The pooled analysis is presented in Table 4.4and the centre wise data are in Annexure-I in Tables 4.4.1 to 4.4.5.

The centre wise yield and zonal mean yield are presented in Table 4.3. The perusal of pooled data in Table 4.4 indicates that increasing the irrigation level significantly increased the grain yield, earhead/m^2, grains/earhead and thousand grain weight. Maximum and significantly higher grain yield (41.08 q/ha) was obtained with two irrigations as compared with zero and one irrigations levels. Increasing irrigation level enhanced the grain yield

Table 4.1 Central Zone	IR-TS-DOS-TAD	Centrewise	Yield, q/ha	2022-23			
Sowing Time	**Genotype**	**Gwalior**	**Indore**	**Junnagadh**	**Powarkheda**	**Udaipur**	**Vijapur**	**Zonal Mean**
Timely	MACS 6768 (I) (C)	60.99	53.67	58.33	50.47	59.93	52.17	55.93
	HI 1650 (I) (C)	45.83	52.23	60.60	53.41	55.00	52.96	53.34
	GW 547	43.45	50.27	56.99	42.95	56.68	55.00	50.89
	NWS 2194	42.50	45.57	55.18	44.48	51.98	45.54	47.54
	GW 513 (C)	44.87	47.50	60.88	43.54	47.13	48.71	48.77
	HI 1636 (C)	48.97	50.13	55.39	43.38	48.73	48.08	49.11
	GW 322 (C)	43.26	51.13	63.52	42.61	62.88	46.88	51.71
	Mean	47.13	50.07	58.70	45.83	54.62	49.90	51.04
Late	MACS 6768 (I) (C)	42.03	47.67	42.86	45.63	50.48	50.58	46.54
	HI 1650 (I) (C)	22.87	50.47	61.03	43.59	39.88	42.58	43.40
	GW 547	30.32	45.97	53.78	39.32	41.70	43.29	42.39
	NWS 2194	29.36	43.33	52.16	42.18	37.47	41.50	41.00
	GW 513 (C)	32.10	50.70	62.50	42.39	35.37	50.25	45.55
	HI 1636 (C)	34.12	43.50	54.53	39.06	39.13	39.71	41.68
	GW 322 (C)	21.03	50.27	50.13	40.38	49.25	33.75	40.80
	Mean	30.26	47.41	53.86	41.79	41.90	43.10	43.05
Mean	MACS 6768 (I) (C)	51.51	50.67	50.60	48.05	55.21	51.38	51.23
	HI 1650 (I) (C)	34.35	51.35	60.81	48.50	47.44	47.77	48.37
	GW 547	36.89	48.12	55.38	41.14	49.19	49.15	46.64
	NWS 2194	35.93	44.45	53.67	43.33	44.73	43.52	44.27
	GW 513 (C)	38.49	49.10	61.69	42.96	41.25	49.48	47.16
	HI 1636 (C)	41.55	46.82	54.96	41.22	43.93	43.90	45.40
	GW 322 (C)	32.15	50.70	56.82	41.50	56.07	40.31	46.26
	Mean	38.69	48.74	56.28	43.81	48.26	46.50	47.05
CD (0.05)	Sowing (A)	3.55	1.65	4.92	1.12	5.38	8.64	0.80
	Genotype(B)	2.12	2.27	3.15	2.55	4.27	3.75	0.94
	B within A	3.00	3.22	4.45	3.61	6.04	5.31	1.32
	A within B	3.48	3.13	5.04	3.40	6.43	7.08	1.44
Date of Sowing	Timely	12.11.2022	16.11.2022	15.11.2022	18.11.2022	12.11.2022	14.11.2022	
	Late	03.12.2022	7.12.2022	5.12.2022	09.12.2022	3.12.2022	4.12.2022	
Date of Harvesting	Timely	6.4.2023	20.3.2023	6.3.2023	06.04.2023	25.3.2023	4.3.2023	
	Late	9.4.2023	29.3.2023	21.3.2023	14.04.2023	1.4.2023	24.3.2023	

Table 4.2. Central Zone			IR-TS-DOS-TAD		Pooled	2022-23
Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	55.93	1	46.54	1	51.23	1
HI 1650 (I) (C)	53.34	2	43.40	3	48.37	2
GW 547	50.89	4	42.39	4	46.64	4
NWS 2194	47.54	7	41.00	6	44.27	7
GW 513 (C)	48.77	6	45.55	2	47.16	3
HI 1636 (C)	49.11	5	41.68	5	45.40	6
GW 322 (C)	51.71	3	40.80	7	46.26	5
Mean	51.04		43.05		47.05	
	Sowing Time (A)	Genotype (B)		B within A		A within B
CD (0.05)	1.14	1.33		1.88		NS
			Earhead/sq.m.			
MACS 6768 (I) (C)	387	2	343	4	365	2
HI 1650 (I) (C)	367	3	347	3	357	4
GW 547	387	1	360	1	374	1
NWS 2194	345	6	332	5	339	6
GW 513 (C)	360	5	332	6	346	5
HI 1636 (C)	335	7	319	7	327	7
GW 322 (C)	366	4	352	2	359	3
Mean	364		341		352	
	Sowing Time (A)	Genotype (B)		B within A		A within B
CD (0.05)	5.22	9.04		12.78		NS
			Grains /earhead			
MACS 6768 (I) (C)	32.66	3	32.73	1	32.69	2
HI 1650 (I) (C)	31.96	4	31.53	5	31.75	4
GW 547	30.40	5	29.95	6	30.18	5
NWS 2194	32.77	2	32.36	3	32.56	3
GW 513 (C)	28.47	7	31.86	4	30.16	6
HI 1636 (C)	29.45	6	28.58	7	29.02	7
GW 322 (C)	35.62	1	32.72	2	34.17	1
Mean	31.62		31.39		31.50	
	Sowing Time (A)	Genotype (B)		B within A		A within B
CD (0.05)	NS	1.29		1.83		NS
			1000 Grains Weight, g			
MACS 6768 (I) (C)	45.33	4	42.46	3	43.90	3
HI 1650 (I) (C)	46.81	3	40.81	4	43.81	4
GW 547	44.57	5	40.18	5	42.37	5
NWS 2194	42.87	6	38.90	6	40.88	6
GW 513 (C)	49.25	2	43.80	2	46.53	2
HI 1636 (C)	51.43	1	46.74	1	49.08	1
GW 322 (C)	40.94	7	36.30	7	38.62	7
Mean	45.89		41.31		43.60	
	Sowing Time (A)	Genotype (B)		B within A		A within B
CD (0.05)	0.27	0.79		1.12		NS
Centres: Gwalior, Indore, Junagadh, Powarkheda, Udaipur, Vijapur						

Table 4.3. Central Zone		RIR-TS-TAD	Centrewise	Yield, q/ha			2022-23
Irrigation	**Genotypes**	**Bilaspur**	**Gwalior**	**Indore**	**Jabalpur**	**Udaipur**	**Zonal mean**
Zero	DBW 359	19.43	28.47	27.20	35.10	33.65	28.77
	CG 1040	22.50	26.67	29.00	26.71	29.87	26.95
	MP 3288 (C)	21.82	29.37	25.13	25.98	18.85	24.23
	DBW 110 (C)	20.62	26.37	23.77	30.27	27.88	25.78
	HI 1655 (I) (C)	20.04	28.93	21.20	23.44	27.18	24.16
	CG 1036 (I) (C)	23.19	30.40	24.17	32.41	26.25	27.28
	Mean	21.27	28.37	25.08	28.99	27.28	26.20
One	DBW 359	25.16	38.90	35.20	41.33	40.50	36.22
	CG 1040	30.86	33.09	32.17	38.43	40.08	34.93
	MP 3288 (C)	29.47	40.05	31.30	41.12	42.97	36.98
	DBW 110 (C)	29.79	32.78	30.80	42.11	43.32	35.76
	HI 1655 (I) (C)	28.33	39.68	33.87	32.27	44.33	35.70
	CG 1036 (I) (C)	32.43	43.42	39.33	38.73	41.63	39.11
	Mean	29.34	37.99	33.78	39.00	42.14	36.45
Two	DBW 359	29.39	42.22	38.83	42.92	47.85	40.24
	CG 1040	36.31	41.07	38.50	38.55	45.47	39.98
	MP 3288 (C)	34.27	45.20	35.57	43.47	43.95	40.49
	DBW 110 (C)	33.10	40.24	36.27	43.05	52.48	41.03
	HI 1655 (I) (C)	32.70	43.29	37.97	36.87	56.68	41.50
	CG 1036 (I) (C)	37.56	50.52	42.60	40.95	44.65	43.25
	Mean	33.89	43.76	38.29	40.97	48.51	41.08
Mean	DBW 359	24.66	36.53	33.74	39.78	40.67	35.08
	CG 1040	29.89	33.61	33.22	34.56	38.47	33.95
	MP 3288 (C)	28.52	38.21	30.67	36.86	35.26	33.90
	DBW 110 (C)	27.84	33.13	30.28	38.48	41.23	34.19
	HI 1655 (I) (C)	27.02	37.30	31.01	30.86	42.73	33.79
	CG 1036 (I) (C)	31.06	41.44	35.37	37.36	37.51	36.55
	Mean	28.16	36.70	32.38	36.32	39.31	34.58
CD (0.05)	Irrigation (A)	1.68	34.16	2.69	1.36	3.99	
	Genotype (B)	1.67	18.70	2.05	1.56	3.03	
	B within A	2.89	32.38	3.56	2.71	5.25	
	A within B	2.92	38.80	3.80	2.67	5.62	
Date of Sowing :		30.10.2022	12.11.2022	4.11.2022	12.11.2022	8.11.2022	
Date of Harvesting :		28.02.2023	10.04.2023	15.3.2023		10.3.2023	

Table 4.4. Central Zone	RIR-TS-TAD						Pooled	2022-23
Genotype	Irrigation level						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
				Yield, q/ha				
DBW 359	28.77	1	36.22	3	40.24	5	35.08	2
CG 1040	26.95	3	34.93	6	39.98	6	33.95	4
MP 3288 (C)	24.23	5	36.98	2	40.49	4	33.90	5
DBW 110 (C)	25.78	4	35.76	4	41.03	3	34.19	3
HI 1655 (I) (C)	24.16	6	35.70	5	41.50	2	33.79	6
CG 1036 (I) (C)	27.28	2	39.11	1	43.25	1	36.55	1
Mean	26.20		36.45		41.08		34.58	
	Irrigation (A)		Genotypes (B)		B within A		A within B	
CD (0.05)	0.77		0.81		NS		NS	
				Earhead/sq.m.				
DBW 359	240	5	276	5	304	5	273	6
CG 1040	248	2	303	1	308	4	286	3
MP 3288 (C)	243	3	294	4	323	2	287	2
DBW 110 (C)	234	6	295	3	301	6	276	4
HI 1655 (I) (C)	240	4	271	6	310	3	274	5
CG 1036 (I) (C)	261	1	298	2	343	1	300	1
Mean	244		289		315		283	
	Irrigation (A)		Genotypes (B)		B within A		A within B	
CD (0.05)	6.38		5.94		NS		NS	
				Grains/earhead				
DBW 359	31.75	1	33.01	3	31.01	3	31.92	1
CG 1040	28.05	4	27.66	6	30.60	4	28.77	5
MP 3288 (C)	30.07	2	33.67	2	30.51	5	31.42	3
DBW 110 (C)	28.05	5	29.22	5	32.03	1	29.76	4
HI 1655 (I) (C)	28.96	3	33.75	1	31.95	2	31.56	2
CG 1036 (I) (C)	26.89	6	31.26	4	27.75	6	28.63	6
Mean	28.96		31.43		30.64		30.34	
	Irrigation (A)		Genotypes (B)		B within A		A within B	
CD (0.05)	0.73		1.04		NS		NS	
				1000 Grains Weight, g				
DBW 359	40.07	4	41.84	4	44.14	4	42.02	4
CG 1040	41.27	2	42.55	3	44.18	2	42.67	2
MP 3288 (C)	38.61	6	39.99	6	42.45	6	40.35	6
DBW 110 (C)	41.08	3	42.79	2	43.51	5	42.46	3
HI 1655 (I) (C)	39.84	5	41.59	5	44.17	3	41.87	5
CG 1036 (I) (C)	41.67	1	44.42	1	47.16	1	44.42	1
Mean	40.42		42.20		44.27		42.30	
	Irrigation (A)		Genotypes (B)		B within A		A within B	
CD (0.05)	0.35		0.38		NS		NS	
Centres: Bilaspur, Gwalior, Indore, Jabalpur, Udaipur								

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mainly due to significant increase in earhead/m^2 and thousand grain weight. The test entry DBW 359 produced an average yield of 35.08 q/ha, which was significantly higher to all the checks and new test entry CG 1040 except CG 1036 which was the significantly highest yielder. However, test entries DBW 359 and CG 1040 ranked first and third, respectively at zero irrigation level. The interaction effect was non-significant for yield and yield attributes. The centre wise data are presented in Tables 4.4.1 to 4.4.5 in Annexure-I.

High Yield Potential Trial

This experiment was conducted to maximise the wheat yield using higher level of inorganic and organic fertilisers and spraying of growth retardant for control of lodging. Experiment consists of two fertiliser treatments viz. NM1 {recommended doses of fertilizers (RDF)} and NM2 {150% NPK + 15 t FYM/ha + two sprays as tank mix-Chlormequat chloride (Lihocin) @0.2% + tebuconazole (Folicur 430 SC) @0.1%} of commercial product dose at first node and flag leaf (tank mix application) stage in main plots. Sub plots consist of four high yielding wheat genotypes (, DBW187, GW 322, DBW 303, DBW 377). The trial was conducted in split plot design with three replications at four centres namely BISA Jabalpur, Jabalpur, Udaipur and Vijapur. The sowing was done using normalized seed rate of 100 kg/ha (adjusted considering 1000 grains weight as 38 g). Irrigation and weed control measures were followed as per recommended package of practices for the concerned zone. The data from Powarkheda was not received.

The centrewise yield and zonal mean are shown in Table 4.5. The pooled analysis showed significant effect of fertiliser application and growth regulators on grain yield and yield attributes (Table 4.6). The grain yield enhanced significantly with increasing fertiliser doses. Addition of 15 t FYM/ha with 150% RDF significantly increased the grain yield (72.62 q/ha) as compared to RDF (66.56 q/ha). This increase was to the tune of 9.1% as compared with RDF. The dose of 150%NPK + 15 t FYM/ha+GR significantly (14.2%) enhanced number of earhead/m^2 (425) compared to RDF (372). The application of growth retardant significantly decreased plant height (86.3 cm) over no use (93.4 cm). This showed that growth retardant in combination with fungicide tebuconazole was effective for control of lodging and enhancing the grain yield owing to more tillering. On mean basis DBW 377 recorded highest grain yield (70.62 q/ha). The centre wise data are presented in Tables 4.6.1 to 4.6.4 in Annexure-I.

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Table 4.5. Central Zone	SPL-IR-ES-HYPT		Centrewise	Yield, q/ha		2022-23
Nutrient management (NM)	**Genotypes**	**BISA Jabalpur**	**Jabalpur**	**Udaipur**	**Vijapur**	**Zonal Mean**
NM1	DBW 187 (C)	89.23	71.31	53.27	51.83	66.41
	GW 322 (C)	89.70	73.58	49.87	49.38	65.63
	DBW 377	88.60	74.98	60.53	52.00	69.03
	DBW 303 (C)	86.57	70.47	50.50	53.17	65.18
	Mean	88.53	72.59	53.54	51.59	66.56
NM2	DBW 187 (C)	88.07	77.82	65.53	59.79	72.80
	GW 322 (C)	88.07	80.05	59.90	58.92	71.73
	DBW 377	88.73	84.39	54.93	60.79	72.21
	DBW 303 (C)	86.53	76.67	69.60	62.17	73.74
	Mean	87.85	79.73	62.49	60.42	72.62
Mean	DBW 187 (C)	88.65	74.57	59.40	55.81	69.61
	GW 322 (C)	88.88	76.81	54.88	54.15	68.68
	DBW 377	88.67	79.69	57.73	56.40	70.62
	DBW 303 (C)	86.55	73.57	60.05	57.67	69.46
	Mean	88.19	76.16	58.02	56.01	69.59
CD (0.05)	NM (A)	5.59	1.08	6.09	3.99	2.18
	Genotypes (B)	4.23	1.51	5.18	5.26	2.22
	B within A	5.99	2.13	7.32	7.43	NS
	A within B	6.21	1.96	7.35	6.88	NS
Date of Sowing		06.11.2022	04.11.2022	11.11.2022	13.11.2022	
Date of Harvesting		04.04.2023	20.03.2023	21.03.2023	27.02.2023	

Table 4.6. Central Zone	SPL-IR-ES-HYPT				Pooled	2022-23
	Nutrient Management				Mean	Rk
Genotype	NM1	Rk	NM2	Rk		
			Yield, q/ha			
DBW 187 (C)	66.41	2	72.80	2	69.61	2
GW 322 (C)	65.63	3	71.73	4	68.68	4
DBW 377	69.03	1	72.21	3	70.62	1
DBW 303 (C)	65.18	4	73.74	1	69.46	3
Mean	66.56		72.62		69.59	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	1.33		NS		NS	NS
			Earhead/sq.m.			
DBW 187 (C)	365	4	422	3	394	4
GW 322 (C)	372	2	421	4	396	3
DBW 377	370	3	433	1	402	2
DBW 303 (C)	379	1	425	2	402	1
Mean	372		425		399	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	8.36		NS		NS	NS

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			Grains/earhead			
DBW 187 (C)	37.51	4	35.98	3	36.75	3
GW 322 (C)	39.59	1	38.45	1	39.02	1
DBW 377	38.52	2	33.57	4	36.05	4
DBW 303 (C)	38.00	3	37.74	2	37.87	2
Mean	38.41		36.44		37.42	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	0.89		1.57		2.22	2.14
			1000 grain wt, g			
DBW 187 (C)	48.62	1	48.29	2	48.46	2
GW 322 (C)	44.33	4	44.36	4	44.35	4
DBW 377	48.41	2	49.80	1	49.11	1
DBW 303 (C)	45.15	3	46.20	3	45.68	3
Mean	46.63		47.16		46.90	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	NS		0.9		NS	NS
			Plant Height, cm			
DBW 187 (C)	95.9	1	87.7	1	91.8	1
GW 322 (C)	90.9	4	86.0	3	88.4	4
DBW 377	93.6	2	86.8	2	90.2	2
DBW 303 (C)	93.4	3	84.7	4	89.1	3
Mean	93.4		86.3		89.9	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	1.90		2.30		NS	NS
			Biomass, q/ha			
DBW 187 (C)	141.9	2	156.8	2	149.3	2
GW 322 (C)	135.7	4	154.0	4	144.9	4
DBW 377	143.4	1	156.8	3	150.1	1
DBW 303 (C)	138.9	3	157.5	1	148.2	3
Mean	140.0		156.3		148.1	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	2.91		NS		NS	NS
			Physiological maturity, days			
DBW 187 (C)	121	4	123	4	122	4
GW 322 (C)	122	3	123	3	122	3
DBW 377	124	1	125	1	124	1
DBW 303 (C)	123	2	123	2	123	2
Mean	123		124		123	
	NM (A)		Genotype (B)		B within A	A within B
CD (0.05)	0.43		0.50		0.71	0.77
Centres: BISA Jabalpur, Jabalpur, Udaipur, Vijapur						

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Peninsular Zone

In Peninsular zone, four centres (Akola, Dharwad, Niphad and Pune) were actively engaged in research activities of coordinated wheat agronomy programme. The data on weather and soil parameters are reported in Annexure II and Annexure III, respectively. The soils of this zone fall under the order of vertisols and predominantly are clayey in nature with low to high organic carbon ranging between 0.3-0.1.32 per cent. The available soil nitrogen is low in content ranging between (136.4 to 318 kg N/ha); while the content of phosphorus is generally medium to high (8.24 to 42.8 kg/ha) whereas potash content in soil is vary from 6.34 to 418 kg/ha. The soils of this region are predominantly alkaline in reaction with EC of 0.2 to 0.56. Majority of rainfall received was in the months of October except a few showers which were received during later stages in the crop season. The maximum rainfall received was 239.9 mm at Niphad followed by 220.8 mm at Pune, 207.41 mm at Dharwad and 134.6 mm at Akola. The average maximum and minimum temperatures were 31.68°C and 13.47°C at Akola, 31.68°C and 16.42°C at Dharwad, 32.0°C and 12.6 °C at Niphad, and 32.3°C and 15.5 °C at Pune centre.

EVALUATION UNDER DIFFERENT GROWING CONDITIONS

The performance of genotypes was evaluated under timely and late sown conditions at different locations and the results are summarized under the following heads:

Irrigated Timely Sown

In this trial, one test entry MP 1378 was evaluated against five check varieties HI 8826, MACS3949, MACS 6222, GW 322 and MACS 4100 (d) (I). The trial was conducted to evaluate the performance of timely sown genotypes under timely and late sown conditions at four locations (Akola, Dharwad, Niphad and Pune) in split plot design with sowing time in main plots and genotypes in sub plots with three replications. The allowed period for timely and late sown conditions was kept as 5th to 11th Nov and 26th Nov to 02nd Dec, respectively. Sowing was done using the normalized (adjusted considering 1000 grains weight as 38 g) seed rate of 100 kg/ha. The dose of NPK fertilizers was maintained as 120:60:40 kg/ha with 1/3rd N, full P and K as basal application during sowing and application of remaining 2/3rd N equally in first and second irrigation.

The centrewise and zonal yield of the trial is given in Table 5.1. The results of pooled analysis and centrewise data of yield and yield attributes are presented in Table 5.2 and Annexure-I (Tables 5.2.1 to 5.2.4), respectively. The data of Akola centre were not considered for pooled analysis due to low mean yield under timely sown condition.

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The perusal of pooled data revealed that grain yield reduced significantly on shifting the sowing from timely to late condition due to significant decline in ear heads. The mean grain yield under timely and late sown conditions was found to be 51.90 and 45.90 q/ha, respectively. In terms of yield, the check variety HI 8826 (d) (I) showed superiority in both timely (54.88 q/ha) and late sown (48.83 q/ha) conditions and overall basis (51.85 q/ha). It was followed by another check variety GW 322 (C) with a mean yield of 50.50 q/ha. The test entry ranked third with mean yield of 48.61 q/ha on over all basis.

Table 5.1. Peninsular Zone IR-TS-DOS-TAD Centrewise Yield, q/ha 2022-23

Sowing time	Genotype	Dharwad	Niphad	Pune	Zonal mean
Timely	HI 8826 (d) (I) (C)	50.52	63.13	50.97	54.88
	MACS 3949 (d) (C)	48.57	56.60	47.04	50.74
	MP 1378	54.14	51.90	50.89	52.31
	MACS 6222 (C)	50.83	50.17	45.05	48.68
	GW 322 (C)	55.00	55.23	50.73	53.66
	MACS 4100 (d) (I) (C)	51.20	57.73	44.42	51.12
	Mean	51.71	55.80	48.18	51.90
Late	HI 8826 (d) (I) (C)	41.77	55.77	48.96	48.83
	MACS 3949 (d) (C)	39.46	50.53	42.68	44.22
	MP 1378	40.99	46.43	47.34	44.92
	MACS 6222 (C)	40.89	44.53	47.14	44.19
	GW 322 (C)	41.94	47.10	53.02	47.35
	MACS 4100 (d) (I) (C)	38.34	51.07	48.19	45.86
	Mean	40.56	49.24	47.89	45.90
Mean	HI 8826 (d) (I) (C)	46.14	59.45	49.97	51.85
	MACS 3949 (d) (C)	44.01	53.57	44.86	47.48
	MP 1378	47.56	49.17	49.11	48.61
	MACS 6222 (C)	45.86	47.35	46.09	46.44
	GW 322 (C)	48.47	51.17	51.88	50.50
	MACS 4100 (d) (I) (C)	44.77	54.40	46.30	48.49
	Mean	46.14	52.52	48.04	48.90
CD (0.05)	Sowing time (A)	5.03	2.49	4.86	1.42
	Genotype (B)	4.65	6.09	2.89	3.07
	B within A	6.58	8.61	4.09	NS
	A within B	6.70	7.99	4.71	4.25
Date of Sowing:	Timely	11.11.2022	11.11.2022	09.11.2022	
	Late	02.12.2022	01.12.2022	30.11.2022	
Date of Harvesting:	Timely	15.03.2023	08.03.2023	10.03.2023	
	Late	28.03.2023	31.03.2023	28.03.2023	

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Table 5.2. Peninsular Zone	IR-TS-DOS-TAD				Pooled	2022-23
Genotype	Sowing time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HI 8826 (d) (I) (C)	54.88	1	48.83	1	51.85	1
MACS 3949 (d) (C)	50.74	5	44.22	5	47.48	5
MP 1378	52.31	3	44.92	4	48.61	3
MACS 6222 (C)	48.68	6	44.19	6	46.44	6
GW 322 (C)	53.66	2	47.35	2	50.50	2
MACS 4100 (d) (I) (C)	51.12	4	45.86	3	48.49	4
Mean	51.90		45.90		48.90	
	Sowing time (A)		Genotype (B)		B within A	A within B
CD (0.05)	1.42		3.07		NS	NS
			Earheads/sqm			
HI 8826 (d) (I) (C)	389	2	385	1	387	1
MACS 3949 (d) (C)	365	6	342	5	354	6
MP 1378	399	1	357	4	378	2
MACS 6222 (C)	374	5	334	6	354	5
GW 322 (C)	381	4	358	3	369	4
MACS 4100 (d) (I) (C)	388	3	363	2	375	3
Mean	383		356		370	
	Sowing time (A)		Genotype (B)		B within A	A within B
CD (0.05)	6.67		13.30		NS	NS
			Grains/Earhead			
HI 8826 (d) (I) (C)	28.28	5	26.34	6	27.31	6
MACS 3949 (d) (C)	28.41	4	28.03	5	28.22	5
MP 1378	30.56	2	31.59	3	31.08	2
MACS 6222 (C)	29.33	3	31.91	2	30.62	3
GW 322 (C)	32.75	1	33.84	1	33.30	1
MACS 4100 (d) (I) (C)	27.80	6	29.34	4	28.57	4
Mean	29.52		30.17		29.85	
	Sowing time (A)		Genotype (B)		B within A	A within B
CD (0.05)	2.22		NS		NS	NS
			1000 Grains Weight, g			
HI 8826 (d) (I) (C)	50.10	1	48.17	1	49.13	1
MACS 3949 (d) (C)	49.66	2	46.52	2	48.09	2
MP 1378	43.75	6	40.22	5	41.99	5
MACS 6222 (C)	45.03	4	42.19	4	43.61	4
GW 322 (C)	43.89	5	40.04	6	41.97	6
MACS 4100 (d) (I) (C)	47.34	3	44.08	3	45.71	3
Mean	46.63		43.54		45.08	
	Sowing time (A)		Genotype (B)		B within A	A within B
CD (0.05)	0.29		1.24		NS	NS
Centres:	Dharwad, Niphad, Pune					

Restricted Irrigation

Five test entries [NIAW 4028, DBW 359, HI 1665, HI 8840 (d), UAS 478 (d)] were evaluated against four check varieties [UAS 446 (d), NIAW 3170, HI 1605, NIDW 1149 (d)] with no, one (CRI stage) and two (CRI and boot leaf stage) irrigations in split plot design with three replications. Irrigation levels were kept in main plots and the genotypes in the sub-plots. The trial was conducted at three locations (Dharwad, Niphad, Pune). Full dose of recommended NPK (90:60:40) was applied as basal in no irrigation treatment and 1/3rd nitrogen, full phosphorus (60 kg P_2O_5/ha) and potash (40 kg K_2O/ha) were applied at the time of sowing

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and remaining N was top dressed at 1st irrigation stage in other two main plots. Weed control measures were followed as per the recommended practice. The normalized seed rate used was 100 kg/ha (considering the 1000 grains weight of 38 g).

Table 5.3. Peninsular Zone RIR-TS-TAD Centrewise Yield, q/ha 2022-23

Irrigation	Genotypes	Dharwad	Niphad	Pune	Zonal mean
Zero	UAS 446 (d) (C)	19.74	17.10	16.22	17.69
	NIAW 3170 (C)	26.96	24.52	27.61	26.36
	NIAW 4028	27.79	25.40	23.35	25.51
	DBW 359	27.13	21.03	20.07	22.74
	HI 1665	26.79	20.44	23.64	23.62
	HI 8840 (d)	25.17	19.84	21.18	22.06
	HI 1605 (C)	28.05	20.00	22.11	23.39
	NIDW 1149 (d) (C)	24.76	20.08	24.28	23.04
	UAS 478 (d)	27.56	12.86	20.55	20.33
	Mean	26.00	20.14	22.11	22.75
One	UAS 446 (d) (C)	25.42	19.17	23.12	22.57
	NIAW 3170 (C)	33.40	27.18	30.45	30.34
	NIAW 4028	31.65	28.02	26.38	28.68
	DBW 359	32.60	25.52	31.54	29.88
	HI 1665	32.03	25.32	31.81	29.72
	HI 8840 (d)	27.59	23.25	28.53	26.46
	HI 1605 (C)	33.62	24.05	29.73	29.13
	NIDW 1149 (d) (C)	30.66	22.14	27.20	26.67
	UAS 478 (d)	31.39	19.09	25.98	25.49
	Mean	30.93	23.75	28.30	27.66
Two	UAS 446 (d) (C)	28.46	24.28	27.22	26.65
	NIAW 3170 (C)	38.06	35.51	43.83	39.13
	NIAW 4028	35.13	37.13	42.18	38.15
	DBW 359	36.82	34.71	43.71	38.41
	HI 1665	38.03	33.60	46.29	39.31
	HI 8840 (d)	32.91	34.49	38.16	35.18
	HI 1605 (C)	38.32	30.98	44.09	37.80
	NIDW 1149 (d) (C)	36.31	33.34	40.98	36.88
	UAS 478 (d)	38.55	29.46	34.35	34.12
	Mean	35.84	32.61	40.09	36.18
Mean	UAS 446 (d) (C)	24.54	20.18	22.19	22.30
	NIAW 3170 (C)	32.80	29.07	33.96	31.95
	NIAW 4028	31.52	30.18	30.64	30.78
	DBW 359	32.18	27.09	31.77	30.35
	HI 1665	32.29	26.45	33.91	30.88
	HI 8840 (d)	28.56	25.86	29.29	27.90
	HI 1605 (C)	33.33	25.01	31.98	30.11
	NIDW 1149 (d) (C)	30.58	25.19	30.82	28.86
	UAS 478 (d)	32.50	20.47	26.96	26.64
	Mean	30.92	25.50	30.17	28.86
CD (0.05)	Irrigation (A)	2.60	6.58	2.43	1.94
	Genotype (B)	2.91	3.24	2.10	1.71
	B within A	5.03	5.61	3.64	2.96
	A within B	5.17	7.40	3.93	3.35
Date of Sowing :		05.11.2022	09.11.2022	09.11.2022	
Date of Harvesting :		20.02.2023	01.03.2023	10.03.2023	

The centrewise yield and zonal mean are presented in Table 5.3. The pooled analysis presented in Table 5.4 showed that increasing number of irrigations successively produced

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significantly higher grain yield. One and two irrigation application yielded 21.58% and 59.03% higher grain yield, respectively over no irrigation. All the yield attributing parameters were significantly improved with increased level of irrigation. So, the yield increase was due to cumulative effect of all yield attributing parameters. The check variety NIAW 3170 ranked 1st (31.95 q/ha) followed by test entry HI 1665 (30.88 q/ha) and NIAW 4028 (30.78 q/ha) and these three genotypes remained statistically at par but significantly higher as compared to other genotypes. Significantly higher number of earheads/sqm was reason for maximum yield of check variety NIAW 3170. Centre wise data are given in Tables 5.4.1 to 5.4.3 of Annexure I.

Table 5.4. Peninsular Zone RIR-TS-TAD Pooled 2022-23

Genotype	Irrigation level						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
				Yield, q/ha				
UAS 446 (d) (C)	17.69	9	22.57	9	26.65	9	22.30	9
NIAW 3170 (C)	26.36	1	30.34	1	39.13	2	31.95	1
NIAW 4028	25.51	2	28.68	5	38.15	4	30.78	3
DBW 359	22.74	6	29.88	2	38.41	3	30.35	4
HI 1665	23.62	3	29.72	3	39.31	1	30.88	2
HI 8840 (d)	22.06	7	26.46	7	35.18	7	27.90	7
HI 1605 (C)	23.39	4	29.13	4	37.80	5	30.11	5
NIDW 1149 (d)(C)	23.04	5	26.67	6	36.88	6	28.86	6
UAS 478 (d)	20.33	8	25.49	8	34.12	8	26.64	8
Mean	22.75		27.66		36.18		28.86	
	Irrigation(A)		Genotypes (B)		B within A		A within B	
CD (0.05)	1.94		1.71		2.96		NS	
				Earhead/sq.m.				
UAS 446 (d) (C)	274	9	333	7	349	8	319	8
NIAW 3170 (C)	366	1	373	2	432	1	390	1
NIAW 4028	344	3	331	8	361	7	345	5
DBW 359	297	7	362	3	393	4	351	3
HI 1665	362	2	378	1	427	2	389	2
HI 8840 (d)	284	8	337	6	376	6	332	7
HI 1605 (C)	301	6	345	4	394	3	347	4
NIDW 1149 (d)(C)	315	4	292	9	304	9	303	9
UAS 478 (d)	311	5	341	5	382	5	345	6
Mean	317		343		380		347	
	Irrigation(A)		Genotypes (B)		B within A		A within B	
CD (0.05)	11.34		17.73		30.72		NS	
				Grains/earhead				
UAS 446 (d) (C)	17.6	9	18.0	9	20.1	9	18.6	9
NIAW 3170 (C)	20.8	3	22.4	3	23.2	7	22.1	4
NIAW 4028	19.4	4	21.0	5	25.0	5	21.8	5
DBW 359	22.1	2	22.4	2	26.0	3	23.5	2
HI 1665	18.5	6	21.2	4	23.8	6	21.1	6
HI 8840 (d)	18.5	5	18.6	8	21.8	8	19.7	8
HI 1605 (C)	23.1	1	23.7	1	26.4	2	24.4	1
NIDW 1149 (d)(C)	17.9	8	20.7	6	29.3	1	22.6	3
UAS 478 (d)	18.0	7	19.9	7	25.1	4	21.0	7
Mean	19.6		20.9		24.5		21.6	
	Irrigation(A)		Genotypes (B)		B within A		A within B	
CD (0.05)	2.11		1.85		3.20		NS	

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1000 Grains Weight, g								
UAS 446 (d) (C)	37.90	5	38.92	7	38.60	8	38.47	6
NIAW 3170 (C)	39.52	4	39.58	5	41.30	5	40.14	4
NIAW 4028	41.03	3	42.19	3	43.72	3	42.31	3
DBW 359	35.98	8	38.95	6	40.27	6	38.40	7
HI 1665	37.83	6	39.62	4	41.50	4	39.65	5
HI 8840 (d)	42.82	1	43.46	2	44.60	2	43.63	2
HI 1605 (C)	34.96	9	37.32	9	38.77	7	37.02	9
NIDW 1149 (d)(C)	42.71	2	45.42	1	45.70	1	44.61	1
UAS 478 (d)	36.79	7	38.23	8	36.73	9	37.25	8
Mean	38.84		40.41		41.24		40.16	
	Irrigation(A)		Genotypes (B)		B within A		A within B	
CD (0.05)	1.09		1.40		2.42		NS	
Centres: Dharwad, Niphad, Pune								

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PRODUCTION TECHNOLOGIES

In this section, the results of various experiments on updating the package of practices of various wheat growing zones are presented. Various special coordinated trials on weed control, nano urea, NPK solubilizing microbial consortium, maximizing production, biofortification and fertigation in wheat were conducted to address the various issues in different wheat growing zones of the country.

SPL -1: Efficacy of herbicides against diverse weed flora of wheat.

Weeds are major problem in wheat production. Chemical weed control is preferred over other weed control methods in wheat. Moreover, wheat is infested with diverse weed flora and for control of complex weed flora herbicide combinations are required. Therefore, keeping these in view, an experiment involving twelve weed control treatments was conducted across zones at 16 locations. The sowing was done using the normalized (adjusted considering 1000 grains weight of 38 g) seed rate of 100 kg/ha at a row-to-row spacing of 20 cm. One third nitrogen, full phosphorus and potash as basal dose as per treatments and the remaining 2/3rd nitrogen as 1/3rd at first irrigation and 1/3rd at second irrigation. Weed control measures were followed as per treatments. Herbicide spraying was done using Knapsack sprayer. The observations were recorded on weed density and weed dry weight at 30, 60 and 90 DAS.

In NHZ, this trial was conducted at two locations (Bajaura and Malan). The pooled analysed yield and yield attributes data of two centres are presented in Table 6.1. The minimum wheat grain yield (27.36 q/ha) was recorded with untreated weedy control on pooled basis. Among herbicide treatments, the maximum grain yield (42.93 q/ha) was recorded with pre-em. tank mix combination of pendimethalin + metribuzin at 1250 + 280 g/ha followed by with pre-em. tank mix combination of pendimethalin + pyroxasulfone at 1250 + 127.5 g/ha which produced grain yield of 41.26 q/ha. If we examine the centrewise performance then among herbicide treatments, the maximum grain yield at Bajaura centre was recorded with pre-em. tank mix combination of pendimethalin + metribuzin at 1250 + 280 g/ha (45.73 q/ha) followed by with pre-em. application of pendimethalin+ pyroxasulfone at 1250 + 127.5 g/ha (44.35 q/ha). Whereas, at Malan, the maximum grain yield was recorded with pre-em. tank mix combination of pendimethalin + metribuzin at 1250 + 280 g/ha. In case of weeds density and dry weight accumulation (Table 6.2); among herbicide treatments, the lowest weed density and dry weight were recorded with pre-em. tank mix combination of pendimethalin + metribuzin at 1250 + 280 g/ha. In Malan, EPOST application of Pyroxasulfone + metsulfuron @ 127.5 + 4 g/ha recorded lowest weed density and dry

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weight. Whereas, at Bajaura, pendimethalin at 1500 g/ha recorded the lowest weed density and dry weight. The centre-wise data of yield and weeds have been given in Table 6.1.1 to 6.1.2 and Table 6.2.1 to 6.2.2 of Annexure-I, respectively.

Table 6.1. Northern Hill Zone **SPL-1** **Pooled** **2022-23**

Treatments	Earheads /m^2	1000 Grains Weight, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	405	41.45	23.96	39.97	98.78
PE Pendimethalin @ 1500 g/ha	402	40.92	25.16	40.95	104.17
PE Pyroxasulfone @ 127.5 g/ha	417	42.15	24.21	40.63	97.61
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	409	41.49	25.67	41.26	98.50
PE Pyroxa+metsulfuron 127.5+4 g/ha	405	41.61	23.75	38.16	88.36
EPOST Pyroxasulfone@ 127.5 g/ha	388	41.93	22.15	34.01	85.97
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	375	40.56	23.61	35.10	85.79
PE Metribuzin @300 g/ha	418	40.51	25.45	40.99	97.36
PE Pendi + metribuzin@1250+280 g/ha	430	40.16	25.55	42.93	105.06
PE Pyroxa + metribuzin@127.5+280 g/ha	402	40.41	25.53	39.93	98.33
Weedy Check	369	40.78	19.62	27.36	80.66
Weed free	423	40.98	25.22	42.37	99.19
CD (0.05)	13.45	1.48	1.61	3.08	6.29

Centres: Bajaura, Malan

Table 6.2. Northern Hill Zone **SPL-1** **Pooled** **2022-23**

Treatments	Weed density. No/m^2		Weed dry weight. g/m^2	
	60	**90**	**60**	**90**
PE Pendimethalin @ 1000 g/ha	11.74 (156.17)*	10.57 (123.33)	3.64 (12.46)	4.71 (21.98)
PE Pendimethalin @ 1500 g/ha	10.32 (120.83)	7.99 (64.67)	2.73 (6.49)	3.37 (10.71)
PE Pyroxasulfone @ 127.5 g/ha	8.83 (80.00)	8.46 (74.00)	2.79 (6.92)	3.47 (11.36)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	5.32 (30.00)	5.13 (25.83)	2.23 (4.82)	2.73 (6.55)
PE Pyroxa+metsulfuron 127.5+4 g/ha	7.04 (49.33)	6.27 (38.50)	2.73 (7.22)	2.97 (8.41)
EPOST Pyroxasulfone@ 127.5 g/ha	12.19 (178.83)	9.86 (112.33)	3.30 (10.30)	4.88 (27.31)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	6.49 (55.00)	5.47 (38.50)	1.94 (2.94)	2.52 (6.47)
PE Metribuzin @300 g/ha	5.57 (32.83)	4.33 (20.67)	2.32 (5.21)	2.67 (6.77)
PE Pendi + metribuzin@1250+280 g/ha	3.73 (20.33)	3.75 (20.67)	1.85 (3.16)	1.87 (3.24)
PE Pyroxa + metribuzin@127.5+280 g/ha	4.09 (25.33)	3.79 (21.17)	2.32 (6.14)	2.30 (6.01)
Weedy Check	14.98 (281.00)	13.04 (209.17)	4.36 (18.72)	6.30 (46.97)
Weed free	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
CD(0.05)	0.49 (13.91)	0.65 (14.32)	0.18 (1.27)	0.31 (3.05)

Centres: Bajaura, Malan

*Original values were given in parenthesis and were square root transformed for statistical analysis.

In NWPZ, this trial was conducted at five centres namely Durgapura, Gurdaspur, Hisar, Jammu and Ludhiana. The analysis of pooled data as shown in Table 6.3 and 6.4 revealed that weed control treatments produced significant effect on grain yield and yield attributes. The highest yield was obtained under weed free situation (55.50 q/ha) which might be attributed to higher and better use of moisture, light, nutrients and space by the crop plants. Among herbicides, pre-emergence application of pendimethalin + pyroxasulfone

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1250+ 127.5 g/ha showed the least number of weed count of 12.5 and weed dry weight of 18.1 g/ sq. m. at 90 DAS and whereas maximum values of these parameters were observed in weedy check with respective values of 107.1/m^2 and 251.9 g/m^2 at 90 DAS. Pyroxasulfone applied as early post emergence was also found effective in reducing the population and dry weight of weeds. The centre-wise data of yield and weeds have been given in Table 6.3.1 to 6.3.5 and Table 6.4.1 to 6.4.5 of Annexure-I, respectively.

Table 6.3. North Western Plains Zone		**SPL-1**	**POOLED**		**2022-23**	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	48.14	355.1	38.9	35.5	116.9	92.0
PE Pendimethalin @ 1500 g/ha	47.65	351.6	38.9	35.5	116.0	90.7
PE Pyroxasulfone @ 127.5 g/ha	47.45	348.7	38.9	35.7	115.0	90.6
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	52.14	374.9	39.6	35.8	124.9	92.8
PE Pyroxa+metsulfuron 127.5+4 g/ha	50.41	365.0	38.9	36.1	121.1	91.5
EPOST Pyroxasulfone@ 127.5 g/ha	49.24	360.4	39.0	35.6	117.4	92.6
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	51.36	373.1	39.1	35.8	123.1	92.1
PE Metribuzin @300 g/ha	45.16	338.1	38.5	35.3	110.6	143.6
PE Pendi + metribuzin@1250+280 g/ha	47.57	347.9	39.9	35.0	114.5	90.6
PE Pyroxa + metribuzin@127.5+280 g/ha	48.47	350.3	39.4	35.7	117.0	90.0
Weedy Check	34.13	281.8	36.7	33.3	96.2	87.6
Weed free	55.50	394.8	39.6	36.3	132.4	95.3
Mean	48.10	353.5	38.9	35.5	117.1	95.8
SEm	1.06	6.150	0.324	0.870	2.527	15.455
CD (0.05)	2.49	14.4	0.8	2.0	5.9	36.3
Centres: Durgapura, Gurdaspur, Hisar, Jammu and Ludhiana						

Table 6.4. North Western Plains Zone	**SPL-1**	**Pooled**	**2022-23**	
Treatments	**Weed density. No/m^2**		**Weed dry weight. g/m^2**	
	60	**90**	**60**	**90**
PE Pendimethalin @ 1000 g/ha	5.33(27.4)*	5.63(30.8)	4.08(15.7)	6.21(37.7)
PE Pendimethalin @ 1500 g/ha	5.05(24.5)	5.3(27.2)	3.57(11.8)	5.79(32.6)
PE Pyroxasulfone @ 127.5 g/ha	4.93(23.4)	5.11(25.1)	4.42(18.6)	6.13(36.8)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	3.61(12.1)	3.66(12.5)	2.84(7.1)	4.37(18.1)
PE Pyroxa+metsulfuron 127.5+4 g/ha	5.56(30.0)	5.91(34.1)	4.22(16.9)	6.79(45.3)
EPOST Pyroxasulfone@ 127.5 g/ha	5.16(25.7)	5.3(27.2)	4.53(19.6)	6.73(44.3)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4.76(21.6)	4.83(22.4)	4.23(16.9)	5.88(33.7)
PE Metribuzin @300 g/ha	6.29(38.7)	6.9(46.6)	4.53(19.6)	7.26(52.2)
PE Pendi + metribuzin@1250+280 g/ha	5.9(33.9)	6.08(36)	3.71(12.8)	9.79(95.4)
PE Pyroxa + metribuzin@127.5+280 g/ha	5.85(33.4)	5.97(34.8)	3.38(10.4)	8.78(76.6)
Weedy Check	9.86(96.2)	10.39(107.1)	8.74(75.4)	15.89(251.9)
Weed free	1.00 (0.0)	1.00 (0.0)	1.00 (0.0)	1.00 (0.0)
CD (0.05)	0.39	0.39	0.35	0.46
Centres: Durgapura, Gurdaspur, Hisar, Jammu and Ludhiana				

*Original values were given in parenthesis and were square root transformed for statistical analysis.

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In NEPZ, this experiment was conducted at four locations (Ayodhya, Ranchi, RPCAU PUSA and Shillongani). The pooled analyzed data of yield traits and weed parameters are presented in Table 6.5 and 6.6. The perusal of data revealed that the maximum grain yield (52.87 q/ha) was obtained in weed free condition which was significantly higher than all other treatments. It was followed by pre-emergence tank mix application of pyroxasulfone + metribuzin@127.5+280 g a.i./ha with a grain yield of 49.43 q/ha and pre-emergence tank mix application of pendimethalin + pyroxasulfone @1250+127.5 g a.i./ha. for a yield of 48.79 q/ha without any significant difference in yield for these treatments. The yield gain in weed

Table 6.5. North Eastern Plains Zone **SPL-1** **Pooled** **2022-23**

Herbicide	Yield, q/ha	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Plant ht, cm	Biomass, q/ha
Pre-emergence (PE) Pendimethalin (Pendi) @1000 g/ha	43.30	302	39.58	38.56	94.00	97.29
PE Pendimethalin @1500 g/ha	44.60	323	39.83	37.32	94.56	98.93
PE Pyroxasulfone (Pyroxa) @127.5 g /ha	47.26	320	40.50	38.96	94.75	98.75
PE Pendi + Pyroxa @ 1250 + 127.5 g /ha	48.79	333	39.88	40.22	96.17	103.47
PE Pyroxa + Metsulfuron (Metsul) @127.5 + 4 g/ha	46.62	324	40.49	38.88	95.61	104.79
Early post emergence (EPOST) Pyroxa @127.5 g /ha	46.05	318	40.64	37.02	95.00	95.13
EPOST Pyroxa + Metsel @127.5 + 4 g/ha	47.52	306	41.12	39.99	94.38	104.06
PE Metribuzin (Metri) @ 300 g /ha	43.51	313	39.66	36.62	95.22	96.83
PE Pendi + Metri @ 1250+280 g/ha	46.71	315	40.06	38.94	94.98	100.15
PE Pyroxa + Metri @127.5 + 280 g /ha	49.43	308	40.88	40.84	95.18	97.54
Weedy Check	30.27	266	36.54	33.37	89.80	75.27
Weed free	52.87	346	41.72	39.94	98.36	109.54
CD (0.05)	1.33	7.06	0.32	1.41	0.98	

Centres: Ayodhya, Ranchi, RPCAU Pusa, Shillongani

Table 6.6. North Eastern Plains Zone **SPL-1** **2022-23**

Herbicide	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
Pre-emergence (PE) Pendimethalin (Pendi) @1000 g/ha	8.6 (74.4)	5.7 (32.7)	4.6 (20.5)	4.5 (19.2)
PE Pendimethalin @1500 g/ha	7.6 (58.8)	6.8 (46.1)	5.4 (28.1)	3.8 (13.8)
PE Pyroxasulfone (Pyroxa) @127.5 g /ha	8.5 (74.5)	5.4 (28.7)	4.8 (22.4)	4.2 (16.9)
PE Pendi + Pyroxa @1250 + 127.5 g /ha	6.6 (43.9)	7.4 (58)	5.4 (29.5)	3.6 (12.1)
PE Pyroxa + Metsulfuron (Metsul) @127.5 + 4 g/ha	7.7 (60.2)	5.7 (32.8)	4.6 (19.9)	4 (15.2)
Early post emergence (EPOST) Pyroxa @127.5 g /ha	8.9 (77.7)	6.8 (48.7)	4.8 (21.6)	4.4 (18.2)
EPOST Pyroxa + Metsel @127.5 + 4 g/ha	6.8 (45.3)	5 (24.9)	4.1 (16)	3.7 (13)
PE Metribuzin (Metri) @ 300 g /ha	9.9 (100.1)	8.1 (68.4)	5.5 (29.3)	4.7 (21.5)
PE Pendi + Metri @ 1250+280 g/ha	6.8 (46.5)	5.5 (30.3)	5 (24.5)	3.7 (13)
PE Pyroxa + Metri @127.5 + 280 g /ha	6.3 (39.1)	5.3 (26.9)	4.6 (20.6)	3.6 (12)
Weedy Check	17.1 (293.5)	14.2 (208.5)	10.2 (105.5)	8.1 (64.4)
Weed free	1 (0)	1 (0)	1 (0)	1 (0)
CD (0.05)	2.35	2.68	1.16	0.90

Centres: Ayodhya, Ranchi, RPCAU PUSA and Shillongani

*Original values were given in parenthesis and were square root transformed for statistical analysis.

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free condition over weedy check was 74.7%. The gain in grain yield was due to more earhead density, bold grains, less weed infestation. Almost similar trend was observed in plant height and bio-mass yield. The weed count and weed dry weight were reduced significantly by pre-emergence tank mix application of pyroxasulfone + metribuzin@127.5+280 g a.i./ha, pre-emergence tank mix application of pendimethalin + pyroxasulfone @1250 + 127.5 g a.i./ha and early post emergence tank mix application of pyroxasulfone+ metsulfuron @ 127.5 + 4 g a.i./ha. at all growth stages. The centre-wise data of yield and weeds have been given in Table 6.5.1 to 6.5.4 and Table 6.6.1 to 6.6.4 of Annexure-I, respectively.

In CZ, this trial was conducted at three centres namely Indore, Powarkheda and Udaipur.The analysis of pooled data as shown in Table 6.7 and 6.8 revealed that weed control treatments produced significant effect on grain yield and yield attributes. The highest yield was obtained under weed free situation (55.30 q/ha) which might be attributed to higher and better use of moisture, light, nutrients and space by the crop plants. Among herbicides, EPOST Pyroxa + metsul @ 127.5 + 4 g/ha showed the least number of weed count of 15.8 and weed dry weight of 24.6 g/ sq. m. at 90 DAS and whereas maximum values of these parameters were observed in weedy check with respective values of 104/m^2 and 124.5 g/m^2at 90 DAS. The centre-wise data of yield and weeds have been given in Table 6.7.1 to 6.7.3 and Table 6.8.1 to 6.8.3 of Annexure-I, respectively.

Table 6.7 Central Zone **SPL-1** **POOLED** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	44.7	323	41.9	34.26	96.8	88.1
PE Pendimethalin @ 1500 g/ha	48.2	358	42.9	32.36	97.0	90.1
PE Pyroxasulfone @ 127.5 g/ha	49.1	362	44.9	31.68	99.9	92.2
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	51.6	381	47.0	30.06	101.3	96.5
PE Pyroxa+metsulfuron 127.5+4 g/ha	49.2	365	48.5	28.81	103.0	93.4
EPOST Pyroxasulfone@ 127.5 g/ha	48.7	361	43.5	32.31	100.4	90.8
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	53.8	392	51.2	27.82	110.3	99.6
PE Metribuzin @300 g/ha	46.6	335	44.4	32.03	97.1	92.9
PE Pendi + metribuzin@1250+280 g/ha	48.9	359	46.3	30.40	97.0	95.3
PE Pyroxa + metribuzin@127.5+280 g/ha	47.8	361	45.1	30.43	100.4	92.8
Weedy Check	38.4	302	40.0	32.41	90.6	86.5
Weed free	55.3	409	52.2	26.95	113.3	95.8
Mean	48.5	359	45.7	30.79	100.6	92.8
CD (0.05)	2.7	19	1.0	2.49	7.8	3.5

Centres: Indore, Powarkheda and Udaipur

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Table 6.8 Central Zone	SPL-1	Pooled	2022-23	
Treatments	Weed density, No/m^2		Weed dry weight, g/m^2	
	60	90	60	90
PE Pendimethalin @ 1000 g/ha	5.98(40.5)	6.24(45.1)	6.08(42.6)	7.07(60.5)
PE Pendimethalin @ 1500 g/ha	5.63(34.7)	5.81(38.5)	5.3(30.7)	6.49(50)
PE Pyroxasulfone @ 127.5 g/ha	4.32(20.7)	4.82(25.6)	4.84(28.3)	5.67(37.4)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	4.07(16.6)	4.2(19)	3.86(15.3)	5.06(29.8)
PE Pyroxa+metsulfuron 127.5+4 g/ha	4.39(19.6)	4.57(23.4)	4(17.3)	5.41(35.2)
EPOST Pyroxasulfone@ 127.5 g/ha	5.21(29.5)	5.44(33.4)	5.2(30.5)	6.17(45.4)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	3.65(13.1)	3.92(15.8)	3.28(10.6)	4.55(24.6)
PE Metribuzin @300 g/ha	5.53(34.4)	5.61(38.3)	5.39(32.9)	5.98(47.1)
PE Pendi + metribuzin@1250+280 g/ha	4.79(25.9)	5.05(30.7)	4.66(23.9)	5.8(42.6)
PE Pyroxa + metribuzin@127.5+280 g/ha	4.74(23.4)	5.04(28.2)	4.71(23.9)	5.9(40.2)
Weedy Check	9.01(90.8)	9.52(104)	9.16(90.6)	10.62(124.5)
Weed free	1(0)	1(0)	1(0)	1(0)
CD (0.05)	0.3	0.2	0.2	0.2
Centres: Indore, Powarkheda and Udaipur				

*Original values were given in parenthesis and were square root transformed for statistical analysis.

In PZ, this trial was conducted at Dharwad and Pune centres. The results of pooled data are presented in Table 6.9 and 6.10. It was found that herbicide application produced significant effect on grain yield and yield attributes. Grain yield was found maximum (49.91 q/ha) under PE Pyroxa+metsulfuron 127.5+4 g/ha treatment followed by 49.29 q/ha under PE Pendi + Pyroxa @ 1250 + 127.5 g/ha treatment, whereas under weed free treatment the yield was 45.59 q/ha which was significantly lower than herbicide treatments. In terms of herbicide performance, pre-emergence application of Pyroxa+metsulfuron 127.5+4 g/ha resulted into minimum weed count (23.83) and weed dry weight (8.7 g/sq.m.) under PE Pendi + Pyroxa @ 1250 + 127.5 g/ha at 90 DAS over weed count (65.83) and weed dry weight (30.1

Table 6.9. Peninsular Zone	SPL-1			Pooled	2022-23
Herbicide	Yield, q/ha	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	47.81	340	45.27	31.47	95
PE Pendimethalin @ 1500 g/ha	47.32	350	45.68	29.79	97
PE Pyroxasulfone @ 127.5 g/ha	48.11	370	44.88	30.11	101
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	49.29	397	46.57	27.17	99
PE Pyroxa+metsulfuron 127.5+4 g/ha	49.91	369	44.87	31.83	104
EPOST Pyroxasulfone@ 127.5 g/ha	48.38	370	47.57	28.27	101
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	47.65	403	46.58	26.56	100
PE Metribuzin @300 g/ha	49.06	410	48.78	24.92	101
PE Pendi + metribuzin@1250+280 g/ha	48.67	408	46.89	26.39	92
PE Pyroxa + metribuzin@127.5+280 g/ha	48.50	375	46.56	28.16	100
Weedy Check	40.84	349	41.88	28.58	85
Weed free	45.60	380	44.9	27.8	94
CD (0.05)	2.14	19.54	1.10	5.00	10.20
Centres: Dharwad, Pune					

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Table 6.10. Peninsular Zone	SPL-1		Pooled	2022-23
Herbicide	Weed density, No/m^2		Weed dry weight, g/m^2	
	60	90	60	90
PE Pendimethalin @ 1000 g/ha	7.4 (87.83)	4.9 (27.0)	4.1 (20.51)	3.3 (10.26)
PE Pendimethalin @ 1500 g/ha	5.6 (41.0)	4.9 (25.5)	3.9 (15.85)	3.1 (9.4)
PE Pyroxasulfone @ 127.5 g/ha	4.8 (27.83)	4.5 (24.83)	3.2 (10.3)	3.1 (9.23)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	5.9 (53.0)	4.9 (27.33)	3.8 (15.46)	3.0 (8.68)
PE Pyroxa+metsulfuron 127.5+4 g/ha	5.2 (36.5)	4.4 (23.83)	3.2 (10.63)	3.2 (10.21)
EPOST Pyroxasulfone@ 127.5 g/ha	5.3 (34.16)	6.4 (52.67)	4.6 (25.16)	4.3 (21.4)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4.7 (24.66)	5.5 (34.83)	4.4 (22.55)	3.4 (10.83)
PE Metribuzin @300 g/ha	6.2 (50.67)	4.7 (25.0)	4.2 (21.18)	3.4 (11.96)
PE Pendi + metribuzin@1250+280 g/ha	8.0 (88.33)	4.7 (24.16)	4.4 (21.76)	3.2 (9.81)
PE Pyroxa + metribuzin@127.5+280 g/ha	5.5 (39.33)	5.0 (28.0)	3.5 (12.01)	3.6 (12.46)
Weedy Check	7.2 (63.5)	7.3 (65.83)	6.9 (55.45)	5.3 (30.05)
Weed free	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)	1.0 (0.0)
CD (0.05)	2.20	1.20	1.10	0.80

Centres: Dharwad, Pune

*Original values were given in parenthesis and were square root transformed for statistical analysis.

g/sq.m.) at 90 DAS under weedy check condition, respectively. The centre-wise data of yield and weeds have been given in Table 6.9.1 to 6.9.2 and Table 6.10.1 to 6.10.2 of Annexure-I, respectively.

SPL-2: Wheat productivity with nano urea under irrigated condition

This experiment was conducted to explore the possibility of maximizing wheat productivity by integrated use of nano urea. The experiment was laid out in randomized complete block design with thirteen treatments viz. control (No N) and 50, 75 and 100% of Rec N rates along with either one spray of nano urea or two spray of nano urea or two spray of urea. One third nitrogen as per treatment, full phosphorus and potash as basal dose and the remaining $2/3^{rd}$ nitrogen as $1/3^{rd}$ at first irrigation and $1/3^{rd}$ at second irrigation were applied. Irrigation and weed control measures were followed as per recommended package of practices for the concerned zone.

In NHZ, this experiment was conducted at Almora centre only. The data presented in Table 6.11 showed that the lowest grain yield (22.91 q/ha) was recorded in treatment where no nitrogen was applied in absolute control treatment. In comparison to control, all the treatments caused significant yield improvement. No specific trend with regards to nano urea applications was observed.

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Table 6.11. Northern Hill Zone		SPL-2	Almora		2022-23	
Treatments	Earheads/ sqm	1000 Grains Weight, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant ht, cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	274	48.58	38.93	51.43	126.49	94.46
Rec. N + one spray of nano urea at tillering	258	46.87	45.15	54.38	128.28	95.12
Rec. N + two spray of nano urea at tillering and jointing	252	47.85	44.35	53.21	136.44	93.65
Rec. N + two spray of urea (5%) at tillering and jointing	264	49.03	42.34	54.63	123.72	96.21
75% N + water spray at tillering and jointing	249	48.91	43.03	52.22	133.00	98.03
75% N + one spray of nano urea at tillering	233	47.99	44.61	49.81	123.31	93.61
75% N + two spray of nano urea at tillering and jointing	245	49.39	42.58	51.41	134.41	95.45
75% N + two spray of 5% urea at tillering and jointing	240	48.50	44.90	52.10	135.31	94.83
50% N + water spray at tillering and jointing	227	49.79	37.51	42.35	110.36	91.31
50% N + one spray of nano urea at tillering	223	48.11	42.53	45.55	123.33	95.20
50% N + two spray of nano urea at tillering and jointing	242	48.92	39.98	47.26	123.95	94.31
50% N + Two spray of 5% urea at tillering and jointing	239	49.27	39.48	46.42	122.23	95.07
Control (without N only)	169	47.52	28.56	22.91	59.67	80.48
CD (0.05)	21.46	1.75	3.88	3.03	11.61	4.65

In NWPZ, this experiment was conducted at eight locations (Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana and Pantnagar). The perusal of pooled analysis data presented in Table 6.12 showed that application of recommended N (rec. N - 1/3rd as basal, 1/3rd at CRI and 1/3rd at jointing as 150:60:40 kg NPK/ha) and two spray of nano urea at tillering and jointing stage produced the maximum grain yield of 53.91 q/ha. However, the grain yield with rec. N + two spray of simple urea (5%) at tillering and

Table 6.12. North Western Plains Zone		SPL-2		Pooled	2022-23	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	50.74	392	39.78	33.29	126.54	93.28
Rec. N + one spray of nano urea at tillering	52.81	386	40.05	34.74	128.59	93.00
Rec. N + two spray of nano urea at tillering and jointing	53.91	395	40.01	34.94	129.92	94.07
Rec. N + two spray of urea (5%) at tillering and jointing	53.44	386	40.16	35.12	130.48	93.79
75% N + water spray at tillering and jointing	50.58	372	39.71	35.11	129.11	92.74
75% N + one spray of nano urea at tillering	51.82	391	39.99	34.06	132.13	93.08
75% N + two spray of nano urea at tillering and jointing	53.91	391	40.00	35.29	132.14	92.73
75% N + two spray of 5% urea at tillering and jointing	52.76	372	40.21	36.10	132.02	93.04
50% N + water spray at tillering and jointing	46.85	358	40.15	33.47	117.68	90.67
50% N + one spray of nano urea at tillering	49.92	374	40.53	33.93	123.21	91.18
50% N + two spray of nano urea at tillering and jointing	51.56	370	40.83	34.93	126.71	92.52
50% N + Two spray of 5% urea at tillering and jointing	51.51	356	40.83	36.19	127.23	91.95
Control (without N only)	36.60	304	38.90	31.75	91.84	87.25
Mean	50.49	373	40.09	34.53	125.20	92.25
CD (0.05)	1.74	9.63	0.81	1.50	3.69	1.73
Centres: Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar						

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joining stage (53.44 q/ha), rec. N + one spray of nano urea at tillering (52.81 q/ha), 75% Rec. N with two nano spray and 75% Rec N with two 5% urea spray were at par with rec. N + two sprays of nano urea. The addition of two spray of nano urea at tillering and jointing stage with recommended N fertilization brought an increase of 6.2% in grain yield over rec. N treatment. The yield gain might be due to the bolder grains (thousand grains weight of 40.16 g in nano urea spray against 39.78 g for recommended dose of N fertilizer without any spray) and higher grains/earhead. The centrewise data have been given in Table 6.12.1 to Table 6.12.8 of Annexure-I.

In NEPZ, this experiment was conducted at five locations (Burdwan, Coochbehar, Ranchi, Sabour and Varanasi). The pooled analyzed data of these centres are presented in Table 6.13. The perusal of data revealed that the maximum grain yield (48.62 q/ha) was obtained under recommended N Dose + two sprays of nano urea at tillering & jointing stage treatment, which was at par to recommended N Dose + two spray of urea (5%) at tillering and jointing but significantly higher than all other treatments. This gain in grain yield was due to more earhead density and bold grains. The yield gain in recommended N Dose + two spray of nano urea at tillering & jointing stage treatment over control was 108.9%. Centre wise data are given in Tables 6.13.1 to 6.13.5 of Annexure-I.

Table 6.13. North Eastern Plains Zone **SPL-2** **Pooled** **2022-23**

Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	311	40.96	35.82	44.71	100.14
Rec. N + one spray of nano urea at tillering	317	41.03	36.35	46.23	102.18
Rec. N + two spray of nano urea at tillering and jointing	327	42.10	36.08	48.62	105.21
Rec. N + two spray of urea (5%) at tillering and jointing	311	41.04	37.96	47.75	107.54
75% N + water spray at tillering and jointing	273	40.59	38.88	42.04	93.74
75% N + one spray of nano urea at tillering	283	41.08	37.66	43.34	97.93
75% N + two spray of nano urea at tillering and jointing	287	41.24	38.45	44.69	100.53
75% N + two spray of 5% urea at tillering and jointing	294	41.25	36.73	44.12	99.86
50% N + water spray at tillering and jointing	249	40.31	36.85	35.60	79.17
50% N + one spray of nano urea at tillering	250	40.15	37.62	37.15	83.63
50% N + two spray of nano urea at tillering and jointing	266	40.44	35.19	37.40	85.45
50% N + Two spray of 5% urea at tillering and jointing	274	40.28	33.58	36.49	83.62
Control (without N only)	207	38.35	30.70	23.27	49.84
Mean	281	40.68	36.30	40.88	91.45
CD (0.05)	14.90	1.00	2.90	2.10	5.1

Centres: Burdwan, Coochbehar, Ranchi, Sabour and Varanasi

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In CZ, this experiment was conducted at five locations (Gwalior, Indore, Junagarh and Vijapur). The perusal of pooled analysis data presented in Table 6.14 showed that application of recommended N (rec. N - 1/3rd as basal, 1/3rd at CRI and 1/3rd at jointing as 120:60:40 kg NPK/ha) and two spray of urea (5%) at tillering & Jointing stage produced the maximum grain yield of 55.8 q/ha which was at par with rec N + two nano urea spray at tillering & Jointing stage (55.4 q/ha), rec N + two water spray (54.6 q/ha) and rec N + One nano urea spray at tillering stage (54.3 q/ha). The addition of two spray of 5% urea at tillering and jointing stage with recommended N fertilization brought an increase of 2.2% in grain yield over rec. N treatment. The yield gain might be due to the bolder grains (thousand grains weight of 49.3 g) and more earhead / sq m (433). The centre wise data have been given in Table 6.14.1 to Table 6.14.4 of Annexure-I.

Table 6.14. Central Zone

	SPL-2			Pooled	2022-23	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec N (1/3rd basal, 1/3rd CRI, 1/3rd Jointing) + two water spray at tillering and jointing	54.6	420	48.6	27.3	124.4	84.8
Rec N + One nano urea spray tillering	54.3	412	48.9	27.8	127.2	83.8
Rec N + Two nano urea spray tillering & Jointing	55.4	437	48.4	27.2	127.4	84.0
Rec N + Two 5% urea spray tillering & Jointing	55.8	433	49.3	27.1	129.9	84.2
75% Rec N (1/3rd basal, 2/3rd CRI-Rec N)	49.4	390	48.3	27.1	121.7	81.9
75% Rec N + One nano urea spray tillering	48.9	394	46.6	27.5	118.3	82.9
75% Rec N + Two nano urea spray tillering & Jointing	50.7	394	47.5	28.3	118.3	82.5
75% Rec N + Two 5% urea spray tillering & Jointing	50.5	388	48.4	28.4	120.6	83.3
50% Rec N (1/3rd basal, 2/3rd CRI-Rec N)	44.6	343	46.3	29.2	110.4	80.4
50% Rec N + One nano urea spray tillering	43.9	356	46.5	27.3	108.8	79.6
50% Rec N + Two nano urea spray tillering & Jointing	45.0	359	46.7	27.5	111.7	80.8
50% Rec N + Two 5% urea spray tillering & Jointing	48.0	347	47.5	30.4	115.3	79.1
Absolute Control (No nitrogen application)	31.3	290	48.3	23.8	82.2	73.7
Mean	48.6	382	47.8	27.6	116.6	81.6
CD (0.05)	2.2	17	1.3	1.9	5.9	1.4

Centres: Gwalior, Indore, Junagarh and Vijapur

In PZ, this experiment was conducted at three locations(Dharwad, Niphad and Pune).The perusal of pooled analysis data presented in Table 6.15 showed that application of recommended N and two spray of nano urea at tillering and jointing stage produced the maximum grain yield of 48.73 q/ha. However, the grain yield (48.07 q/ha) with recommended N and two spray of urea (5%) at tillering and joining stage was at par to two spray of nano urea. The addition of two spray of nano urea at tillering and joinitng stage with recommended N fertilization brought an increase of 11.07% in grain yield

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over base treatment. The treatment of 75% N + two spray of nano urea produced the bolder grains with thousands grains weight of 46.64 g against 44.55 g for recommended dose of N fertilizer without any spray. The centrewise data are given in Table 6.15.1 to Table 6.15.3 of Annexure-I.

Table 6.15. Peninsular Zone			**SPL-2**		**Pooled**	**2022-23**
Treatments	Earheads/ sqm	1000 Grains Wt, g	Grains/ earhead	Yield, q/ha	Biomass, q/ha	Plant ht, cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd tillering-Rec. N) + water spray at tillering & jointing	392	44.55	26.65	43.87	85.79	81.76
Rec. N + one spray of nano urea at tillering	399	45.07	26.42	46.67	89.81	81.81
Rec. N + two spray of nano urea at tillering & jointing	401	44.57	27.97	48.73	92.11	80.57
Rec. N + two spray of urea (5%) at tillering & jointing	402	45.72	26.78	48.07	87.98	81.32
75% N + water spray at tillering & jointing	396	43.02	24.61	40.35	71.22	81.18
75% N + one spray of nano urea at tillering	411	45.72	24.38	44.18	79.77	80.87
75% N + two spray of nano urea at tillering & jointing	387	46.64	24.88	43.62	81.57	80.18
75% N + two spray of 5% urea at tillering & jointing	368	44.61	29.28	46.93	93.45	80.59
50% N + water spray at tillering & jointing	367	42.27	25.81	38.44	72.67	80.61
50% N + one spray of nano urea at tillering	375	45.13	25.40	41.08	78.16	82.03
50% N + two spray of nano urea at tillering & jointing	374	45.03	25.31	41.60	74.37	81.07
50% N + Two spray of 5% urea at tillering & jointing	363	45.06	27.01	43.06	75.54	79.64
Control (without N only)	384	39.13	25.37	36.54	69.55	79.73
CD(0.05)	27.40	1.90	3.20	4.60	8.00	3.90
Centres : Dharwad, Niphad, Pune						

SPL- 3: Wheat productivity with nano urea under restricted irrigation

The experiment was conducted in randomised complete block design with nine treatments viz. control (no N), control + nano urea spray (one and two), recommended N (Rec. N), rec. N + one (at tillering) and two spray (tillering and jointing) of nano urea and urea (5%) and Rec. N + one spray of nano urea at tillering + one spray of urea (5%) at jointing stage. One third nitrogen as per treatment was applied as basal dose and the remaining 2/3rd nitrogen at CRI stage of wheat. Weed control measures were followed as per recommended package of practices for the concerned zone.

In NHZ, this trial was conducted at two locations namely Bajaura and Malan. The data presented in Table 6.16 clearly reveal that significantly highest wheat grain yield (41.06 q/ha) was obtained by applying recommended dose of N along with spray of urea (5%) + nano urea at tillering stage. The minimum grain yield (16.60 q/ha) was recorded in absolute control (No nitrogen). Compared to control treatment, application of two spray of nano urea alone at tillering and jointing significantly increased the grain yield (20.22 q/ha). As compared to recommended N, one or two spray of either nano urea or urea did not significantly improve the grain yield. In comparison to control, combination of Rec. N with

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either nano urea or urea resulted in significant improvement in earhead density, 1000 grains weight, grains per earhead, biomass and plant height. The centrewise data are given in Table 6.16.1 to Table 6.16.2 of Annexure-I.

Table 6.16. Northern Hill Zone		**SPL-3**	**Pooled**		**2022-23**	
Treatments	Earheads/ m^2	1000 grains weight, g	Grains/ earhead	Yield, q/ha	Biomass, q/ha	Plant ht., cm
One Nano Urea Spray at tillering	241	39.97	20.53	18.72	53.36	76.32
Two Nano Urea Spray at tillering & Jointing	244	40.30	20.92	20.22	57.86	77.80
Rec N (1/3rd basal, 2/3rd CRI)	295	45.03	29.27	37.49	92.20	88.08
Rec N + One Nano Urea Spray at tillering	301	45.15	28.62	37.95	98.28	86.55
Rec N + Two Nano Urea Spray at tillering & Jointing	300	45.07	28.97	38.50	97.19	86.18
Rec N + One Urea (5%) Spray at tillering	310	45.90	28.45	40.10	94.39	88.47
Rec N + Two Urea (5%) Spray at tillering & Jointing	311	45.73	28.89	40.71	96.70	89.37
Rec N + One Urea (5%) + Nano Urea spray at tillering	305	45.35	29.51	41.06	98.97	88.42
Absolute control (No Nitrogen)	232	38.33	20.66	16.60	49.69	74.87
CD (0.05)	12.14	1.70	1.68	2.55	5.63	3.19
Centres: Bajaura, Malan						

In NWPZ, this experiment was conducted at three locations (Hisar, Karnal and Pantnagar). The perusal of pooled analysis data presented in Table 6.17 showed that application of recommended N {Rec N (1/3rd basal, 2/3rd CRI)} and two spray of 5% urea at tillering and jointing stage produced the maximum grain yield of 51.47 q/ha and it was statistically at par with recommended N and one spray of 5% urea + one spray of nano urea at tillering stage (49.57 q/ha) but was significantly superior to rest of the treatments. The better yield in Rec N + two spray of urea was due to higher tiller density (431/m^2). Two sprays of nano urea at tillering and jointing stage brought an increase of 11.4% in grain yield over absolute control. The nano spray was inferior to 5% urea. The centre wise data are given in Table 6.17.1 to Table 6.17.3 of Annexure-I.

Table 6.17. North Western Plains Zone	**SPL-3**			**Pooled**	**2022-23**	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	34.97	326	39.99	27.30	78.65	85.36
Two Nano Urea Spray at tillering & Jointing	36.25	328	40.09	28.45	80.90	85.50
Rec N (1/3rd basal, 2/3rd CRI)	47.62	397	39.39	31.16	117.82	98.78
Rec N + One Nano Urea Spray at tillering	48.90	408	40.96	30.13	124.59	99.29
Rec N + Two Nano Urea Spray at tillering & Jointing	47.39	418	41.30	28.52	120.58	98.87
Rec N + One Urea (5%) Spray at tillering	49.02	396	39.04	32.36	127.01	100.13
Rec N + Two Urea (5%) Spray at tillering & Jointing	51.47	431	39.24	31.27	133.86	100.49
Rec N + One Urea (5%) + Nano Urea spray at tillering	49.57	416	40.46	30.46	125.77	99.56
Absolute control (No Nitrogen)	32.54	315	40.28	25.96	75.25	81.62
Mean	44.19	382	40.08	29.51	109.38	94.40
CD (0.05)	2.10	28.88	2.00	2.40	8.15	4.01
Centres: Hisar, Karnal and Pantnagar						

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In NEPZ, this experiment was conducted at four locations (Burdwan, Kanpur, RPCAU PUSA and Shillongani). The pooled analyzed data of Burdwan, Kanpur, RPCAU PUSA and Shillongani centres are presented in Table 6.18. The perusal of data revealed that the maximum grain yield (45.24 q/ha) was obtained under recommended N + two sprays of urea (5%) at tillering and jointing stages which was at par to treatment having one spray of urea (5%) at tillering + one spray of nano urea at jointing and was significantly superior to all other treatments . This gain in grain yield was due to more earhead density and bold grains. The yield gain in recommended N + two sprays of urea (5%) at tillering and jointing stages over recommended dose of nitrogen was 28.4%. Centre wise data are given in Tables 6.18.1 to 6.18.4 of Annexure-I.

Table 6.18. North Eastern Plains Zone **SPL-3** **Pooled** **2022-23**

Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant ht, cm
One spray of nano urea at tillering	209	40.22	35.38	28.87	61.2	80.4
Two spray of nano urea at tillering and Jointing	212	41.76	39.99	34.45	70.4	83.6
Rec N (1/3rd basal, 2/3rd CRI-Rec N)	232	41.42	38.59	35.22	83.1	90.8
Rec N + One spray of nano urea at tillering	239	41.99	40.31	38.56	86.9	93.0
Rec N + Two sprays of nano urea at tillering and Jointing	239	43.85	38.79	38.47	86.3	93.8
Rec N + One spray of urea (5%) at tillering	242	42.59	42.21	40.66	92.6	94.6
Rec N + Two sprays of urea (5%) at tillering and Jointing	248	43.71	43.24	45.24	100.9	94.3
Rec N + One spray of urea (5%) + nano urea at tillering	251	42.43	42.09	43.18	97.9	93.7
Absolute Control	194	36.80	37.07	25.79	59.1	78.7
Mean	230	41.64	39.74	36.71	82.0	89.2
CD (0.05)	8.60	0.67	3.56	2.23	3.76	1.73

Centres: Burdwan, Kanpur, RPCAU PUSA and Shillongani

In CZ, this experiment was conducted at four locations (Gwalior, Indore, Udaipur and Vijapur). The perusal of pooled analysis data presented in Table 6.19 showed that application of recommended N (1/3rd basal, 2/3rd CRI) and two spray of Nano Urea at tillering & Jointing stage produced the maximum grain yield of 42.4 q/ha and it was statistically at par with Rec N + One Urea spray (5%) + Nano Urea spray at tillering, Rec N + Two Urea (5%) spray at tillering & Jointing and Rec N + One Urea (5%) spray at tillering but was significantly superior to rest of the treatments. The better yield in Rec N + two spray of Nano Urea at tillering & Jointing stage was due to higher tiller density (348/m^2) and increase in grain yield was 10.1% over recommended N. Two spray of Nano Urea at tillering & Jointing stage registered almost 2 % yield increase over rec N + two Urea (5%) spray at tillering & Jointing. The centrewise data are given inTable 6.19.1 to Table 6.19.4 of Annexure-I.

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Table 6.19 Central Zone	SPL-3			Pooled	2022-23	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	27.4	243	43.5	26.75	66.6	80.9
One spray of nano urea at tillering	29.8	259	43.9	27.13	69.0	81.7
Two spray of nano urea at tillering and Jointing	38.5	316	44.3	29.27	94.8	86.9
Rec N (1/3rd basal, 2/3rd CRI-Rec N)	39.9	342	46.3	26.37	98.3	86.6
Rec N + One spray of nano urea at tillering	42.4	348	46.2	27.65	101.2	86.7
Rec N + Two sprays of nano urea at tillering and Jointing	40.7	336	45.1	28.36	97.1	86.6
Rec N + One spray of urea (5%) at tillering	41.6	346	46.4	27.61	100.9	87.7
Rec N + Two sprays of urea (5%) at tillering and Jointing	41.9	342	43.8	29.05	99.7	85.8
Rec N + One spray of urea (5%) + nano urea at tillering	25.4	227	42.0	27.79	60.0	76.0
Absolute Control	36.4	307	44.6	27.78	87.5	84.3
CD (0.05)	2.2	13	1.6	2.12	4.3	3.0
Centres: Gwalior, Indore, Udaipur and Vijapur						

SPL-4: Agronomic interventions for quality enhancement in wheat

The trial was conducted in split-plot design with four genotypes (HD 3226, HI 1544, DBW 187 and PBW 1 Zn) in main plots and foliar spray (no foliar spray, 2% sulphur (S), 2% urea, 0.5% $ZnSO_4.7H_2O$, 1% KCl and S + N + Zn + KCl) in sub-plot with three replications. The experiment was conducted with recommended dose of NPK as 150:60:40 kg/ha. One third nitrogen as per treatment, full phosphorus and potash as basal dose and the remaining 2/3rd nitrogen as 1/3rd at first irrigation and 1/3rd at second irrigation were applied.

In NWPZ, this trial was conducted with an objective to enhance quality of wheat varieties by foliar spray of sulphur (S), nitrogen (N), zinc (Zn), potash (K) and their combinations at four centres (Gurdaspur, Hisar, Ludhiana and Pantnagar). The pooled analysis of data presented in Table 6.20 revealed that the maximum mean grain yield (60.03 q/ha) was produced under the treatment of 2% urea spray, which remained statistically significant over all other treatments. Among varieties, DBW187 produced the maximum and significantly higher grain yield (60.28 q/ha) than all the other varieties. The maximum iron (Fe) content (40.99 ppm) and Zn (36.62 ppm) were recorded in PBW 1 Zn genotype. However, there was no significant difference due to varieties. Where, foliar fertilization significantly affected the Zn content in the grains. Among foliar sprays, maximum zinc content (38.40 ppm) was observed in treatment of foliar fertilization Zn followed by the treatment of S (38.83 ppm). Maximum protein content (11.99%) was recorded in genotype HD 3226. Among foliar fertilization, maximum protein was recorded in 2% urea application, which was at par with all the treatments except 1% KCl spray. The centrewise data of yield and quality parameters are given in Table 6.20.1 to 6.20.4 of Annexure-I, respectively.

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Table 6.20. North Western Plains Zone **SPL-4** **Pooled** **2022-23**

Nutrients foliar spray	Variety: HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW 1 Zn	Rk	Mean	Rk
					Yield, q/ha					
No foliar fertilization	56.75	4	56.86	4	60.34	4	58.09	4	58.01	4
S (2% S)	55.81	6	58.52	2	60.89	3	60.66	1	58.97	2
N (2% Urea)	58.24	1	59.02	1	62.76	1	60.12	2	60.03	1
Zn (0.5% $ZnSO_4.7H_2O$)	57.43	3	53.58	6	58.26	5	57.29	6	56.64	5
KCl 1%	57.61	2	56.92	3	61.34	2	59.23	3	58.78	3
S+N+Zn+KCl	56.00	5	54.29	5	58.11	6	57.73	5	56.53	6
Mean	56.97		56.53		60.28		58.85		58.16	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	1.17		1.09				NS		NS	
					Earhead/sq.m.					
No foliar fertilization	351	5	345	5	328	6	342	5	341	6
S (2% S)	348	6	365	2	342	5	364	2	355	3
N (2% Urea)	353	4	364	3	350	3	347	4	354	4
Zn (0.5% $ZnSO_4.7H_2O$)	357	2	349	4	348	4	326	6	345	5
KCl 1%	360	1	367	1	353	2	354	3	359	1
S+N+Zn+KCl	355	3	340	6	367	1	367	1	357	2
Mean	354		355		348		350		352	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	NS		8.40				16.80		16.06	
					1000 grains weight, g					
No foliar fertilization	39.51	4	36.84	5	41.86	5	38.19	5	39.10	6
S (2% S)	39.95	3	37.63	4	41.65	6	40.36	1	39.90	3
N (2% Urea)	38.26	6	39.11	1	43.54	1	40.20	2	40.28	2
Zn (0.5% $ZnSO_4.7H_2O$)	40.75	2	35.96	6	42.67	4	38.02	6	39.35	5
KCl 1%	43.25	1	38.45	2	42.73	3	38.97	3	40.85	1
S+N+Zn+KCl	39.07	5	37.76	3	43.53	2	38.50	4	39.72	4
Mean	40.13		37.63		42.66		39.04		39.87	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	1.03		NS				NS		NS	
					Grains/ear head					
No foliar fertilization	44.37	2	46.35	1	47.02	1	46.30	2	46.01	1
S (2% S)	42.73	5	45.72	2	44.88	2	44.52	5	44.46	3
N (2% Urea)	46.39	1	44.70	3	44.87	3	45.06	4	45.26	2
Zn (0.5% $ZnSO_4.7H_2O$)	42.79	4	44.51	4	42.86	5	47.50	1	44.42	4
KCl 1%	41.91	6	43.68	6	44.13	4	45.32	3	43.76	5
S+N+Zn+KCl	43.61	3	44.00	5	40.67	6	43.29	6	42.89	6
Mean	43.63		44.83		44.07		45.33		44.47	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	NS		1.65				NS		NS	
					Biomass, q/ha					
No foliar fertilization	160.62	5	146.97	2	153.55	6	161.20	5	155.58	4
S (2% S)	158.27	6	143.82	3	156.25	3	163.29	3	155.41	5
N (2% Urea)	170.77	1	150.58	1	161.76	1	163.82	2	161.73	1
Zn (0.5% $ZnSO_4.7H_2O$)	167.71	3	137.00	6	156.83	2	161.85	4	155.85	3
KCl 1%	170.13	2	142.85	4	154.46	4	165.63	1	158.27	2
S+N+Zn+KCl	163.77	4	137.36	5	154.44	5	154.68	6	152.56	6
Mean	165.21		143.09		156.21		161.75		156.57	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	4.48		3.31				6.61		7.54	

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Fe Content Grains, ppm										
No foliar fertilization	38.39	1	37.67	4	37.65	3	41.59	3	38.83	1
S (2% S)	38.13	2	37.08	5	37.02	5	42.25	1	38.62	2
N (2% Urea)	37.72	3	38.43	3	35.97	6	42.06	2	38.54	5
Zn (0.5% ZnSO4.7H2O)	36.83	5	38.68	2	38.18	1	40.60	5	38.57	4
KCl 1%	36.45	6	36.72	6	37.87	2	38.07	6	37.28	6
S+N+Zn+KCl	36.83	4	38.79	1	37.41	4	41.36	4	38.60	3
Mean	37.39		37.89		37.35		40.99		38.40	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	NS		NS				NS		NS	
Zn Content Grains, ppm										
No foliar fertilization	33.49	6	34.39	5	37.18	1	39.33	1	36.10	3
S (2% S)	34.25	4	37.99	3	32.10	6	34.85	5	34.80	5
N (2% Urea)	33.68	5	34.88	4	35.38	3	39.01	2	35.74	4
Zn (0.5% ZnSO4.7H2O)	41.54	1	39.06	1	35.22	4	37.77	3	38.40	1
KCl 1%	35.08	3	32.84	6	35.68	2	32.96	6	34.14	6
S+N+Zn+KCl	40.43	2	38.43	2	34.33	5	35.81	4	37.25	2
Mean	36.41		36.26		34.98		36.62		36.07	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	NS		1.85				3.71		3.96	
Protein Content Grains, %										
No foliar fertilization	12.30	1	11.60	3	11.59	2	11.23	5	11.68	2
S (2% S)	12.21	3	11.41	5	11.37	4	11.14	6	11.53	5
N (2% Urea)	12.21	2	11.76	1	11.36	5	11.49	2	11.71	1
Zn (0.5% ZnSO4.7H2O)	11.92	4	11.70	2	11.61	1	11.45	3	11.67	3
KCl 1%	11.46	6	11.35	6	11.26	6	11.23	4	11.33	6
S+N+Zn+KCl	11.81	5	11.41	4	11.48	3	11.71	1	11.60	4
Mean	11.99		11.54		11.45		11.38		11.59	
	Variety (A)		Nutrients Spray (B)				B within A		A within B	
C.D. (0.05)	NS		0.23				NS		NS	

Centres: Gurdaspur, Hisar, Ludhiana and Pantnagar

In NEPZ, this experiment was conducted at Kanpur centre. The yield and micro-nutrients data of Kanpur centre is presented in Table 6.21. The effect of genotype, foliar spray and their interaction on grain yield was significant. The maximum yield of 37.60 q/ha was recorded for DBW 187 under the foliar application of S + N + Zn + KCl at stem elongation and milk stage; however, it was statistically similar to grain yield of check entry HD 3226 under the same treatment. On mean basis, the maximum yield of 34.43 q/ha was recorded for DBW 187 followed by PBW 1 Zn. The foliar application of Zn, KCL and S + N + Zn + KCl significantly improved the grain yield and biomass of all varieties over treatment having no foliar application. The maximum iron content (57.3 ppm) was observed for PBW 1 Zn without any foliar application of micro-nutrients followed by HD 3226 with iron content of 50.7 ppm under 2% urea application as foliar spray. On overall basis, the maximum iron content was observed for PBW 1 Zn followed by HD 3226. The maximum and significantly higher

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zinc content (58.4 ppm) was recorded in PBW 1 Zn followed by HI 1544 (55.5 ppm) under the treatment of S+N+Zn+Kcl and Zn foliar application, respectively. In all treatment except Zn and S + N + Zn + KCl foliar application and overall basis, HD 3226 showed higher Zn content compared to other genotypes. In all treatment except Zn foliar spray and overall basis, the maximum protein (up to 11.92% with 2% S foliar spray) was recorded with HD 3226 with overall mean value of 11.17%. In other three genotypes, overall mean protein was similar (10.41-10.63%).

Table 6.21. North Eastern Plains Zone SPL-4 Kanpur 2022-23

	Genotypes									
Foliar Fertilization	HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW1 Zn	Rk	Mean	Rk
				Yield, q/ha						
No foliar fertilization	29.83	6	30.40	6	31.50	6	31.83	4	30.89	6
S (2% S)	31.44	4	31.67	5	33.52	5	31.53	5	32.04	5
N (2% Urea)	30.57	5	32.29	4	35.14	2	31.48	6	32.37	4
Zn (0.5% ZnSO4.7H2O)	32.60	3	33.34	3	34.44	3	34.61	3	33.75	3
KCl 1%	34.51	2	34.87	2	34.41	4	34.89	2	34.67	2
S+N+Zn+KCl	37.13	1	35.66	1	37.60	1	36.55	1	36.74	1
Mean	32.68		33.04		34.43		33.48		33.41	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)	0.84		0.89		1.77		1.76			
				Earheads/sqm						
No foliar fertilization	366	6	368	6	382	3	375	5	373	6
S (2% S)	376	4	374	4	389	1	376	3	379	2
N (2% Urea)	372	5	382	1	380	4	380	2	378	3
Zn (0.5% ZnSO4.7H2O)	381	2	372	5	369	6	376	4	374	5
KCl 1%	378	3	379	2	371	5	382	1	378	4
S+N+Zn+KCl	387	1	379	3	384	2	373	6	381	1
Mean	377		376		379		377		377	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)	N.S.		4.84		9.69		9.80			
				Grains/Earhead						
No foliar fertilization	18.93	6	18.34	3	18.19	6	17.91	5	18.34	6
S (2% S)	20.03	3	17.91	6	18.93	5	18.50	4	18.84	4
N (2% Urea)	19.74	5	18.05	5	20.40	3	17.05	6	18.81	5
Zn (0.5% ZnSO4.7H2O)	20.00	4	19.57	2	21.27	2	20.37	1	20.30	2
KCl 1%	21.99	2	18.14	4	19.69	4	20.27	2	20.02	3
S+N+Zn+KCl	22.06	1	20.89	1	22.56	1	19.13	3	21.16	1
Mean	20.46		18.81		20.17		18.87		19.58	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)	1.05		0.69		1.39		1.53			
				1000 Grains Weight, g						
No foliar fertilization	43.07	2	45.20	5	45.33	4	47.53	3	45.28	4
S (2% S)	41.80	4	47.23	2	45.57	2	45.33	4	44.98	5
N (2% Urea)	41.63	5	47.00	3	45.37	3	48.63	2	45.66	3
Zn (0.5% ZnSO4.7H2O)	42.77	3	45.80	4	43.93	5	45.23	5	44.43	6
KCl 1%	41.53	6	50.87	1	47.10	1	45.07	6	46.14	1
S+N+Zn+KCl	43.53	1	45.10	6	43.50	6	51.30	1	45.86	2
Mean	42.39		46.87		45.13		47.18		45.39	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)	2.29		N.S.		2.48		2.95			

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				Biomass, q/ha						
No foliar fertilization	98.27	6	100.60	6	104.33	6	97.93	6	100.28	6
S (2% S)	101.87	5	119.23	5	117.00	5	106.60	5	111.18	5
N (2% Urea)	106.33	3	123.83	3	119.83	4	107.22	4	114.30	4
Zn (0.5% ZnSO4.7H2O)	105.60	4	121.87	4	121.00	3	118.09	3	116.64	3
KCl 1%	119.60	2	132.63	1	127.33	2	128.53	2	127.03	2
S+N+Zn+KCl	127.00	1	132.47	2	135.77	1	134.53	1	132.44	1
Mean	109.78		121.77		120.88		115.48		116.98	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)	1.58		1.33		2.66		2.76			
				Fe, ppm						
No foliar fertilization	45.40		48.60		39.40		57.30		47.68	
S (2% S)	44.00		41.60		45.10		41.30		43.00	
N (2% Urea)	50.70		48.90		42.90		43.60		46.53	
Zn (0.5% ZnSO4.7H2O)	42.60		44.60		40.80		45.00		43.25	
KCl 1%	38.20		37.80		41.80		37.10		38.73	
S+N+Zn+KCl	44.00		40.50		36.70		47.90		42.28	
Mean	44.15		43.67		41.12		45.37		43.58	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)										
				Zn, ppm						
No foliar fertilization	31.60		31.50		27.70		25.30		29.03	
S (2% S)	34.20		28.70		26.80		31.40		30.28	
N (2% Urea)	31.30		32.70		27.20		27.40		29.65	
Zn (0.5% ZnSO4.7H2O)	44.50		55.50		37.90		47.90		46.45	
KCl 1%	34.00		29.20		30.30		31.40		31.23	
S+N+Zn+KCl	53.10		30.40		47.70		58.40		47.40	
Mean	38.12		34.67		32.93		36.97		35.67	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)										
				Protein, %						
No foliar fertilization	11.22		10.45		10.27		11.06		10.75	
S (2% S)	11.92		10.90		11.26		10.28		11.09	
N (2% Urea)	10.93		10.89		10.67		10.61		10.78	
Zn (0.5% ZnSO4.7H2O)	10.70		11.35		10.60		10.96		10.90	
KCl 1%	11.00		9.97		10.92		9.98		10.47	
S+N+Zn+KCl	11.24		10.20		9.74		9.58		10.19	
Mean	11.17		10.63		10.58		10.41		10.70	
	Genotype (A)		Foliar application(B)		B within A		A within B			
CD (0.05)										
Date of Sowing: 26.11.2022			Date of Harvesting: 21.04.2023							

In CZ, this trial was conducted at Vijapur only. The pooled analysis of data presented in Table 6.22 revealed that the maximum mean grain yield (51.35 q/ha) was produced under the treatment of 0.5% Zn spray, which remained statistically at par to all other treatments. Among varieties, DBW187 produced the maximum grain yield (52.31 q/ha) and was also at par to all the other varieties. Maximum iron (Fe) content (34.42 ppm) was recorded in PBW 1 Zn genotype which was at par with HD 3226 (32.91ppm) and these both varieties were also at par with each other for Zn content also. However, there was no significant difference in Fe content due to foliar spray but significantly highest Zn content (45.31 ppm) was

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recorded due to foliar spray of S+N+Zn+KCl. Significantly highest protein content (10.73%) was recorded in genotype HI 1544. Among foliar fertilization, maximum protein was recorded in S+N+Zn+KCl spray which was equal to 1% KCl spray.

Table 6.22. Central Zone SPL-4 Vijapur 2022-23

	Variety									
Nutrients foliar spray	HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW 1 Zn	Rk	Mean	Rk
					Yield, q/ha					
No foliar fertilization	46.17	4	46.63	5	55.63	3	44.12	6	48.13	5
S (2% S)	48.63	2	54.29	3	44.50	6	46.58	4	48.50	4
N (2% Urea)	47.25	3	54.67	2	51.42	4	49.17	1	50.63	2
Zn (0.5% $ZnSO_4.7H_2O$)	45.04	5	55.46	1	55.75	2	49.17	1	51.35	1
KCl 1%	43.50	6	48.58	4	56.46	1	46.29	5	48.71	3
S+N+Zn+KCl	49.42	1	45.71	6	50.13	5	46.92	3	48.04	6
Mean	46.67		50.89		52.31		47.04		49.23	
	Variety (A)				Nutrients Spray (B)		B within A		A within B	
C.D. (0.05)	NS				NS		NS		NS	
					Earhead/sq.m.					
No foliar fertilization	433	2	392	3	424	1	405	5	414	2
S (2% S)	432	3	396	2	379	6	422	3	407	4
N (2% Urea)	411	6	367	5	381	5	420	4	395	5
Zn (0.5% $ZnSO_4.7H_2O$)	425	4	365	6	396	3	394	6	395	6
KCl 1%	420	5	384	4	390	4	451	1	411	3
S+N+Zn+KCl	452	1	461	1	409	2	436	2	440	1
Mean	429		394		396		421		410	
	Variety (A)				Nutrients Spray (B)		B within A		A within B	
C.D. (0.05)	NS				NS		NS		NS	
					1000 grains weight, g					
No foliar fertilization	44.75	1	44.99	1	49.28	1	48.06	3	46.77	1
S (2% S)	43.46	2	43.55	4	47.30	5	44.45	6	44.69	5
N (2% Urea)	41.12	4	43.13	5	48.58	3	48.44	1	45.32	3
Zn (0.5% $ZnSO_4.7H_2O$)	38.63	6	44.27	2	49.00	2	47.60	4	44.87	4
KCl 1%	39.56	5	42.65	6	48.15	4	45.48	5	43.96	6
S+N+Zn+KCl	42.59	3	44.10	3	47.16	6	48.07	2	45.48	2
Mean	41.68		43.78		48.24		47.02		45.18	
	Variety (A)				Nutrients Spray (B)		B within A		A within B	
C.D. (0.05)	2.16				NS		NS		NS	
					Grains per ear head					
No foliar fertilization	23.77	6	26.26	5	27.19	4	22.69	5	24.97	5
S (2% S)	25.95	4	31.62	3	26.10	6	24.98	2	27.16	4
N (2% Urea)	28.10	1	35.18	1	28.64	3	24.28	3	29.05	2
Zn (0.5% $ZnSO_4.7H_2O$)	27.51	2	34.47	2	28.87	2	26.25	1	29.27	1
KCl 1%	26.43	3	30.02	4	31.13	1	22.81	4	27.60	3
S+N+Zn+KCl	25.67	5	23.39	6	26.14	5	22.40	6	24.40	6
Mean	26.24		30.16		28.01		23.90		27.08	
	Variety (A)				Nutrients Spray (B)		B within A		A within B	
C.D. (0.05)	3.17				NS		NS		NS	

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Biomass, q/ha										
No foliar fertilization	132.3	5	115.8	6	137.2	4	126.2	5	127.9	6
S (2% S)	138.9	2	127.3	2	137.8	3	130.7	3	133.7	1
N (2% Urea)	134.3	3	120.4	4	139.2	2	128.5	4	130.6	5
Zn (0.5% $ZnSO_4.7H_2O$)	133.4	4	129.3	1	137.0	5	131.6	2	132.8	3
KCl 1%	131.8	6	124.5	3	142.3	1	126.1	6	131.1	4
S+N+Zn+KCl	144.7	1	118.9	5	133.0	6	135.3	1	133.0	2
Mean	135.9		122.7		137.7		129.7		131.5	
	Variety (A)			Nutrients Spray (B)			B within A		A within B	
C.D. (0.05)	NS			NS			NS		NS	
Fe Content Grains, ppm										
No foliar fertilization	31.60	6	29.17	6	30.03	4	35.53	2	31.58	5
S (2% S)	32.43	5	32.33	1	29.40	6	31.63	6	31.45	6
N (2% Urea)	33.67	2	30.13	4	29.80	5	35.90	1	32.38	2
Zn (0.5% $ZnSO_4.7H_2O$)	32.43	4	32.17	2	30.37	3	34.33	5	32.33	3
KCl 1%	32.50	3	29.63	5	30.60	2	34.40	4	31.78	4
S+N+Zn+KCl	34.80	1	31.03	3	31.87	1	34.70	3	33.10	1
Mean	32.91		30.74		30.34		34.42		32.10	
	Variety (A)			Nutrients Spray (B)			B within A		A within B	
C.D. (0.05)	2.79			NS			NS		NS	
Zn Content Grains, ppm										
No foliar fertilization	28.37	6	25.23	6	23.90	6	32.53	3	27.51	6
S (2% S)	32.43	4	28.93	3	26.20	3	29.43	6	29.25	4
N (2% Urea)	34.13	3	25.30	5	26.13	4	32.43	4	29.50	3
Zn (0.5% $ZnSO_4.7H_2O$)	47.80	2	42.03	1	33.67	2	44.90	2	42.10	2
KCl 1%	28.97	5	26.63	4	24.03	5	30.90	5	27.63	5
S+N+Zn+KCl	52.37	1	41.83	2	39.33	1	47.70	1	45.31	1
Mean	37.34		31.66		28.88		36.32		33.55	
	Variety (A)			Nutrients Spray (B)			B within A		A within B	
C.D. (0.05)	1.92			2.65			NS		NS	
Protein Content Grains, %										
No foliar fertilization	12.12	1	10.92	3	9.29	5	8.67	6	10.25	3
S (2% S)	11.82	2	10.44	4	9.09	6	9.07	5	10.11	5
N (2% Urea)	8.82	5	11.31	2	9.69	4	10.01	4	9.96	6
Zn (0.5% $ZnSO_4.7H_2O$)	8.63	6	11.52	1	9.78	3	10.59	3	10.13	4
KCl 1%	9.74	3	9.94	6	11.76	1	11.63	2	10.77	1
S+N+Zn+KCl	9.58	4	10.26	5	11.59	2	11.64	1	10.77	2
Mean	10.12		10.73		10.20		10.27		10.33	
	Variety (A)			Nutrients Spray (B)			B within A		A within B	
C.D. (0.05)	0.39			0.57			1.14		1.09	

SPL- 5: Effect of NPK solubilizing microbial consortium on wheat productivity

An experiment on evaluation of the effect of NPK solubilizing microbial (Rhizosphere) consortium on productivity of wheat under irrigated condition was conducted at one location (Shimla) in NHZ. The three rates of NPK fertilizers, control (No NPK), 75% Rec. NPK and 100% Rec NPK were applied in combination of with two seed treatment of NPK solubilizing microbial (Rhizosphere) and Bio GROW consortium. For seed treatment, 2.5 ml of NPK

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solubilizing microbial (Rhizosphere) and Bio GROW consortium was diluted to 25 ml with water and a pinch of sugar is added to it. This suspension is then sprinkled on the seeds and thoroughly mixed to have uniform coating. The treated seeds were then dried in shade before seeding. The recommended dose of NPK was 150:60:40 kg N, P_2O_5 and K_2O. Full dose of P and K and 1/3rd dose of N were applied as basal. Remaining 2/3rd N was applied in to two equal splits at first and second irrigation.

In NHZ, the application of recommended dose of NPK with seed treatment of NPK solubilizing microbial (Rhizosphere) and Bio GROW consortium recorded significantly higher grain yield compared to all the lower doses of NPK applied with seed treatment of NPK solubilizing microbial (Rhizosphere) and Bio GROW consortium (Table 6.22). The lowest grain yield (25.58 q/ha) was recorded in control plots (no fertilizer and no seed treatment). The wheat grain yield was significantly increased with the increase in NPK rates. The seed treatment with NPK solubilizing microbial (Rhizosphere) or Bio GROW consortium did not cause any significant yield improvement over Rec. NPK rates. The absolute control treatment recorded lesser earhead density, thinner grains, lesser biomass and shortest plants. Whereas, the treatment of 100% Rec NPK recorded highest earhead density (324/m^2) and 1000 grains weight (46.0 g).

Table 6.22. Northern Hill Zone **SPL-5** **Shimla** **2022-23**

Treatments	Earheads/ m^2	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant ht., cm
Control (No seed treatment and no NPK)	243	44.67	23.78	25.58	80.42	76.67
Control (No NPK) + Bio NPK @2.5 ml/kg seed treatment	247	45.67	24.86	27.94	89.94	80.00
Control (No NPK) + Bio GROW @2.5 ml/kg seed treatment	235	46.67	25.16	27.58	78.30	76.00
75% Rec. NPK	315	44.33	33.79	46.42	121.16	93.67
75% Rec. NPK+ Bio NPK @2.5 ml/kg seed treatment	301	44.33	34.88	46.49	134.92	89.33
75% Rec. NPK+ Bio GROW @2.5 ml/kg seed treatment	320	44.67	33.46	47.68	149.73	92.33
100% Rec. NPK	324	46.00	33.19	49.46	149.20	92.00
100% Rec. NPK + Bio NPK @2.5 ml/kg seed treatment	317	44.00	36.32	50.49	151.85	94.33
100% Rec. NPK + Bio GROW @2.5 ml/kg seed treatment	319	42.67	38.12	51.66	150.79	93.67
CD (0.05)	33.34	2.02	2.93	3.09	6.82	5.11

In NWPZ, this experiment was conducted at four centres viz., Gurdaspur, Hisar, Jammu and Ludhiana. The experiment was conducted in RBD design having control, 50% recommended NPK, 75% NPK and 100% NPK with and without seed treatment (Bio NPK @ 2.5 ml/kg or Bio Grow 2.5 ml/kg seed). The recommended dose of fertilizer was maintained as 150:60:40 kg N, P_2O_5 and K_2O/ha. One third nitrogen, full phosphorus and potash were applied as basal dose and the remaining 2/3rd nitrogen was applied during first and second irrigation equally. The pooled data of all the four centres presented in Table 6.23 showed that the maximum grain yield of 52.27 q/ha was recorded with 100% NPK + seed treatment with Bio NPK @2.5 ml/kg followed by 51.98 q/ha with 100% NPK + seed treatment with Bio Grow

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@2.5 ml/kg. The seed treatment with either Bio NPK @2.5 ml/kg or Bio Grow @ 2.5 ml/kg seed brought about significant improvement in grain yield only under control (no NPK) treatments. The significant change in biomass with seed treatment was observed only with seed treatment with no fertilizer over control treatment. No NPK application treatments recorded significantly lesser yield and yield attributes except grain weight. The centre wise data have been illustrated in Tables 6.23.1 to 6.23.4 of Annexure-I.

Table 6.23. North Western Plains Zone	**SPL-5**			**Pooled**		**2022-23**
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
Control (no seed trt. and no NPK)	28.04	277	40.07	26.30	72.52	83.02
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	31.56	287	40.58	27.90	81.22	85.07
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	31.65	288	40.65	27.61	80.48	85.89
75% Rec. NPK	46.02	333	40.30	35.00	117.67	92.51
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	47.69	337	40.32	35.86	120.44	94.21
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	47.79	336	40.34	35.98	119.71	93.48
100% Rec. NPK	51.06	364	40.01	35.61	128.06	95.07
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	52.27	369	40.38	35.62	131.21	96.07
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	51.98	369	40.27	35.54	131.00	95.88
CD (0.05)	2.07	13.36	0.79	2.21	4.91	2.86
Centres: Gurdaspur, Hisar, Jammu and Ludhiana						

In NEPZ, this experiment was conducted at two locations (RPCAU PUSA and Varanasi). The pooled analyzed data of these centres are presented in Table 6.24. The perusal of data revealed that the maximum grain yield (41.63 q/ha) was recoded with 100% recommended NPK + seed treatment with Bio GROW @ 2.5 ml/kg which was at par to 100% recommended NPK + seed treatment with Bio NPK@ 2.5 ml/kg but significantly higher than all other treatments. The yield gain in 100% recommended NPK + seed treatment with Bio GROW @ 2.5 ml/kg treatment over Rec. NPK was 4.73%. The centre wise data have been illustrated in Tables 6.24.1 to 6.24.2 of Annexure-I.

Table 6.24. North Eastern Plains Zone	**SPL-5**		**Pooled**		**2022-23**
Treatments	Yield, q/ha	Earhead/ sqm	1000 GW, g	Grains/ earhead	Biomass, q/ha
Control (no seed treatment and no NPK)	23.57	181	36.45	36.13	61.58
Control (no NPK) + seed treatment with Bio NPK @2.5 ml/kg	25.26	194	36.41	35.98	60.11
Control (no NPK) + seed treatment with Bio GROW@2.5 ml/kg	25.32	182	36.68	38.30	60.88
75% Rec. NPK	35.66	237	35.76	42.57	85.73
75% Rec. NPK + seed treatment with Bio NPK@2.5 ml/kg	36.20	230	36.59	43.21	83.96
75% Rec. NPK + seed treatment with Bio GROW@2.5 ml/kg	36.46	233	36.69	42.78	85.51
100% Rec. NPK	39.75	260	36.41	43.17	93.31
100% Rec. NPK + seed treatment with Bio NPK@2.5 ml/kg	41.07	253	36.40	45.50	96.70
100% Rec. NPK + seed treatment with Bio GROW@2.5 ml/kg	41.63	256	36.76	45.12	97.55
CD (0.05)	1.09	8.60	4.52	2.41	4.52
Centres: RPCAU PUSA and Varanasi					

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In CZ, this experiment was conducted at three centres viz., Indore, Junagarh and Vijapur . Pooled analysis results (Table 6.25) showed that the seed treatment of bio NPK or biogrow were effective under no fertiliser application only, however, along with 75% or 100% NPK these treatments were at par in grain yield. The centre wise data have been illustrated in Tables 6.25.1 to 6.25.3 of Annexure-I.

Table 6.25 Central Zone	**SPL-5**			**Pooled**	**2022-23**	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
Control (no seed treatment and no NPK)	19.8	262	45.9	17.7	45.4	59.0
Control (no NPK) + seed treatment with Bio NPK @2.5 ml/kg	23.3	275	48.3	18.6	52.1	60.5
Control (no NPK) + seed treatment with Bio GROW@2.5 ml/kg	25.2	288	49.1	19.1	58.8	64.4
75% Rec. NPK	47.2	352	48.2	28.5	106.5	81.0
75% Rec. NPK + seed treatment with Bio NPK@2.5 ml/kg	49.4	366	49.2	28.1	112.1	81.3
75% Rec. NPK + seed treatment with Bio GROW@2.5 ml/kg	48.9	366	49.4	27.8	110.1	81.9
100% Rec. NPK	53.1	390	48.4	28.9	119.6	82.0
100% Rec. NPK + seed treatment with Bio NPK@2.5 ml/kg	52.5	395	50.4	27.1	118.2	82.0
100% Rec. NPK + seed treatment with Bio GROW@2.5 ml/kg	54.2	402	49.9	28.0	122.8	83.5
CD (0.05)	2.2	14	2.6	1.6	5.4	2.5
Centres: Indore, Junagarh and Vijapur						

In PZ, this experiment was conducted at Pune centre. The experiment was conducted in RBD design having control, seed treatment with Bio NPK and Bio GROW (microbial consortium) @ 2.5 ml/kg seed each with 75% and 100% of recommended dose of NPK. The recommended dose of fertilizer was maintained as 120:60:40 kg N, P_2O_5 and K_2O/ha. One third nitrogen, full phosphorus and potash were applied as basal dose and the remaining 2/3rd nitrogen was applied during first and second irrigation equally. The data of Pune centre presented in Table 6.26 showed that the maximum grain yield of 54.77 q/ha was recorded with 100% Rec NPK + seed treatment with Bio NPK @2.5 ml/kg seed treatment followed by 100% Rec NPK (51.36 q/ha) both treatments remained at par.

Table 6.26. Peninsular Zone	**SPL-5**			**Pune**		**2022-23**
Treatments	Yield, q/ha	Earhead/ sqm	1000 grains weight, g	Grains/ earhead	Plant Ht., cm	Biomass, q/ha
Control (no seed treatment and no NPK)	40.28	275	48.33	30.47	79.0	87.89
Control (no NPK) + seed treatment with Bio NPK @2.5 ml/kg	43.23	288	49.00	30.56	80.0	94.00
Control (no NPK) + seed treatment with Bio GROW@2.5 ml/kg	42.47	280	49.33	30.77	82.7	91.98
75% Rec. NPK	42.11	267	48.00	33.40	80.0	91.24
75% Rec. NPK + seed treatment with Bio NPK@2.5 ml/kg	43.87	297	48.67	30.40	80.0	93.91
75% Rec. NPK + seed treatment with Bio GROW@2.5 ml/kg	48.40	325	49.33	30.66	81.7	102.95
100% Rec. NPK	51.36	318	48.00	34.23	81.7	110.51
100% Rec. NPK + seed treatment with Bio NPK@2.5 ml/kg	54.77	303	48.00	37.81	82.0	110.35
100% Rec. NPK + seed treatment with Bio GROW@2.5 ml/kg	50.44	278	49.33	36.71	80.7	106.31
CD (0.05)	6.91	48.37	2.03	6.21	3.16	15.89

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BARLEY

Resource Management group of AICRP Wheat and Barley are engaged in agronomic evaluation of new genotypes and updating the package of practices under different agro climatic conditions. Input management *viz.* Nutrients and water under resource scarce conditions, sowing timings in different zones under changing climatic conditions, micro nutrient supply, nano fertiliser application and other crop management practices for yield maximisation are the priority researchable areas in barley agronomy. In spite of the fact that the crop is being grown mostly on fringe and problematic lands, the productivity increased during recent years and the newly developed improved technologies contributes in the increased productivity.

The details of the trials (proposed and conducted) are reported in Table 7. A total of 4 trials at 25 locations were proposed and all were conducted and reported.

Table 7 Details of barley trials proposed and conducted

Trial Name	Number of locations	
	Proposed	Conducted
Nitrogen Levels x Varieties (NWPZ)	4	4
N and Zn scheduling (NWPZ)	5	5
Nano fertiliser application (NWPZ,NEPZ,CZ,NHZ)	11	11
Method of sowing x Seed rate (NWPZ)	5	5
Total	25	25

Response of new barley genotypes to different N levels (NWPZ)

This trial was conducted at Durgapura, Hisar, Karnal and Ludhiana. The test entry DWRB 219 and checks RD 2849 and DWRB 137 (six row) were at par. However, DWRB 219 recorded the highest yield (52.90 q/ha) followed by check RD 2849 (51.39 q/ha) with 120 kg N/ha and were numerically superior than other checks (Table 7.1). The genotypes DWRUB 52, RD 2849 and DWRB 219 responded up to 120 kg N/ha and rest of entries responded up to 90 kg N/ha. It was found that 1000 grains wt and grains/earhead were better in new genotype DWRB 219 compared to other two row checks.

Table 7.1 AVT (Malt) NWPZ POOLED 2022-23

Genotype	N levels, kg/ha						Mean	Rk
	60	Rk	90	Rk	120	Rk		
	Yield, q/ha							
DWRUB 52 (C)	45.21	3	48.80	4	50.75	3	48.25	4
DWRB 219	45.96	2	49.53	3	52.90	1	49.46	1
RD 2849 (C)	45.21	4	49.63	2	51.39	2	48.74	3
DWRB 137 (C)	46.42	1	49.68	1	50.21	4	48.77	2
DWRB 182 (C)	44.30	5	48.41	5	47.28	5	46.66	5
Mean	45.42		49.21		50.51		48.38	
CD (0.05)	Nitrogen(A)		Genotype (B)		B within A		A within B	
	0.85		0.91		1.58		1.64	

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				Earhead/m^2				
DWRUB 52 (C)	391	2	412	3	419	3	407	3
DWRB 219	380	4	388	4	404	4	391	4
RD 2849 (C)	390	3	428	1	438	1	419	2
DWRB 137 (C)	367	5	380	5	385	5	377	5
DWRB 182 (C)	413	1	421	2	428	2	421	1
Mean	388		406		415		403	
CD (0.05)	Nitrogen(A)		Genotype (B)		B within A		A within B	
	6.73		7.29		12.6		13.1	
				Grains/Earhead				
DWRUB 52 (C)	27.56	4	28.73	4	28.41	4	28.24	4
DWRB 219	28.85	2	29.38	2	29.84	2	29.36	2
RD 2849 (C)	28.59	3	27.55	5	26.98	5	27.71	5
DWRB 137 (C)	40.55	1	41.47	1	42.61	1	41.54	1
DWRB 182 (C)	27.56	5	29.25	3	29.14	3	28.65	3
Mean	30.62		31.28		31.40		31.10	
CD (0.05)	Nitrogen(A)		Genotype (B)		B within A		A within B	
	NS		0.81		NS		1.69	
				1000 Grain Weight, g				
DWRUB 52 (C)	49.46	3	49.65	3	50.57	3	49.90	3
DWRB 219	51.97	1	53.39	1	53.62	1	52.99	1
RD 2849 (C)	49.53	2	50.13	2	51.55	2	50.40	2
DWRB 137 (C)	48.53	4	49.25	4	48.37	4	48.72	4
DWRB 182 (C)	46.05	5	47.25	5	46.69	5	46.66	5
Mean	49.11		49.94		50.16		49.73	
CD (0.05)	Nitrogen(A)		Genotype (B)		B within A		A within B	
	NS		1.04		NS		1.97	
Centres: Durgapura, Hisar, Karnal Ludhiana								

Table 7.1.1 Response of new genotypes to Nitrogen levels **2022-23**

Genotype	N levels, kg/ha						Mean	Rank
	60	Rank	90	Rank	120	Rank		
				Durgapura				
DWRUB 52 (C)	47.17	5	53.85	5	55.24	4	52.09	5
DWRB 219	54.23	1	59.90	1	64.23	1	59.46	1
RD 2849 (C)	47.27	4	58.70	2	56.36	3	54.11	2
DWRB 137 (C)	47.87	3	55.89	3	57.01	2	53.59	3
DWRB 182 (C)	51.35	2	54.84	4	52.63	5	52.94	4
Mean	49.58		56.64		57.09		54.44	
	F. Test		S.E.m		CD (0.05)		C.V.(%)	
N levels (A)	**		0.77		3.04		5.51	
Genotype (B)	**		0.88		2.56		4.83	
B within A	N.S.		1.52		4.43			
A within B			1.56		4.56			
				Hisar				
Genotype	60	Rank	90	Rank	120	Rank	Mean	Rank
DWRUB 52 (C)	44.06	3	49.38	1	49.21	2	47.55	2
DWRB 219	45.13	2	48.60	2	50.51	1	48.08	1
RD 2849 (C)	41.95	4	47.72	4	47.92	3	45.86	4
DWRB 137 (C)	46.67	1	48.22	3	47.38	4	47.42	3
DWRB 182 (C)	41.83	5	46.16	5	45.72	5	44.57	5
Mean	43.93		48.02		48.15		46.70	
	F. Test		S.E.m		CD (0.05)		C.V.(%)	
N levels (A)	*		0.61		2.39		5.05	
Genotype (B)	*		0.82		2.40		5.28	
B within A	N.S.		1.42		4.16			
A within B			1.41		4.12			

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Karnal								
Genotype	60	Rank	90	Rank	120	Rank	Mean	Rank
DWRUB 52 (C)	52.24	2	50.80	4	54.30	4	52.45	2
DWRB 219	48.88	4	51.00	2	54.46	3	51.45	4
RD 2849 (C)	50.75	3	50.89	3	55.06	2	52.23	3
DWRB 137 (C)	59.54	1	56.41	1	55.55	1	57.17	1
DWRB 182 (C)	47.30	5	45.78	5	42.23	5	45.10	5
Mean	51.74		50.98		52.32		51.68	
	F. Test		S.E.m		CD (0.05)		C.V.(%)	
N levels (A)	N.S.		0.59		2.30		4.39	
Genotype (B)	**		0.58		1.68		3.35	
B within A	**		1.00		2.91			
A within B			1.07		3.12			
Ludhiana								
Genotype	60	Rank	90	Rank	120	Rank	Mean	Rank
DWRUB 52 (C)	37.38	2	41.14	3	44.26	3	40.93	3
DWRB 219	35.60	4	38.59	4	42.40	4	38.87	4
RD 2849 (C)	40.88	1	41.19	2	46.22	2	42.76	2
DWRB 137 (C)	31.59	5	38.19	5	40.90	5	36.89	5
DWRB 182 (C)	36.72	3	46.85	1	48.55	1	44.04	1
Mean	36.44		41.19		44.46		40.70	
	F. Test		S.E.m		CD (0.05)		C.V.(%)	
N levels (A)	**		0.75		2.96		7.17	
Genotype (B)	**		0.81		2.35		5.94	
B within A	N.S.		1.40		4.08			
A within B			1.46		4.26			

Barley Production Technology

To increase the production, productivity and profitability of the barley growing farmers, updating of package of practices of barley crop is continuous process and the need of the hour. Three special trials were conducted in different zones to achieve this objective. The results from these trials are presented below.

SPL 1: Productivity enhancement of barley through nitrogen and zinc scheduling

The trial was conducted at five locations in NWPZ with nine treatments of N scheduling and in three treatments of Zn using DWRB 160. The productivity was superior and at par in T_4, T_5 and T_7 treatments when nitrogen was splitted twice and also applied urea or urea and Zn through foliar spray (Table 7.2). Three year average data also resulted similar findings.

Table 7.2 NWPZ N and Zn scheduling Pooled 2022-23

	Earhead/m^2	Grains/Earhead	1000 grains wt, g	Yield, q/ha	3 years mean yield
T_1	361	30.14	52.93	46.96	46.92
T_2	362	31.34	53.47	46.48	47.70
T_3	366	31.28	53.16	46.65	48.59
T_4	375	31.18	54.96	49.88	49.87
T_5	385	31.64	55.12	51.38	51.42
T_6	357	31.38	53.02	46.68	47.30
T_7	371	31.52	54.53	50.38	50.96
T_8	354	30.22	52.56	44.73	46.57
T_9	357	31.42	53.41	47.36	48.88
CD (0.05)	10.3	1.9	1.6	1.5	1.37
Centers: Agra, Durgapura, Hisar, Karnal, Ludhiana					

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T_1: 1/2 at basal+1/2 at tillering (35-40 DAS)
T_2: 1/2 at basal+1/4 at tillering (35-40 DAS) +1/4 at anthesis stage (80-90 DAS)
T_3 : 1/3 at basal+1/3 at tillering (35-40 DAS) +1/3 at flag leaf stage (65-70 DAS)
T_4 : 1/2 at basal+1/2 at tillering (35-40 DAS) +5.0% urea spray at anthesis stage (80-90 DAS)
T_5 : 1/2 at basal+1/2 at tillering (35-40 DAS) +5.0% urea + 0.5% $ZnSO_4.7H_2O$ spray at anthesis stage (80-90 DAS)
T_6 : 1/2 at basal+1/4 at tillering (35-40 DAS) +5.0% urea spray at anthesis stage (65-70 DAS)
T_7 : 1/2 at basal+1/4 at tillering (35-40 DAS) +5.0% urea + 0.5% $ZnSO_4.7H_2O$ spray at flag leaf (65-70 DAS) and 5% urea spray at anthesis stage (80-90 DAS)
T_8 : 1/3 at basal+1/3 at tillering (35-40 DAS) +5.0% spray at flag leaf stage (80-90 DAS)
T_9 : 1/3 at basal+1/3 at tillering (35-40 DAS) +5.0% Urea + 0.5% $ZnSO_4.7H_2O$ spray at anthesis (80-90 DAS)

Table 7.2.1. NWPZ	**N and Zn scheduling**		**Yield, q/ha**	**2022-23**
Agra	Durgapura	Hisar	Karnal	Ludhiana
T_1	39.45	58.43	38.64	51.96	46.29
T_2	39.77	55.17	43.78	49.50	44.17
T_3	40.43	57.67	43.08	48.90	43.16
T_4	43.70	62.90	42.62	53.85	46.31
T_5	49.78	65.20	44.12	51.44	46.37
T_6	43.07	58.23	38.92	51.74	41.45
T_7	51.26	63.17	42.01	54.75	40.71
T_8	42.20	54.50	39.84	50.46	36.67
T_9	48.35	57.83	41.64	51.43	37.54
CD (0.05)	3.37	6.10	3.63	4.79	3.44

SPL 2: Enhancing nutrient use efficiency through nano fertiliser

The experiment was conducted at five locations in NWPZ, three in NEPZ, one in CZ and two in NHZ and different combinations of nanofertilizer were used to optimise nano nitrogen dose for barley. The productivity of barley increased with increase in the level of nitrogen up to recommended level and the addition of nano nitrogen did not effect significantly (Tables 7.3 and 7.3.1 to 7.3.5). The productivity of recommended dose and recommended + Nano N were at par and significantly more than the other treatments in NWPZ and NEPZ. The productivity at 75% RDF + nanofertiliser and RDF were at par in CZ and NHZ.

Table 7.3	**NWPZ**	**Nano Urea**		**Pooled**	**2022-23**
Treatments	Earhead/m^2	Grains/Earhead	1000 grains wt, g	Yield, q/ha	3 years mean yield
T_1	263	42.34	40.31	29.68	28.81
T_2	293	43.16	41.17	36.93	36.33
T_3	312	46.93	41.80	43.39	41.82
T_4	323	46.54	42.51	45.56	44.07
T_5	342	47.97	43.64	49.93	47.65
T_6	350	47.65	43.73	51.19	49.03
T_7	359	48.08	44.55	53.69	51.10
T_8	366	48.16	44.36	53.58	51.21
T_9	360	48.44	43.90	54.62	52.08
C.D. (0.05)	9.2	1.8	1.0	2.0	1.82
Centers: Agra, Durgapura, Hisar, Karnal, Ludhiana					

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T_1 : Control (P+K only)

T_2 : Control (P+K only) +1000 ml NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS

T_3 : 50% RDN + 500ml NN/ha at 30-35 DAS+500ml/ha at 60-65 DAS

T_4 : 50% RDN + 1000 NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS

T_5 : 75% RDN +500ml NN at 30-35 DAS+500ml NN at 60-65 DAS

T_6 : 75% RDN + 1000ml NN at 30-35 DAS+1000ml NN at 60-65 DAS

T_7 : RDN + 500ml NN/ha at 30-35 DAS+500ml/ha at 60-65 DAS

T_8 : RDN + 1000ml NN/ha at 30-35 DAS+1000ml/ha at 60-65

T_9 : Recommended doses of Nitrogen (RDN)

Table 7.3.1. NWPZ Nano Urea 2022-23

Treatments	Agra	Durgapura	Hisar	Karnal	Ludhiana
T1	34.50	33.50	15.68	45.40	19.33
T2	39.80	48.90	20.16	55.99	19.78
T3	43.15	56.40	32.63	56.37	28.40
T4	46.08	62.67	34.17	56.25	28.66
T5	48.50	66.17	38.90	57.90	38.18
T6	51.40	67.67	40.11	58.02	38.73
T7	53.79	63.67	44.62	58.84	47.53
T8	56.66	59.67	45.08	59.03	47.45
T9	56.88	64.33	46.56	57.80	47.54
C.D. (0.05)	9.67	5.68	3.13	3.68	3.66

Table 7.3.2. NEPZ Nano Urea Pooled 2022-23

Treatments	Earhead/m^2	Grains/Earhead	1000 grains wt, g	Yield, q/ha
T_1	247	30.87	40.71	26.16
T_2	258	32.26	40.93	27.51
T_3	296	33.56	41.05	32.47
T_4	301	33.01	41.67	33.75
T_5	308	35.51	40.65	38.33
T_6	314	36.69	41.11	38.99
T_7	336	35.51	41.06	40.22
T_8	336	36.42	41.44	42.20
T_9	336	36.22	43.36	42.23
C.D. (0.05)	5.2	1.4	1.1	3.5
Centers: Ayodhya, Kanpur, Varanasi, Udaipur				

Table 7.3.3. NEPZ and CZ Nano Urea Yield, q/ha 2022-23

Treatments	Ayodhya	Kanpur	Varanasi	CZ Udaipur
T_1	22.68	38.80	17.00	42.97
T_2	23.29	42.44	16.80	39.48
T_3	26.58	41.70	29.13	39.23
T_4	27.12	42.49	31.63	43.58
T_5	29.86	42.78	42.37	43.72
T_6	30.25	43.56	43.17	48.63
T_7	33.25	42.90	44.50	45.92
T_8	33.84	44.09	48.67	40.32
T_9	33.00	45.66	48.03	46.37
C.D. (0.05)	1.55	1.69	13.04	5.83

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Table 7.3.4. NHZ	Nano Urea		Pooled	2022-23
Treatments	Earhead/m^2	Grains/Earhead	1000 grains wt, g	Yield, q/ha
T_1	235	28.00	37.04	20.10
T_2	245	28.56	37.28	23.28
T_3	272	30.22	38.92	30.54
T_4	282	29.94	38.96	31.90
T_5	296	30.54	39.43	34.46
T_6	317	32.21	39.67	38.50
T_7	329	31.41	39.97	38.61
T_8	333	31.61	39.74	39.09
T_9	322	30.55	39.83	35.69
C.D. (0.05)	13.5	1.8	0.8	2.7
Centers: Bajaura, Malan				

Table 7.3.5. NHZ	Nano Urea	Yield, q/ha	2022-23
Treatments	**Bajaura**	**Malan**	
T_1	18.70	21.50	
T_2	19.33	27.23	
T_3	28.41	32.68	
T_4	28.33	35.46	
T_5	31.42	37.49	
T_6	35.48	41.51	
T_7	36.19	41.03	
T_8	36.44	41.73	
T_9	35.48	35.89	
C.D. (0.05)	6.24	2.26	

SPL 3: Effect of sowing method and seed rate on barley productivity

The trial was conducted at five locations in NWPZ (Agra, Hisar, Ludhiana, Karnal and Durgapura) in split plot design having sowing method (2 treatments) in main plot and seed rate (3 levels) in sub plot. Pooled results revealed that normal sowing and paired row were similar in productivity and 100 and 87.5 kg seed rate/ha were at par but superior to 75 kg seed rate /ha . The highest yield (46.57 q/ha) was obtained in paired row with 100 kg seed/ha (Table 7.4). Centre wise results showed that paired row sowing was better at Durgapura and Karnal, normal sowing was better at Agra and normal and paired sowing were similar at Hisar and Ludhiana. Two year mean data also revealed the similar results.

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Table 7.4. Sowing Method × seed rate Pooled 2022-23

Seed rate, kg/ha	Method of Sowing				Mean	Rank
	Normal	Rank	Paired row	Rank		
			Yield, q/ha			
75	41.87	3	42.00	3	41.94	3
87.5	43.95	2	44.84	2	44.40	2
100	44.70	1	46.57	1	45.63	1
MEAN	43.51		44.47		43.99	
CD (0.05)	SM(A) NS		SR(B)0.88	B within A NS	A within B 1.57	
			Earhead/m^2			
75	286	3	286	3	286	3
87.5	301	2	305	2	303	2
100	313	1	320	1	316	1
MEAN	300		304		302	
CD (0.05)	SM(A) 5.94		SR(B) NS	B within A NS	A within B 11.8	
			Grains/Earhead			
75	38.51	1	39.42	1	38.96	1
87.5	38.45	2	38.63	2	38.54	2
100	37.35	3	38.48	3	37.91	3
MEAN	38.10		38.84		38.47	
CD (0.05)	SM(A) NS		SR(B) NS	B within A NS	A within B NS	
			1000 Grains wt, g			
75	38.52	1	39.59	1	39.06	1
87.5	38.51	2	38.97	2	38.74	2
100	37.54	3	38.70	3	38.12	3
MEAN	38.19		39.09		38.64	
CD (0.05)	SM(A) NS		SR(B) 0.65	B within A NS	A within B 1.12	
			2 years mean yield, q/ha			
75	40.40	1	40.15	1	40.27	1
87.5	42.05	2	42.83	2	42.44	2
100	42.59	3	44.55	3	43.57	3
MEAN	41.68		42.51		42.10	
CD (0.05)	SM(A) 0.33		SR(B) 0.35	B within A 0.54	A within B 0.49	
Centers: Agra, Hisar, Ludhiana, Karnal, Durgapura						

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Table 7.4.1. Sowing Method × seed rate	Yield, q/ha				2022-2023	
Seed rate, kg/ha	Method of Sowing				Mean	Rank
	Normal	Rank	Paired row	Rank		
			Agra			
75	52.63	3	41.76	3	47.195	3
87.5	54.25	2	44.79	2	49.52	2
100	57.12	1	47.68	1	52.4	1
MEAN	54.67		44.74		49.71	
		F. Test	S.E.m	CD (0.05)	C.V.(%)	
Sowing Method (A)		*	1.05	4.32	6.31	
Seed rate (B)		**	0.79	2.09	3.92	
B within A		N.S.	1.12	2.96		
A within B			1.39	3.66		
			Durgapura			
75	54.50	3	58.46	3	56.48	3
87.5	58.17	1	64.37	2	61.27	2
100	56.33	2	69.37	1	62.86	1
MEAN	56.33		64.07		60.20	
		F. Test	S.E.m	CD (0.05)	C.V.(%)	
Sowing Method (A)		N.S.	1.36	5.63	6.79	
Seed rate (B)		**	0.88	2.32	3.59	
B within A		*	1.25	3.28		
A within B			1.70	4.48		
			Hisar			
75	48.61	3	49.96	3	49.29	3
87.5	51.15	2	52.78	2	51.97	2
100	52.50	1	53.57	1	53.04	1
MEAN	50.75		52.10		51.43	
		F. Test	S.E.m	CD (0.05)	C.V.(%)	
Sowing Method (A)		N.S.	1.32	5.46	7.71	
Seed rate (B)		*	0.78	2.06	3.73	
B within A		N.S.	1.11	2.91		
A within B			1.60	4.21		
			Karnal			
75	54.33	3	60.58	3	57.45	3
87.5	54.78	2	60.63	2	57.70	2
100	55.11	1	61.44	1	58.27	1
MEAN	54.74		60.88		57.81	
		F. Test	S.E.m	CD (0.05)	C.V.(%)	
Sowing Method (A)		**	0.31	1.27	1.60	
Seed rate (B)		N.S.	0.72	1.90	3.05	
B within A		N.S.	1.02	2.68		
A within B			0.89	2.33		
			Ludhiana			
75	41.15	3	41.26	3	41.20	3
87.5	45.38	2	46.45	2	45.92	2
100	47.13	1	47.34	1	47.23	1
MEAN	44.56		45.01		44.79	
		F. Test	S.E.m	CD (0.05)	C.V.(%)	
Sowing Method (A)		N.S.	0.95	3.91	6.35	
Seed rate (B)		**	0.92	2.42	5.04	
B within A		N.S.	1.30	3.43		
A within B			1.43	3.75		

Table 2.2.1.	**North Western Plain Zone**		**IR-DOS-TAS**		**Agra**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	52.22	5	44.38	5	48.30	5
HD 3386	60.66	2	51.63	2	56.15	2
HD 3086 (C)	59.32	3	49.47	3	54.40	3
DBW 222 (C)	51.30	6	43.19	6	47.25	6
HD 2967 (C)	61.99	1	54.26	1	58.13	1
DBW 187 (C)	58.33	4	47.95	4	53.14	4
Mean	57.30		48.48		52.89	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.12	0.50	0.98	
Genotype (B)	**		0.53	1.29	2.45	
B within A	N.S.		0.75	1.83		
A within B			0.69	1.69		
			Earhead/sq.m.			
PBW 826 (I) (C)	356	5	342	5	349	5
HD 3386	368	2	353	2	360	2
HD 3086 (C)	365	3	350	3	357	3
DBW 222 (C)	352	6	338	6	345	6
HD 2967 (C)	371	1	356	1	364	1
DBW 187 (C)	363	4	348	4	355	4
Mean	362		348		355	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.69	2.87	0.83	
Genotype (B)	**		1.30	3.18	0.90	
B within A	N.S.		1.84	4.50		
A within B			1.82	4.44		
			Grains/earhead			
PBW 826 (I) (C)	37.77	6	35.73	5	36.75	6
HD 3386	39.62	4	38.48	2	39.05	2
HD 3086 (C)	39.76	2	37.51	3	38.63	4
DBW 222 (C)	38.53	5	35.52	6	37.02	5
HD 2967 (C)	39.68	3	38.98	1	39.33	1
DBW 187 (C)	40.27	1	37.35	4	38.81	3
Mean	39.27		37.26		38.27	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.11	0.44	1.17	
Genotype (B)	**		0.34	0.82	2.15	
B within A	N.S.		0.48	1.16		
A within B			0.45	1.09		
			1000 grains weight, g			
PBW 826 (I) (C)	38.80	5	36.30	5	37.55	5
HD 3386	41.70	2	38.00	2	39.85	2
HD 3086 (C)	40.90	3	37.70	3	39.30	3
DBW 222 (C)	37.86	6	35.98	6	36.92	6
HD 2967 (C)	42.14	1	39.10	1	40.62	1
DBW 187 (C)	39.96	4	36.90	4	38.43	4
Mean	40.23		37.33		38.78	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.05	0.22	0.58	
Genotype (B)	**		0.53	1.30	3.36	
B within A	N.S.		0.75	1.83		
A within B			0.69	1.68		

Date of Sowing:	08.11.2022	08.12.2022	Date of Harvesting:	24.03.2023	08.04.2023

Table 2.2.2	**North Western Plain Zone**		**IR-DOS-TAS**		**Delhi**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	63.67	1	54.07	1	58.87	1
HD 3386	56.87	4	50.83	2	53.85	3
HD 3086 (C)	52.87	6	49.93	3	51.40	6
DBW 222 (C)	57.27	3	49.63	4	53.45	4
HD 2967 (C)	62.97	2	48.30	6	55.63	2
DBW 187 (C)	55.10	5	48.80	5	51.95	5
Mean	58.12		50.26		54.19	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		1.55	6.38	12.10	
Genotype (B)	**		1.12	2.72	5.05	
B within A	*		1.58	3.85		
A within B			2.11	5.15		
			Earhead/sq.m.			
PBW 826 (I) (C)	421	3	395	1	408	1
HD 3386	418	4	392	4	405	3
HD 3086 (C)	423	1	393	3	408	2
DBW 222 (C)	421	2	385	5	403	4
HD 2967 (C)	410	5	377	6	394	6
DBW 187 (C)	402	6	393	2	398	5
Mean	416		389		402	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		3.47	14.34	3.66	
Genotype (B)	N.S.		4.50	10.97	2.74	
B within A	N.S.		6.36	15.52		
A within B			6.77	16.51		
			Grains/earhead			
PBW 826 (I) (C)	36.18	2	33.07	1	34.62	2
HD 3386	30.60	5	31.06	5	30.83	6
HD 3086 (C)	29.47	6	32.44	3	30.96	5
DBW 222 (C)	33.59	3	32.02	4	32.80	3
HD 2967 (C)	37.55	1	32.59	2	35.07	1
DBW 187 (C)	32.47	4	29.80	6	31.13	4
Mean	33.31		31.83		32.57	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.78	3.22	10.17	
Genotype (B)	**		0.91	2.21	6.81	
B within A	N.S.		1.28	3.12		
A within B			1.41	3.43		
			1000 grains weight, g			
PBW 826 (I) (C)	41.83	4	41.41	3	41.62	3
HD 3386	44.56	1	41.77	1	43.17	1
HD 3086 (C)	42.58	2	39.24	6	40.91	4
DBW 222 (C)	40.55	6	40.27	4	40.41	5
HD 2967 (C)	40.93	5	39.54	5	40.24	6
DBW 187 (C)	42.19	3	41.69	2	41.94	2
Mean	42.11		40.65		41.38	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.38	1.58	3.92	
Genotype (B)	N.S.		0.72	1.76	4.27	
B within A	N.S.		1.02	2.49		
A within B			1.01	2.46		
Date of Sowing:	08.11.2022	16.12.2022	Date of Harvesting:		11.04.2023	13.04.2023

Table 2.2.3	**North Western Plain Zone**		**IR-DOS-TAS**		**Durgapura**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	45.88	2	38.34	1	42.11	1
HD 3386	43.55	3	35.78	2	39.67	3
HD 3086 (C)	41.33	4	26.85	6	34.09	5
DBW 222 (C)	40.54	5	33.09	4	36.82	4
HD 2967 (C)	49.26	1	33.93	3	41.60	2
DBW 187 (C)	31.20	6	29.93	5	30.57	6
Mean	41.96		32.99		37.47	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		0.79	3.28	8.98	
Genotype (B)	**		1.44	3.51	9.42	
B within A	*		2.04	4.97		
A within B			2.02	4.93		
			Earhead/sq.m.			
PBW 826 (I) (C)	314	2	284	1	299	1
HD 3386	304	3	277	2	290	3
HD 3086 (C)	300	4	242	6	271	5
DBW 222 (C)	298	5	264	4	281	4
HD 2967 (C)	323	1	268	3	296	2
DBW 187 (C)	256	6	257	5	257	6
Mean	299		265		282	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		1.58	6.51	2.37	
Genotype (B)	**		5.55	13.54	4.82	
B within A	*		7.85	19.14		
A within B			7.34	17.89		
			Grains/earhead			
PBW 826 (I) (C)	34.50	4	36.43	1	35.46	3
HD 3386	37.51	2	34.12	2	35.82	2
HD 3086 (C)	33.09	5	29.23	6	31.16	5
DBW 222 (C)	34.86	3	32.07	4	33.47	4
HD 2967 (C)	38.86	1	33.06	3	35.96	1
DBW 187 (C)	30.28	6	30.78	5	30.53	6
Mean	34.85		32.62		33.73	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.79	3.26	9.93	
Genotype (B)	*		1.26	3.07	9.13	
B within A	N.S.		1.78	4.34		
A within B			1.81	4.40		
			1000 grains weight, g			
PBW 826 (I) (C)	42.30	1	37.30	6	39.80	2
HD 3386	38.11	6	37.95	4	38.03	6
HD 3086 (C)	41.58	2	38.05	3	39.81	1
DBW 222 (C)	39.27	4	39.00	1	39.14	3
HD 2967 (C)	39.16	5	38.43	2	38.80	5
DBW 187 (C)	40.11	3	37.85	5	38.98	4
Mean	40.09		38.10		39.09	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.58	2.39	6.29	
Genotype (B)	N.S.		1.07	2.61	6.71	
B within A	N.S.		1.51	3.70		
A within B			1.50	3.66		
Date of Sowing:	05.11.2022	12.12.2022	Date of Harvesting:		19.03.2023	06.04.2023

Not included in pooled due to low mean yield

Table 2.2.4	**North Western Plain Zone**		**IR-DOS-TAS**		**Gurdaspur**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	67.13	2	53.08	6	60.10	4
HD 3386	65.60	3	57.36	2	61.48	2
HD 3086 (C)	58.68	6	55.32	5	57.00	6
DBW 222 (C)	60.63	5	62.06	1	61.34	3
HD 2967 (C)	62.50	4	55.58	4	59.04	5
DBW 187 (C)	68.04	1	57.04	3	62.54	1
Mean	63.76		56.74		60.25	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		1.06	4.38	7.48	
Genotype (B)	N.S.		2.38	5.82	9.69	
B within A	N.S.		3.37	8.22		
A within B			3.26	7.94		
			Earhead/sq.m.			
PBW 826 (I) (C)	354	5	364	3	359	5
HD 3386	378	1	365	2	372	1
HD 3086 (C)	360	4	375	1	368	2
DBW 222 (C)	347	6	335	6	341	6
HD 2967 (C)	367	3	364	3	365	4
DBW 187 (C)	372	2	360	5	366	3
Mean	363		360		362	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		16.23	67.02	19.04	
Genotype (B)	N.S.		10.22	24.94	6.92	
B within A	N.S.		14.46	35.26		
A within B			20.92	51.03		
			Grains/earhead			
PBW 826 (I) (C)	48.43	1	36.92	6	42.68	3
HD 3386	42.92	4	38.84	4	40.88	4
HD 3086 (C)	40.35	6	37.13	5	38.74	6
DBW 222 (C)	43.75	3	47.54	1	45.65	1
HD 2967 (C)	42.46	5	39.00	3	40.73	5
DBW 187 (C)	45.99	2	41.96	2	43.98	2
Mean	43.99		40.23		42.11	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.79	3.26	9.93	
Genotype (B)	*		1.26	3.07	9.13	
B within A	N.S.		1.78	4.34		
A within B			1.81	4.40		
			1000 grains weight, g			
PBW 826 (I) (C)	39.63	5	39.52	3	39.58	5
HD 3386	40.71	3	40.48	1	40.60	1
HD 3086 (C)	40.98	1	39.82	2	40.40	2
DBW 222 (C)	40.11	4	39.26	4	39.69	4
HD 2967 (C)	40.72	2	39.18	5	39.95	3
DBW 187 (C)	39.59	6	38.07	6	38.83	6
Mean	40.29		39.39		39.84	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.30	1.22	3.15	
Genotype (B)	N.S.		0.75	1.84	4.63	
B within A	N.S.		1.07	2.60		
A within B			1.02	2.48		
Date of Sowing:	10.11.2022	10.12.2022	Date of Harvesting:		21.04.2023	30.04.2023

Table 2.2.5	**North Western Plain Zone**		**IR-DOS-TAS**		**Hisar**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	65.83	1	54.26	2	60.05	1
HD 3386	60.87	3	53.18	3	57.02	3
HD 3086 (C)	46.77	5	41.38	5	44.08	5
DBW 222 (C)	62.95	2	55.12	1	59.03	2
HD 2967 (C)	45.32	6	33.49	6	39.40	6
DBW 187 (C)	56.07	4	46.88	4	51.48	4
Mean	56.30		47.38		51.84	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		0.65	2.70	5.35	
Genotype (B)	**		1.04	2.54	4.92	
B within A	N.S.		1.47	3.59		
A within B			1.50	3.65		
			Earhead/sq.m.			
PBW 826 (I) (C)	443	1	410	3	427	2
HD 3386	442	2	415	1	428	1
HD 3086 (C)	438	3	413	2	426	3
DBW 222 (C)	418	5	385	5	402	5
HD 2967 (C)	387	6	352	6	369	6
DBW 187 (C)	422	4	390	4	406	4
Mean	425		394		410	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		3.92	16.20	4.06	
Genotype (B)	**		11.18	27.27	6.68	
B within A	N.S.		15.81	38.56		
A within B			14.95	36.48		
			Grains/earhead			
PBW 826 (I) (C)	33.05	4	32.01	3	32.53	3
HD 3386	31.00	5	30.66	4	30.83	5
HD 3086 (C)	28.59	6	28.41	6	28.50	6
DBW 222 (C)	38.24	1	39.26	1	38.75	1
HD 2967 (C)	33.53	3	29.82	5	31.67	4
DBW 187 (C)	34.86	2	33.36	2	34.11	2
Mean	33.21		32.25		32.73	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.48	1.97	6.17	
Genotype (B)	**		1.19	2.90	8.90	
B within A	N.S.		1.68	4.10		
A within B			1.61	3.92		
			1000 grains weight, g			
PBW 826 (I) (C)	45.18	1	41.62	2	43.40	1
HD 3386	44.72	2	42.05	1	43.39	2
HD 3086 (C)	37.40	5	35.29	5	36.35	5
DBW 222 (C)	39.51	3	36.62	3	38.07	3
HD 2967 (C)	35.12	6	32.01	6	33.57	6
DBW 187 (C)	38.27	4	36.06	4	37.16	4
Mean	40.03		37.28		38.65	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		0.38	1.57	4.17	
Genotype (B)	**		0.36	0.88	2.29	
B within A	N.S.		0.51	1.25		
A within B			0.60	1.47		
Date of Sowing:	11.11.2022	12.12.2022	Date of Harvesting:		16.04.2023	21.04.2023

Table 2.2.6	**North Western Plain Zone**		**IR-DOS-TAS**		**Jammu**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	47.89	2	40.03	2	43.96	2
HD 3386	47.00	4	39.49	4	43.25	4
HD 3086 (C)	46.46	5	43.51	1	44.98	1
DBW 222 (C)	47.28	3	37.69	6	42.48	6
HD 2967 (C)	45.80	6	39.64	3	42.72	5
DBW 187 (C)	48.61	1	39.10	5	43.86	3
Mean	47.17		39.91		43.54	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.04	0.32	0.28	
Genotype (B)	N.S.		0.71	1.81	3.25	
B within A	N.S.		1.00	2.56		
A within B			0.91	2.34		
			Earhead/sq.m.			
PBW 826 (I) (C)	432	4	394	1	413	2
HD 3386	437	3	388	2	412	3
HD 3086 (C)	444	2	351	6	397	5
DBW 222 (C)	400	6	355	5	377	6
HD 2967 (C)	427	5	381	3	404	4
DBW 187 (C)	466	1	380	4	423	1
Mean	434		375		404	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		6.25	55.77	5.35	
Genotype (B)	N.S.		8.93	22.90	4.42	
B within A	N.S.		12.64	32.38		
A within B			13.12	33.61		
			Grains/earhead			
PBW 826 (I) (C)	28.69	3	29.75	2	29.22	3
HD 3386	27.90	5	28.50	6	28.20	5
HD 3086 (C)	28.24	4	33.79	1	31.01	1
DBW 222 (C)	31.59	1	29.03	3	30.31	2
HD 2967 (C)	28.98	2	28.87	4	28.93	4
DBW 187 (C)	26.33	6	28.74	5	27.53	6
Mean	28.62		29.78		29.20	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.52	4.64	6.16	
Genotype (B)	N.S.		0.98	2.52	6.74	
B within A	N.S.		1.39	3.56		
A within B			1.37	3.52		
			1000 grains weight, g			
PBW 826 (I) (C)	38.80	2	34.40	6	36.60	6
HD 3386	38.63	3	35.78	5	37.20	2
HD 3086 (C)	37.10	6	36.69	1	36.89	4
DBW 222 (C)	37.55	4	36.63	2	37.09	3
HD 2967 (C)	37.13	5	36.08	3	36.60	5
DBW 187 (C)	39.75	1	35.95	4	37.85	1
Mean	38.16		35.92		37.04	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.08	0.74	0.78	
Genotype (B)	N.S.		0.68	1.73	3.65	
B within A	N.S.		0.95	2.45		
A within B			0.88	2.24		
Date of Sowing:	07.11.2022	10.12.2022	Date of Harvesting:		30.04.2023	

Table 2.2.7	**North Western Plain Zone**		**IR-DOS-TAS**		**Karnal**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	63.77	2	53.41	3	58.59	3
HD 3386	63.17	4	54.37	2	58.77	2
HD 3086 (C)	56.90	5	40.75	6	48.83	6
DBW 222 (C)	65.32	1	55.63	1	60.48	1
HD 2967 (C)	56.39	6	46.87	5	51.63	5
DBW 187 (C)	63.37	3	52.54	4	57.96	4
Mean	61.49		50.60		56.04	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.75	3.11	5.69	
Genotype (B)	**		0.72	1.75	3.14	
B within A	*		1.02	2.48		
A within B			1.19	2.91		
			Earhead/sq.m.			
PBW 826 (I) (C)	488	3	461	3	474	2
HD 3386	463	6	437	5	450	6
HD 3086 (C)	483	4	433	6	458	5
DBW 222 (C)	493	1	473	1	483	1
HD 2967 (C)	482	5	464	2	473	3
DBW 187 (C)	489	2	456	4	473	4
Mean	483		454		468	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		6.13	25.33	5.56	
Genotype (B)	N.S.		7.95	19.40	4.16	
B within A	N.S.		11.25	27.43		
A within B			11.96	29.17		
			Grains/earhead			
PBW 826 (I) (C)	28.99	5	28.31	6	28.65	6
HD 3386	29.12	4	30.61	4	29.87	4
HD 3086 (C)	26.23	6	31.77	2	29.00	5
DBW 222 (C)	34.29	2	33.31	1	33.80	1
HD 2967 (C)	35.03	1	31.33	3	33.18	2
DBW 187 (C)	32.30	3	30.41	5	31.35	3
Mean	30.99		30.96		30.97	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.32	1.32	4.39	
Genotype (B)	**		0.66	1.60	5.19	
B within A	**		0.93	2.26		
A within B			0.91	2.21		
			1000 grains weight, g			
PBW 826 (I) (C)	45.16	2	40.95	1	43.06	2
HD 3386	46.87	1	40.72	2	43.80	1
HD 3086 (C)	44.98	3	29.81	6	37.39	4
DBW 222 (C)	38.65	5	35.35	4	37.00	5
HD 2967 (C)	33.52	6	32.37	5	32.94	6
DBW 187 (C)	40.16	4	38.00	3	39.08	3
Mean	41.56		36.20		38.88	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.09	0.36	0.96	
Genotype (B)	**		0.49	1.20	3.11	
B within A	**		0.70	1.70		
A within B			0.64	1.57		
Date of Sowing:	11.11.2022	16.12.2022	Date of Harvesting:		07.04.2023	17.04.2023

Table 2.2.8	**North Western Plain Zone**		**IR-DOS-TAS**		**Ludhiana**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	67.83	4	43.83	5	55.83	4
HD 3386	68.28	2	54.81	1	61.54	1
HD 3086 (C)	58.64	6	48.36	4	53.50	5
DBW 222 (C)	69.72	1	52.22	2	60.97	2
HD 2967 (C)	61.67	5	43.14	6	52.40	6
DBW 187 (C)	68.03	3	50.36	3	59.19	3
Mean	65.69		48.79		57.24	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.55	2.26	4.06	
Genotype (B)	**		1.73	4.23	7.42	
B within A	N.S.		2.45	5.98		
A within B			2.30	5.62		
			Earhead/sq.m.			
PBW 826 (I) (C)	305	6	262	2	283	5
HD 3386	333	2	262	1	297	1
HD 3086 (C)	308	5	261	3	284	4
DBW 222 (C)	333	1	259	4	296	2
HD 2967 (C)	318	4	246	6	282	6
DBW 187 (C)	330	3	259	5	295	3
Mean	321		258		290	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		1.50	6.17	2.19	
Genotype (B)	**		3.37	8.22	2.85	
B within A	**		4.76	11.62		
A within B			4.60	11.22		
			Grains/earhead			
PBW 826 (I) (C)	47.23	3	38.11	6	22.05	6
HD 3386	38.94	6	49.66	4	26.83	4
HD 3086 (C)	42.93	5	65.75	1	33.37	1
DBW 222 (C)	46.32	4	51.23	3	27.12	3
HD 2967 (C)	48.19	2	55.54	2	28.77	2
DBW 187 (C)	48.62	1	46.64	5	25.82	5
Mean	45.37		51.15		51.15	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		2.04	N.S.	2.04	
Genotype (B)	N.S.		2.89	N.S.	3.14	
B within A	*		4.98	15.84		
A within B			4.36	16.35		
			1000 grains weight, g			
PBW 826 (I) (C)	47.29	2	43.98	1	45.63	2
HD 3386	52.81	1	43.09	2	47.95	1
HD 3086 (C)	44.83	4	28.95	6	36.89	5
DBW 222 (C)	45.58	3	39.67	4	42.63	4
HD 2967 (C)	41.56	6	32.13	5	36.85	6
DBW 187 (C)	42.91	5	42.56	3	42.73	3
Mean	45.83		38.40		42.11	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.71	4.62	4.06	
Genotype (B)	**		1.96	5.83	7.42	
B within A	N.S.		1.73	N.S.		
A within B			2.63	N.S.		
Date of Sowing:	05.11.2022	12.12.2022	Date of Harvesting:		26.04.2023	

Table 2.2.9	**North Western Plain Zone**		**IR-DOS-TAS**		**Pantnagar**	**2022-23**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	58.16	2	42.84	2	50.50	2
HD 3386	58.79	1	42.39	3	50.59	1
HD 3086 (C)	49.27	5	34.09	6	41.68	5
DBW 222 (C)	54.56	3	43.07	1	48.82	3
HD 2967 (C)	44.43	6	34.71	5	39.57	6
DBW 187 (C)	50.27	4	40.88	4	45.58	4
Mean	52.58		39.66		46.12	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.40	1.65	3.68	
Genotype (B)	**		1.09	2.65	5.77	
B within A	N.S.		1.54	3.75		
A within B			1.46	3.56		
			Earhead/sq.m.			
PBW 826 (I) (C)	468	4	325	6	396	6
HD 3386	479	2	429	2	454	2
HD 3086 (C)	473	3	441	1	457	1
DBW 222 (C)	448	6	367	5	407	5
HD 2967 (C)	452	5	421	3	436	4
DBW 187 (C)	487	1	405	4	446	3
Mean	468		398		433	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		6.95	28.70	6.81	
Genotype (B)	N.S.		15.83	38.62	8.96	
B within A	N.S.		22.39	54.62		
A within B			21.59	52.66		
			Grains/earhead			
PBW 826 (I) (C)	25.14	4	32.75	2	28.94	2
HD 3386	23.61	5	24.93	4	24.27	5
HD 3086 (C)	26.05	3	21.94	6	24.00	6
DBW 222 (C)	30.01	1	34.20	1	32.10	1
HD 2967 (C)	26.66	2	23.35	5	25.00	3
DBW 187 (C)	22.80	6	26.34	3	24.57	4
Mean	25.71		27.25		26.48	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	N.S.		0.95	3.93	15.26	
Genotype (B)	*		1.70	4.15	15.74	
B within A	N.S.		2.41	5.87		
A within B			2.39	5.84		
			1000 grains weight, g			
PBW 826 (I) (C)	50.04	2	40.52	1	45.28	2
HD 3386	52.19	1	40.27	2	46.23	1
HD 3086 (C)	40.13	5	35.39	5	37.76	5
DBW 222 (C)	41.87	4	35.01	6	38.44	4
HD 2967 (C)	37.14	6	35.61	4	36.38	6
DBW 187 (C)	45.63	3	38.54	3	42.08	3
Mean	44.50		37.55		41.03	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		0.96	3.95	9.90	
Genotype (B)	**		1.30	3.18	7.79	
B within A	N.S.		1.84	4.50		
A within B			1.94	4.73		
Date of Sowing:	05.11.2022	13.12.2022	Date of Harvesting:		11.04.2023	24.04.2023

Table 2.2.10	**North Western Plain Zone**		**IR-DOS-TAS**		**Sriganganagar**	**2021-22**
	Date of Sowing					
Genotype	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
PBW 826 (I) (C)	60.07	5	33.66	2	46.87	3
HD 3386	57.76	6	29.59	4	43.67	5
HD 3086 (C)	60.61	4	25.06	6	42.83	6
DBW 222 (C)	62.46	3	25.47	5	43.97	4
HD 2967 (C)	62.54	2	33.97	1	48.25	2
DBW 187 (C)	67.08	1	31.66	3	49.37	1
Mean	61.75		29.90		45.83	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.36	1.48	3.31	
Genotype (B)	**		0.47	1.14	2.51	
B within A	**		0.66	1.62		
A within B			0.70	1.72		
			Earhead/sq.m.			
PBW 826 (I) (C)	448	2	332	3	390	3
HD 3386	443	3	310	6	377	5
HD 3086 (C)	402	6	315	5	359	6
DBW 222 (C)	442	4	342	1	392	2
HD 2967 (C)	439	5	326	4	383	4
DBW 187 (C)	463	1	336	2	399	1
Mean	440		327		383	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		2.05	8.47	2.27	
Genotype (B)	**		2.81	6.86	1.80	
B within A	**		3.97	9.70		
A within B			4.17	10.17		
			Grains/earhead			
PBW 826 (I) (C)	32.13	5	31.65	2	31.89	3
HD 3386	31.69	6	31.04	3	31.37	4
HD 3086 (C)	40.98	1	25.52	5	33.25	2
DBW 222 (C)	34.42	3	21.85	6	28.13	6
HD 2967 (C)	34.90	2	32.21	1	33.55	1
DBW 187 (C)	33.51	4	28.23	4	30.87	5
Mean	34.61		28.41		31.51	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	*		0.63	2.58	8.42	
Genotype (B)	**		0.64	1.56	4.97	
B within A	**		0.90	2.20		
A within B			1.03	2.52		
			1000 grains weight, g			
PBW 826 (I) (C)	41.74	2	32.08	4	36.91	3
HD 3386	41.17	3	30.73	6	35.95	5
HD 3086 (C)	36.78	6	31.25	5	34.01	6
DBW 222 (C)	41.12	4	34.13	1	37.63	2
HD 2967 (C)	40.79	5	32.40	3	36.60	4
DBW 187 (C)	43.30	1	33.45	2	38.37	1
Mean	40.82		32.34		36.58	
	F. Test		SEm	CD (0.05)	CV (%)	
Sowing (A)	**		0.22	0.92	2.57	
Genotype (B)	**		0.30	0.74	2.03	
B within A	**		0.43	1.04		
A within B			0.45	1.10		
Date of Sowing:	05.11.2022	15.12.2022	Date of Harvesting:		18.04.2023	29.04.2023

Table 2.4.1 North Western Plain Zone			**RIR-TS-TAS**			**Agra**		**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	29.35	2	44.28	2	51.58	2	41.74	2
DBW 296 (C)	28.32	3	42.67	3	49.97	3	40.32	3
HI 1653 (I) (C)	29.92	1	46.23	1	54.15	1	43.43	1
PBW 644 (C)	24.48	6	40.49	6	45.93	6	36.97	6
WH 1402	27.14	4	41.80	4	47.66	4	38.87	4
NIAW 3170 (C)	25.54	5	41.63	5	46.24	5	37.80	5
HI 1654 (I) (C)	23.52	7	39.01	7	45.05	7	35.86	7
Mean	26.90		42.30		48.65		39.28	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.28		1.10		3.26	
Genotype (B)	**		0.47		1.35		3.60	
B within A	N.S.		0.82		2.34			
A within B			0.81		2.31			
			Earhead/sq.m.					
HD 3369 (I) (C)	336	2	353	2	364	2	351	2
DBW 296 (C)	334	3	352	3	362	3	349	3
HI 1653 (I) (C)	338	1	355	1	364	1	352	1
PBW 644 (C)	323	6	349	6	359	6	344	6
WH 1402	330	4	351	4	361	4	347	4
NIAW 3170 (C)	326	5	350	5	359	5	345	5
HI 1654 (I) (C)	321	7	346	7	357	7	342	7
Mean	330		351		361		347	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.67		2.64		0.89	
Genotype (B)	*		2.52		7.24		2.18	
B within A	N.S.		4.37		12.54			
A within B			4.10		11.77			
			Grains/earhead					
HD 3369 (I) (C)	24.17	2	32.07	1	33.78	2	30.01	2
DBW 296 (C)	23.56	3	31.13	3	33.29	3	29.33	3
HI 1653 (I) (C)	24.34	1	32.00	2	34.56	1	30.30	1
PBW 644 (C)	21.10	6	30.17	6	32.19	5	27.82	6
WH 1402	22.70	4	30.77	5	32.80	4	28.76	4
NIAW 3170 (C)	21.68	5	30.89	4	32.17	6	28.24	5
HI 1654 (I) (C)	21.03	7	29.27	7	32.00	7	27.43	7
Mean	22.65		30.90		32.97		28.84	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.32		1.28		5.16	
Genotype (B)	**		0.51		1.46		5.28	
B within A	N.S.		0.88		2.52			
A within B			0.88		2.51			
			1000 grains weight, g					
HD 3369 (I) (C)	36.19	3	39.09	2	42.01	2	39.10	2
DBW 296 (C)	35.99	5	38.99	3	41.53	3	38.84	3
HI 1653 (I) (C)	36.49	1	40.76	1	43.09	1	40.11	1
PBW 644 (C)	35.91	6	38.53	6	39.79	6	38.08	6
WH 1402	36.35	2	38.69	4	40.29	4	38.44	4
NIAW 3170 (C)	36.17	4	38.58	5	40.03	5	38.26	5
HI 1654 (I) (C)	34.83	7	38.53	6	39.41	7	37.59	7
Mean	35.99		39.02		40.88		38.63	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.17		0.66		1.99	
Genotype (B)	**		0.36		1.03		2.79	
B within A	N.S.		0.62		1.78			
A within B			0.60		1.72			
Date of Sowing:	05.11.2022		Date of Harvesting:				31.03.2023	

Table 2.4.2 North Western Plain Zone			**RIR-TS-TAS**		**Delhi**			**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	34.35	3	39.97	5	53.91	1	42.74	1
DBW 296 (C)	34.52	2	39.29	6	52.21	2	42.01	3
HI 1653 (I) (C)	29.29	7	41.19	3	51.56	3	40.68	5
PBW 644 (C)	34.35	3	43.37	1	45.07	7	40.93	4
WH 1402	32.24	5	42.86	2	46.77	6	40.62	6
NIAW 3170 (C)	30.95	6	38.10	7	48.30	5	39.12	7
HI 1654 (I) (C)	35.20	1	41.19	3	50.00	4	42.13	2
Mean	32.99		40.85		49.69		41.18	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.58		2.27		6.44	
Genotype (B)	N.S.		1.29		3.71		9.41	
B within A	N.S.		2.24		6.42			
A within B			2.15		6.17			
			Earhead/sq.m.					
HD 3369 (I) (C)	290	3	337	5	355	7	327	5
DBW 296 (C)	291	2	342	4	363	5	332	3
HI 1653 (I) (C)	300	1	343	3	383	2	342	1
PBW 644 (C)	280	4	346	2	376	3	334	2
WH 1402	274	5	331	7	386	1	330	4
NIAW 3170 (C)	256	7	337	6	369	4	320	7
HI 1654 (I) (C)	259	6	352	1	362	6	324	6
Mean	279		341		371		330	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		9.09		35.67		12.61	
Genotype (B)	N.S.		8.89		25.52		8.08	
B within A	N.S.		15.40		44.20			
A within B			16.91		48.52			
			Grains/earhead					
HD 3369 (I) (C)	34.65	4	30.20	4	37.04	1	33.96	1
DBW 296 (C)	33.54	5	30.38	3	34.60	2	32.84	3
HI 1653 (I) (C)	25.64	7	29.56	5	32.61	4	29.27	7
PBW 644 (C)	35.21	2	31.79	1	28.89	6	31.96	4
WH 1402	33.02	6	31.11	2	28.46	7	30.86	5
NIAW 3170 (C)	34.84	3	26.51	7	30.63	5	30.66	6
HI 1654 (I) (C)	38.99	1	27.78	6	33.09	3	33.28	2
Mean	33.70		29.62		32.19		31.83	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		1.16		4.55		16.67	
Genotype (B)	N.S.		1.85		5.30		17.42	
B within A	N.S.		3.20		9.19			
A within B			3.18		9.13			
			1000 grains weight, g					
HD 3369 (I) (C)	34.65	7	39.32	6	41.24	7	38.40	7
DBW 296 (C)	36.21	4	38.35	7	42.04	4	38.86	6
HI 1653 (I) (C)	37.63	1	40.67	4	41.31	6	39.87	4
PBW 644 (C)	35.51	5	39.74	5	41.56	5	38.94	5
WH 1402	37.42	2	41.72	3	43.10	1	40.74	2
NIAW 3170 (C)	36.71	3	42.66	1	43.10	1	40.82	1
HI 1654 (I) (C)	35.15	6	42.37	2	42.10	3	39.87	3
Mean	36.18		40.69		42.06		39.64	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.19		0.73		2.14	
Genotype (B)	N.S.		0.85		2.42		6.39	
B within A	N.S.		1.46		4.20			
A within B			1.37		3.92			
Date of Sowing:	04.11.2022		Date of Harvesting:				27.03.2023	

Table 2.4.3 North Western Plain Zone			**RIR-TS-TAS**		**Durgapura**			**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	21.57	4	20.90	6	29.01	1	23.83	4
DBW 296 (C)	22.67	3	21.00	5	25.88	6	23.18	6
HI 1653 (I) (C)	26.30	1	22.47	4	27.72	3	25.50	1
PBW 644 (C)	23.67	2	23.11	3	26.23	5	24.34	2
WH 1402	19.90	7	25.95	1	25.07	7	23.64	5
NIAW 3170 (C)	21.17	5	23.17	2	28.60	2	24.31	3
HI 1654 (I) (C)	20.61	6	20.83	7	27.47	4	22.97	7
Mean	22.27		22.49		27.14		23.97	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.52		2.05		10.00	
Genotype (B)	**		0.85		2.44		10.63	
B within A	N.S.		1.47		4.22			
A within B			1.46		4.19			
			Earhead/sq.m.					
HD 3369 (I) (C)	237	5	235	5	274	1	249	5
DBW 296 (C)	243	3	235	5	260	6	246	6
HI 1653 (I) (C)	260	1	244	4	268	3	257	1
PBW 644 (C)	251	2	245	3	261	5	252	3
WH 1402	232	7	260	1	259	7	250	4
NIAW 3170 (C)	238	4	248	2	273	2	253	2
HI 1654 (I) (C)	234	6	235	5	267	4	245	7
Mean	242		243		266		250	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		2.04		8.01		3.73	
Genotype (B)	N.S.		3.95		11.34		4.73	
B within A	N.S.		6.84		19.64			
A within B			6.66		19.10			
			Grains/earhead					
HD 3369 (I) (C)	26.06	6	23.68	6	28.63	3	26.12	5
DBW 296 (C)	27.12	3	23.43	7	26.81	6	25.78	6
HI 1653 (I) (C)	27.34	2	24.65	5	28.03	4	26.67	4
PBW 644 (C)	28.17	1	26.69	1	28.00	5	27.62	1
WH 1402	22.50	7	24.93	4	23.91	7	23.78	7
NIAW 3170 (C)	27.09	4	26.14	2	29.03	2	27.42	2
HI 1654 (I) (C)	26.94	5	25.78	3	29.44	1	27.38	3
Mean	26.46		25.04		27.69		26.40	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.31		1.21		5.35	
Genotype (B)	**		0.63		1.81		7.16	
B within A	N.S.		1.09		3.13			
A within B			1.06		3.03			
			1000 grains weight, g					
HD 3369 (I) (C)	34.92	3	37.60	3	36.74	4	36.42	4
DBW 296 (C)	34.46	4	38.17	2	37.14	2	36.59	3
HI 1653 (I) (C)	36.75	2	37.38	4	36.89	3	37.01	2
PBW 644 (C)	33.51	5	35.27	6	35.76	6	34.85	6
WH 1402	38.10	1	40.08	1	40.47	1	39.55	1
NIAW 3170 (C)	33.00	6	35.75	5	36.08	5	34.94	5
HI 1654 (I) (C)	32.70	7	34.35	7	34.90	7	33.98	7
Mean	34.78		36.94		36.85		36.19	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.19		0.76		2.45	
Genotype (B)	**		0.55		1.58		4.56	
B within A	N.S.		0.95		2.73			
A within B			0.90		2.59			
Date of Sowing:	17.11.2022		Date of Harvesting:				21.03.2023	

Not included in pooled due to low mean yield

Table 2.4.4 North Western Plain Zone			**RIR-TS-TAS**			**Gurdaspur**		**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	53.45	5	61.48	1	59.61	3	58.18	1
DBW 296 (C)	53.78	2	57.69	6	57.97	7	56.48	7
HI 1653 (I) (C)	54.33	1	60.32	2	59.77	1	58.14	2
PBW 644 (C)	53.62	4	57.38	7	58.98	4	56.66	6
WH 1402	53.32	6	58.77	4	58.73	5	56.94	4
NIAW 3170 (C)	53.75	3	59.63	3	58.31	6	57.23	3
HI 1654 (I) (C)	52.46	7	58.66	5	59.70	2	56.94	5
Mean	53.53		59.13		59.01		57.22	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		1.87		7.33		14.96	
Genotype (B)	N.S.		2.11		6.06		11.08	
B within A	N.S.		3.66		10.50			
A within B			3.87		11.10			
			Earhead/sq.m.					
HD 3369 (I) (C)	343	5	373	1	361	5	359	1
DBW 296 (C)	348	2	359	5	363	4	357	5
HI 1653 (I) (C)	353	1	353	7	350	7	352	7
PBW 644 (C)	348	3	369	2	354	6	357	4
WH 1402	343	4	361	4	369	2	358	3
NIAW 3170 (C)	338	7	364	3	373	1	358	2
HI 1654 (I) (C)	341	6	355	6	363	3	353	6
Mean	345		362		362		356	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		4.29		16.83		5.52	
Genotype (B)	N.S.		6.28		18.01		5.29	
B within A	N.S.		10.87		31.19			
A within B			10.94		31.39			
			Grains/earhead					
HD 3369 (I) (C)	42.74	3	43.61	2	41.35	4	42.57	1
DBW 296 (C)	41.85	5	41.83	3	40.35	5	41.34	5
HI 1653 (I) (C)	41.44	7	43.68	1	42.29	1	42.47	2
PBW 644 (C)	41.75	6	39.47	7	42.10	2	41.11	7
WH 1402	42.76	2	41.18	5	40.05	6	41.33	6
NIAW 3170 (C)	43.61	1	41.51	4	40.04	7	41.72	3
HI 1654 (I) (C)	42.18	4	41.05	6	41.64	3	41.62	4
Mean	42.33		41.76		41.12		41.74	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		1.33		5.23		14.64	
Genotype (B)	N.S.		1.73		4.97		12.45	
B within A	N.S.		3.00		8.61			
A within B			3.08		8.84			
			1000 grains weight, g					
HD 3369 (I) (C)	36.56	6	38.18	7	39.88	3	38.21	7
DBW 296 (C)	36.94	2	38.70	6	39.63	4	38.42	6
HI 1653 (I) (C)	37.26	1	39.25	5	40.52	1	39.01	1
PBW 644 (C)	36.86	3	39.49	4	39.57	5	38.64	4
WH 1402	36.69	4	39.54	3	40.01	2	38.75	3
NIAW 3170 (C)	36.58	5	39.61	2	39.13	7	38.44	5
HI 1654 (I) (C)	36.47	7	40.24	1	39.57	6	38.76	2
Mean	36.76		39.29		39.76		38.60	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.18		0.69		2.09	
Genotype (B)	N.S.		0.23		0.67		1.82	
B within A	N.S.		0.41		1.16			
A within B			0.42		1.19			
Date of Sowing:	05.11.2022		Date of Harvesting:				24.04.2023	

Table 2.4.5 North Western Plain Zone			**RIR-TS-TAS**			**Hisar**		**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	31.06	7	44.70	5	49.63	5	41.80	6
DBW 296 (C)	34.56	4	43.03	6	50.07	4	42.55	5
HI 1653 (I) (C)	36.34	2	46.94	1	50.64	2	44.64	2
PBW 644 (C)	31.39	6	41.97	7	47.62	7	40.33	7
WH 1402	39.21	1	46.46	2	51.26	1	45.65	1
NIAW 3170 (C)	34.32	5	45.78	3	50.34	3	43.48	3
HI 1654 (I) (C)	35.75	3	45.03	4	48.71	6	43.16	4
Mean	34.66		44.85		49.75		43.09	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.51		1.98		5.38	
Genotype (B)	**		0.64		1.83		4.45	
B within A	N.S.		1.11		3.18			
A within B			1.14		3.28			
			Earhead/sq.m.					
HD 3369 (I) (C)	292	7	370	5	392	6	351	6
DBW 296 (C)	312	5	362	7	400	4	358	5
HI 1653 (I) (C)	347	2	397	2	413	1	386	2
PBW 644 (C)	305	6	363	6	385	7	351	7
WH 1402	352	1	408	1	410	2	390	1
NIAW 3170 (C)	313	4	378	4	408	3	367	4
HI 1654 (I) (C)	333	3	383	3	400	4	372	3
Mean	322		380		401		368	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		3.94		15.48		4.91	
Genotype (B)	**		5.59		16.04		4.56	
B within A	N.S.		9.68		27.79			
A within B			9.79		28.11			
			Grains/earhead					
HD 3369 (I) (C)	23.64	5	27.52	4	28.95	2	26.70	4
DBW 296 (C)	24.08	2	28.05	3	28.90	3	27.01	3
HI 1653 (I) (C)	18.08	7	24.08	7	22.89	7	21.69	7
PBW 644 (C)	23.32	6	29.19	1	30.58	1	27.70	1
WH 1402	23.96	3	24.25	6	25.78	6	24.66	6
NIAW 3170 (C)	25.75	1	28.52	2	27.63	4	27.30	2
HI 1654 (I) (C)	23.82	4	26.77	5	27.34	5	25.97	5
Mean	23.24		26.91		27.44		25.86	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		0.68		2.66		12.01	
Genotype (B)	**		0.63		1.81		7.30	
B within A	N.S.		1.09		3.13			
A within B			1.22		3.49			
			1000 grains weight, g					
HD 3369 (I) (C)	45.13	5	43.97	4	43.85	5	44.32	4
DBW 296 (C)	46.26	3	42.52	6	43.35	6	44.04	5
HI 1653 (I) (C)	58.12	1	49.22	1	53.66	1	53.66	1
PBW 644 (C)	44.17	6	39.84	7	40.48	7	41.50	7
WH 1402	46.89	2	47.09	2	48.59	2	47.52	2
NIAW 3170 (C)	42.76	7	42.63	5	44.71	3	43.37	6
HI 1654 (I) (C)	45.21	4	44.12	3	44.52	4	44.62	3
Mean	46.93		44.20		45.59		45.58	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.26		1.01		2.58	
Genotype (B)	**		0.51		1.46		3.34	
B within A	**		0.88		2.52			
A within B			0.85		2.45			
Date of Sowing:	31.10.2022		Date of Harvesting:				04.04.2023	

Table 2.4.6 North Western Plain Zone			**RIR-TS-TAS**		**Jammu**			**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	42.30	4	43.07	4	44.01	5	43.13	4
DBW 296 (C)	42.14	5	42.43	5	43.35	6	42.64	5
HI 1653 (I) (C)	43.50	3	44.72	2	45.36	3	44.52	3
PBW 644 (C)	41.37	7	42.26	7	44.06	4	42.56	6
WH 1402	44.64	1	46.17	1	47.92	1	46.24	1
NIAW 3170 (C)	42.07	6	42.33	6	43.10	7	42.50	7
HI 1654 (I) (C)	44.25	2	44.65	3	46.46	2	45.12	2
Mean	42.89		43.66		44.89		43.82	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		0.49		1.92		5.11	
Genotype (B)	*		0.96		2.75		6.57	
B within A	N.S.		1.66		4.77			
A within B			1.61		4.63			
			Earhead/sq.m.					
HD 3369 (I) (C)	397	3	401	4	411	5	403	4
DBW 296 (C)	396	4	400	5	407	6	401	5
HI 1653 (I) (C)	408	2	415	2	417	3	413	2
PBW 644 (C)	381	7	380	7	412	4	391	7
WH 1402	413	1	426	1	432	1	424	1
NIAW 3170 (C)	386	5	398	6	403	7	396	6
HI 1654 (I) (C)	384	6	413	3	427	2	408	3
Mean	395		405		415		405	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		3.78		14.84		4.28	
Genotype (B)	**		5.98		17.16		4.43	
B within A	N.S.		10.36		29.71			
A within B			10.31		29.57			
			Grains/earhead					
HD 3369 (I) (C)	26.19	4	26.00	6	26.91	3	26.37	4
DBW 296 (C)	26.21	3	26.09	5	26.91	4	26.40	3
HI 1653 (I) (C)	25.78	5	26.22	4	26.54	5	26.18	5
PBW 644 (C)	25.20	6	25.98	7	25.15	7	25.44	7
WH 1402	26.82	2	28.52	1	30.62	1	28.65	1
NIAW 3170 (C)	25.00	7	26.44	3	26.43	6	25.96	6
HI 1654 (I) (C)	27.72	1	27.24	2	27.94	2	27.64	2
Mean	26.13		26.64		27.21		26.66	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		0.82		3.23		14.13	
Genotype (B)	N.S.		0.90		2.58		10.11	
B within A	N.S.		1.56		4.46			
A within B			1.66		4.76			
			1000 grains weight, g					
HD 3369 (I) (C)	40.78	6	41.51	2	40.72	4	41.00	4
DBW 296 (C)	40.56	7	40.74	4	40.11	5	40.47	5
HI 1653 (I) (C)	41.84	3	41.08	3	41.29	2	41.41	3
PBW 644 (C)	43.58	2	43.71	1	42.70	1	43.33	1
WH 1402	40.85	5	38.57	7	36.70	7	38.70	7
NIAW 3170 (C)	43.88	1	40.35	5	41.18	3	41.80	2
HI 1654 (I) (C)	41.62	4	39.66	6	39.36	6	40.22	6
Mean	41.87		40.80		40.29		40.99	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		1.33		5.22		14.88	
Genotype (B)	N.S.		1.65		4.73		12.07	
B within A	N.S.		2.86		8.19			
A within B			2.96		8.49			
Date of Sowing:	27.10.2022		Date of Harvesting:				10.04.2023	

Table 2.4.7 North Western Plain Zone			**RIR-TS-TAS**			**Karnal**		**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	26.62	2	44.86	2	48.43	2	39.97	2
DBW 296 (C)	25.19	5	43.33	6	47.87	5	38.80	4
HI 1653 (I) (C)	30.79	1	44.44	3	48.06	4	41.10	1
PBW 644 (C)	26.25	3	43.29	7	46.46	7	38.67	6
WH 1402	25.46	4	44.26	4	47.41	6	39.04	3
NIAW 3170 (C)	24.17	6	43.66	5	48.47	1	38.77	5
HI 1654 (I) (C)	22.04	7	45.32	1	48.33	3	38.56	7
Mean	25.79		44.17		47.86		39.27	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.71		2.78		8.27	
Genotype (B)	N.S.		1.13		3.24		8.63	
B within A	N.S.		1.96		5.62			
A within B			1.95		5.58			
			Earhead/sq.m.					
HD 3369 (I) (C)	329	2	491	1	456	4	425	1
DBW 296 (C)	303	4	457	3	481	2	413	3
HI 1653 (I) (C)	343	1	478	2	453	5	425	2
PBW 644 (C)	256	6	373	7	444	7	358	7
WH 1402	308	3	384	6	463	3	385	5
NIAW 3170 (C)	262	5	428	5	451	6	380	6
HI 1654 (I) (C)	249	7	454	4	493	1	399	4
Mean	293		438		463		398	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		15.98		62.72		18.40	
Genotype (B)	N.S.		23.03		66.07		17.36	
B within A	N.S.		39.88		114.43			
A within B			40.23		115.44			
			Grains/earhead					
HD 3369 (I) (C)	21.04	5	21.86	6	23.84	3	22.25	5
DBW 296 (C)	19.80	7	22.52	5	22.90	5	21.74	6
HI 1653 (I) (C)	23.04	3	20.38	7	20.50	7	21.31	7
PBW 644 (C)	28.55	1	30.20	1	26.45	1	28.40	1
WH 1402	20.40	6	29.98	2	23.40	4	24.59	3
NIAW 3170 (C)	23.83	2	26.63	3	26.45	2	25.63	2
HI 1654 (I) (C)	23.00	4	25.15	4	21.60	6	23.25	4
Mean	22.81		25.25		23.59		23.88	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		1.11		4.35		21.26	
Genotype (B)	N.S.		1.96		5.63		24.66	
B within A	N.S.		3.40		9.76			
A within B			3.34		9.58			
			1000 grains weight, g					
HD 3369 (I) (C)	41.76	4	43.58	2	44.66	3	43.33	3
DBW 296 (C)	43.11	1	42.60	3	44.44	4	43.38	2
HI 1653 (I) (C)	42.48	2	47.11	1	51.89	1	47.16	1
PBW 644 (C)	37.46	7	38.93	7	40.24	7	38.88	7
WH 1402	42.11	3	41.73	4	44.35	5	42.73	4
NIAW 3170 (C)	39.72	6	40.70	6	42.28	6	40.90	6
HI 1654 (I) (C)	40.01	5	40.93	5	45.65	2	42.20	5
Mean	40.95		42.23		44.79		42.65	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.23		0.92		2.51	
Genotype (B)	**		0.60		1.71		4.20	
B within A	*		1.03		2.97			
A within B			0.98		2.83			
Date of Sowing:	01.11.2022		Date of Harvesting:				18.04.2023	

Table 2.4.8 North Western Plain Zone			**RIR-TS-TAS**			**Ludhiana**		**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	23.29	5	42.06	5	48.73	1	38.02	4
DBW 296 (C)	24.28	4	44.24	1	46.33	5	38.28	3
HI 1653 (I) (C)	22.06	6	41.57	6	45.14	7	36.26	7
PBW 644 (C)	25.21	3	39.95	7	46.04	6	37.07	5
WH 1402	21.39	7	42.52	4	47.29	3	37.07	5
NIAW 3170 (C)	26.32	1	43.38	3	48.50	2	39.40	1
HI 1654 (I) (C)	25.32	2	44.19	2	47.23	4	38.91	2
Mean	23.98		42.56		47.04		37.86	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		2.34		9.17		28.28	
Genotype (B)	N.S.		1.69		4.85		13.39	
B within A	N.S.		2.93		8.40			
A within B			3.58		10.26			
			Earhead/sq.m.					
HD 3369 (I) (C)	223	5	276	3	282	3	260	4
DBW 296 (C)	227	3	275	4	280	4	261	3
HI 1653 (I) (C)	205	7	274	5	278	5	252	7
PBW 644 (C)	228	2	263	7	271	7	254	5
WH 1402	217	6	268	6	275	6	253	6
NIAW 3170 (C)	223	4	292	1	301	1	272	1
HI 1654 (I) (C)	238	1	282	2	289	2	270	2
Mean	223		276		282		260	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		2.79		10.94		4.91	
Genotype (B)	*		4.88		14.02		5.63	
B within A	N.S.		8.46		24.27			
A within B			8.31		23.86			
			Grains/earhead					
HD 3369 (I) (C)	28.52	6	34.86	6	42.82	2	35.40	3
DBW 296 (C)	28.93	5	36.66	3	35.01	6	33.53	5
HI 1653 (I) (C)	30.54	3	36.62	4	37.16	4	34.78	4
PBW 644 (C)	34.09	1	38.63	1	39.70	3	37.47	1
WH 1402	29.39	4	36.90	2	44.65	1	36.98	2
NIAW 3170 (C)	31.43	2	34.54	7	34.07	7	33.35	6
HI 1654 (I) (C)	28.22	7	35.50	5	35.16	5	32.96	7
Mean	30.16		36.24		38.37		34.92	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		1.98		7.78		25.99	
Genotype (B)	N.S.		1.80		5.18		15.50	
B within A	N.S.		3.13		8.97			
A within B			3.51		10.06			
			1000 grains weight, g					
HD 3369 (I) (C)	35.93	4	44.09	2	40.62	6	40.21	4
DBW 296 (C)	36.62	3	43.90	3	47.26	2	42.59	3
HI 1653 (I) (C)	34.86	6	41.49	6	43.53	4	39.96	5
PBW 644 (C)	32.55	7	39.27	7	42.72	5	38.18	7
WH 1402	35.00	5	43.36	4	38.42	7	38.93	6
NIAW 3170 (C)	37.48	2	43.03	5	47.32	1	42.61	2
HI 1654 (I) (C)	38.18	1	44.39	1	46.55	3	43.04	1
Mean	35.80		42.79		43.78		40.79	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.48		1.90		5.45	
Genotype (B)	**		0.86		2.46		6.30	
B within A	N.S.		1.48		4.26			
A within B			1.46		4.18			
Date of Sowing:	28.10.2022		Date of Harvesting:				12.04.2023	

Table 2.4.9 North Western Plain Zone			**RIR-TS-TAS**		**Pantnagar**			**2022-23**
Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	25.80	6	47.98	5	51.80	4	41.86	6
DBW 296 (C)	29.19	4	48.16	4	53.47	3	43.60	3
HI 1653 (I) (C)	27.23	5	45.42	7	54.13	2	42.26	5
PBW 644 (C)	24.19	7	50.10	3	51.09	5	41.79	7
WH 1402	31.78	2	50.35	2	51.08	6	44.40	2
NIAW 3170 (C)	30.69	3	47.59	6	50.70	7	42.99	4
HI 1654 (I) (C)	33.35	1	53.14	1	54.62	1	47.04	1
Mean	28.89		48.96		52.41		43.42	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		1.25		4.89		13.15	
Genotype (B)	**		0.95		2.73		6.57	
B within A	N.S.		1.65		4.73			
A within B			1.97		5.65			
			Earhead/sq.m.					
HD 3369 (I) (C)	243	4	268	6	327	5	279	6
DBW 296 (C)	224	6	354	1	266	6	281	5
HI 1653 (I) (C)	249	3	279	4	245	7	258	7
PBW 644 (C)	236	5	277	5	338	4	283	4
WH 1402	224	6	299	3	435	2	320	2
NIAW 3170 (C)	276	1	259	7	357	3	297	3
HI 1654 (I) (C)	254	2	332	2	464	1	350	1
Mean	244		295		347		295	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		8.70		34.14		13.49	
Genotype (B)	**		13.10		37.59		13.30	
B within A	**		22.69		65.11			
A within B			22.74		65.24			
			Grains/earhead					
HD 3369 (I) (C)	24.22	6	39.04	3	36.40	3	33.22	4
DBW 296 (C)	28.82	3	31.50	6	46.75	1	35.69	1
HI 1653 (I) (C)	21.45	7	29.69	7	40.76	2	30.63	7
PBW 644 (C)	26.71	4	43.89	1	35.98	4	35.52	2
WH 1402	31.66	1	38.54	4	25.60	6	31.93	5
NIAW 3170 (C)	26.50	5	41.34	2	33.74	5	33.86	3
HI 1654 (I) (C)	29.74	2	37.72	5	25.59	7	31.02	6
Mean	27.01		37.39		34.97		33.12	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		1.09		4.29		15.13	
Genotype (B)	N.S.		1.85		5.32		16.79	
B within A	**		3.21		9.22			
A within B			3.17		9.09			
			1000 grains weight, g					
HD 3369 (I) (C)	44.02	5	46.07	2	45.45	4	45.18	2
DBW 296 (C)	45.24	2	43.23	6	43.42	6	43.96	5
HI 1653 (I) (C)	52.30	1	55.39	1	54.63	1	54.11	1
PBW 644 (C)	38.86	7	42.04	7	42.61	7	41.17	7
WH 1402	44.86	4	43.99	4	46.37	2	45.08	3
NIAW 3170 (C)	42.27	6	44.75	3	43.73	5	43.59	6
HI 1654 (I) (C)	44.87	3	43.53	5	46.21	3	44.87	4
Mean	44.63		45.57		46.06		45.42	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		1.16		4.56		11.71	
Genotype (B)	**		0.62		1.77		4.08	
B within A	N.S.		1.07		3.07			
A within B			1.53		4.38			
Date of Sowing:	29.10.2022		Date of Harvesting:				08.04.2023	

Table 2.4.10 North Western Plain Zone **RIR-TS-TAS** **Sriganganagar** **2022-23**

Genotype	Level of Irrigation						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
			Yield, q/ha					
HD 3369 (I) (C)	35.48	4	42.93	7	67.99	3	48.80	4
DBW 296 (C)	36.27	3	43.75	6	59.47	6	46.49	6
HI 1653 (I) (C)	32.70	5	45.51	4	73.11	2	50.44	3
PBW 644 (C)	31.90	6	48.23	2	55.69	7	45.27	7
WH 1402	37.48	2	45.25	5	68.89	1	53.20	1
NIAW 3170 (C)	39.00	1	48.02	3	66.95	4	51.32	2
HI 1654 (I) (C)	31.34	7	48.96	1	61.79	5	47.36	5
Mean	34.88		46.00		65.98		48.98	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.04		0.18		0.42	
Genotype (B)	**		0.34		0.97		2.06	
B within A	N.S.		0.58		1.67			
A within B			0.54		1.55			
			Earhead/sq.m.					
HD 3369 (I) (C)	349	6	373	6	424	3	382	5
DBW 296 (C)	357	4	385	4	414	4	385	4
HI 1653 (I) (C)	327	7	354	7	383	7	355	7
PBW 644 (C)	360	3	388	3	413	5	387	3
WH 1402	350	5	377	5	409	6	379	6
NIAW 3170 (C)	371	2	401	2	434	2	402	2
HI 1654 (I) (C)	379	1	409	1	437	1	408	1
Mean	356		384		416		385	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.60		2.36		0.72	
Genotype (B)	**		2.17		6.24		1.69	
B within A	N.S.		3.76		10.80			
A within B			3.54		10.15			
			Grains/earhead					
HD 3369 (I) (C)	26.06	4	26.73	7	36.67	3	29.82	3
DBW 296 (C)	26.44	3	26.77	6	33.25	5	28.82	5
HI 1653 (I) (C)	29.38	1	33.78	1	49.16	1	37.44	1
PBW 644 (C)	23.09	6	29.29	2	31.24	7	27.87	6
WH 1402	28.09	2	28.50	3	43.93	2	33.51	2
NIAW 3170 (C)	25.94	5	26.91	5	34.07	4	28.97	4
HI 1654 (I) (C)	20.82	7	27.33	4	31.76	6	26.64	7
Mean	25.69		28.47		37.16		30.44	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.05		0.21		0.81	
Genotype (B)	**		0.39		1.12		3.84	
B within A	**		0.68		1.94			
A within B			0.63		1.80			
			1000 grains weight, g					
HD 3369 (I) (C)	39.03	3	43.03	3	43.79	3	41.95	3
DBW 296 (C)	38.46	4	42.47	4	43.22	4	41.38	4
HI 1653 (I) (C)	34.07	7	38.07	7	38.83	7	36.99	7
PBW 644 (C)	38.41	5	42.41	5	43.17	5	41.33	5
WH 1402	38.08	6	42.08	6	42.84	6	41.00	6
NIAW 3170 (C)	40.59	1	44.59	1	45.35	1	43.51	1
HI 1654 (I) (C)	39.76	2	43.76	2	44.52	2	42.68	2
Mean	38.34		42.34		43.10		41.26	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	#DIV/0!		0.00		0.00		0.00	
Genotype (B)	**		0.25		0.71		1.79	
B within A	N.S.		0.43		1.23			
A within B			0.40		1.14			
Date of Sowing:	05.11.2022		Date of Harvesting:				20.04.2023	

Not included in pooled due to improper data

Table 3.2.1.	North Eastern Plains Zone		IR-TS-DOS-TAS		Ayodhya	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	50.00	5	46.88	4	48.44	3
HD 3249 (C)	51.22	4	45.21	5	48.21	7
HD 3086 (C)	49.35	7	47.35	2	48.35	4
PBW 826 (I)(C)	52.56	2	45.00	7	48.78	2
DBW 222 (C)	49.45	6	47.00	3	48.22	5
DBW 187 (C)	54.23	1	49.14	1	51.69	1
HD 2967 (C)	51.43	3	45.01	6	48.22	5
Mean	51.18		46.51		48.84	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.13	0.54	1.24	
Genotype (B)		**	0.38	0.92	1.91	
B within A		**	0.54	1.30		
A within B			0.52	1.25		
			Earhead/sqm			
HD 3388	485	6	490	1	488	3
HD 3249 (C)	486	5	486	4	486	5
HD 3086 (C)	488	4	480	6	484	6
PBW 826 (I)(C)	501	1	490	1	496	1
DBW 222 (C)	485	6	479	7	482	7
DBW 187 (C)	494	2	490	1	492	2
HD 2967 (C)	491	3	482	5	487	4
Mean	490		485		488	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.76	3.11	0.71	
Genotype (B)		**	1.22	2.96	0.61	
B within A		**	1.73	4.19		
A within B			1.77	4.29		
			Grains/Earhead			
HD 3388	25.81	5	25.2	3	25.5	4
HD 3249 (C)	26.35	1	23.8	6	25.1	5
HD 3086 (C)	25.78	6	26.4	1	26.1	1
PBW 826 (I)(C)	25.59	7	23.4	7	24.5	7
DBW 222 (C)	25.86	4	25.8	2	25.8	2
DBW 187 (C)	26.29	2	25.1	4	25.7	3
HD 2967 (C)	26.17	3	23.8	5	25.0	6
Mean	25.98		24.8		25.4	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.10	0.39	1.72	
Genotype (B)		*	0.30	0.73	2.90	
B within A		**	0.43	1.03		
A within B			0.41	0.98		
			1000 Grains Weight, g			
HD 3388	40.00	4	38.0	5	39.0	5
HD 3249 (C)	40.00	4	39.1	4	39.5	4
HD 3086 (C)	39.23	7	37.3	7	38.3	7
PBW 826 (I)(C)	41.00	2	39.2	2	40.1	2
DBW 222 (C)	39.43	6	38.0	5	38.7	6
DBW 187 (C)	41.77	1	40.0	1	40.9	1
HD 2967 (C)	40.03	3	39.2	3	39.6	3
Mean	40.21		38.7		39.4	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.02	0.06	0.18	
Genotype (B)		**	0.28	0.69	1.76	
B within A		N.S.	0.40	0.97		
A within B			0.37	0.90		
Date of Sowing	11.11.2022		16.12.2022			
Date of Harvesting						

Table 3.2.2.	North Eastern Plains Zone		IR-TS-DOS-TAS		Coochbehar	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	55.87	3	52.20	2	54.03	3
HD 3249 (C)	40.87	6	40.37	6	40.62	6
HD 3086 (C)	38.37	7	38.33	7	38.35	7
PBW 826 (I)(C)	59.80	2	50.20	3	55.00	2
DBW 222 (C)	43.47	5	47.17	5	45.32	5
DBW 187 (C)	48.90	4	48.27	4	48.58	4
HD 2967 (C)	62.63	1	55.17	1	58.90	1
Mean	49.99		47.39		48.69	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.36	1.46	3.35	
Genotype (B)		**	1.45	3.52	7.32	
B within A		*	2.06	4.98		
A within B			1.94	4.69		
			Earhead/sqm			
HD 3388	312	3	302	2	307	3
HD 3249 (C)	254	6	241	6	248	6
HD 3086 (C)	246	7	222	7	234	7
PBW 826 (I)(C)	332	2	297	3	315	2
DBW 222 (C)	266	5	271	5	269	5
DBW 187 (C)	291	4	284	4	288	4
HD 2967 (C)	340	1	309	1	325	1
Mean	292		275		283	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	1.73	7.08	2.79	
Genotype (B)		**	11.50	27.84	9.94	
B within A		N.S.	16.27	39.37		
A within B			15.16	36.69		
			Grains/Earhead			
HD 3388	45.69	2	44.51	2	45.10	2
HD 3249 (C)	40.90	6	41.86	7	41.38	6
HD 3086 (C)	39.34	7	42.67	4	41.00	7
PBW 826 (I)(C)	45.36	3	42.55	6	43.95	3
DBW 222 (C)	40.97	5	43.32	3	42.15	5
DBW 187 (C)	41.95	4	42.59	5	42.27	4
HD 2967 (C)	47.33	1	45.94	1	46.64	1
Mean	43.08		43.35		43.21	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	0.71	2.93	7.57	
Genotype (B)		N.S.	2.04	4.94	11.58	
B within A		N.S.	2.89	6.99		
A within B			2.77	6.70		
			1000 Grains Weight, g			
HD 3388	39.30	6	39.27	6	39.28	6
HD 3249 (C)	40.03	3	40.20	3	40.12	2
HD 3086 (C)	40.10	1	40.63	1	40.37	1
PBW 826 (I)(C)	39.73	5	39.70	5	39.72	5
DBW 222 (C)	39.97	4	40.23	2	40.10	3
DBW 187 (C)	40.07	2	40.10	4	40.08	4
HD 2967 (C)	39.03	7	39.23	7	39.13	7
Mean	39.75		39.91		39.83	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	0.10	0.40	1.12	
Genotype (B)		**	0.18	0.44	1.11	
B within A		N.S.	0.26	0.62		
A within B			0.26	0.62		
Date of Sowing	10.11.2022		10.12.2022			
Date of Harvesting						

Table 3.2.3.	North Eastern Plains Zone		IR-TS-DOS-TAS		Kalyani	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	43.89	4	27.38	6	35.64	4
HD 3249 (C)	35.56	6	35.28	2	35.42	5
HD 3086 (C)	38.69	5	27.14	7	32.92	6
PBW 826 (I)(C)	45.79	2	36.51	1	41.15	1
DBW 222 (C)	35.32	7	29.57	4	32.45	7
DBW 187 (C)	46.29	1	31.43	3	38.86	2
HD 2967 (C)	45.64	3	27.46	5	36.55	3
Mean	41.60		30.68		36.14	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.17	0.70	2.15	
Genotype (B)		**	1.28	3.10	8.68	
B within A		**	1.81	4.38		
A within B			1.69	4.08		
			Earhead/sqm			
HD 3388	295	4	193	5	244	5
HD 3249 (C)	313	2	192	6	253	3
HD 3086 (C)	279	7	194	4	236	7
PBW 826 (I)(C)	333	1	203	3	268	2
DBW 222 (C)	299	3	185	7	242	6
DBW 187 (C)	290	5	325	1	308	1
HD 2967 (C)	286	6	205	2	246	4
Mean	299		214		257	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	2.88	11.81	5.14	
Genotype (B)		**	2.20	5.33	2.10	
B within A		**	3.12	7.54		
A within B			4.08	9.86		
			Grains/Earhead			
HD 3388	39.74	3	43.65	5	41.70	5
HD 3249 (C)	31.70	7	53.79	1	42.74	2
HD 3086 (C)	39.61	4	45.86	4	42.73	3
PBW 826 (I)(C)	36.17	5	51.80	2	43.98	1
DBW 222 (C)	33.80	6	48.30	3	41.05	6
DBW 187 (C)	41.61	2	28.90	7	35.25	7
HD 2967 (C)	42.15	1	42.80	6	42.48	4
Mean	37.82		45.01		41.42	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	1.21	4.98	13.44	
Genotype (B)		**	1.44	3.49	8.54	
B within A		**	2.04	4.94		
A within B			2.25	5.44		
			1000 Grains Weight, g			
HD 3388	37.43	4	32.67	5	35.05	4
HD 3249 (C)	36.00	5	34.13	2	35.07	3
HD 3086 (C)	35.00	6	30.60	7	32.80	7
PBW 826 (I)(C)	38.07	2	34.67	1	36.37	1
DBW 222 (C)	34.90	7	33.07	4	33.98	6
DBW 187 (C)	38.27	1	33.47	3	35.87	2
HD 2967 (C)	37.93	3	31.23	6	34.58	5
Mean	36.80		32.83		34.82	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.30	1.22	3.93	
Genotype (B)		**	0.48	1.16	3.38	
B within A		*	0.68	1.65		
A within B			0.70	1.69		
Date of Sowing	11.11.2022		16.12.2022			
Date of Harvesting	09.04.2023		30.03.2023			

Table 3.2.4.	North Eastern Plains Zone		IR-TS-DOS-TAS		Kanpur	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	46.51	3	35.57	7	41.04	6
HD 3249 (C)	46.03	5	36.55	4	41.29	4
HD 3086 (C)	47.34	2	35.74	6	41.54	3
PBW 826 (I)(C)	47.49	1	36.91	3	42.20	1
DBW 222 (C)	46.24	4	36.93	2	41.59	2
DBW 187 (C)	45.43	6	36.11	5	40.77	7
HD 2967 (C)	45.12	7	37.02	1	41.07	5
Mean	46.31		36.40		41.36	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.32	1.33	3.58	
Genotype (B)		N.S.	0.67	1.62	3.96	
B within A		N.S.	0.94	2.29		
A within B			0.93	2.26		
			Earhead/sqm			
HD 3388	427	3	410	5	419	5
HD 3249 (C)	433	1	411	4	422	2
HD 3086 (C)	425	5	415	1	420	4
PBW 826 (I)(C)	427	4	415	2	421	3
DBW 222 (C)	421	7	408	6	414	6
DBW 187 (C)	430	2	415	2	422	1
HD 2967 (C)	425	5	401	7	413	7
Mean	427		411		419	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.51	2.09	0.56	
Genotype (B)		N.S.	4.00	9.69	2.34	
B within A		N.S.	5.66	13.70		
A within B			5.27	12.75		
			Grains/Earhead			
HD 3388	26.40	7	23.05	5	24.73	6
HD 3249 (C)	29.12	3	23.83	3	26.48	4
HD 3086 (C)	28.33	6	20.60	7	24.46	7
PBW 826 (I)(C)	30.53	2	23.55	4	27.04	2
DBW 222 (C)	32.07	1	25.69	1	28.88	1
DBW 187 (C)	28.65	5	21.92	6	25.28	5
HD 2967 (C)	28.88	4	24.51	2	26.70	3
Mean	29.14		23.31		26.22	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.52	2.14	9.10	
Genotype (B)		**	0.57	1.37	5.29	
B within A		N.S.	0.80	1.94		
A within B			0.91	2.19		
			1000 Grains Weight, g			
HD 3388	41.30	1	37.63	5	39.47	2
HD 3249 (C)	36.80	4	37.33	6	37.07	6
HD 3086 (C)	39.37	2	41.80	1	40.58	1
PBW 826 (I)(C)	36.47	6	37.77	3	37.12	5
DBW 222 (C)	34.30	7	35.27	7	34.78	7
DBW 187 (C)	36.93	3	39.73	2	38.33	3
HD 2967 (C)	36.80	4	37.67	4	37.23	4
Mean	37.42		38.17		37.80	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	0.41	1.67	4.94	
Genotype (B)		**	0.42	1.01	2.71	
B within A		**	0.59	1.43		
A within B			0.68	1.65		
Date of Sowing	11.11.2022		15.12.2022			
Date of Harvesting	23.04.2023					

Table 3.2.5.	North Eastern Plains Zone		IR-TS-DOS-TAS		Ranchi	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	67.70	1	55.83	4	61.77	1
HD 3249 (C)	65.63	3	57.33	2	61.48	2
HD 3086 (C)	59.00	7	57.87	1	58.43	4
PBW 826 (I)(C)	66.13	2	56.80	3	61.47	3
DBW 222 (C)	60.23	5	54.23	5	57.23	5
DBW 187 (C)	59.07	6	50.87	6	54.97	6
HD 2967 (C)	63.77	4	39.03	7	51.40	7
Mean	63.08		53.14		58.11	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.61	2.50	4.81	
Genotype (B)		**	1.21	2.94	5.12	
B within A		**	1.72	4.16		
A within B			1.70	4.12		
			Earhead/sqm			
HD 3388	463	1	345	4	404	1
HD 3249 (C)	421	3	358	2	390	3
HD 3086 (C)	367	6	380	1	373	4
PBW 826 (I)(C)	425	2	355	3	390	2
DBW 222 (C)	360	7	315	5	338	6
DBW 187 (C)	373	5	308	6	341	5
HD 2967 (C)	390	4	263	7	327	7
Mean	400		332		366	
		F. Test	SEm	CD	CV (%)	
Sowing (A)	(A)	**	2.42	9.93	3.03	
Genotype (B)	(B)	**	12.10	29.27	8.10	
B within A		**	17.11	41.39		
A within B			16.02	38.77		
			Grains/Earhead			
HD 3388	32.23	7	39.35	4	35.79	7
HD 3249 (C)	36.84	5	39.05	5	37.94	4
HD 3086 (C)	37.23	3	35.87	7	36.55	6
PBW 826 (I)(C)	35.24	6	39.61	3	37.43	5
DBW 222 (C)	41.31	1	41.98	1	41.65	1
DBW 187 (C)	37.23	4	41.64	2	39.43	2
HD 2967 (C)	39.41	2	38.56	6	38.98	3
Mean	37.07		39.44		38.25	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	0.91	3.72	10.88	
Genotype (B)		N.S.	1.86	4.51	11.93	
B within A		N.S.	2.64	6.38		
A within B			2.60	6.30		
			1000 Grains Weight, g			
HD 3388	45.40	1	41.13	3	43.27	1
HD 3249 (C)	42.49	5	41.33	2	41.91	4
HD 3086 (C)	43.33	3	42.53	1	42.93	2
PBW 826 (I)(C)	44.26	2	40.47	6	42.36	3
DBW 222 (C)	41.13	7	41.13	3	41.13	6
DBW 187 (C)	42.66	4	40.69	5	41.68	5
HD 2967 (C)	41.73	6	38.47	7	40.10	7
Mean	43.00		40.82		41.91	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.23	0.95	2.52	
Genotype (B)		*	0.57	1.37	3.31	
B within A		N.S.	0.80	1.94		
A within B			0.78	1.88		
Date of Sowing	01.11.2022		10.12.2022			
Date of Harvesting	20.04.2023					

Table 3.2.6.	North Eastern Plains Zone		IR-TS-DOS-TAS		RPCAU PUSA	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	31.17	7	25.23	4	28.2	5
HD 3249 (C)	35.78	4	14.80	7	25.29	7
HD 3086 (C)	33.30	6	31.17	2	32.23	4
PBW 826 (I)(C)	48.04	1	34.20	1	41.12	1
DBW 222 (C)	47.83	2	25.80	3	36.82	2
DBW 187 (C)	47.52	3	24.97	5	36.24	3
HD 2967 (C)	34.36	5	16.50	6	25.43	6
Mean	39.71		24.67		32.19	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.51	2.08	7.21	
Genotype (B)		**	0.72	1.74	5.48	
B within A		**	1.02	2.46		
A within B			1.07	2.59		
			Earhead/sqm			
HD 3388	219	7	212	2	215	7
HD 3249 (C	228	6	205	7	217	6
HD 3086 (C)	239	4	209	5	224	4
PBW 826 (I)(C)	256	1	215	1	235	1
DBW 222 (C)	246	3	211	4	229	3
DBW 187 (C)	254	2	211	3	233	2
HD 2967 (C)	234	5	205	6	220	5
Mean	240		210		225	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.85	3.48	1.73	
Genotype (B)		*	4.82	11.67	5.26	
B within A		N.S.	6.82	16.51		
A within B			6.37	15.42		
			Grains/Earhead			
HD 3388	37.21	5	31.35	4	34.28	5
HD 3249 (C)	42.66	4	21.44	7	32.05	6
HD 3086 (C)	34.13	7	39.64	2	36.89	4
PBW 826 (I)(C)	43.82	2	40.32	1	42.07	2
DBW 222 (C)	49.33	1	35.68	3	42.50	1
DBW 187 (C)	43.82	3	31.02	5	37.42	3
HD 2967 (C)	36.84	6	23.34	6	30.09	7
Mean	41.12		31.83		36.47	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.47	1.93	5.92	
Genotype (B)		**	1.44	3.48	9.67	
B within A		**	2.04	4.93		
A within B			1.94	4.70		
			1000 Grains Weight, g			
HD 3388	38.40	6	38.15	3	38.28	4
HD 3249 (C)	36.90	7	33.63	7	35.27	7
HD 3086 (C)	41.07	3	37.68	4	39.37	3
PBW 826 (I)(C)	42.85	1	39.69	1	41.27	1
DBW 222 (C)	39.60	5	34.38	6	36.99	6
DBW 187 (C)	42.69	2	38.24	2	40.46	2
HD 2967 (C)	39.95	4	34.69	5	37.32	5
Mean	40.21		36.64		38.42	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.42	1.70	4.95	
Genotype (B)		**	0.78	1.88	4.94	
B within A		N.S.	1.10	2.65		
A within B			1.10	2.65		
Date of Sowing	24.11.2022		16.12.2023			
Date of Harvesting	12.04.2023					

Not included in pooled due to low mean yield

Table 3.2.7.	North Eastern Plains Zone		IR-TS-DOS-TAS		Sabour	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	35.95	5	24.19	7	30.07	7
HD 3249 (C)	41.13	1	32.58	1	36.85	1
HD 3086 (C)	38.21	2	27.90	3	33.06	2
PBW 826 (I)(C)	35.44	6	25.85	5	30.64	5
DBW 222 (C)	36.15	4	24.38	6	30.26	6
DBW 187 (C)	36.69	3	27.26	4	31.97	4
HD 2967 (C)	35.00	7	29.38	2	32.19	3
Mean	36.94		27.30		32.15	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.91	3.74	13.00	
Genotype (B)			1.21	2.93	9.22	
B within A		N.S.	1.71	4.14		
A within B			1.83	4.42		
			Earhead/sqm			
HD 3388	228	6	219	5	223	6
HD 3249 (C)	286	1	217	6	252	2
HD 3086 (C)	276	2	234	1	255	1
PBW 826 (I)(C)	253	4	227	4	240	4
DBW 222 (C)	236	5	232	2	234	5
DBW 187 (C)	266	3	231	3	249	3
HD 2967 (C)	215	7	211	7	213	7
Mean	251		224		238	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	5.56	22.79	10.71	
Genotype (B)		**	6.91	16.73	7.12	
B within A		*	9.78	23.66		
A within B			10.62	25.70		
			Grains/Earhead			
HD 3388	41.14	3	34.22	4	37.68	2
HD 3249 (C)	33.93	6	38.82	2	36.38	4
HD 3086 (C)	33.52	7	31.57	7	32.54	7
PBW 826 (I)(C)	35.23	4	31.85	6	33.54	6
DBW 222 (C)	41.95	2	32.25	5	37.10	3
DBW 187 (C)	34.81	5	35.95	3	35.38	5
HD 2967 (C)	47.50	1	39.17	1	43.33	1
Mean	38.30		34.83		36.56	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	2.03	8.33	25.44	
Genotype (B)		N.S.	2.40	5.82	16.11	
B within A		N.S.	3.40	8.23		
A within B			3.75	9.07		
			1000 Grains Weight, g			
HD 3388	38.67	5	33.67	5	36.17	5
HD 3249 (C)	42.33	1	39.00	1	40.67	1
HD 3086 (C)	41.67	2	37.67	2	39.67	2
PBW 826 (I)(C)	40.00	3	36.00	3	38.00	3
DBW 222 (C)	36.67	6	33.33	6	35.00	7
DBW 187 (C)	39.67	4	33.33	6	36.50	4
HD 2967 (C)	35.00	7	35.67	4	35.33	6
Mean	39.14		35.52		37.33	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.50	2.06	6.17	
Genotype (B)		*	1.31	3.16	8.57	
B within A		N.S.	1.85	4.47		
A within B			1.78	4.31		
Date of Sowing	11.11.2022		12.12.2022			
Date of Harvesting	08.04.2023					

Table 3.2.8.	North Eastern Plains Zone		IR-TS-DOS-TAS		Shillongani	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	37.50	5	43.86	7	40.68	6
HD 3249 (C)	48.69	1	60.83	3	54.76	1
HD 3086 (C)	47.19	2	57.90	4	52.55	2
PBW 826 (I)(C)	40.62	3	56.72	5	48.67	4
DBW 222 (C)	40.62	3	62.87	1	51.74	3
DBW 187 (C)	31.01	6	62.41	2	46.71	5
HD 2967 (C)	27.35	7	49.10	6	38.23	7
Mean	39.00		56.24		47.62	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	1.68	6.90	16.20	
Genotype (B)		**	1.55	3.76	8.00	
B within A		**	2.20	5.32		
A within B			2.64	6.39		
			Earhead/sqm			
HD 3388	176	4	304	3	240	3
HD 3249 (C)	192	2	312	2	252	2
HD 3086 (C)	211	1	314	1	262	1
PBW 826 (I)(C)	158	5	298	4	228	5
DBW 222 (C)	152	6	274	6	213	6
DBW 187 (C)	178	3	294	5	236	4
HD 2967 (C)	100	7	246	7	173	7
Mean	167		292		229	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	9.31	38.17	18.61	
Genotype (B)		**	9.86	23.85	10.54	
B within A		N.S.	13.94	33.73		
A within B			15.91	38.50		
			Grains/Earhead			
HD 3388	48.23	6	46.78	4	47.51	6
HD 3249 (C)	52.16	4	45.00	6	48.58	4
HD 3086 (C)	55.54	3	47.06	3	51.30	3
PBW 826 (I)(C)	50.20	5	45.31	5	47.75	5
DBW 222 (C)	69.91	1	50.79	2	60.35	1
DBW 187 (C)	34.87	7	42.23	7	38.55	7
HD 2967 (C)	65.09	2	51.65	1	58.37	2
Mean	53.71		46.97		50.34	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	1.16	4.75	10.54	
Genotype (B)		**	2.29	5.53	11.13	
B within A		*	3.23	7.83		
A within B			3.21	7.77		
			1000 Grains Weight, g			
HD 3388	44.97	4	30.93	7	37.95	7
HD 3249 (C)	49.60	3	43.50	3	46.55	3
HD 3086 (C)	40.53	6	39.27	6	39.90	6
PBW 826 (I)(C)	51.37	1	42.23	4	46.80	2
DBW 222 (C)	38.77	7	45.37	2	42.07	4
DBW 187 (C)	49.87	2	50.53	1	50.20	1
HD 2967 (C)	41.83	5	39.97	5	40.90	5
Mean	45.28		41.69		43.48	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.30	1.25	3.21	
Genotype (B)		**	1.09	2.63	6.12	
B within A		**	1.54	3.72		
A within B			1.46	3.52		
Date of Sowing	11.11.2022		12.12.2022			
Date of Harvesting	08.04.2023					

Not included in pooled due to low mean yield

Table 3.2.9.	North Eastern Plains Zone		IR-TS-DOS-TAS		Varanasi	2022-23
Genotype	Date of Sowing				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HD 3388	49.40	2	33.50	7	41.45	6
HD 3249 (C)	47.58	3	42.09	3	44.83	2
HD 3086 (C)	43.21	7	37.09	6	40.15	7
PBW 826 (I)(C)	52.17	1	42.31	1	47.24	1
DBW 222 (C)	44.83	5	42.30	2	43.57	3
DBW 187 (C)	46.58	4	37.51	5	42.04	4
HD 2967 (C)	44.09	6	39.82	4	41.95	5
Mean	46.84		39.23		43.03	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		*	0.94	3.87	10.04	
Genotype (B)		**	0.68	1.64	3.87	
B within A		**	0.96	2.33		
A within B			1.30	3.14		
			Earhead/sqm			
HD 3388	313	2	296	2	305	2
HD 3249 (C)	274	6	288	6	281	5
HD 3086 (C)	314	1	293	3	304	3
PBW 826 (I)(C)	301	4	289	5	295	4
DBW 222 (C)	276	5	284	7	280	6
DBW 187 (C)	262	7	293	3	278	7
HD 2967 (C)	308	3	360	1	334	1
Mean	293		300		296	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	3.44	14.12	5.32	
Genotype (B)		**	4.30	10.41	3.55	
B within A		**	6.08	14.72		
A within B			6.60	15.97		
			Grains/Earhead			
HD 3388	41.04	6	36.75	7	38.89	7
HD 3249 (C)	43.05	4	45.46	4	44.25	3
HD 3086 (C)	38.70	7	47.37	3	43.03	4
PBW 826 (I)(C)	43.52	3	48.56	2	46.04	2
DBW 222 (C)	45.02	1	49.61	1	47.31	1
DBW 187 (C)	44.07	2	40.15	5	42.11	5
HD 2967 (C)	42.41	5	38.53	6	40.47	6
Mean	42.54		43.77		43.16	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		N.S.	1.02	4.20	10.86	
Genotype (B)		**	1.50	3.63	8.51	
B within A		*	2.12	5.13		
A within B			2.21	5.35		
			1000 Grains Weight, g			
HD 3388	38.48	4	30.89	3	34.69	4
HD 3249 (C)	40.35	2	32.25	1	36.30	1
HD 3086 (C)	35.64	6	26.85	7	31.25	7
PBW 826 (I)(C)	39.89	3	30.68	4	35.29	3
DBW 222 (C)	36.12	5	30.16	5	33.14	5
DBW 187 (C)	40.38	1	32.01	2	36.20	2
HD 2967 (C)	33.77	7	28.83	6	31.30	6
Mean	37.80		30.24		34.02	
		F. Test	SEm	CD	CV (%)	
Sowing (A)		**	0.12	0.51	1.66	
Genotype (B)		**	0.79	1.90	5.65	
B within A		N.S.	1.11	2.69		
A within B			1.04	2.51		
Date of Sowing	09.11.2022		16.12.2022			
Date of Harvesting	08.04.2023					

Table 4.2.1. Central Zone **IR-TS-DOS-TAD** **Bilaspur** **2022-23**

Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	37.96	7	29.53	7	33.75	7
HI 1650 (I) (C)	39.95	5	31.14	5	35.55	5
GW 547	41.66	3	31.54	4	36.60	4
NWS 2194	43.65	2	35.54	2	39.60	2
GW 513 (C)	45.11	1	38.27	1	41.69	1
HI 1636 (C)	41.39	4	32.31	3	36.85	3
GW 322 (C)	38.84	6	30.14	6	34.49	6
Mean	41.23		32.64		36.93	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.22	0.91	2.76		
Genotype (B)	**	0.67	1.61	4.41		
B within A	N.S.	0.94	2.28			
A within B		0.90	2.17			
			Earhead/sq.m.			
MACS 6768 (I) (C)	322	7	267	7	294	7
HI 1650 (I) (C)	341	5	281	6	311	5
GW 547	359	3	291	4	325	4
NWS 2194	366	2	319	2	342	2
GW 513 (C)	367	1	322	1	345	1
HI 1636 (C)	357	4	301	3	329	3
GW 322 (C)	328	6	282	5	305	6
Mean	348		295		322	
	F. Test	S.E.m	C.D.	C.V.(%)		
Date of sowing (A)	**	1.03	4.21	1.46		
Genotype (B)	**	1.72	4.17	1.31		
B within A	**	2.44	5.89			
A within B		2.48	6.00			
			Grains/earhead			
MACS 6768 (I) (C)	29.34	1	27.96	1	28.65	1
HI 1650 (I) (C)	27.89	3	27.74	2	27.81	2
GW 547	26.74	5	25.67	7	26.20	6
NWS 2194	26.30	7	26.11	5	26.20	7
GW 513 (C)	26.94	4	27.47	3	27.21	4
HI 1636 (C)	26.65	6	26.03	6	26.34	5
GW 322 (C)	28.97	2	26.65	4	27.81	3
Mean	27.54		26.80		27.17	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.16	0.65	2.69		
Genotype (B)	N.S.	0.70	1.69	6.31		
B within A	N.S.	0.99	2.40			
A within B		0.93	2.25			
			1000 grain wt, g			
MACS 6768 (I) (C)	40.24	7	39.71	7	39.98	7
HI 1650 (I) (C)	42.15	5	40.00	6	41.08	5
GW 547	43.35	4	42.22	3	42.78	3
NWS 2194	45.41	2	42.73	2	44.07	2
GW 513 (C)	45.64	1	43.32	1	44.48	1
HI 1636 (C)	43.55	3	41.34	4	42.44	4
GW 322 (C)	40.97	6	40.14	5	40.56	6
Mean	43.04		41.35		42.20	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.13	0.55	1.46		
Genotype (B)	**	0.53	1.28	3.08		
B within A	N.S.	0.75	1.82			
A within B		0.71	1.71			
Date of Sowing:		12.11.2022		03.12.2022		
Date of Harvesting:		07.04.2023		19.04.2023		

Not included in pooled due to low mean yield

Table 4.2.2. Central Zone **IR-TS-DOS-TAD** **Gwalior** **2022-23**

Genotpe	Sowing Time					
	Timely	Rk	Late	Rk	Mean	Rk
			Yield, q/ha			
MACS 6768 (I) (C)	60.99	1	42.03	1	51.51	1
HI 1650 (I) (C)	45.83	3	22.87	6	34.35	6
GW 547	43.45	5	30.32	4	36.89	4
NWS 2194	42.50	7	29.36	5	35.93	5
GW 513 (C)	44.87	4	32.10	3	38.49	3
HI 1636 (C)	48.97	2	34.12	2	41.55	2
GW 322 (C)	43.26	6	21.03	7	32.15	7
Mean	47.13		30.26		38.69	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.87	3.55	10.26		
Genotype (B)	**	0.88	2.12	5.55		
B within A	**	1.24	3.00			
A within B		1.44	3.48			
			Earhead/sq.m.			
MACS 6768 (I) (C)	455	1	375	6	415	4
HI 1650 (I) (C)	365	6	389	5	377	6
GW 547	432	2	402	3	417	3
NWS 2194	400	5	400	4	400	5
GW 513 (C)	431	3	411	2	421	2
HI 1636 (C)	351	7	365	7	358	7
GW 322 (C)	427	4	436	1	432	1
Mean	409		397		403	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	3.83	15.70	4.36		
Genotype (B)	**	7.82	18.92	4.75		
B within A	**	11.06	26.75			
A within B		10.93	26.44			
			Grains/earhead			
MACS 6768 (I) (C)	32.14	1	33.22	1	32.68	1
HI 1650 (I) (C)	31.76	3	20.44	7	26.10	5
GW 547	25.58	7	22.31	5	23.94	7
NWS 2194	30.66	5	23.36	4	27.01	4
GW 513 (C)	31.96	2	25.22	2	28.59	2
HI 1636 (C)	30.32	6	24.74	3	27.53	3
GW 322 (C)	31.12	4	20.95	6	26.04	6
Mean	30.51		24.32		27.41	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.97	3.97	16.16		
Genotype (B)	**	0.96	2.31	8.54		
B within A	**	1.35	3.27			
A within B		1.58	3.83			
			1000 grain wt, g			
MACS 6768 (I) (C)	41.73	2	34.03	2	37.88	2
HI 1650 (I) (C)	39.51	3	28.74	6	34.13	4
GW 547	39.47	4	33.78	3	36.63	3
NWS 2194	34.70	5	31.53	4	33.11	5
GW 513 (C)	32.56	7	30.97	5	31.76	6
HI 1636 (C)	46.15	1	37.87	1	42.01	1
GW 322 (C)	32.69	6	23.22	7	27.96	7
Mean	38.11		31.45		34.78	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.17	0.70	2.24		
Genotype (B)	**	0.31	0.75	2.17		
B within A	**	0.44	1.06			
A within B		0.44	1.06			
Date of Sowing:		12.11.2022		03.12.2022		
Date of Harvesting:		6.4.2023		9.4.2023		

Table 4.2.3. Central Zone			**IR-TS-DOS-TAD**		**Indore**	**2022-23**
Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	53.67	1	47.67	4	50.67	3
HI 1650 (I) (C)	52.23	2	50.47	2	51.35	1
GW 547	50.27	4	45.97	5	48.12	5
NWS 2194	45.57	7	43.33	7	44.45	7
GW 513 (C)	47.50	6	50.70	1	49.10	4
HI 1636 (C)	50.13	5	43.50	6	46.82	6
GW 322 (C)	51.13	3	50.27	3	50.70	2
Mean	50.07		47.41		48.74	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.40	1.65	3.77		
Genotype (B)	**	0.94	2.27	4.72		
B within A	*	1.33	3.22			
A within B		1.29	3.13			
			Earhead/sq.m.			
MACS 6768 (I) (C)	324	3	283	5	304	3
HI 1650 (I) (C)	332	2	289	2	310	2
GW 547	315	4	285	3	300	4
NWS 2194	273	7	275	6	274	7
GW 513 (C)	275	6	284	4	279	5
HI 1636 (C)	280	5	274	7	277	6
GW 322 (C)	333	1	296	1	314	1
Mean	304		284		294	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	4	15	6		
Genotype (B)	**	6	15	5		
B within A	*	9	22			
A within B		9	22			
			Grains/earhead			
MACS 6768 (I) (C)	38.50	3	38.87	4	38.68	3
HI 1650 (I) (C)	35.37	6	41.57	2	38.47	4
GW 547	37.23	4	38.70	5	37.97	5
NWS 2194	40.00	2	41.07	3	40.53	2
GW 513 (C)	35.20	7	38.60	6	36.90	6
HI 1636 (C)	35.80	5	31.47	7	33.63	7
GW 322 (C)	41.23	1	44.63	1	42.93	1
Mean	37.62		39.27		38.45	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.56	2.29	6.65		
Genotype (B)	**	1.23	2.98	7.84		
B within A	N.S.	1.74	4.21			
A within B		1.70	4.12			
			1000 grain wt, g			
MACS 6768 (I) (C)	43.37	4	42.33	3	42.85	4
HI 1650 (I) (C)	44.67	3	42.23	4	43.45	3
GW 547	42.90	5	41.70	5	42.30	5
NWS 2194	41.60	6	38.37	6	39.98	6
GW 513 (C)	49.33	2	46.87	2	48.10	2
HI 1636 (C)	50.13	1	50.57	1	50.35	1
GW 322 (C)	37.37	7	38.07	7	37.72	7
Mean	44.20		42.88		43.54	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.07	0.29	0.75		
Genotypes (B)	**	0.43	1.04	2.41		
B within A	*	0.61	1.47			
A within B		0.57	1.37			
Date of Sowing:		16.11.2022		7.12.2022		
Date of Harvesting:		20.3.2023		29.3.2023		

Table 4.2.4. Central Zone **IR-TS-DOS-TAD** **Junagadh** **2022-23**

Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	58.33	4	42.86	7	50.60	7
HI 1650 (I) (C)	60.60	3	61.03	2	60.81	2
GW 547	56.99	5	53.78	4	55.38	4
NWS 2194	55.18	7	52.16	5	53.67	6
GW 513 (C)	60.88	2	62.50	1	61.69	1
HI 1636 (C)	55.39	6	54.53	3	54.96	5
GW 322 (C)	63.52	1	50.13	6	56.82	3
Mean	58.70		53.86		56.28	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	1.20	4.92	9.77		
Genotype (B)	**	1.30	3.15	5.66		
B within A	**	1.84	4.45			
A within B		2.08	5.04			
			Earhead/sq.m.			
MACS 6768 (I) (C)	388	4	338	4	363	4
HI 1650 (I) (C)	388	5	332	6	360	6
GW 547	403	2	383	1	393	1
NWS 2194	375	6	352	2	363	3
GW 513 (C)	418	1	343	3	381	2
HI 1636 (C)	390	3	333	5	362	5
GW 322 (C)	328	7	332	6	330	7
Mean	384		345		365	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	9.04	37.06	11.36		
Genotype (B)	**	7.83	18.94	5.26		
B within A	*	11.07	26.78			
A within B		13.66	33.06			
			Grains/earhead			
MACS 6768 (I) (C)	32.97	3	28.16	7	30.56	5
HI 1650 (I) (C)	31.59	4	40.20	2	35.89	2
GW 547	31.21	5	33.36	4	32.29	4
NWS 2194	33.84	2	36.73	3	35.28	3
GW 513 (C)	24.87	7	32.58	5	28.73	7
HI 1636 (C)	26.50	6	31.68	6	29.09	6
GW 322 (C)	50.82	1	42.14	1	46.48	1
Mean	33.12		34.98		34.05	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	1.37	5.61	18.43		
Genotype (B)	**	1.15	2.79	8.29		
B within A	**	1.63	3.94			
A within B		2.04	4.93			
			1000 grain wt, g			
MACS 6768 (I) (C)	46.11	4	45.00	4	45.56	4
HI 1650 (I) (C)	49.71	3	45.74	3	47.72	3
GW 547	45.42	5	42.15	5	43.79	5
NWS 2194	43.55	6	40.58	6	42.07	6
GW 513 (C)	58.53	1	56.01	1	57.27	1
HI 1636 (C)	53.67	2	51.88	2	52.78	2
GW 322 (C)	38.28	7	35.86	7	37.07	7
Mean	47.90		45.32		46.61	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.39	1.60	3.83		
Genotype (B)	**	0.78	1.88	4.09		
B within A	N.S.	1.10	2.66			
A within B		1.09	2.64			
Date of Sowing:		15.11.2022		5.12.2022		
Date of Harvesting:		6.3.2023		21.3.2023		

Table 4.2.5. Central Zone **IR-TS-DOS-TAD** **Powarkheda** **2022-23**

Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	50.47	2	45.63	1	48.05	2
HI 1650 (I) (C)	53.41	1	43.59	2	48.50	1
GW 547	42.95	6	39.32	6	41.14	7
NWS 2194	44.48	3	42.18	4	43.33	3
GW 513 (C)	43.54	4	42.39	3	42.96	4
HI 1636 (C)	43.38	5	39.06	7	41.22	6
GW 322 (C)	42.61	7	40.38	5	41.50	5
Mean	45.83		41.79		43.81	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.27	1.12	2.86		
Genotype (B)	**	1.05	2.55	5.89		
B within A	N.S.	1.49	3.61			
A within B		1.41	3.40			
			Earhead/sq.m.			
MACS 6768 (I) (C)	438	3	405	3	422	3
HI 1650 (I) (C)	484	1	448	1	466	1
GW 547	458	2	414	2	436	2
NWS 2194	385	6	356	6	371	6
GW 513 (C)	373	7	339	7	356	7
HI 1636 (C)	396	5	365	5	381	5
GW 322 (C)	399	4	378	4	389	4
Mean	419		387		403	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	1.68	6.90	1.91		
Genotype (B)	**	7.65	18.51	4.65		
B within A	N.S.	10.82	26.18			
A within B		10.16	24.58			
			Grains/earhead			
MACS 6768 (I) (C)	23.55	3	25.20	4	24.37	4
HI 1650 (I) (C)	21.47	5	20.60	7	21.04	6
GW 547	20.37	6	22.59	5	21.48	5
NWS 2194	26.04	1	29.27	1	27.66	1
GW 513 (C)	22.57	4	26.43	3	24.50	3
HI 1636 (C)	19.95	7	20.88	6	20.42	7
GW 322 (C)	25.26	2	28.04	2	26.65	2
Mean	22.74		24.72		23.73	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.27	1.11	5.22		
Genotype (B)	**	0.79	1.91	8.13		
B within A	N.S.	1.11	2.70			
A within B		1.07	2.58			
			1000 grain wt, g			
MACS 6768 (I) (C)	49.00	4	44.80	4	46.90	4
HI 1650 (I) (C)	51.50	3	47.27	3	49.38	3
GW 547	46.67	5	42.50	5	44.58	5
NWS 2194	44.45	6	40.57	6	42.51	6
GW 513 (C)	51.77	2	47.28	2	49.53	2
HI 1636 (C)	54.97	1	51.45	1	53.21	1
GW 322 (C)	42.50	7	38.43	7	40.47	7
Mean	48.69		44.61		46.65	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.14	0.59	1.41		
Genotype (B)	**	0.89	2.15	4.67		
B within A	N.S.	1.26	3.04			
A within B		1.17	2.84			
Date of Sowing:		18.11.2022		09.12.2022		
Date of Harvesting:		06.04.2023		14.04.2023		

Table 4.2.6. Central Zone **IR-TS-DOS-TAD** **Udaipur** **2022-23**

Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	59.93	2	50.48	1	55.21	2
HI 1650 (I) (C)	55.00	4	39.88	4	47.44	4
GW 547	56.68	3	41.70	3	49.19	3
NWS 2194	51.98	5	37.47	6	44.73	5
GW 513 (C)	47.13	7	35.37	7	41.25	7
HI 1636 (C)	48.73	6	39.13	5	43.93	6
GW 322 (C)	62.88	1	49.25	2	56.07	1
Mean	54.62		41.90		48.26	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	1.31	5.38	12.45		
Genotype (B)	**	1.77	4.27	8.96		
B within A	N.S.	2.50	6.04			
A within B		2.66	6.43			
			Earhead/sq.m.			
MACS 6768 (I) (C)	371	2	283	4	327	3
HI 1650 (I) (C)	313	5	283	4	298	5
GW 547	364	3	299	2	332	2
NWS 2194	312	6	271	7	292	6
GW 513 (C)	339	4	285	3	312	4
HI 1636 (C)	279	7	276	6	277	7
GW 322 (C)	376	1	325	1	350	1
Mean	336		289		313	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	6.72	27.54	9.84		
Genotype (B)	**	11.27	27.28	8.83		
B within A	N.S.	15.94	38.58			
A within B		16.22	39.24			
			Grains/earhead			
MACS 6768 (I) (C)	33.76	5	38.53	1	36.15	1
HI 1650 (I) (C)	36.68	1	35.18	2	35.93	2
GW 547	36.17	3	33.17	3	34.67	3
NWS 2194	36.17	4	31.94	6	34.05	5
GW 513 (C)	28.71	7	29.19	7	28.95	7
HI 1636 (C)	36.64	2	32.20	5	34.42	4
GW 322 (C)	31.63	6	32.26	4	31.95	6
Mean	34.25		33.21		33.73	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.86	3.51	11.63		
Genotype (B)	N.S.	1.76	4.26	12.78		
B within A	N.S.	2.49	6.02			
A within B		2.46	5.95			
			1000 grain wt, g			
MACS 6768 (I) (C)	48.58	2	46.42	2	47.50	2
HI 1650 (I) (C)	48.08	4	40.07	7	44.08	6
GW 547	43.13	7	42.20	6	42.67	7
NWS 2194	46.08	6	43.70	4	44.89	5
GW 513 (C)	48.55	3	42.55	5	45.55	4
HI 1636 (C)	47.95	5	45.28	3	46.62	3
GW 322 (C)	52.97	1	47.07	1	50.02	1
Mean	47.91		43.90		45.90	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.47	1.93	4.71		
Genotype (B)	**	0.77	1.85	4.09		
B within A	*	1.08	2.62			
A within B		1.11	2.68			
Date of Sowing:		12.11.2022		3.12.2022		
Date of Harvesting:		25.3.2023		1.4.2023		

Table 4.2.7. Central Zone			**IR-TS-DOS-TAD**		**Vijapur**	**2022-23**
Genotype	Sowing Time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
MACS 6768 (I) (C)	52.17	3	50.58	1	51.38	1
HI 1650 (I) (C)	52.96	2	42.58	4	47.77	4
GW 547	55.00	1	43.29	3	49.15	3
NWS 2194	45.54	7	41.50	5	43.52	6
GW 513 (C)	48.71	4	50.25	2	49.48	2
HI 1636 (C)	48.08	5	39.71	6	43.90	5
GW 322 (C)	46.88	6	33.75	7	40.31	7
Mean	49.90		43.10		46.50	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	2.11	8.64	20.76		
Genotype (B)	**	1.55	3.75	8.17		
B within A	*	2.19	5.31			
A within B		2.93	7.08			
			Earhead/sq.m.			
MACS 6768 (I) (C)	344	2	372	2	358	2
HI 1650 (I) (C)	321	6	339	4	330	5
GW 547	353	1	377	1	365	1
NWS 2194	325	4	339	5	332	4
GW 513 (C)	324	5	329	6	327	6
HI 1636 (C)	315	7	301	7	308	7
GW 322 (C)	333	3	343	3	338	3
Mean	331		343		337	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	4.63	18.99	6.30		
Genotype (B)	*	10.74	25.99	7.81		
B within A	N.S.	15.19	36.76			
A within B		14.81	35.83			
			Grains/earhead			
MACS 6768 (I) (C)	35.03	1	32.42	2	33.73	1
HI 1650 (I) (C)	34.92	2	31.18	4	33.05	3
GW 547	31.85	4	29.55	6	30.70	6
NWS 2194	29.91	5	31.77	3	30.84	5
GW 513 (C)	27.48	7	39.12	1	33.30	2
HI 1636 (C)	27.51	6	30.55	5	29.03	7
GW 322 (C)	33.62	3	28.30	7	30.96	4
Mean	31.47		31.84		31.66	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.98	4.03	14.24		
Genotype (B)	N.S.	1.42	3.44	10.99		
B within A	**	2.01	4.86			
A within B		2.10	5.09			
			1000 grain wt, g			
MACS 6768 (I) (C)	43.22	6	42.17	2	42.69	6
HI 1650 (I) (C)	47.38	4	40.84	3	44.11	4
GW 547	49.84	3	38.72	5	44.28	3
NWS 2194	46.82	5	38.64	6	42.73	5
GW 513 (C)	54.77	2	39.11	4	46.94	2
HI 1636 (C)	55.70	1	43.40	1	49.55	1
GW 322 (C)	41.84	7	35.14	7	38.49	7
Mean	48.51		39.72		44.11	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.21	0.86	2.17		
Genotypes (B)	**	1.15	2.77	6.37		
B within A	**	1.62	3.92			
A within B		1.52	3.67			
Date of Sowing:		14.11.2022		4.12.2022		
Date of Harvesting:		4.3.2023		24.3.2023		

Table 4.4.1. Central Zone **RIR-TS-TAD** **Bilaspur** **2022-23**

Genotype	Irrigation level							
	Zero	Rk	One	Rk	Two	Rk	Mean	Rk
				Yield, q/ha				
DBW 359	19.43	6	25.16	6	29.39	6	24.66	6
CG 1040	22.50	2	30.86	2	36.31	2	29.89	2
MP 3288 (C)	21.82	3	29.47	4	34.27	3	28.52	3
DBW 110 (C)	20.62	4	29.79	3	33.10	4	27.84	4
HI 1655 (I) (C)	20.04	5	28.33	5	32.70	5	27.02	5
CG 1036 (I) (C)	23.19	1	32.43	1	37.56	1	31.06	1
Mean	21.27		29.34		33.89		28.16	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.43	1.68	6.45				
Genotype (B)	**	0.58	1.67	6.16				
B within A	N.S.	1.00	2.89					
A within B		1.01	2.92					
				Earhead/sq.m.				
DBW 359	213	6	239	6	258	6	237	6
CG 1040	250	2	281	2	311	2	281	2
MP 3288 (C)	241	3	276	3	302	3	273	3
DBW 110 (C)	232	4	271	4	297	4	267	4
HI 1655 (I) (C)	228	5	267	5	291	5	262	5
CG 1036 (I) (C)	255	1	296	1	328	1	293	1
Mean	236		272		298		269	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	1.04	4.09	1.64				
Genotype (B)	**	1.35	3.90	1.51				
B within A	**	2.34	6.76					
A within B		2.38	6.87					
				Grains/earhead				
DBW 359	26.30	1	28.55	2	30.68	1	28.51	1
CG 1040	23.75	5	28.20	3	28.81	3	26.92	5
MP 3288 (C)	24.62	4	27.72	5	28.47	4	26.94	4
DBW 110 (C)	24.82	3	29.00	1	27.92	5	27.25	3
HI 1655 (I) (C)	25.18	2	28.19	4	28.93	2	27.43	2
CG 1036 (I) (C)	23.52	6	27.00	6	27.37	6	25.96	6
Mean	24.70		28.11		28.70		27.17	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.41	1.62	6.43				
Genotype (B)	N.S.	0.66	1.91	7.32				
B within A	N.S.	1.15	3.32					
A within B		1.13	3.25					
				1000 grain wt, g				
DBW 359	34.69	6	36.98	6	37.22	6	36.30	6
CG 1040	37.99	2	38.99	2	40.62	2	39.20	2
MP 3288 (C)	36.93	3	38.51	3	39.89	4	38.45	3
DBW 110 (C)	35.87	4	37.90	4	39.94	3	37.91	4
HI 1655 (I) (C)	35.02	5	37.61	5	38.95	5	37.19	5
CG 1036 (I) (C)	38.77	1	40.62	1	41.85	1	40.41	1
Mean	36.55		38.44		39.75		38.24	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.15	0.60	1.70				
Genotype (B)	**	0.41	1.19	3.24				
B within A	N.S.	0.72	2.07					
A within B		0.67	1.94					
Date of Sowing:		30.10.2022						
Date of Harvesting:		28.02.2023						

Table 4.4.2. Central Zone **RIR-TS-TAD** **Gwalior** **2022-23**

Genotype	Irrigations							
	Zero	Rk	One	Rk	Two	Rk	Mean	Rk
				Yield, q/ha				
DBW 359	28.47	4	38.90	4	42.22	4	36.53	4
CG 1040	26.67	5	33.09	5	41.07	5	33.61	5
MP 3288 (C)	29.37	2	40.05	2	45.20	2	38.21	2
DBW 110 (C)	26.37	6	32.78	6	40.24	6	33.13	6
HI 1655 (I) (C)	28.93	3	39.68	3	43.29	3	37.30	3
CG 1036 (I) (C)	30.40	1	43.42	1	50.52	1	41.44	1
Mean	28.37		37.99		43.76		36.70	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.84	3.31	9.75				
Genotype (B)	**	0.85	2.46	6.96				
B within A	N.S.	1.47	4.26					
A within B		1.59	4.59					
				Earhead/sq.m.				
DBW 359	343	5	419	3	434	4	399	4
CG 1040	343	4	408	6	429	5	393	5
MP 3288 (C)	359	2	425	2	465	2	416	2
DBW 110 (C)	305	6	411	5	407	6	374	6
HI 1655 (I) (C)	354	3	419	4	446	3	406	3
CG 1036 (I) (C)	360	1	440	1	491	1	430	1
Mean	344		420		446		403	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	8.70	34.16	9.15				
Genotype (B)	**	6.47	18.70	4.82				
B within A	N.S.	11.21	32.38					
A within B		13.43	38.80					
				Grains /earhead				
DBW 359	23.51	2	25.52	1	23.86	6	24.29	2
CG 1040	22.74	3	23.33	5	26.08	1	24.05	3
MP 3288 (C)	22.55	4	25.14	3	23.98	4	23.89	5
DBW 110 (C)	25.11	1	22.40	6	25.95	2	24.49	1
HI 1655 (I) (C)	22.40	5	25.16	2	23.95	5	23.84	6
CG 1036 (I) (C)	22.34	6	24.90	4	24.76	3	24.00	4
Mean	23.11		24.41		24.76		24.09	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	N.S.	0.83	3.24	14.53				
Genotype (B)	N.S.	0.78	2.26	9.73				
B within A	N.S.	1.35	3.91					
A within B		1.49	4.29					
				1000 grain wt, g				
DBW 359	35.46	4	36.49	4	40.85	2	37.60	4
CG 1040	34.15	6	34.97	6	36.81	6	35.31	6
MP 3288 (C)	36.48	3	37.75	2	40.57	4	38.26	3
DBW 110 (C)	34.47	5	35.70	5	38.27	5	36.14	5
HI 1655 (I) (C)	36.63	2	37.70	3	40.75	3	38.36	2
CG 1036 (I) (C)	37.86	1	39.62	1	41.63	1	39.70	1
Mean	35.84		37.04		39.81		37.56	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.36	1.43	4.10				
Genotype (B)	**	0.37	1.07	2.96				
B within A	N.S.	0.64	1.85					
A within B		0.69	1.99					
Date of Sowing:		12.11.2022						
Date of Harvesting:		10.04.2023						

Table 4.4.3. Central Zone			**RIR-TS-TAD**				**Indore**	**2022-23**
Genotype	Irrigations							
	Zero	Rk	One	Rk	Two	Rk	Mean	Rk
				Yield, q/ha				
DBW 359	27.20	2	35.20	2	38.83	2	33.74	2
CG 1040	29.00	1	32.17	4	38.50	3	33.22	3
MP 3288 (C)	25.13	3	31.30	5	35.57	6	30.67	5
DBW 110 (C)	23.77	5	30.80	6	36.27	5	30.28	6
HI 1655 (I) (C)	21.20	6	33.87	3	37.97	4	31.01	4
CG 1036 (I) (C)	24.17	4	39.33	1	42.60	1	35.37	1
Mean	25.08		33.78		38.29		32.38	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.69	2.69	8.99				
Genotype (B)	**	0.71	2.05	6.59				
B within A	**	1.23	3.56					
A within B		1.32	3.80					
				Earhead/sq.m.				
DBW 359	228	3	230	5	241	4	233	4
CG 1040	222	5	243	3	258	3	241	3
MP 3288 (C)	229	2	298	1	271	2	266	2
DBW 110 (C)	207	6	225	6	236	5	223	6
HI 1655 (I) (C)	225	4	230	4	225	6	227	5
CG 1036 (I) (C)	254	1	276	2	301	1	277	1
Mean	228		250		255		244	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	*	5.08	19.93	8.81				
Genotype (B)	**	6.56	18.96	8.06				
B within A	N.S.	11.37	32.83					
A within B		11.55	33.37					
				Grains /earhead				
DBW 359	26.17	3	35.70	1	32.80	3	31.56	1
CG 1040	27.83	1	29.03	5	32.80	3	29.89	2
MP 3288 (C)	26.40	2	26.77	6	30.67	5	27.94	5
DBW 110 (C)	24.57	4	30.17	3	33.03	2	29.26	3
HI 1655 (I) (C)	20.13	5	31.33	2	35.60	1	29.02	4
CG 1036 (I) (C)	19.80	6	29.77	4	27.13	6	25.57	6
Mean	24.15		30.46		32.01		28.87	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.59	2.33	8.72				
Genotype (B)	**	1.03	2.98	10.71				
B within A	*	1.79	5.16					
A within B		1.73	5.01					
				1000 grain wt, g				
DBW 359	45.87	4	43.53	5	49.20	2	46.20	5
CG 1040	47.60	2	45.53	4	45.90	5	46.34	4
MP 3288 (C)	41.70	6	39.63	6	42.97	6	41.43	6
DBW 110 (C)	47.03	3	45.53	3	46.53	4	46.37	3
HI 1655 (I) (C)	45.47	5	47.00	2	47.43	3	46.63	2
CG 1036 (I) (C)	48.37	1	48.00	1	52.10	1	49.49	1
Mean	46.01		44.87		47.36		46.08	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	*	0.40	1.56	3.66				
Genotype (B)	**	0.32	0.93	2.09				
B within A	**	0.55	1.60					
A within B		0.64	1.86					
Date of Sowing:		4.11.2022						
Date of Harvesting:		15.3.2023						

Table 4.4.4. Central Zone **RIR-TS-TAD** **Jabalpur** **2022-23**

Genotype	Irrigations							
	Zero	Rk	One	Rk	Two	Rk	Mean	Rk
				Yield, q/ha				
DBW 359	35.10	1	41.33	2	42.92	3	39.78	1
CG 1040	26.71	4	38.43	5	38.55	5	34.56	5
MP 3288 (C)	25.98	5	41.12	3	43.47	1	36.86	4
DBW 110 (C)	30.27	3	42.11	1	43.05	2	38.48	2
HI 1655 (I) (C)	23.44	6	32.27	6	36.87	6	30.86	6
CG 1036 (I) (C)	32.41	2	38.73	4	40.95	4	37.36	3
Mean	28.99		39.00		40.97		36.32	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.35	1.36	4.06				
Genotype (B)	**	0.54	1.56	4.47				
B within A	**	0.94	2.71					
A within B		0.92	2.67					
				Earhead/sq.m.				
DBW 359	172	2	213	3	263	3	216	3
CG 1040	157	4	281	1	231	5	223	2
MP 3288 (C)	123	5	207	4	277	1	203	5
DBW 110 (C)	173	1	267	2	268	2	236	1
HI 1655 (I) (C)	118	6	174	6	219	6	170	6
CG 1036 (I) (C)	169	3	198	5	257	4	208	4
Mean	152		224		253		209	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	4.21	16.54	8.53				
Genotype (B)	**	2.91	8.42	4.17				
B within A	**	5.05	14.58					
A within B		6.24	18.03					
				Grains /earhead				
DBW 359	51.01	3	46.29	3	38.67	3	45.32	3
CG 1040	38.79	6	29.74	6	37.17	5	35.23	6
MP 3288 (C)	60.15	1	52.67	1	40.11	2	50.98	1
DBW 110 (C)	40.99	5	36.36	5	37.68	4	38.35	5
HI 1655 (I) (C)	55.95	2	49.24	2	43.19	1	49.46	2
CG 1036 (I) (C)	43.45	4	44.55	4	35.13	6	41.05	4
Mean	48.39		43.14		38.66		43.40	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.68	2.68	6.67				
Genotype (B)	**	0.88	2.55	6.11				
B within A	**	1.53	4.42					
A within B		1.56	4.49					
				1000 grain wt, g				
DBW 359	40.08	4	41.85	4	42.17	4	41.37	4
CG 1040	43.78	2	46.01	1	44.83	2	44.87	1
MP 3288 (C)	35.08	6	37.66	6	39.05	5	37.26	6
DBW 110 (C)	43.10	3	43.43	3	42.64	3	43.06	3
HI 1655 (I) (C)	35.49	5	37.73	5	39.00	6	37.41	5
CG 1036 (I) (C)	44.15	1	43.85	2	45.40	1	44.47	2
Mean	40.28		41.76		42.18		41.41	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.02	0.09	0.23				
Genotype (B)	**	0.03	0.10	0.25				
B within A	**	0.06	0.17					
A within B		0.06	0.17					
Date of Sowing:		12.11.2022						
Date of Harvesting:								

Table 4.4.5. Central Zone			**RIR-TS-TAD**				**Udaipur**	**2022-23**
	Irrigations							
	Zero	Rk	One	Rk	Two	Rk	Mean	Rk
				Yield, q/ha				
DBW 359	33.65	1	40.50	5	47.85	3	40.67	3
CG 1040	29.87	2	40.08	6	45.47	4	38.47	4
MP 3288 (C)	18.85	6	42.97	3	43.95	6	35.26	6
DBW 110 (C)	27.88	3	43.32	2	52.48	2	41.23	2
HI 1655 (I) (C)	27.18	4	44.33	1	56.68	1	42.73	1
CG 1036 (I) (C)	26.25	5	41.63	4	44.65	5	37.51	5
Mean	27.28		42.14		48.51		39.31	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	1.02	3.99	10.96				
Genotype (B)	**	1.05	3.03	8.01				
B within A	**	1.82	5.25					
A within B		1.94	5.62					
				Earhead/sq.m.				
DBW 359	243	6	279	3	322	3	281	5
CG 1040	268	2	304	1	309	4	294	2
MP 3288 (C)	263	4	265	5	303	5	277	6
DBW 110 (C)	252	5	299	2	296	6	282	4
HI 1655 (I) (C)	276	1	265	5	368	1	303	1
CG 1036 (I) (C)	266	3	278	4	335	2	293	3
Mean	261		282		322		288	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	7.13	27.98	10.49				
Genotype (B)	N.S.	8.08	23.33	8.41				
B within A	N.S.	13.99	40.41					
A within B		14.63	42.25					
				Grains /earhead				
DBW 359	31.78	1	28.98	4	29.06	3	29.94	1
CG 1040	27.12	2	27.98	6	28.16	4	27.75	4
MP 3288 (C)	16.64	6	36.06	1	29.31	2	27.34	5
DBW 110 (C)	24.74	4	28.15	5	35.55	1	29.48	2
HI 1655 (I) (C)	21.15	5	34.84	2	28.11	5	28.03	3
CG 1036 (I) (C)	25.32	3	30.10	3	24.37	6	26.60	6
Mean	24.46		31.02		29.09		28.19	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.77	3.03	11.61				
Genotype (B)	N.S.	1.43	4.12	15.17				
B within A	**	2.47	7.13					
A within B		2.38	6.88					
				1000 grain wt, g				
DBW 359	44.25	3	50.35	2	51.27	4	48.62	3
CG 1040	42.85	5	47.23	5	52.75	3	47.61	5
MP 3288 (C)	42.87	4	46.40	6	49.75	6	46.34	6
DBW 110 (C)	44.95	2	51.42	1	50.15	5	48.84	2
HI 1655 (I) (C)	46.62	1	47.90	4	54.72	2	49.74	1
CG 1036 (I) (C)	39.18	6	50.03	3	54.80	1	48.01	4
Mean	43.45		48.89		52.24		48.19	
	F. Test	SEm	CD (0.05)	CV (%)				
Irrigation (A)	**	0.45	1.76	3.96				
Genotype (B)	**	0.49	1.43	3.08				
B within A	**	0.86	2.48					
A within B		0.90	2.61					
Date of Sowing:		8.11.2022						
Date of Harvesting:		10.3.2023						

Table 4.6.1 Central Zone **SPL-IR-ES-HYPT** **BISA Jabalpur** **2022-23**

Genotype	Nutrient Managent					
	NM1	Rk	NM2	Rk	Mean	Rk
			Yield, q/ha			
DBW 187 (C)	89.23	2	88.07	3	88.65	3
GW 322 (C)	89.70	1	88.07	2	88.88	1
DBW 377	88.60	3	88.73	1	88.67	2
DBW 303 (C)	86.57	4	86.53	4	86.55	4
Mean	88.53		87.85		88.19	
	F. Test	SEm	CD (0.05)	CV (%)		
Nutrient Mgt (A)	N.S.	1.35	5.59	5.32		
Genotype (B)	N.S.	1.68	4.23	4.67		
B within A	N.S.	2.38	5.99			
A within B		2.46	6.21			
			Earhead/sq.m.			
DBW 187 (C)	450	2	503	2	477	2
GW 322 (C)	443	3	523	1	483	1
DBW 377	438	4	490	3	464	4
DBW 303 (C)	453	1	484	4	469	3
Mean	446		500		473	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	8.57	35.40	6.28		
Genotype (B)	N.S.	6.21	15.66	3.22		
B within A	N.S.	8.79	22.14			
A within B		11.46	28.89			
			Grains/earhead			
DBW 187 (C)	47.00	2	42.67	2	44.83	2
GW 322 (C)	49.83	1	42.04	3	45.94	1
DBW 377	43.42	4	39.97	4	41.69	4
DBW 303 (C)	45.30	3	43.11	1	44.21	3
Mean	46.39		41.95		44.17	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	1.00	4.15	7.88		
Genotype (B)	N.S.	1.13	2.84	6.25		
B within A	N.S.	1.59	4.01			
A within B		1.71	4.30			
			1000 grain wt, g			
DBW 187 (C)	42.27	2	41.20	3	41.73	3
GW 322 (C)	40.60	4	40.07	4	40.33	4
DBW 377	46.73	1	45.33	1	46.03	1
DBW 303 (C)	42.20	3	41.47	2	41.83	2
Mean	42.95		42.02		42.48	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.70	2.88	5.68		
Genotype (B)	**	0.50	1.26	2.87		
B within A	N.S.	0.70	1.78			
A within B		0.93	2.33			
			Plant Height, cm			
DBW 187 (C)	105.4	1	93.3	1	99.3	1
GW 322 (C)	99.4	4	92.6	2	96.0	3
DBW 377	103.5	2	92.1	3	97.8	2
DBW 303 (C)	100.6	3	87.5	4	94.1	4
Mean	102.2		91.4		96.8	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.9	3.8	3.3		
Genotype (B)	**	0.8	2.0	2.0		
B within A	N.S.	1.1	2.8			
A within B		1.3	3.4			

			Biomass, q/ha			
DBW 187 (C)	198.1	2	195.3	2	196.7	2
GW 322 (C)	187.4	3	188.1	4	187.8	4
DBW 377	204.2	1	207.8	1	206.0	1
DBW 303 (C)	186.7	4	192.5	3	189.6	3
Mean	194.1		195.9		195.0	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	3.1	12.6	5.4		
Genotype (B)	*	3.8	9.5	4.7		
B within A	N.S.	5.3	13.4			
A within B		5.5	13.9			
			Physiological Maturity, Days			
DBW 187 (C)	128	4	130	3	129	4
GW 322 (C)	129	3	131	2	130	3
DBW 377	131	1	134	1	132	1
DBW 303 (C)	131	2	129	4	130	2
Mean	130		131		130	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.33	1.35	0.87		
Genotype (B)	**	0.36	0.91	0.68		
B within A	**	0.51	1.28			
A within B		0.55	1.39			
Date of Sowing:		06.11.2022				
Date of Harvesting:		04.04.2023				

Table 4.6.2. Central Zone **SPL-IR-ES-HYPT** **Jabalpur** **2022-23**

Genotype	Nutrient Managent					
	NM1	Rk	NM2	Rk	Mean	Rk
			Yield, q/ha			
DBW 187 (C)	71.31	3	77.82	3	74.57	3
GW 322 (C)	73.58	2	80.05	2	76.81	2
DBW 377	74.98	1	84.39	1	79.69	1
DBW 303 (C)	70.47	4	76.67	4	73.57	4
Mean	72.59		79.73		76.16	
	F. Test	SEm	CD (0.05)	CV (%)		
Nutrient Mgt (A)	**	0.26	1.08	1.19		
Genotype (B)	**	0.60	1.51	1.93		
B within A	N.S.	0.85	2.13			
A within B		0.78	1.96			
			Earhead/sq.m.			
DBW 187 (C)	377	3	417	4	397	3
GW 322 (C)	397	2	435	2	416	2
DBW 377	403	1	458	1	430	1
DBW 303 (C)	363	4	424	3	393	4
Mean	385		434		409	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	1.01	4.15	0.85		
Genotype (B)	**	5.64	14.21	3.38		
B within A	N.S.	7.98	20.10			
A within B		6.98	17.59			
			Grains/earhead			
DBW 187 (C)	36.80	4	35.70	4	36.25	4
GW 322 (C)	38.92	2	38.88	1	38.90	2
DBW 377	37.69	3	36.72	3	37.21	3
DBW 303 (C)	41.69	1	38.38	2	40.04	1
Mean	38.78		37.42		38.10	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.28	1.18	2.59		
Genotype (B)	**	0.62	1.56	3.98		
B within A	N.S.	0.88	2.21			
A within B		0.81	2.04			

			1000 grain wt, g			
DBW 187 (C)	51.47	1	52.27	1	51.87	1
GW 322 (C)	47.73	3	47.33	3	47.53	3
DBW 377	49.43	2	50.20	2	49.82	2
DBW 303 (C)	46.63	4	47.13	4	46.88	4
Mean	48.82		49.23		49.03	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.12	0.51	0.87		
Genotype (B)	**	0.14	0.35	0.70		
B within A	*	0.20	0.50			
A within B		0.21	0.53			
			Plant Height, cm			
DBW 187 (C)	91.93	1	75.13	1	83.53	1
GW 322 (C)	81.17	4	70.70	3	75.93	4
DBW 377	86.80	3	70.93	2	78.87	3
DBW 303 (C)	91.47	2	69.17	4	80.32	2
Mean	87.84		71.48		79.66	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.81	3.35	3.52		
Genotype (B)	N.S.	1.83	4.61	5.62		
B within A	N.S.	2.58	6.51			
A within B		2.38	6.00			
			Biomass, q/ha			
DBW 187 (C)	133.7	3	153.3	2	143.5	2
GW 322 (C)	140.8	1	144.0	4	142.4	3
DBW 377	134.5	2	165.8	1	150.1	1
DBW 303 (C)	133.1	4	149.6	3	141.3	4
Mean	135.5		153.2		144.3	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.4	1.5	0.8		
Genotype (B)	**	1.3	3.4	2.3		
B within A	**	1.9	4.7			
A within B		1.7	4.2			
			Physiological Maturity			
DBW 187 (C)	128	2	130	2	129	2
GW 322 (C)	127	3	129	3	128	3
DBW 377	131	1	134	1	133	1
DBW 303 (C)	127	3	128	4	128	4
Mean	128		130		129	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.27	1.12	0.72		
Genotype (B)	**	0.40	1.01	0.76		
B within A	N.S.	0.57	1.42			
A within B		0.56	1.41			
Date of Sowing:		04.11.2022				
Date of Harvesting:		20.03.2023				

Table 4.6.3. Central Zone **SPL-IR-ES-HYPT** **Udaipur** **2022-23**

Genotype	Nutrient Managent					
	NM1	Rk	NM2	Rk	Mean	Rk
			Yield, q/ha			
DBW 187 (C)	53.27	2	65.53	2	59.40	2
GW 322 (C)	49.87	4	59.90	3	54.88	4
DBW 377	60.53	1	54.93	4	57.73	3
DBW 303 (C)	50.50	3	69.60	1	60.05	1
Mean	53.54		62.49		58.02	
	F. Test	SEm	CD (0.05)	CV (%)		
Nutrient Mgt (A)	N.S.	1.48	6.09	8.81		
Genotype (B)	N.S.	2.05	5.18	8.68		
B within A	**	2.91	7.32			
A within B		2.92	7.35			

			Earhead/sq.m.			
DBW 187 (C)	318	3	398	3	358	2
GW 322 (C)	332	2	348	4	340	4
DBW 377	304	4	403	1	353	3
DBW 303 (C)	358	1	401	2	379	1
Mean	328		387		358	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	9.1	37.5	8.8		
Genotype (B)	N.S.	11.6	29.2	7.9		
B within A	N.S.	16.4	41.3			
A within B		16.8	42.4			
			Grains/earhead			
DBW 187 (C)	35.98	2	33.16	2	34.57	2
GW 322 (C)	33.14	3	37.14	1	35.14	1
DBW 377	42.11	1	25.96	4	34.04	3
DBW 303 (C)	29.61	4	33.03	3	31.32	4
Mean	35.21		32.33		33.77	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	**	0.17	0.71	1.77		
Genotype (B)	N.S.	1.25	3.15	9.06		
B within A	**	1.77	4.45			
A within B		1.54	3.88			
			1000 grain wt, g			
DBW 187 (C)	46.77	3	49.73	3	48.25	3
GW 322 (C)	45.63	4	46.40	4	46.02	4
DBW 377	47.33	2	52.73	1	50.03	2
DBW 303 (C)	47.80	1	52.60	2	50.20	1
Mean	46.88		50.37		48.63	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.51	2.09	3.61		
Genotype (B)	**	0.66	1.67	3.33		
B within A	N.S.	0.94	2.36			
A within B		0.96	2.41			
			Plant Height, cm			
DBW 187 (C)	100.2	1	102.6	2	101.4	2
GW 322 (C)	95.9	3	98.6	4	97.2	4
DBW 377	99.7	2	103.6	1	101.6	1
DBW 303 (C)	93.5	4	101.3	3	97.4	3
Mean	97.3		101.5		99.4	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	2.8	11.4	9.6		
Genotype (B)	N.S.	2.4	6.1	6.0		
B within A	N.S.	3.4	8.7			
A within B		4.1	10.2			
			Biomass, q/ha			
DBW 187 (C)	122.8	2	145.2	3	134.0	2
GW 322 (C)	105.5	4	153.1	1	129.3	3
DBW 377	123.2	1	120.2	4	121.7	4
DBW 303 (C)	121.8	3	152.2	2	137.0	1
Mean	118.3		142.7		130.5	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	2.9	11.9	7.7		
Genotype (B)	*	3.0	7.6	5.7		
B within A	**	4.3	10.8			
A within B		4.7	11.8			

			Physiological Maturity			
DBW 187 (C)	130	3	130	1	130	2
GW 322 (C)	130	1	130	3	130	2
DBW 377	130	1	130	1	130	1
DBW 303 (C)	130	3	129	4	130	4
Mean	130		130		130	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.59	2.43	1.57		
Genotype (B)	N.S.	0.50	1.26	0.94		
B within A	N.S.	0.71	1.78			
A within B		0.85	2.14			
Date of Sowing:		11.11.2022				
Date of Harvesting:		21.03.2023				

Table 4.6.4. Central Zone **SPL-IR-ES-HYPT** **Vijapur** **2022-23**

Genotype	Nutrient Managent					
	NM1	Rk	NM2	Rk	Mean	Rk
			Yield, q/ha			
DBW 187 (C)	51.83	3	59.79	3	55.81	3
GW 322 (C)	49.38	4	58.92	4	54.15	4
DBW 377	52.00	2	60.79	2	56.40	2
DBW 303 (C)	53.17	1	62.17	1	57.67	1
Mean	51.59		60.42		56.01	
	F. Test	SEm	CD (0.05)	CV (%)		
Nutrient Mgt (A)	*	0.97	3.99	5.97		
Genotype (B)	N.S.	2.09	5.26	9.12		
B within A	N.S.	2.95	7.43			
A within B		2.73	6.88			
			Earhead/sq.m.			
DBW 187 (C)	318	3	371	4	345	4
GW 322 (C)	314	4	377	3	346	3
DBW 377	337	2	381	2	359	2
DBW 303 (C)	343	1	392	1	368	1
Mean	328		380		354	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	6.5	26.7	6.3		
Genotype (B)	N.S.	12.7	32.1	8.8		
B within A	N.S.	18.0	45.4			
A within B		16.9	42.5			
			Grains/earhead			
DBW 187 (C)	30.28	4	32.40	3	31.34	3
GW 322 (C)	36.47	1	35.76	2	36.11	1
DBW 377	30.87	3	31.62	4	31.24	4
DBW 303 (C)	35.40	2	36.44	1	35.92	2
Mean	33.25		34.05		33.65	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	1.05	4.35	10.85		
Genotype (B)	N.S.	1.58	3.99	11.53		
B within A	N.S.	2.24	5.65			
A within B		2.21	5.57			
			1000 grain wt, g			
DBW 187 (C)	53.98	1	49.97	2	51.97	1
GW 322 (C)	43.36	4	43.64	3	43.50	4
DBW 377	50.15	2	50.95	1	50.55	2
DBW 303 (C)	43.97	3	43.60	4	43.79	3
Mean	47.86		47.04		47.45	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	N.S.	0.70	2.89	5.11		
Genotype (B)	**	1.09	2.74	5.60		
B within A	N.S.	1.54	3.87			
A within B		1.50	3.79			

			Plant Height, cm			
DBW 187 (C)	86.1	3	79.7	4	82.9	3
GW 322 (C)	87.1	2	81.9	1	84.5	1
DBW 377	84.5	4	80.5	3	82.5	4
DBW 303 (C)	87.9	1	80.9	2	84.4	2
Mean	86.4		80.8		83.6	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.9	3.7	3.7		
Genotype (B)	N.S.	1.6	4.0	4.7		
B within A	N.S.	2.3	5.7			
A within B		2.1	5.4			
			Biomass, q/ha			
DBW 187 (C)	112.9	2	133.3	2	123.1	2
GW 322 (C)	109.3	4	130.8	4	120.0	4
DBW 377	112.0	3	133.3	3	122.6	3
DBW 303 (C)	114.1	1	135.7	1	124.9	1
Mean	112.1		133.3		122.7	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	2.51	10.37	7.10		
Genotype (B)	N.S.	4.81	12.13	9.61		
B within A	N.S.	6.81	17.16			
A within B		6.41	16.15			
			Physiological Maturity			
DBW 187 (C)	121	4	126	1	124	3
GW 322 (C)	122	2	125	2	124	2
DBW 377	122	3	124	4	123	4
DBW 303 (C)	124	1	125	2	125	1
Mean	122.33		125.00		123.67	
	F. Test	SEm	CD (0.05)	CV (%)		
Date of sowing (A)	*	0.10	0.42	0.34		
Genotype (B)	**	0.22	0.56	0.53		
B within A	N.S.	0.31	0.79			
A within B		0.29	0.73			
Date of Sowing:		13.11.2022				
Date of Harvesting:		27.02.2023				

Table 5.2.1. Peninsular Zone		**IR-TS-DOS-TAD**			**Akola**	**2022-23**
Genotype	Sowing time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HI 8826 (d) (I) (C)	17.05	5	16.63	6	16.84	6
MACS 3949 (d) (C)	24.15	2	31.03	3	27.59	3
MP 1378	33.26	1	38.86	2	36.06	1
MACS 6222 (C)	23.31	3	41.97	1	32.64	2
GW 322 (C)	18.89	4	25.32	4	22.11	4
MACS 4100 (d) (I) (C)	14.31	6	24.57	5	19.44	5
Mean	21.83		29.73		25.78	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		0.64		2.63	10.47
Genotype (B)	**		1.09		2.67	10.40
B within A	**		1.55		3.78	
A within B			1.55		3.78	
			Earheads/sqm			
HI 8826 (d) (I) (C)	432	1	450	3	441	1
MACS 3949 (d) (C)	363	4	395	6	379	5
MP 1378	403	2	478	1	441	2
MACS 6222 (C)	357	5	418	5	388	4
GW 322 (C)	380	3	478	1	429	3
MACS 4100 (d) (I) (C)	317	6	435	4	376	6
Mean	375		443		409	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		10.72		44.26	11.12
Genotype (B)	N.S.		28.20		68.79	16.89
B within A	N.S.		39.88		97.29	
A within B			37.95		92.58	
			Grains/Earhead			
HI 8826 (d) (I) (C)	9.01	6	8.38	6	8.70	6
MACS 3949 (d) (C)	14.37	2	17.38	3	15.87	3
MP 1378	19.01	1	20.46	2	19.73	1
MACS 6222 (C)	14.37	3	24.74	1	19.55	2
GW 322 (C)	11.09	4	14.50	4	12.79	4
MACS 4100 (d) (I) (C)	10.70	5	13.56	5	12.13	5
Mean	13.09		16.50		14.80	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		0.36		1.48	10.27
Genotype (B)	**		1.32		3.21	21.77
B within A	N.S.		1.86		4.54	
A within B			1.74		4.23	
			1000 Grains Weight, g			
HI 8826 (d) (I) (C)	44.88	5	44.67	2	44.78	2
MACS 3949 (d) (C)	46.50	1	47.13	1	46.82	1
MP 1378	45.03	3	40.20	5	42.62	4
MACS 6222 (C)	45.67	2	42.00	3	43.83	3
GW 322 (C)	44.90	4	36.53	6	40.72	6
MACS 4100 (d) (I) (C)	42.33	6	41.93	4	42.13	5
Mean	44.89		42.08		43.48	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		0.32		1.32	3.12
Genotype (B)	**		0.24		0.59	1.36
B within A	**		0.34		0.84	
A within B			0.45		1.09	
Date of Sowing:	11.11.2022		22.03.2023			
Date of Harvesting:	28.11.2022		28.03.2023			

Not included in pooled due to low mean yield

Table 5.2.2. Peninsular Zone	**IR-TS-DOS-TAD**				**Dharwad**	**2022-23**
Genotype	Sowing time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HI 8826 (d) (I) (C)	50.52	5	41.77	2	46.14	3
MACS 3949 (d) (C)	48.57	6	39.46	5	44.01	6
MP 1378	54.14	2	40.99	3	47.56	2
MACS 6222 (C)	50.83	4	40.89	4	45.86	4
GW 322 (C)	55.00	1	41.94	1	48.47	1
MACS 4100 (d) (I) (C)	51.20	3	38.34	6	44.77	5
Mean	51.71		40.56		46.14	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		1.22		5.03	11.21
Genotype (B)	N.S.		1.91		4.65	10.13
B within A	N.S.		2.70		6.58	
A within B			2.75		6.70	
			Earheads/sqm			
HI 8826 (d) (I) (C)	417	4	380	3	398	5
MACS 3949 (d) (C)	398	6	331	6	364	6
MP 1378	459	1	364	5	411	1
MACS 6222 (C)	437	2	374	4	406	4
GW 322 (C)	419	3	395	2	407	3
MACS 4100 (d) (I) (C)	414	5	401	1	408	2
Mean	424		374		399	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	**		0.34		1.41	0.36
Genotype (B)	**		7.40		18.05	4.54
B within A	**		10.46		25.53	
A within B			9.56		23.32	
			Grains/Earhead			
HI 8826 (d) (I) (C)	26.77	3	24.45	5	25.61	5
MACS 3949 (d) (C)	26.37	5	28.24	1	27.30	2
MP 1378	26.66	4	26.92	3	26.79	3
MACS 6222 (C)	25.66	6	25.86	4	25.76	4
GW 322 (C)	29.93	1	27.59	2	28.76	1
MACS 4100 (d) (I) (C)	27.45	2	23.27	6	25.36	6
Mean	27.14		26.06		26.60	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	N.S.		0.71		2.94	11.35
Genotype (B)	N.S.		1.32		3.22	12.15
B within A	N.S.		1.87		4.55	
A within B			1.85		4.50	
			1000 Grains Weight, g			
HI 8826 (d) (I) (C)	45.30	3	45.17	1	45.23	1
MACS 3949 (d) (C)	46.65	1	42.57	2	44.61	2
MP 1378	44.25	5	42.00	4	43.13	4
MACS 6222 (C)	45.43	2	42.23	3	43.83	3
GW 322 (C)	44.02	6	38.47	6	41.24	6
MACS 4100 (d) (I) (C)	45.02	4	41.23	5	43.13	5
Mean	45.11		41.95		43.53	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	**		0.16		0.68	1.60
Genotype (B)	*		0.71		1.74	4.01
B within A	N.S.		1.01		2.46	
A within B			0.93		2.28	
Date of Sowing:	11.11.2022		15.03.2023			
Date of Harvesting:	02.12.2022		28.03.2023			

Table 5.2.3. Peninsular Zone		**IR-TS-DOS-TAD**			**Niphad**	**2022-23**
Genotype	Sowing time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HI 8826 (d) (I) (C)	63.13	1	55.77	1	59.45	1
MACS 3949 (d) (C)	56.60	3	50.53	3	53.57	3
MP 1378	51.90	5	46.43	5	49.17	5
MACS 6222 (C)	50.17	6	44.53	6	47.35	6
GW 322 (C)	55.23	4	47.10	4	51.17	4
MACS 4100 (d) (I) (C)	57.73	2	51.07	2	54.40	2
Mean	55.80		49.24		52.52	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		0.60		2.49	4.87
Genotype (B)	*		2.49		6.09	11.64
B within A	N.S.		3.53		8.61	
A within B			3.28		7.99	
			Earheads/sqm			
HI 8826 (d) (I) (C)	416	1	382	1	399	1
MACS 3949 (d) (C)	403	3	352	3	378	3
MP 1378	371	5	333	5	352	5
MACS 6222 (C)	370	6	318	6	344	6
GW 322 (C)	399	4	344	4	372	4
MACS 4100 (d) (I) (C)	405	2	377	2	391	2
Mean	394		351		373	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		6.32		26.10	7.20
Genotype (B)	**		7.47		18.23	4.91
B within A	N.S.		10.57		25.78	
A within B			11.53		28.14	
			Grains/Earhead			
HI 8826 (d) (I) (C)	28.62	4	28.16	5	28.39	5
MACS 3949 (d) (C)	27.83	6	29.06	4	28.44	4
MP 1378	29.72	1	32.89	2	31.31	1
MACS 6222 (C)	29.25	2	33.35	1	31.30	2
GW 322 (C)	29.24	3	30.85	3	30.04	3
MACS 4100 (d) (I) (C)	27.95	5	27.97	6	27.96	6
Mean	28.77		30.38		29.57	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	N.S.		0.99		4.09	14.22
Genotype (B)	N.S.		1.78		4.34	14.75
B within A	N.S.		2.52		6.14	
A within B			2.50		6.11	
			1000 Grains Weight, g			
HI 8826 (d) (I) (C)	53.00	1	52.00	1	52.50	1
MACS 3949 (d) (C)	50.67	3	50.00	2	50.33	2
MP 1378	47.33	5	42.33	5	44.83	5
MACS 6222 (C)	46.33	6	42.33	5	44.33	6
GW 322 (C)	47.67	4	44.67	4	46.17	4
MACS 4100 (d) (I) (C)	51.00	2	48.67	3	49.83	3
Mean	49.33		46.67		48.00	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	*		0.30		1.22	2.62
Genotype (B)	**		0.94		2.29	4.80
B within A	N.S.		1.33		3.24	
A within B			1.25		3.05	
Date of Sowing:	11.11.2022		08.03.2023			
Date of Harvesting:	01.12.2022		31.03.2023			

Table 5.2.4. Peninsular Zone	**IR-TS-DOS-TAD**				**Pune**	**2022-23**
Genotype	Sowing time				Mean	Rk
	Timely	Rk	Late	Rk		
			Yield, q/ha			
HI 8826 (d) (I) (C)	50.97	1	48.96	2	49.97	2
MACS 3949 (d) (C)	47.04	4	42.68	6	44.86	6
MP 1378	50.89	2	47.34	4	49.11	3
MACS 6222 (C)	45.05	5	47.14	5	46.09	5
GW 322 (C)	50.73	3	53.02	1	51.88	1
MACS 4100 (d) (I) (C)	44.42	6	48.19	3	46.30	4
Mean	48.18		47.89		48.04	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	N.S.		1.18		4.86	10.38
Genotype (B)	**		1.19		2.89	6.05
B within A	N.S.		1.68		4.09	
A within B			1.93		4.71	
			Earheads/sqm			
HI 8826 (d) (I) (C)	335	3	392	1	363	2
MACS 3949 (d) (C)	295	6	342	3	318	5
MP 1378	367	1	373	2	370	1
MACS 6222 (C)	315	5	312	5	313	6
GW 322 (C)	325	4	333	4	329	3
MACS 4100 (d) (I) (C)	345	2	310	6	328	4
Mean	330		344		337	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	N.S.		5.62		23.21	7.08
Genotype (B)	**		10.02		24.43	7.28
B within A	*		14.16		34.55	
A within B			14.10		34.39	
			Grains/Earhead			
HI 8826 (d) (I) (C)	29.43	5	26.42	6	27.92	6
MACS 3949 (d) (C)	31.02	4	26.79	5	28.91	5
MP 1378	35.31	2	34.96	4	35.14	2
MACS 6222 (C)	33.08	3	36.51	3	34.80	3
GW 322 (C)	39.09	1	43.09	1	41.09	1
MACS 4100 (d) (I) (C)	28.01	6	36.77	2	32.39	4
Mean	32.66		34.09		33.37	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	N.S.		0.77		3.17	9.76
Genotype (B)	**		0.99		2.42	7.29
B within A	**		1.40		3.43	
A within B			1.49		3.64	
			1000 Grains Weight, g			
HI 8826 (d) (I) (C)	52.00	1	47.33	1	49.67	1
MACS 3949 (d) (C)	51.67	2	47.00	2	49.33	2
MP 1378	39.67	6	36.33	6	38.00	6
MACS 6222 (C)	43.33	4	42.00	4	42.67	4
GW 322 (C)	40.00	5	37.00	5	38.50	5
MACS 4100 (d) (I) (C)	46.00	3	42.33	3	44.17	3
Mean	45.44		42.00		43.72	
	F. Test		SEm		CD (0.05)	CV (%)
Sowing time (A)	**		0.14		0.58	1.37
Genotype (B)	**		0.67		1.62	3.73
B within A	N.S.		0.94		2.30	
A within B			0.87		2.13	
Date of Sowing:	09.11.2022		10.03.2023			
Date of Harvesting:	30.11.2022		28.03.2023			

Table 5.4.1. Peninsular Zone RIR-TS-TAD Dharwad 2022-23

Genotype	Irrigation Levels						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
Yield, q/ha								
UAS 446 (d) (C)	19.74	9	25.42	9	28.46	9	24.54	9
NIAW 3170 (C)	26.96	5	33.40	2	38.06	3	32.80	2
NIAW 4028	27.79	2	31.65	5	35.13	7	31.52	6
DBW 359	27.13	4	32.60	3	36.82	5	32.18	5
HI 1665	26.79	6	32.03	4	38.03	4	32.29	4
HI 8840 (d)	25.17	7	27.59	8	32.91	8	28.56	8
HI 1605 (C)	28.05	1	33.62	1	38.32	2	33.33	1
NIDW 1149 (d) (C	24.76	8	30.66	7	36.31	6	30.58	7
UAS 478 (d)	27.56	3	31.39	6	38.55	1	32.50	3
Mean	26.00		30.93		35.84		30.92	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.86		2.60		14.52	
Genotype (B)	**		1.23		2.91		11.89	
B within A	N.S.		2.12		5.03			
A within B			2.18		5.17			
Earheads/sqm								
UAS 446 (d) (C)	369	8	401	7	367	8	379	8
NIAW 3170 (C)	564	1	525	2	545	2	545	1
NIAW 4028	463	3	397	8	413	7	424	6
DBW 359	392	7	504	3	459	4	452	3
HI 1665	522	2	528	1	559	1	537	2
HI 8840 (d)	359	9	424	6	425	6	403	7
HI 1605 (C)	400	6	441	4	482	3	441	4
NIDW 1149 (d) (C	407	5	296	9	304	9	335	9
UAS 478 (d)	440	4	434	5	437	5	437	5
Mean	435		439		444		439	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		2.22		6.69		2.62	
Genotype (B)	**		15.33		36.35		10.47	
B within A	*		26.55		62.97			
A within B			25.13		59.60			
Grains/Earhead								
UAS 446 (d) (C)	14.46	6	16.15	8	20.03	6	16.88	7
NIAW 3170 (C)	12.34	9	16.38	7	17.56	8	15.43	8
NIAW 4028	14.02	7	19.45	3	21.29	3	18.25	5
DBW 359	19.16	2	17.50	5	20.35	5	19.00	3
HI 1665	13.81	8	15.32	9	16.47	9	15.20	9
HI 8840 (d)	17.57	3	16.58	6	19.06	7	17.74	6
HI 1605 (C)	20.00	1	20.71	2	21.12	4	20.61	2
NIDW 1149 (d) (C	16.55	4	25.14	1	31.09	1	24.26	1
UAS 478 (d)	16.21	5	18.23	4	21.91	2	18.78	4
Mean	16.01		18.39		20.99		18.46	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.20		0.59		5.54	
Genotype (B)	**		1.20		2.84		19.43	
B within A	N.S.		2.07		4.91			
A within B			1.96		4.65			

				1000 Grains Weight, g				
UAS 446 (d) (C)	36.70	7	39.42	7	39.12	8	38.41	7
NIAW 3170 (C)	38.90	4	40.07	4	39.91	6	39.63	4
NIAW 4028	42.77	1	42.57	1	40.49	4	41.94	1
DBW 359	36.27	8	37.52	8	40.15	5	37.98	8
HI 1665	37.15	6	40.20	3	41.49	1	39.61	5
HI 8840 (d)	40.45	2	39.71	5	41.14	2	40.43	2
HI 1605 (C)	35.21	9	37.31	9	38.66	9	37.06	9
NIDW 1149 (d) (C	37.47	5	41.59	2	39.44	7	39.50	6
UAS 478 (d)	39.03	3	39.69	6	40.52	3	39.74	3
Mean	38.22		39.79		40.10		39.37	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		1.15		3.46		15.14	
Genotype (B)	N.S.		1.12		2.66		8.55	
B within A	N.S.		1.94		4.61			
A within B			2.16		5.12			
Date of Sowing:	05.11.2022							
Date of Harvesting	20.02.2023							

Table 5.4.2. Peninsular Zone RIR-TS-TAD Niphad 2022-23

Genotype	Irrigation Levels						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
				Yield, q/ha				
UAS 446 (d) (C)	17.10	8	19.17	8	24.28	9	20.18	9
NIAW 3170 (C)	24.52	2	27.18	2	35.51	2	29.07	2
NIAW 4028	25.40	1	28.02	1	37.13	1	30.18	1
DBW 359	21.03	3	25.52	3	34.71	3	27.09	3
HI 1665	20.44	4	25.32	4	33.60	5	26.45	4
HI 8840 (d)	19.84	7	23.25	6	34.49	4	25.86	5
HI 1605 (C)	20.00	6	24.05	5	30.98	7	25.01	7
NIDW 1149 (d) (C	20.08	5	22.14	7	33.34	6	25.19	6
UAS 478 (d)	12.86	9	19.09	9	29.46	8	20.47	8
Mean	20.14		23.75		32.61		25.50	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		2.18		6.58		44.47	
Genotype (B)	**		1.37		3.24		16.08	
B within A	N.S.		2.37		5.61			
A within B			3.12		7.40			
				Earheads/sqm				
UAS 446 (d) (C)	222	8	266	6	318	9	269	8
NIAW 3170 (C)	243	2	284	3	348	2	292	2
NIAW 4028	248	1	296	1	354	1	299	1
DBW 359	236	3	282	4	346	3	288	3
HI 1665	234	5	284	2	331	5	283	4
HI 8840 (d)	224	7	266	7	327	7	272	6
HI 1605 (C)	226	6	258	8	331	5	272	7
NIDW 1149 (d) (C	235	4	270	5	336	4	280	5
UAS 478 (d)	219	9	258	8	320	8	266	9
Mean	232		274		335		280	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		10.19		30.73		18.90	
Genotype (B)	**		6.34		15.05		6.79	
B within A	N.S.		10.99		26.06			
A within B			14.53		34.47			

				Grains/Earhead				
UAS 446 (d) (C)	18.95	7	16.72	8	17.50	8	17.73	8
NIAW 3170 (C)	25.17	2	23.37	2	21.61	3	23.39	1
NIAW 4028	25.90	1	21.99	5	21.17	4	23.02	2
DBW 359	24.27	3	22.03	4	20.64	5	22.31	4
HI 1665	22.89	5	22.17	3	21.65	2	22.24	5
HI 8840 (d)	19.30	6	18.05	7	20.04	7	19.13	7
HI 1605 (C)	24.17	4	23.52	1	20.24	6	22.65	3
NIDW 1149 (d) (C	18.05	8	15.81	9	17.13	9	17.00	9
UAS 478 (d)	17.51	9	19.70	6	23.43	1	20.21	6
Mean	21.80		20.38		20.38		20.85	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	N.S.		2.25		6.80		56.17	
Genotype (B)	**		1.28		3.04		18.43	
B within A	N.S.		2.22		5.26			
A within B			3.08		7.29			
				1000 Grains Weight, g				
UAS 446 (d) (C)	41.00	3	43.67	3	43.67	8	42.78	5
NIAW 3170 (C)	40.33	4	40.67	7	48.00	5	43.00	4
NIAW 4028	39.67	5	43.00	4	49.33	3	44.00	3
DBW 359	37.00	8	41.33	5	48.67	4	42.33	6
HI 1665	37.67	6	40.33	8	47.00	6	41.67	7
HI 8840 (d)	46.00	2	48.67	2	54.00	2	49.56	2
HI 1605 (C)	37.33	7	41.33	5	46.00	7	41.56	8
NIDW 1149 (d) (C	47.67	1	52.00	1	59.00	1	52.89	1
UAS 478 (d)	34.33	9	38.00	9	39.67	9	37.33	9
Mean	40.11		43.22		48.37		43.90	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.69		2.08		8.16	
Genotype (B)	**		1.04		2.48		7.14	
B within A	N.S.		1.81		4.29			
A within B			1.84		4.36			
Date of Sowing:	09.11.2022							
Date of Harvesting	01.03.2023							

Table 5.4.3. Peninsular Zone **RIR-TS-TAD** **Pune** **2022-23**

Genotype	Irrigation Levels						Mean	Rk
	Zero	Rk	One	Rk	Two	Rk		
				Yield, q/ha				
UAS 446 (d) (C)	16.22	9	23.12	9	27.22	9	22.19	9
NIAW 3170 (C)	27.61	1	30.45	3	43.83	3	33.96	1
NIAW 4028	23.35	4	26.38	7	42.18	5	30.64	6
DBW 359	20.07	8	31.54	2	43.71	4	31.77	4
HI 1665	23.64	3	31.81	1	46.29	1	33.91	2
HI 8840 (d)	21.18	6	28.53	5	38.16	7	29.29	7
HI 1605 (C)	22.11	5	29.73	4	44.09	2	31.98	3
NIDW 1149 (d) (C	24.28	2	27.20	6	40.98	6	30.82	5
UAS 478 (d)	20.55	7	25.98	8	34.35	8	26.96	8
Mean	22.11		28.30		40.09		30.17	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.81		2.43		13.89	
Genotype (B)	**		0.89		2.10		8.81	
B within A	**		1.53		3.64			
A within B			1.66		3.93			

Earheads/sqm								
UAS 446 (d) (C)	232	9	332	2	363	7	309	8
NIAW 3170 (C)	290	4	312	6	403	1	335	2
NIAW 4028	320	2	300	8	317	8	312	6
DBW 359	262	8	300	8	375	4	312	6
HI 1665	328	1	320	4	390	2	346	1
HI 8840 (d)	268	7	320	4	375	4	321	5
HI 1605 (C)	277	5	335	1	370	6	327	4
NIDW 1149 (d) (C	302	3	310	7	272	9	294	9
UAS 478 (d)	275	6	330	3	388	3	331	3
Mean	284		318		361		321	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		10.04		30.27		16.26	
Genotype (B)	N.S.		13.06		30.97		12.21	
B within A	*		22.62		53.64			
A within B			23.57		55.90			
Grains/Earhead								
UAS 446 (d) (C)	19.51	5	21.04	8	22.82	9	21.13	9
NIAW 3170 (C)	24.92	2	27.31	2	30.52	6	27.58	3
NIAW 4028	18.25	9	21.64	6	32.64	5	24.17	6
DBW 359	22.77	3	27.67	1	36.90	3	29.11	2
HI 1665	18.76	7	25.97	4	33.17	4	25.96	5
HI 8840 (d)	18.76	8	21.30	7	26.36	8	22.14	8
HI 1605 (C)	25.21	1	26.73	3	37.88	2	29.94	1
NIDW 1149 (d) (C	19.25	6	21.01	9	39.60	1	26.62	4
UAS 478 (d)	20.33	4	21.92	5	29.87	7	24.04	7
Mean	20.86		23.84		32.19		25.63	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	*		1.47		4.44		29.83	
Genotype (B)	**		1.33		3.16		15.62	
B within A	N.S.		2.31		5.48			
A within B			2.63		6.24			
1000 Grains Weight, g								
UAS 446 (d) (C)	36.00	7	33.67	8	33.00	6	34.22	8
NIAW 3170 (C)	39.33	4	38.00	5	36.00	4	37.78	4
NIAW 4028	40.67	3	41.00	3	41.33	1	41.00	2
DBW 359	34.67	8	38.00	5	32.00	7	34.89	6
HI 1665	38.67	5	38.33	4	36.00	4	37.67	5
HI 8840 (d)	42.00	2	42.00	2	38.67	2	40.89	3
HI 1605 (C)	32.33	9	33.33	9	31.67	8	32.44	9
NIDW 1149 (d) (C	43.00	1	42.67	1	38.67	2	41.44	1
UAS 478 (d)	37.00	6	37.00	7	30.00	9	34.67	7
Mean	38.19		38.22		35.26		37.22	
	F. Test		SEm		CD (0.05)		CV (%)	
Irrigation (A)	**		0.40		1.20		5.57	
Genotype (B)	**		0.65		1.53		5.22	
B within A	N.S.		1.12		2.66			
A within B			1.13		2.68			
Date of Sowing:	09.11.2022							
Date of Harvesting	10.03.2023							

Table 6.1.1. Northern Hill Zone **SPL-1** **Bajaura** **2022-23**

Treatments	Earheads/ sqm	1000 Grains Weight, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant Height, cm
PE Pendimethalin @ 1000 g/ha	367	42.50	25.18	39.18	103.29	99.33
PE Pendimethalin @ 1500 g/ha	370	41.07	27.89	42.34	116.50	99.87
PE Pyroxasulfone @ 127.5 g/ha	350	39.97	30.07	41.88	106.53	100.23
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	328	40.33	32.13	42.45	108.21	97.07
PE Pyroxa+metsulfuron 127.5+4 g/ha	327	41.90	29.46	40.32	98.73	99.10
EPOST Pyroxasulfone@ 127.5 g/ha	310	42.77	28.41	37.64	103.86	97.33
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	337	41.87	30.48	43.02	106.82	97.47
PE Metribuzin @300 g/ha	342	40.07	32.08	43.88	112.14	102.63
PE Pendi + metribuzin@1250+280 g/ha	378	39.33	30.73	45.73	120.58	101.37
PE Pyroxa + metribuzin@127.5+280 g/ha	347	39.83	32.08	44.35	107.60	98.23
Weedy Check	290	41.60	26.50	31.95	84.20	95.30
Weed free	353	40.83	30.05	43.35	109.99	98.80
SEM	10.78	1.02	1.10	2.17	5.06	1.26
CD (0.05)	26.18	2.48	2.66	5.26	12.29	3.07
CV (%)	5.47	4.31	6.42	9.08	8.23	2.21
Date of Sowing:	21.11.2022	Date of Harvesting:		14.06.2023		

Table 6.1.2. Northern Hill Zone **SPL-1** **Malan** **2022-23**

Treatments	Earheads/ sqm	1000 Grains Weight, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant Height, cm
PE Pendimethalin @ 1000 g/ha	444	40.40	22.74	40.75	94.26	91.20
PE Pendimethalin @ 1500 g/ha	433	40.76	22.43	39.56	91.85	96.17
PE Pyroxasulfone @ 127.5 g/ha	485	44.32	18.36	39.37	88.69	95.80
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	489	42.64	19.21	40.07	88.79	92.27
PE Pyroxa+metsulfuron 127.5+4 g/ha	484	41.31	18.04	36.00	77.98	93.50
EPOST Pyroxasulfone@ 127.5 g/ha	465	41.10	15.90	30.37	68.08	94.80
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	414	39.25	16.74	27.17	64.76	86.93
PE Metribuzin @300 g/ha	494	40.96	18.83	38.11	82.58	94.97
PE Pendi + metribuzin@1250+280 g/ha	481	40.99	20.37	40.13	89.55	95.77
PE Pyroxa + metribuzin@127.5+280 g/ha	457	40.99	18.97	35.51	89.05	90.90
Weedy Check	447	39.96	12.75	22.77	77.12	94.00
Weed free	493	41.13	20.39	41.38	88.40	92.57
SEM	3.47	0.72	0.79	1.42	1.54	0.56
CD(0.05)	8.41	1.75	1.93	3.46	3.73	1.35
CV(%)	1.29	3.03	7.34	6.87	3.19	1.03
Date of Sowing:	06.11.2022	Date of Harvesting:		16.05.2023		

Table 6.2.1. Northern Hill Zone **SPL-1** **Bajaura** **Weeds** **2022-23**

Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	13.11 (171.33)	16.09 (258.67)	14.04 (197.33)	1.82 (2.33)	3.25 (9.73)	5.56 (30.07)
PE Pendimethalin @ 1500 g/ha	11.21 (125.00)	14.21 (201.33)	9.27 (85.33)	1.42 (1.03)	2.63 (5.97)	3.92 (14.40)
PE Pyroxasulfone @ 127.5 g/ha	13.25 (174.67)	10.48 (109.33)	10.27 (104.67)	1.59 (1.53)	2.54 (5.53)	3.96 (14.80)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	7.04 (49.33)	3.74 (13.33)	4.55 (20.00)	1.18 (0.40)	1.30 (0.70)	2.42 (4.87)
PE Pyroxa+metsulfuron 127.5+4 g/ha	9.29 (85.33)	6.28 (38.67)	5.95 (34.67)	1.39 (0.93)	1.89 (2.60)	2.23 (4.03)
EPOST Pyroxasulfone@ 127.5 g/ha	23.95 (573.33)	17.75 (314.67)	13.8 (190.67)	2.48 (5.17)	3.83 (13.87)	6.95 (47.67)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	24.25 (587.67)	10.13 (102.67)	8.53 (72.00)	2.37 (4.67)	2.32 (4.40)	3.56 (11.77)
PE Metribuzin @300 g/ha	3.94 (14.67)	3.95 (15.00)	2.99 (10.00)	1.09 (0.20)	1.43 (1.07)	2.09 (4.00)
PE Pendi + metribuzin@1250+280 g/ha	4.09 (16.00)	1.00 (0.00)	1.00 (0.00)	1.15 (0.33)	1.00 (0.00)	1.00(0.00)
PE Pyroxa + metribuzin@127.5+280 g/ha	5.85 (33.33)	1.00 (0.00)	1.00 (0.00)	1.22 (0.50)	1.00 (0.00)	1.00(0.00)
Weedy Check	25.42 (646.67)	22.55 (508.00)	19.35 (374.00)	2.70 (6.30)	5.19 (25.97)	9.16 (83.13)
Weed free	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00(0.00)
Mean	11.87 (206.44)	9.01 (130.14)	7.65 (90.72)	1.62 (1.95)	2.28 (5.82)	3.57 (17.89)
SEm	0.42 (16.14)	0.37 (11.49)	0.52 (11.87)	0.09 (0.38)	0.12 (0.87)	0.25 (2.51)
CD (0.05)	1.01 (39.20)	0.90 (27.90)	1.26 (28.82)	0.21 (0.91)	0.29 (2.12)	0.6 (6.11)
CV (%)	6.09 (13.54)	7.16 (15.29)	11.72 (22.66)	9.38 (33.46)	8.91 (26.03)	12.03 (24.34)

Table 6.2.2. Northern Hill Zone **SPL-1** **Malan** **Weeds** **2022-23**

Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	6.45 (40.67)	7.39 (53.67)	7.09 (49.33)	2.33 (4.43)	4.02 (15.18)	3.86 (13.90)
PE Pendimethalin @ 1500 g/ha	5.16 (25.67)	6.42 (40.33)	6.70 (44.00)	1.66 (1.76)	2.83 (7.02)	2.83 (7.02)
PE Pyroxasulfone @ 127.5 g/ha	6.43 (40.33)	7.19 (50.67)	6.65 (43.33)	1.98 (2.91)	3.04 (8.31)	2.98 (7.92)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	5.68 (31.33)	6.90 (46.67)	5.71 (31.67)	2.08 (3.34)	3.15 (8.93)	3.04 (8.23)
PE Pyroxa+metsulfuron 127.5+4 g/ha	6.63 (43)	7.80 (60.00)	6.58 (42.33)	2.50 (5.28)	3.57 (11.84)	3.71 (12.78)
EPOST Pyroxasulfone@ 127.5 g/ha	5.71 (31.67)	6.62 (43.00)	5.91 (34.00)	2.01 (3.05)	2.78 (6.74)	2.82 (6.95)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	2.82 (7.00)	2.84 (7.33)	2.40 (5.00)	1.97 (2.89)	1.57 (1.47)	1.48 (1.18)
PE Metribuzin @300 g/ha	6.35 (39.33)	7.19 (50.67)	5.68 (31.33)	2.28 (4.19)	3.22 (9.35)	3.25 (9.55)
PE Pendi + metribuzin@1250+280 g/ha	5.63 (30.67)	6.45 (40.67)	6.50 (41.33)	2.04 (3.18)	2.70 (6.31)	2.74 (6.48)
PE Pyroxa + metribuzin@127.5+280 g/ha	6.78 (45.00)	7.19 (50.67)	6.58 (42.33)	2.07 (3.29)	3.64 (12.28)	3.6 (12.02)
Weedy Check	6.83 (45.67)	7.41 (54.00)	6.73 (44.33)	2.24 (4.01)	3.53 (11.46)	3.43 (10.8)
Weed free	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Mean	5.46 (31.69)	6.20 (41.47)	5.63 (34.08)	2.01 (3.19)	2.92 (8.24)	2.89 (8.07)
SEm	0.13 (1.50)	0.18 (2.27)	0.19 (2.10)	0.06 (0.26)	0.09 (0.62)	0.08 (0.53)
CD (0.05)	0.32 (3.65)	0.44 (5.51)	0.45 (5.10)	0.15 (0.64)	0.22 (1.50)	0.19 (1.28)
CV (%)	4.15 (8.21)	5.1 0(9.47)	5.73 (10.66)	5.16 (14.29)	5.47 (12.94)	4.72 (11.35)

Table 6.3.1. North Western Plains Zone **SPL-1** **Durgapura** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	51.95	369.0	39.80	35.48	111.98	87.6
PE Pendimethalin @ 1500 g/ha	47.44	350.0	39.63	34.19	104.63	82.5
PE Pyroxasulfone @ 127.5 g/ha	48.35	354.7	40.10	33.89	105.66	77.8
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	57.58	406.7	39.47	35.96	126.14	86.8
PE Pyroxa+metsulfuron 127.5+4 g/ha	54.31	393.7	38.43	35.97	118.94	80.2
EPOST Pyroxasulfone@ 127.5 g/ha	55.55	395.7	40.50	34.72	120.41	88.0
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	63.04	446.3	39.43	35.78	137.41	87.8
PE Metribuzin @300 g/ha	38.48	285.7	38.70	34.77	85.56	79.7
PE Pendi + metribuzin@1250+280 g/ha	37.34	281.0	39.93	33.19	80.78	76.9
PE Pyroxa + metribuzin@127.5+280 g/ha	36.56	281.3	38.60	33.68	80.85	74.0
Weedy Check	34.47	269.7	35.39	36.06	73.45	84.8
Weed free	65.79	468.0	37.58	37.69	144.86	89.6
	49.24	358.5	38.96	35.11	107.56	83.0
SEM	2.80	18.03	0.98	1.09	6.65	2.80
CD (0.05)	6.79	43.79	2.39	2.65	16.14	6.80
CV (%)	9.84	8.71	4.38	5.39	10.71	5.84
Date of Sowing:	17.10.2022	Date of Harvesting:		22.05.2023		

Table 6.3.2. North Western Plains Zone **SPL-1** **Gurdaspur** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	46.56	333.7	38.21	36.53	123.90	95.5
PE Pendimethalin @ 1500 g/ha	47.13	335.2	38.42	36.67	124.62	95.2
PE Pyroxasulfone @ 127.5 g/ha	47.87	334.0	38.63	37.15	124.36	96.5
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	50.47	341.3	38.68	38.29	125.93	97.5
PE Pyroxa+metsulfuron 127.5+4 g/ha	51.04	335.3	38.82	39.26	126.78	98.0
EPOST Pyroxasulfone@ 127.5 g/ha	49.87	336.0	38.97	38.09	123.39	98.3
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	49.24	339.2	38.88	37.31	123.78	97.1
PE Metribuzin @300 g/ha	48.90	339.8	38.89	37.31	122.79	97.8
PE Pendi + metribuzin@1250+280 g/ha	51.24	342.5	39.85	37.53	128.88	96.3
PE Pyroxa + metribuzin@127.5+280 g/ha	51.79	343.2	39.75	38.30	128.69	97.5
Weedy Check	34.26	286.0	38.59	31.02	122.86	93.2
Weed free	50.91	347.5	39.92	36.87	129.40	98.4
	48.27	334.5	38.97	37.03	125.45	96.8
SEM	3.10	11.46	0.37	2.64	6.86	1.26
CD(0.05)	7.53	27.84	0.90	6.41	16.65	3.07
CV(%)	11.12	5.94	1.65	12.35	9.46	2.26
Date of Sowing:	15.11.2022	Date of Harvesting:		02.05.2023		

Table 6.3.3. North Western Plains Zone		SPL-1		Hisar	2022-23	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	49.25	383.3	36.10	35.65	131.29	92.8
PE Pendimethalin @ 1500 g/ha	49.59	380.7	36.13	36.09	131.29	93.1
PE Pyroxasulfone @ 127.5 g/ha	50.78	382.3	36.06	36.98	132.99	94.5
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	55.31	420.7	37.56	35.09	140.14	95.9
PE Pyroxa+metsulfuron 127.5+4 g/ha	53.34	409.3	36.70	35.51	137.08	95.5
EPOST Pyroxasulfone@ 127.5 g/ha	51.73	405.7	36.38	35.13	133.33	94.9
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	52.42	401.7	36.83	35.58	135.71	95.2
PE Metribuzin @300 g/ha	48.75	382.3	36.02	35.43	130.61	92.7
PE Pendi + metribuzin@1250+280 g/ha	54.38	414.7	37.43	35.13	138.44	94.1
PE Pyroxa + metribuzin@127.5+280 g/ha	55.11	416.3	37.09	35.79	140.82	93.4
Weedy Check	39.05	346.0	34.30	33.13	107.14	86.6
Weed free	56.20	419.3	37.67	35.64	140.48	96.4
Mean	51.33	396.9	36.52	35.43	133.28	93.8
SEm	1.47	10.32	0.61	1.59	3.36	1.65
CD (0.05)	3.56	25.05	1.48	3.86	8.15	4.02
CV (%)	4.95	4.50	2.90	7.78	4.36	3.06
Date of Sowing:	11.11.2022	Date of Harvesting:		16.04.2023		

Table 6.3.4. North Western Plains Zone		SPL-1		Jammu		
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	44.33	413.3	37.14	28.91	109.09	96.8
PE Pendimethalin @ 1500 g/ha	44.92	416.0	37.30	29.11	110.54	98.2
PE Pyroxasulfone @ 127.5 g/ha	42.20	397.3	36.65	28.99	103.79	96.1
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	47.41	422.0	37.68	30.16	116.69	100.9
PE Pyroxa+metsulfuron 127.5+4 g/ha	43.64	403.7	36.72	29.66	107.36	96.5
EPOST Pyroxasulfone@ 127.5 g/ha	41.74	391.7	36.49	29.15	102.61	95.7
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	42.92	399.0	36.70	29.70	105.61	96.5
PE Metribuzin @300 g/ha	44.01	410.7	37.03	28.94	108.36	96.7
PE Pendi + metribuzin@1250+280 g/ha	45.66	419.7	37.43	29.32	112.22	99.2
PE Pyroxa + metribuzin@127.5+280 g/ha	49.38	428.3	37.86	30.39	121.69	101.2
Weedy Check	30.78	267.0	34.96	33.25	75.02	88.8
Weed free	52.50	452.7	38.11	30.43	131.26	103.6
Mean	44.12	401.8	37.01	29.84	108.69	97.5
SEm	2.73	17.48	0.55	2.29	6.86	3.34
CD (0.05)	6.64	42.45	1.34	5.57	16.65	8.11
CV (%)	10.73	7.54	2.58	13.32	10.93	5.93
Date of Sowing:	24.11.2022	Date of Harvesting:		30.04.2023		

Table 6.3.5. North Western Plains Zone		SPL-1		Ludhiana	2022-23	
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
PE Pendimethalin @ 1000 g/ha	48.62	276.0	43.13	40.88	108.05	87.3
PE Pendimethalin @ 1500 g/ha	49.14	276.3	43.14	41.22	108.97	84.7
PE Pyroxasulfone @ 127.5 g/ha	48.04	275.0	42.83	41.37	107.97	88.0
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	49.93	284.0	44.39	39.75	115.41	83.0
PE Pyroxa+metsulfuron 127.5+4 g/ha	49.72	282.9	43.86	40.09	115.25	87.3
EPOST Pyroxasulfone@ 127.5 g/ha	47.31	272.8	42.44	40.96	107.31	86.3
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	49.21	279.2	43.57	40.48	113.01	84.0
PE Metribuzin @300 g/ha	45.67	272.0	41.82	40.16	105.64	351.3
PE Pendi + metribuzin@1250+280 g/ha	49.26	281.8	44.62	39.59	112.43	86.7
PE Pyroxa + metribuzin@127.5+280 g/ha	49.53	282.5	43.57	40.28	113.18	84.0
Weedy Check	32.07	240.4	40.20	33.24	102.36	84.3
Weed free	52.08	286.3	44.82	40.63	116.23	88.3
Mean	47.55	275.8	43.20	39.89	110.49	107.9
SEm	1.00	8.78	0.92	1.72	3.20	77.12
CD (0.05)	2.43	21.32	2.22	4.18	7.76	187.27
CV (%)	3.65	5.51	3.67	7.47	5.01	123.75
Date of Sowing:	07.11.2022	Date of Harvesting:		15.04.2023		

Table 6.4.1. North Western Plains Zone **SPL-1** **Durgapura** **Weeds** **2022-23**

Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	5.67(31.7)	7.75(59.7)	8.91(79)	3.15(9)	4.19(16.9)	8.15(66.4)
PE Pendimethalin @ 1500 g/ha	5.51(30)	7.27(52.3)	7.97(63.3)	2.92(7.6)	4.02(15.3)	7.93(62.5)
PE Pyroxasulfone @ 127.5 g/ha	4.41(19)	5.35(28)	6(36)	2.96(7.7)	3.8(13.5)	7.46(55.3)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	3.32(10.3)	4.03(15.7)	4.66(21.3)	2.8(6.9)	3.42(10.9)	5.61(30.7)
PE Pyroxa+metsulfuron 127.5+4 g/ha	7.53(56.3)	8.93(79)	10.07(101)	3.48(11.3)	4.34(18)	10.97(119.6)
EPOST Pyroxasulfone@ 127.5 g/ha	5.68(31.7)	6.59(42.7)	7.17(51)	3.09(8.6)	4.18(16.5)	9.92(97.6)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4.31(17.7)	5.52(29.7)	6.05(35.7)	2.58(5.7)	3.82(13.7)	6.86(46.2)
PE Metribuzin @300 g/ha	8.3(68.3)	10.39(107.7)	11.65(135)	3.41(10.7)	5.26(26.7)	11.43(133.8)
PE Pendi + metribuzin@1250+280 g/ha	8.46(71)	10.89(118)	11.25(125.7)	3.5(11.5)	5.8(32.9)	19.93(399.6)
PE Pyroxa + metribuzin@127.5+280 g/ha	9.31(86)	11.12(123.3)	11.5(131.7)	3.49(11.2)	5.4(28.3)	17.85(320.1)
Weedy Check	10.34(106)	12.66(160)	13.38(178.7)	3.99(14.9)	7.69(58.7)	28.83(830.7)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
Mean						
SEm	0.44	0.45	0.51	0.19	0.30	0.75
CD (0.05)	1.08	1.10	1.23	0.45	0.72	1.82
CV (%)	12.48	10.31	10.58	10.59	11.72	11.47

Table 6.4.2. North Western Plains Zone **SPL-1** **Gurdaspur** **Weeds** **2022-23**

Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	2.72(6.5)	4.13(16.2)	5.16(25.7)	1.53(1.4)	1.84(2.4)	2.75(6.7)
PE Pendimethalin @ 1500 g/ha	2.56(5.7)	3.96(14.8)	5.35(27.7)	1.51(1.3)	1.68(1.8)	2.62(6.1)
PE Pyroxasulfone @ 127.5 g/ha	2.63(6)	4.22(16.9)	5.53(29.7)	1.52(1.3)	1.77(2.1)	2.76(6.8)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	1.93(3)	3.56(11.8)	5.1(25.2)	1.29(0.8)	1.56(1.5)	2.37(4.7)
PE Pyroxa+metsulfuron 127.5+4 g/ha	2.49(5.3)	3.96(14.7)	5.25(26.7)	1.44(1.1)	1.69(1.8)	2.46(5.1)
EPOST Pyroxasulfone@ 127.5 g/ha	2.9(7.5)	4.46(18.9)	5.42(28.6)	1.62(1.7)	1.9(2.6)	3.19(9.2)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	2.84(7.3)	4.3(17.7)	5.44(28.7)	1.61(1.6)	1.78(2.2)	3.29(9.9)
PE Metribuzin @300 g/ha	2.95(7.8)	4.38(18.3)	5.77(32.3)	1.65(1.7)	1.83(2.4)	3.34(10.2)
PE Pendi + metribuzin@1250+280 g/ha	2.24(4.2)	3.96(14.8)	4.95(23.7)	1.33(0.8)	1.64(1.7)	2.35(4.5)
PE Pyroxa + metribuzin@127.5+280 g/ha	1.81(2.3)	3.51(11.4)	4.85(22.7)	1.27(0.6)	1.52(1.3)	2.44(5)
Weedy Check	6.65(43.3)	9.61(91.7)	11.47(130.9)	3.74(13)	5.58(30.2)	6.52(41.8)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
Mean						
SEm	0.25	0.24	0.24	0.11	0.10	0.22
CD (0.05)	0.61	0.59	0.59	0.28	0.24	0.52
CV (%)	15.85	9.85	7.72	12.07	8.74	12.77

Table 6.4.3. North Western Plains Zone **SPL-1** **Hisar** **Weeds** **2022-23**

Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	4.43(18.7)	5.74(32)	5.11(25.3)	1.91(2.6)	2.69(6.4)	6.07(35.9)
PE Pendimethalin @ 1500 g/ha	4.24(17.3)	5.44(28.7)	4.99(24)	1.75(2.1)	3.08(8.6)	6.09(36.3)
PE Pyroxasulfone @ 127.5 g/ha	3.78(13.3)	5.38(28)	4.57(20)	1.69(1.9)	2.95(7.8)	5(24.1)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	2.49(5.3)	3.4(10.7)	2.49(5.3)	1.34(0.8)	1.87(2.6)	3.45(10.9)
PE Pyroxa+metsulfuron 127.5+4 g/ha	3.2(9.3)	4.42(18.7)	3.58(12)	1.88(2.6)	2.27(4.3)	3.46(11.1)
EPOST Pyroxasulfone@ 127.5 g/ha	3.37(10.7)	4.4(18.7)	4.1(16)	1.9(2.6)	2.34(4.7)	4.45(18.9)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	3.2(9.3)	4.57(20)	3.73(13.3)	1.85(2.5)	2.29(4.3)	4.44(19.1)
PE Metribuzin @300 g/ha	4.57(20)	5.96(34.7)	5.74(32)	2.1(3.4)	3.09(8.6)	5.84(33.2)
PE Pendi + metribuzin@1250+280 g/ha	2.75(6.7)	3.73(13.3)	3.58(12)	1.54(1.4)	2.34(4.6)	4.23(17.7)
PE Pyroxa + metribuzin@127.5+280 g/ha	2.75(6.7)	3.4(10.7)	3.2(9.3)	1.69(2)	1.97(2.9)	3.95(15)
Weedy Check	8.22(66.7)	8.52(72)	9.14(82.7)	3.21(9.5)	4.21(16.8)	8.46(71.3)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
Mean						
SEm	0.26	0.30	0.26	0.16	0.20	0.34
CD (0.05)	0.63	0.72	0.64	0.39	0.49	0.83
CV (%)	12.18	10.99	10.63	15.33	13.92	12.54

Table 6.4.4. North Western Plains Zone		SPL-1		Jammu		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	5.68(31.3)	5.19(26)	4.4(18.3)	3.79(13.8)	7.22(51.5)	8.7(75.4)
PE Pendimethalin @ 1500 g/ha	4.99(24)	5.08(25)	4.14(16.7)	3.31(9.9)	5.77(32.3)	7.52(55.5)
PE Pyroxasulfone @ 127.5 g/ha	5.99(35.7)	6.36(39.7)	5.94(34.3)	4.32(17.9)	8.27(67.6)	9.64(92.4)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	3.83(13.7)	4.62(20.7)	2.8(7)	2.79(6.8)	4.54(19.7)	6.56(42.1)
PE Pyroxa+metsulfuron 127.5+4 g/ha	5.87(33.7)	6.11(36.7)	5.46(29)	4.24(17.2)	7.77(60)	9.49(89.6)
EPOST Pyroxasulfone@ 127.5 g/ha	6.16(37.3)	6.84(46)	6.01(35.3)	4.52(19.6)	8.58(72.8)	9.67(92.8)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	6(35)	6.32(39)	5.59(30.3)	4.3(17.5)	8.01(63.6)	9.57(90.9)
PE Metribuzin @300 g/ha	5.76(32.3)	5.53(29.7)	5.38(28)	4.05(15.4)	7.72(58.8)	8.98(79.8)
PE Pendi + metribuzin@1250+280 g/ha	4.6(20.3)	4.72(21.3)	3.88(14.3)	3.1(8.6)	4.96(23.6)	7.32(52.5)
PE Pyroxa + metribuzin@127.5+280 g/ha	3.74(13)	4.58(20)	2.66(6.7)	2.72(6.5)	4.45(18.9)	6.48(41)
Weedy Check	10.8(115.7)	11.71(136.3)	10.86(117.3)	8.05(64.3)	16.19(261.6)	17.01(288.8)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
Mean						
SEm	0.29	0.28	0.32	0.23	0.32	0.31
CD (0.05)	0.72	0.68	0.78	0.55	0.77	0.75
CV (%)	9.51	8.56	11.53	10.26	7.76	6.34
Date of Sowing :	11.11.2021		Date of Harvesting:		13.03.2022	

Table 6.4.5. North Western Plains Zone		SPL-1		Ludhiana		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	1.59(1.5)	2.05(3.2)	2.55(5.5)	1.32(0.7)	1.57(1.5)	2.26(4.1)
PE Pendimethalin @ 1500 g/ha	1.51(1.3)	1.68(1.8)	2.27(4.2)	1.27(0.6)	1.35(0.8)	1.84(2.4)
PE Pyroxasulfone @ 127.5 g/ha	1.65(1.7)	2.31(4.3)	2.57(5.6)	1.35(0.8)	1.71(1.9)	2.53(5.4)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	1.2(0.4)	1.6(1.6)	2.12(3.5)	1.09(0.2)	1.31(0.7)	1.74(2)
PE Pyroxa+metsulfuron 127.5+4 g/ha	1.25(0.6)	1.36(0.9)	1.61(1.6)	1.13(0.3)	1.18(0.4)	1.44(1.1)
EPOST Pyroxasulfone@ 127.5 g/ha	1.65(1.7)	1.85(2.4)	2.39(5)	1.35(0.8)	1.45(1.1)	2.04(3.2)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	1.47(1.2)	1.68(1.8)	2.16(3.8)	1.23(0.5)	1.35(0.8)	1.82(2.3)
PE Metribuzin @300 g/ha	1.76(2.1)	1.97(2.9)	2.58(5.7)	1.41(1)	1.53(1.3)	2.18(3.8)
PE Pendi + metribuzin@1250+280 g/ha	1.4(1)	1.74(2)	2.11(4.3)	1.2(0.5)	1.38(0.9)	1.89(2.6)
PE Pyroxa + metribuzin@127.5+280 g/ha	1.31(0.7)	1.56(1.4)	2.14(3.6)	1.16(0.3)	1.28(0.7)	1.67(1.8)
Weedy Check	3.23(10.1)	4.67(21.2)	5.17(26)	2.38(4.7)	3.23(9.5)	5.23(26.7)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
Mean						
SEm	0.16	0.13	0.26	0.06	0.06	0.15
CD (0.05)	0.39	0.33	0.64	0.14	0.14	0.35
CV (%)	17.43	11.89	19.20	7.54	6.58	11.83
Date of Sowing :	19.11.2021		Date of Harvesting:		14.04.2022	

Table 6.5.1. North Eastern Plains Zone		SPL-1		Ayodhya		2022-23
Herbicide	Yield, q/ha	Earheads/sqm	1000 GW, g	Grains/ Earhead	Plant Ht, cm	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	45.13	438.00	39.60	26.02	97.33	100.08
PE Pendimethalin @ 1500 g/ha	46.40	471.67	39.77	24.74	98.33	104.28
PE Pyroxasulfone @ 127.5 g/ha	45.87	458.67	39.77	25.15	97.67	102.92
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	48.58	493.00	39.87	24.72	100.67	109.15
PE Pyroxa+metsulfuron 127.5+4 g/ha	47.13	478.67	39.83	24.72	99.33	108.24
EPOST Pyroxasulfone@ 127.5 g/ha	43.58	422.67	39.50	26.11	97.00	96.62
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	44.56	430.00	39.60	26.17	97.00	100.20
PE Metribuzin @300 g/ha	40.97	411.33	39.43	25.26	97.00	92.12
PE Pendi + metribuzin@1250+280 g/ha	41.65	414.00	39.43	25.52	97.00	93.58
PE Pyroxa + metribuzin@127.5+280 g/ha	42.83	418.33	39.53	25.90	97.00	96.70
Weedy Check	33.97	398.67	37.97	22.45	96.00	78.20
Weed free	50.29	501.00	40.33	24.90	102.00	110.79
CD (0.05)	0.83	8.98	0.28	0.74	1.91	2.23
Date of Sowing :	13.11.2022		Date of Harvesting:		08.03.2023	

Table 6.5.2. North Eastern Plains Zone	SPL-1			Ranchi		2022-23
Herbicide	Yield, q/ha	Earheads/sqm	1000 GW, g	Grains/Earhead	Plant Ht, cm	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	48.63	313.33	40.63	38.42	89.40	111.03
PE Pendimethalin @ 1500 g/ha	49.60	360.00	41.23	33.36	92.13	113.15
PE Pyroxasulfone @ 127.5 g/ha	52.13	350.00	40.73	37.14	94.20	118.71
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	54.07	385.00	41.73	33.76	95.27	122.93
PE Pyroxa+metsulfuron 127.5+4 g/ha	57.10	386.67	43.13	34.39	95.40	138.21
EPOST Pyroxasulfone@ 127.5 g/ha	51.83	350.00	41.27	36.02	90.53	118.29
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	55.17	316.67	42.93	42.28	89.83	128.29
PE Metribuzin @300 g/ha	52.13	356.67	41.47	35.30	93.73	129.69
PE Pendi + metribuzin@1250+280 g/ha	53.83	348.33	41.33	37.95	94.53	129.57
PE Pyroxa + metribuzin@127.5+280 g/ha	56.90	321.67	42.43	41.98	94.87	128.84
Weedy Check	35.67	273.33	36.80	35.69	75.80	100.06
Weed free	57.93	406.67	43.07	33.11	104.00	139.56
CD (0.05)	5.48	50.42	2.06	7.19	8.54	15.04
Date of Sowing :	30.11.2022		Date of Harvesting:		20.04.2023	

Table 6.5.3. North Eastern Plains Zone	SPL-1			RPCAU PUSA		2022-23
Herbicide	Yield, q/ha	Earheads/sqm	1000 GW, g	Grains/ Earhead	Plant Ht, cm	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	33.62	231	34.17	42.57	94.07	100.09
PE Pendimethalin @ 1500 g/ha	35.83	234	35.70	42.85	92.30	98.34
PE Pyroxasulfone @ 127.5 g/ha	36.35	215	36.92	45.86	91.67	96.59
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	33.77	218	35.46	43.74	94.80	98.85
PE Pyroxa+metsulfuron 127.5+4 g/ha	35.18	224	35.64	44.06	92.85	97.70
EPOST Pyroxasulfone@ 127.5 g/ha	36.84	237	38.28	40.61	93.72	101.91
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	36.62	226	39.49	41.03	93.90	104.40
PE Metribuzin @300 g/ha	35.48	228	35.18	44.26	93.15	97.26
PE Pendi + metribuzin@1250+280 g/ha	35.23	209	36.64	45.95	93.70	97.30
PE Pyroxa + metribuzin@127.5+280 g/ha	36.72	232	37.90	41.79	93.40	99.38
Weedy Check	24.44	210	32.64	35.66	91.80	92.62
Weed free	36.82	235	39.10	40.11	94.59	101.31
CD (0.05)	1.78	2.33	1.81	2.59	1.56	6.86
Date of Sowing :	01.12.2022		Date of Harvesting:		10.04.2023	

Table 6.5.4. North Eastern Plains Zone	SPL-1			Shillongani		2022-23
Herbicide	Yield, q/ha	Earheads/sqm	1000 GW, g	Grains/ Earhead	Plant Ht, cm	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	45.81	228	43.90	47.24	95.20	77.96
PE Pendimethalin @ 1500 g/ha	46.55	227	42.60	48.33	95.47	79.96
PE Pyroxasulfone @ 127.5 g/ha	54.67	258	44.57	47.68	95.47	76.79
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	58.73	236	42.47	58.66	93.93	82.94
PE Pyroxa+metsulfuron 127.5+4 g/ha	47.08	208	43.33	52.33	94.87	75.00
EPOST Pyroxasulfone@ 127.5 g/ha	51.93	263	43.50	45.34	98.73	63.69
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	53.73	251	42.47	50.47	96.80	83.33
PE Metribuzin @300 g/ha	45.46	256	42.57	41.66	97.00	68.25
PE Pendi + metribuzin@1250+280 g/ha	56.12	288	42.83	46.33	94.67	80.16
PE Pyroxa + metribuzin@127.5+280 g/ha	61.25	261	43.67	53.67	95.47	65.24
Weedy Check	26.99	181	38.73	39.67	95.60	30.20
Weed free	66.44	243	44.40	61.67	92.87	86.51
CD (0.05)	11.48	45.59	1.32	11.34	3.52	8.71
Date of Sowing :	19.11.2022		Date of Harvesting:		14.03.2023	

Table 6.6.1. North Eastern Plains Zone		SPL-1		Ayodhya		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	3.9 (14.3)	4.5 (19)	3.7 (12.9)	4.7 (21.4)	5.8 (32.8)	4.6 (20.1)
PE Pendimethalin @ 1500 g/ha	3.8 (13.6)	4.4 (18)	3.7 (12.3)	4.6 (20.6)	5.7 (31.1)	4.5 (19.1)
PE Pyroxasulfone @ 127.5 g/ha	3.9 (14)	4.4 (18.3)	3.7 (12.6)	4.7 (21.2)	5.7 (31.6)	4.5 (19.7)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	3.6 (12)	4.3 (17.4)	3.4 (10.9)	4.4 (18.2)	5.6 (30.1)	4.2 (17)
PE Pyroxa+metsulfuron 127.5+4 g/ha	3.7 (13)	4.4 (18)	3.5 (11.1)	4.5 (19.6)	5.7 (31)	4.3 (17.2)
EPOST Pyroxasulfone@ 127.5 g/ha	4.1 (15.6)	4.5 (19.5)	3.9 (14)	4.9 (23.3)	5.9 (33.6)	4.8 (21.7)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4 (14.8)	4.5 (19.2)	3.8 (13.2)	4.8 (22.1)	5.9 (33.3)	4.7 (20.6)
PE Metribuzin @300 g/ha	4.4 (18)	4.8 (22.4)	4.1 (16.1)	5.3 (26.8)	6.3 (38.7)	5.1 (25)
PE Pendi + metribuzin@1250+280 g/ha	4.1 (16.2)	4.7 (21.5)	3.9 (14.5)	5 (24.2)	6.2 (37.2)	4.8 (22.5)
PE Pyroxa + metribuzin@127.5+280 g/ha	4.1 (15.7)	4.6 (20.4)	3.9 (13.9)	4.9 (23.4)	6 (35.1)	4.8 (21.8)
Weedy Check	5.3 (26.6)	5.6 (30.5)	5 (23.8)	6.4 (39.8)	7.3 (52.9)	6.2 (36.8)
Weed free	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
CD (0.05)	0.11	0.07	0.09	0.12	0.08	0.09
Date of Sowing :	13.11.2022		Date of Harvesting:		08.03.2023	

Table 6.6.2. North Eastern Plains Zone		SPL-1		Ranchi		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	1.4 (1)	4.8 (24.7)	4.8 (22.3)	1.1 (0.1)	3 (8.5)	2.8 (6.9)
PE Pendimethalin @ 1500 g/ha	1.7 (3)	5.4 (33)	4.1 (17.3)	1.1 (0.2)	2.5 (7.5)	2.4 (6.2)
PE Pyroxasulfone @ 127.5 g/ha	1.8 (4)	5.9 (38)	4.4 (21.3)	1.2 (0.6)	2.9 (8.7)	2.8 (8)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	1.6 (1)	4.7 (23)	3.3 (10.3)	1.1 (0.3)	2.5 (6)	2.4 (5)
PE Pyroxa+metsulfuron 127.5+4 g/ha	1.8 (3)	4.7 (22.3)	4.2 (17.7)	1.1 (0.2)	2.8 (7.4)	2.2 (3.9)
EPOST Pyroxasulfone@ 127.5 g/ha	2 (4)	6.8 (49.3)	5.2 (28)	1.3 (0.8)	4 (16.4)	3.4 (10.8)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	1.7 (1)	3.4 (11.3)	3.4 (11)	1.1 (0.3)	1.7 (2.3)	1.6 (1.9)
PE Metribuzin @300 g/ha	1.9 (1)	3.6 (12.7)	4 (15.3)	1.3 (0.8)	2.3 (4.8)	2.3 (4.4)
PE Pendi + metribuzin@1250+280 g/ha	1.9 (3)	3.6 (14)	3.4 (12.7)	1.1 (0.3)	2.2 (4.7)	2.1 (4.1)
PE Pyroxa + metribuzin@127.5+280 g/ha	1.8 (2)	3.4 (11.7)	3 (8.3)	1.1 (0.3)	2.4 (6.8)	2.3 (5.7)
Weedy Check	5.6 (25)	13 (170)	11 (120)	2.6 (6.4)	8 (63.7)	6.9 (47.3)
Weed free	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
CD (0.05)	0.48	2.61	1.71	0.38	1.64	1.32
Date of Sowing :	30.11.2022		Date of Harvesting:		20.04.2023	

Table 6.6.3. North Eastern Plains Zone		SPL-1		RPCAU PUSA		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	4.1 (16)	5.5 (29.3)	4.2 (16.3)	3.3 (9.6)	4.1 (15.9)	3.6 (11.7)
PE Pendimethalin @ 1500 g/ha	4 (15.3)	4.9 (22.7)	4.3 (17.3)	3.3 (10)	3.5 (11)	3.5 (11.2)
PE Pyroxasulfone @ 127.5 g/ha	4.3 (17.7)	5.4 (28.7)	4.5 (19)	3.6 (12.3)	4.1 (15.6)	3.5 (11.3)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	4.3 (17.3)	5.3 (26.7)	4.1 (16)	3.4 (10.4)	3.6 (12.2)	3.3 (9.7)
PE Pyroxa+metsulfuron 127.5+4 g/ha	3.9 (14.3)	4.8 (21.7)	4 (14.7)	3.4 (10.3)	3.4 (10.9)	3.4 (10.9)
EPOST Pyroxasulfone@ 127.5 g/ha	4.4 (18.7)	5.7 (31)	4.7 (21)	3.4 (10.3)	4.1 (16)	3.6 (12)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4 (14.7)	5.8 (32.7)	4.2 (16.7)	3.4 (10.6)	3.6 (11.8)	3.3 (10)
PE Metribuzin @300 g/ha	4.5 (19.3)	5.5 (29.3)	4.5 (19.7)	3.6 (11.7)	3.9 (14.5)	3.5 (11.3)
PE Pendi + metribuzin@1250+280 g/ha	4.2 (16.7)	4.8 (22.3)	4.1 (15.7)	3.2 (9.3)	3.6 (11.9)	3.2 (9.4)
PE Pyroxa + metribuzin@127.5+280 g/ha	3.6 (12.3)	4.8 (22.3)	4 (14.7)	3.1 (8.8)	3.5 (10.9)	3.2 (9.1)
Weedy Check	7.5 (55.7)	12.2 (147.3)	11.4 (129.3)	5 (24.5)	6.9 (46.1)	6.8 (45.9)
Weed free	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
CD (0.05)	0.53	0.61	0.47	0.24	0.22	0.35
Date of Sowing :	01.12.2022		Date of Harvesting:		10.04.2023	

Table 6.6.4. North Eastern Plains Zone		SPL-1		Shillongani		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	10.5 (124.7)	14.7 (224.7)	8.6 (79)	4.6 (20)	5.1 (25)	6.1 (38.2)
PE Pendimethalin @ 1500 g/ha	9.2 (96)	12 (161.7)	11.6 (137.3)	3.9 (14.2)	7.7 (62.9)	4.2 (18.7)
PE Pyroxasulfone @ 127.5 g/ha	14.4 (214.3)	14.2 (213)	7.8 (61.7)	4.5 (21.1)	5.6 (33.7)	5.2 (28.4)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	12.1 (153.3)	10.1 (108.3)	13.4 (194.7)	3.9 (15.7)	8 (69.9)	4.1 (16.8)
PE Pyroxa+metsulfuron 127.5+4 g/ha	7.6 (66)	12.9 (179)	8.8 (87.7)	2.8 (8.4)	5.5 (30.3)	5.3 (28.8)
EPOST Pyroxasulfone@ 127.5 g/ha	12.1 (148.7)	14.4 (211)	10.8 (131.7)	4.8 (22.8)	4.6 (20.5)	5.2 (28.1)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	10.4 (113.3)	10.8 (118)	7.3 (58.7)	3.6 (12.9)	3.9 (16.5)	4.5 (19.4)
PE Metribuzin @300 g/ha	18 (328)	17.9 (336)	14.2 (222.3)	4.9 (23.3)	7.4 (59.2)	6.4 (45.3)
PE Pendi + metribuzin@1250+280 g/ha	9.9 (97.7)	10.9 (128.3)	8.7 (78.3)	3.3 (10.8)	6.6 (44.1)	4.1 (16.1)
PE Pyroxa + metribuzin@127.5+280 g/ha	8.8 (95.3)	10 (102)	8.5 (70.7)	2.5 (5.6)	5.5 (29.5)	3.5 (11.3)
Weedy Check	24.9 (648.3)	28.7 (826.3)	22.6 (560.7)	6.1 (37)	15.7 (259.1)	11.1 (127.4)
Weed free	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
CD (0.05)	3.96	4.94	5.37	1.26	3.02	2.31
Date of Sowing :	19.11.2022		Date of Harvesting:		14.03.2023	

Table 6.7.1. Central Zone		SPL-1		Indore	2022-23
Herbicide	Earheads/sqm	Grains/ Earhead	1000 grains weight, g	Yield, q/ha	Plant height, cm
PE Pendimethalin @ 1000 g/ha	283	35.1	48.90	48.70	97.0
PE Pendimethalin @ 1500 g/ha	300	34.6	48.37	50.03	97.7
PE Pyroxasulfone @ 127.5 g/ha	270	37.7	46.40	47.10	95.9
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	278	36.3	47.07	47.17	95.7
PE Pyroxa+metsulfuron 127.5+4 g/ha	271	35.2	48.33	45.97	94.1
EPOST Pyroxasulfone@ 127.5 g/ha	289	34.3	49.43	48.97	97.0
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	294	34.7	48.67	49.60	96.6
PE Metribuzin @300 g/ha	272	35.6	46.53	44.87	95.5
PE Pendi + metribuzin@1250+280 g/ha	261	37.2	45.37	43.97	94.1
PE Pyroxa + metribuzin@127.5+280 g/ha	270	35.3	45.93	43.70	94.4
Weedy Check	277	35.0	48.37	46.77	99.3
Weed free	301	34.3	48.90	50.43	99.5
CD (0.05)	16	2.6	1.47	1.83	2.80
Date of Sowing	16.11.2022		Date of Harvesting	05.04.2023	

Table 6.7.2. Central Zone		SPL-1		Powarkheda	2022-23
Herbicide	Earheads/sqm	Grains/ Earhead	1000 grains weight, g	Yield, q/ha	Plant height, cm
PE Pendimethalin @ 1000 g/ha	377	37.42	31.67	44.43	82.0
PE Pendimethalin @ 1500 g/ha	412	35.72	33.00	48.53	85.3
PE Pyroxasulfone @ 127.5 g/ha	419	33.29	37.00	51.58	91.3
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	461	29.78	41.33	56.64	103.7
PE Pyroxa+metsulfuron 127.5+4 g/ha	429	27.04	46.00	53.34	97.3
EPOST Pyroxasulfone@ 127.5 g/ha	415	35.79	34.00	50.48	87.7
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	473	24.16	51.33	58.57	106.3
PE Metribuzin @300 g/ha	439	28.57	44.00	55.14	101.0
PE Pendi + metribuzin@1250+280 g/ha	463	26.10	48.33	58.29	105.3
PE Pyroxa + metribuzin@127.5+280 g/ha	425	31.41	39.33	52.35	95.3
Weedy Check	354	30.98	29.67	32.48	79.3
Weed free	504	22.16	53.67	59.86	90.3
CD (0.05)	13.00	2.2	1.31	1.98	5.20
Date of Sowing	25.11.2022		Date of Harvesting	05.04.2023	

Table 6.7.3. Central Zone		SPL-1		Udaipur	2022-23
Herbicide	Earheads/sqm	Grains/ Earhead	1000 grains weight, g	Yield, q/ha	Plant height, cm
PE Pendimethalin @ 1000 g/ha	308	30.21	45.07	40.83	85.3
PE Pendimethalin @ 1500 g/ha	362	26.71	47.20	46.08	87.2
PE Pyroxasulfone @ 127.5 g/ha	397	24.08	51.33	48.58	89.5
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	403	24.11	52.67	51.13	90.3
PE Pyroxa+metsulfuron 127.5+4 g/ha	393	24.22	51.10	48.28	88.7
EPOST Pyroxasulfone@ 127.5 g/ha	378	26.88	47.20	46.77	87.6
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	408	24.60	53.50	53.13	95.8
PE Metribuzin @300 g/ha	294	31.95	42.57	39.78	82.3
PE Pendi + metribuzin@1250+280 g/ha	353	27.92	45.10	44.38	86.4
PE Pyroxa + metribuzin@127.5+280 g/ha	389	24.59	50.10	47.50	88.5
Weedy Check	273	31.27	42.10	35.90	80.9
Weed free	423	24.38	53.93	55.58	97.5
CD (0.05)	54.00	6.9	2.47	7.78	8.90
Date of Sowing	11.11.2022		Date of Harvesting	27.03.2023	

Table 6.8.1. Central Zone	SPL-1			Indore		2022-2023
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	3.32(10.3)	2.64(6.2)	2.63(6)	1.42(1)	2.56(5.6)	2.42(5.1)
PE Pendimethalin @ 1500 g/ha	3.76(13.2)	2.89(8)	2.56(5.8)	1.61(1.7)	2.67(6.1)	2.51(5.3)
PE Pyroxasulfone @ 127.5 g/ha	3.39(10.7)	1.98(3)	2.28(4.3)	1.37(0.9)	2.44(4.9)	2.36(4.6)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	4.45(19)	2.7(6.5)	2.2(4)	1.56(1.5)	2.53(5.4)	2.29(4.3)
PE Pyroxa+metsulfuron 127.5+4 g/ha	3.91(14.3)	2.85(7.5)	2.07(3.3)	1.56(1.5)	2.09(3.4)	2.11(3.5)
EPOST Pyroxasulfone@ 127.5 g/ha	4.06(15.5)	2.62(6)	2.51(5.3)	1.4(1)	2.43(4.9)	2.3(4.3)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4.08(15.7)	2.53(5.7)	2.45(5.2)	1.71(2)	2.25(4.1)	2.2(3.9)
PE Metribuzin @300 g/ha	3.81(13.5)	3.15(9.3)	2.71(6.3)	1.43(1)	2.46(5.3)	2.67(6.2)
PE Pendi + metribuzin@1250+280 g/ha	3.8(13.8)	2.53(5.7)	2.51(5.3)	1.35(0.9)	2.37(4.6)	2.24(4.1)
PE Pyroxa + metribuzin@127.5+280 g/ha	3.22(9.8)	2.87(7.5)	2.5(5.3)	1.43(1.1)	2.6(5.8)	2.83(7.1)
Weedy Check	3.95(14.8)	4.43(18.8)	4.18(16.5)	1.53(1.4)	5.69(32)	5.63(30.9)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
CD (0.05)	0.7	0.89	0.5	0.26	0.51	0.49
Date of Sowing:	16.11.2022		Date of Harvesting			05.04.2023

Table 6.8.2. Central Zone	SPL-1			Powarkheda		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	7.42(54)	7.45(54.6)	7.1(49.5)	9.25(84.5)	8.64(73.7)	8.48(70.9)
PE Pendimethalin @ 1500 g/ha	7.15(50.2)	7.07(49)	6.71(44.1)	7.71(58.4)	7.09(49.3)	7.32(52.6)
PE Pyroxasulfone @ 127.5 g/ha	6.26(38.2)	6.05(35.6)	5.75(32.1)	9.04(80.8)	8.16(65.7)	6.3(38.8)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	5.24(26.5)	4.83(22.3)	4.54(19.6)	5.57(30)	5.38(28)	5.06(24.7)
PE Pyroxa+metsulfuron 127.5+4 g/ha	5.74(32)	5.23(26.3)	4.99(24)	5.8(32.7)	5.71(31.7)	5.58(30.2)
EPOST Pyroxasulfone@ 127.5 g/ha	6.71(44)	6.62(42.9)	6.09(36.2)	8.42(70)	7.57(56.3)	6.97(47.6)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4.25(17.2)	4.2(16.7)	3.91(14.3)	4.89(22.9)	4.39(18.3)	3.95(14.6)
PE Metribuzin @300 g/ha	5.46(28.9)	5.03(24.3)	4.75(21.6)	6.53(41.7)	6.05(35.7)	4.44(18.7)
PE Pendi + metribuzin@1250+280 g/ha	4.81(22.1)	4.55(19.8)	4.19(16.6)	5.25(26.6)	4.86(22.7)	5.25(26.6)
PE Pyroxa + metribuzin@127.5+280 g/ha	5.91(33.9)	5.53(29.6)	5.38(28)	6.87(46.3)	6.61(42.7)	5.89(33.7)
Weedy Check	10(99)	11.04(120.8)	12.44(153.8)	11.1(122.1)	12.4(152.7)	13.52(181.7)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
CD (0.05)	0.19	0.2	0.18	0.29	0.32	0.2
Date of Sowing:	25.11.2022		Date of Harvesting			05.04.2023

Table 6.8.3. Central Zone	SPL-1			Udaipur		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	6.19(37.3)	7.85(60.7)	8.98(79.7)	5.87(33.5)	7.04(48.6)	10.33(105.7)
PE Pendimethalin @ 1500 g/ha	5.8(32.7)	6.92(47)	8.16(65.7)	5.57(30)	6.14(36.8)	9.64(92)
PE Pyroxasulfone @ 127.5 g/ha	4.86(22.7)	4.92(23.3)	6.43(40.3)	4.75(21.6)	3.92(14.4)	8.36(68.9)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	4.54(19.7)	4.68(21)	5.86(33.3)	4.48(19.1)	3.66(12.5)	7.84(60.4)
PE Pyroxa+metsulfuron 127.5+4 g/ha	4.97(23.7)	5.1(25)	6.63(43)	4.94(23.4)	4.21(16.7)	8.53(71.8)
EPOST Pyroxasulfone@ 127.5 g/ha	5.8(32.7)	6.37(39.7)	7.72(58.7)	5.55(29.8)	5.6(30.3)	9.23(84.2)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	4.16(16.3)	4.24(17)	5.38(28)	4.4(18.4)	3.2(9.3)	7.51(55.4)
PE Metribuzin @300 g/ha	6.58(42.3)	8.41(69.7)	9.38(87)	6.13(36.6)	7.66(57.7)	10.83(116.2)
PE Pendi + metribuzin@1250+280 g/ha	5.94(34.3)	7.3(52.3)	8.44(70.3)	5.67(31.2)	6.74(44.5)	9.91(97.3)
PE Pyroxa + metribuzin@127.5+280 g/ha	5.26(26.7)	5.83(33)	7.23(51.3)	5.2(26)	4.92(23.2)	8.99(79.8)
Weedy Check	9.25(84.7)	11.56(132.7)	11.94(141.7)	8.33(68.4)	9.39(87.2)	12.73(161)
Weed free	1(0)	1(0)	1(0)	1(0)	1(0)	1(0)
CD (0.05)	0.22	0.3	0.2	0.15	0.19	0.23
Date of Sowing:	11.11.2022		Date of Harvesting			27.03.2023

Table 6.9.1. Peninsular Zone		SPL-1		Dharwad		2022-23
Herbicide	Yield, q/ha	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Stand count	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	43.68	341	43.20	30.04	381	76
PE Pendimethalin @ 1500 g/ha	44.84	372	43.70	27.70	389	84
PE Pyroxasulfone @ 127.5 g/ha	45.62	404	43.42	27.64	404	92
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	49.07	436	45.80	24.85	428	91
PE Pyroxa+metsulfuron 127.5+4 g/ha	47.85	427	43.74	26.96	451	92
EPOST Pyroxasulfone@ 127.5 g/ha	46.60	411	47.48	23.93	500	91
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	47.73	466	45.49	23.05	492	95
PE Metribuzin @300 g/ha	50.21	454	50.55	21.92	494	95
PE Pendi + metribuzin@1250+280 g/ha	51.20	492	46.78	22.28	498	83
PE Pyroxa + metribuzin@127.5+280 g/ha	48.77	414	46.46	25.32	458	95
Weedy Check	31.84	388	35.09	23.42	427	66
Weed free	45.32	421	41.52	27.40	456	85
Mean	46.06	419	44.44	25.38	448	87
SEm	3.13	31.12	2.13	3.44	25.95	5.91
CD (0.05)	7.60	75.57	5.18	8.34	63.02	14.36
CV (%)	11.77	12.87	8.31	23.45	10.03	11.75
Date of Sowing : 12.11.2022			Date of Harvesting:20.03.2023			

Table 6.9.2. Peninsular Zone		SPL-1		Pune		2022-23
Herbicide	Yield, q/ha	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Stand count	Biomass, q/ha
PE Pendimethalin @ 1000 g/ha	51.93	338	47.33	32.90	285	115
PE Pendimethalin @ 1500 g/ha	49.80	328	47.67	31.89	278	110
PE Pyroxasulfone @ 127.5 g/ha	50.60	335	46.33	32.57	335	111
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	49.50	358	47.33	29.49	298	107
PE Pyroxa+metsulfuron 127.5+4 g/ha	51.97	310	46.00	36.70	293	115
EPOST Pyroxasulfone@ 127.5 g/ha	50.17	328	47.67	32.62	305	111
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	47.57	340	47.67	30.08	303	105
PE Metribuzin @300 g/ha	47.90	367	47.00	27.93	352	107
PE Pendi + metribuzin@1250+280 g/ha	46.13	323	47.00	30.51	300	101
PE Pyroxa + metribuzin@127.5+280 g/ha	48.23	337	46.67	30.99	318	106
Weedy Check	49.83	310	48.67	33.73	300	103
Weed free	45.87	338	48.33	28.14	330	103
Mean	49.13	334	47.31	31.46	308	108
SEm	2.92	23.65	0.61	2.43	14.85	6.26
CD (0.05)	7.09	57.44	1.48	5.90	36.05	15.21
CV (%)	10.30	12.25	2.23	13.37	8.34	10.07
Date of Sowing : 15.11.2022			Date of Harvesting: 13.03.2023			

Table 6.10.1. Peninsular Zone	SPL-1			Dharwad		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	2.90(7.66)	3.24(9.6)	3.40(10.6)	2.59(5.8)	2.82(7.03)	2.97(7.86)
PE Pendimethalin @ 1500 g/ha	2.77(7.0)	3.39(10.6)	3.49(11.3)	2.44(5.16)	2.93(7.70)	3.01(8.13)
PE Pyroxasulfone @ 127.5 g/ha	2.32(4.66)	2.60(6.0)	2.97(8.0)	2.08(3.46)	2.33(4.60)	2.58(5.80)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	2.29(4.33)	2.58(5.6)	3.05(8.3)	2.04(3.20)	2.29(4.26)	2.65(6.03)
PE Pyroxa+metsulfuron 127.5+4 g/ha	2.35(4.66)	2.81(7.0)	3.11(8.6)	2.15(3.6)	2.49(5.26)	2.72(6.43)
EPOST Pyroxasulfone@ 127.5 g/ha	2.80(7.0)	3.08(8.6)	3.32(10.3)	2.49(5.26)	2.69(6.33)	2.88(7.46)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	2.70(6.33)	2.88(7.3)	3.11(8.6)	2.35(4.56)	2.47(5.10)	2.71(6.33)
PE Metribuzin @300 g/ha	2.49(5.33)	2.94(7.6)	3.15(9.0)	2.19(3.86)	2.58(5.70)	2.75(6.60)
PE Pendi + metribuzin@1250+280 g/ha	2.41(5.0)	2.94(7.6)	3.27(9.6)	2.19(3.9)	2.55(5.53)	2.82(6.96)
PE Pyroxa + metribuzin@127.5+280 g/ha	2.56(5.66)	2.99(8.0)	3.26(9.6)	2.28(4.26)	2.65(6.03)	2.81(6.93)
Weedy Check	4.20(16.66)	4.32(17.6)	4.61(20.3)	3.63(12.23)	4.23(16.90)	4.66(20.76)
Weed free	1.0(0.0)	1.0(0.0)	1.0(0.0)	1.0(0.0)	1.0(0.0)	1.0(0.0)
Mean	2.57(6.19)	2.90(8.0)	3.15(9.55)	2.29(4.61)	2.59(6.20)	2.80(7.44)
SEm	0.27	0.22	3.15	0.20	0.17	0.16
CD (0.05)	0.66	0.54	0.20	0.49	0.40	0.39
CV (%)	18.32	13.23	0.49	15.18	11.07	9.88
Date of Sowing : 12.11.2022			Date of Harvesting:20.03.2023			

Table 6.10.2. Peninsular Zone	SPL-1			Pune		2022-23
Herbicide	Weed Count 30 DAS	Weed Count 60 DAS	Weed Count 90 DAS	Weed dry wt. 30 DAS	Weed dry wt. 60 DAS	Weed dry wt. 90 DAS
PE Pendimethalin @ 1000 g/ha	19.78(405.0)	11.48(166.0)	6.38(43.3)	11.11(129.33)	5.33(34.0)	3.65(12.66)
PE Pendimethalin @ 1500 g/ha	21.0(487.0)	7.75(71.3)	6.35(39.6)	11.99(166.66)	4.81(24.0)	3.23(10.66)
PE Pyroxasulfone @ 127.5 g/ha	17.43(305.3)	6.91(49.6)	6.06(41.6)	10.19(103.33)	4.09(16.0)	3.56(12.66)
PE Pendi + Pyroxa @ 1250 + 127.5 g/ha	14.44(212.6)	9.31(100.3)	6.69(46.3)	8.30(68.66)	5.24(26.6)	3.40(11.33)
PE Pyroxa+metsulfuron 127.5+4 g/ha	15.64(248.3)	7.54(66.0)	5.76(39.0)	7.02(48.66)	4.01(16.0)	3.77(14.0)
EPOST Pyroxasulfone@ 127.5 g/ha	22.79(538.0)	7.53(59.6)	9.42(95.0)	11.16(139.33)	6.45(44.0)	5.81(35.33)
EPOST Pyroxa + metsul @ 127.5 + 4 g/ha	21.02(445.0)	6.55(42.0)	7.80(61.0)	8.80(77.33)	6.33(40.0)	4.04(15.33)
PE Metribuzin @300 g/ha	20.75(446.6)	9.53(93.6)	6.29(41.0)	12.47(186.0)	5.79(36.6)	4.11(17.33)
PE Pendi + metribuzin@1250+280 g/ha	19.36(377.6)	12.99(169.0)	6.17(38.6)	10.97(123.33)	6.20(38.0)	3.59(12.66)
PE Pyroxa + metribuzin@127.5+280 g/ha	16.15(270.0)	7.97(70.6)	6.78(46.3)	9.21(90.0)	4.35(18.0)	4.33(18.0)
Weedy Check	25.01(634.6)	10.04(109.3)	10.08(111.3)	14.0(198.6)	9.54(94.0)	6.02(39.33)
Weed free	1.0(0.0)	1.0(0.0)	1.0(0.0)	1.0(0.0)	1.0(0.0)	1.0(0.0)
Mean	17.87(364.19)	8.22(83.13)	6.57(50.27)	9.69(110.94)	5.26(32.27)	3.88(16.61)
SEm	2.29	1.81	0.96	1.94	0.88	0.64
CD (0.05)	5.57	4.39	2.32	4.71	2.14	1.55
CV (%)	22.23	38.10	25.22	34.72	29.08	28.60
Date of Sowing : 15.11.2022			Date of Harvesting: 13.03.2023			

Table 6.12.1. North Western Plains Zone		SPL-2		Delhi		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	34.45	347	38.13	26.09	84.30	87.07
Rec. N + one spray of nano urea at tillering	38.63	353	38.90	28.19	96.53	89.23
Rec. N + two spray of nano urea at tillering and jointing	37.90	357	38.40	27.65	94.50	89.50
Rec. N + two spray of urea (5%) at tillering and jointing	40.50	379	39.22	27.22	100.67	91.80
75% N + water spray at tillering and jointing	42.73	401	39.97	26.64	107.57	92.47
75% N + one spray of nano urea at tillering	42.23	403	39.63	26.42	108.30	92.53
75% N + two spray of nano urea at tillering and jointing	47.07	411	40.60	28.23	117.47	94.40
75% N + two spray of 5% urea at tillering and jointing	49.03	412	41.57	28.64	122.87	94.50
50% N + water spray at tillering and jointing	48.97	415	41.33	28.57	124.87	95.00
50% N + one spray of nano urea at tillering	58.03	422	42.43	32.42	147.17	96.63
50% N + two spray of nano urea at tillering and jointing	60.93	420	43.40	33.43	153.53	97.90
50% N + Two spray of 5% urea at tillering and jointing	60.00	419	43.03	33.30	152.70	97.97
Control (without N only)	55.60	414	41.70	32.29	145.27	98.53
Mean	47.39	396	40.64	29.16	119.67	93.66
SEm	1.85	3.96	0.27	1.33	3.67	0.45
CD (0.05)	4.49	9.57	0.65	3.21	8.88	1.10
CV (%)	6.77	1.73	1.14	7.89	5.31	0.84
Date of Sowing:	17.11.2022		Date of Harvesting: 07.04.2023			

Table 6.12.2. North Western Plains Zone		SPL-2		Durgapura		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	54.68	390	37.73	37.19	129.49	69.80
Rec. N + one spray of nano urea at tillering	57.65	405	38.57	37.01	127.64	73.60
Rec. N + two spray of nano urea at tillering and jointing	58.63	411	38.97	36.69	129.80	73.13
Rec. N + two spray of urea (5%) at tillering and jointing	56.30	395	38.47	37.11	120.94	75.13
75% N + water spray at tillering and jointing	52.39	363	36.47	39.85	117.63	73.03
75% N + one spray of nano urea at tillering	56.66	393	39.83	36.32	125.21	73.83
75% N + two spray of nano urea at tillering and jointing	57.36	404	40.03	35.52	127.81	68.57
75% N + two spray of 5% urea at tillering and jointing	54.72	372	40.33	36.53	120.82	74.83
50% N + water spray at tillering and jointing	40.54	328	38.67	31.97	90.73	65.80
50% N + one spray of nano urea at tillering	49.89	352	40.23	35.29	109.69	67.07
50% N + two spray of nano urea at tillering and jointing	52.51	350	40.37	37.14	116.57	70.80
50% N + Two spray of 5% urea at tillering and jointing	53.76	351	40.00	38.28	116.44	70.97
Control (without N only)	36.09	283	38.37	33.23	82.28	73.63
Mean	52.40	369	39.08	36.32	116.54	71.55
SEm	1.63	10.39	1.08	1.10	4.06	2.37
CD (0.05)	3.94	25.13	2.60	2.66	9.83	5.74
CV (%)	5.38	4.88	4.77	5.25	6.04	5.74
Date of Sowing:	17.11.2022		Date of Harvesting: 21.03.2023			

Table 6.12.3. North Western Plains Zone		SPL-2		Gurdaspur		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	50.65	347	39.15	37.29	127.84	90.87
Rec. N + one spray of nano urea at tillering	56.73	343	39.88	41.70	141.78	90.73
Rec. N + two spray of nano urea at tillering and jointing	61.42	354	39.41	44.17	143.29	92.80
Rec. N + two spray of urea (5%) at tillering and jointing	60.36	352	39.41	43.59	149.29	92.33
75% N + water spray at tillering and jointing	51.06	336	38.83	39.27	148.55	89.73
75% N + one spray of nano urea at tillering	52.24	360	38.56	37.60	139.61	89.93
75% N + two spray of nano urea at tillering and jointing	57.05	358	38.93	41.17	144.66	90.47
75% N + two spray of 5% urea at tillering and jointing	56.11	358	39.17	39.94	145.73	91.40
50% N + water spray at tillering and jointing	46.09	359	39.51	32.85	141.78	93.60
50% N + one spray of nano urea at tillering	48.84	355	39.94	34.75	133.05	89.60
50% N + two spray of nano urea at tillering and jointing	54.86	365	39.41	38.12	144.22	93.20
50% N + Two spray of 5% urea at tillering and jointing	53.72	365	40.17	36.65	142.75	91.33
Control (without N only)	34.01	291	38.33	30.62	101.83	90.73
Mean	52.55	349	39.28	38.29	138.80	91.29
SEm	3.90	12.06	0.74	3.19	5.82	1.62
CD (0.05)	9.43	29.18	1.80	7.71	14.08	3.93
CV (%)	12.84	5.98	3.28	14.42	7.26	3.08
Date of Sowing:	15.11.2022		Date of Harvesting: 06.05.2023			

Table 6.12.4. North Western Plains Zone		SPL-2		Hisar		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	59.06	410	37.00	38.95	146.60	96.00
Rec. N + one spray of nano urea at tillering	60.13	414	36.86	39.45	147.62	95.40
Rec. N + two spray of nano urea at tillering and jointing	62.20	415	37.21	40.34	151.02	96.97
Rec. N + two spray of urea (5%) at tillering and jointing	61.27	416	37.60	39.15	148.98	97.83
75% N + water spray at tillering and jointing	54.00	372	37.35	38.93	135.37	92.20
75% N + one spray of nano urea at tillering	54.93	373	37.32	39.56	137.07	92.47
75% N + two spray of nano urea at tillering and jointing	56.06	382	37.76	38.90	139.80	94.23
75% N + two spray of 5% urea at tillering and jointing	56.55	380	38.20	39.06	140.82	93.40
50% N + water spray at tillering and jointing	45.83	330	39.90	34.93	115.99	89.47
50% N + one spray of nano urea at tillering	47.11	335	38.51	36.66	119.73	88.33
50% N + two spray of nano urea at tillering and jointing	48.46	338	39.81	36.09	123.13	90.07
50% N + Two spray of 5% urea at tillering and jointing	48.30	334	39.45	36.75	123.13	91.13
Control (without N only)	35.10	292	40.80	29.73	90.48	84.87
Mean	53.00	369	38.29	37.58	132.29	92.49
SEm	1.34	9.95	0.70	1.42	3.25	1.51
CD (0.05)	3.23	24.08	1.70	3.44	7.86	3.66
CV (%)	4.37	4.68	3.19	6.55	4.25	2.83
Date of Sowing:	17.11.2022		Date of Harvesting: 14.04.2023			

Table 6.12.5. North Western Plains Zone		SPL-2		Jammu		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	47.35	404	39.94	29.44	115.37	108.39
Rec. N + one spray of nano urea at tillering	44.38	402	38.41	28.85	108.15	106.87
Rec. N + two spray of nano urea at tillering and jointing	49.04	420	38.92	30.08	119.49	110.24
Rec. N + two spray of urea (5%) at tillering and jointing	48.39	412	38.77	30.55	117.89	106.38
75% N + water spray at tillering and jointing	41.18	386	38.21	28.21	100.34	103.80
75% N + one spray of nano urea at tillering	43.22	399	38.37	28.46	105.32	106.60
75% N + two spray of nano urea at tillering and jointing	47.59	408	38.68	30.16	115.97	109.74
75% N + two spray of 5% urea at tillering and jointing	42.29	392	38.33	28.42	103.07	105.79
50% N + water spray at tillering and jointing	38.94	368	37.65	28.23	94.88	98.26
50% N + one spray of nano urea at tillering	39.41	373	37.09	28.64	96.04	100.38
50% N + two spray of nano urea at tillering and jointing	40.12	380	38.17	27.77	97.77	103.21
50% N + Two spray of 5% urea at tillering and jointing	39.84	379	38.16	27.71	97.07	100.50
Control (without N only)	28.87	258	35.64	31.98	70.33	95.03
Mean	42.36	383	38.18	29.12	103.21	104.25
SEm	1.85	15.95	0.97	2.34	4.51	3.70
CD (0.05)	4.48	38.59	2.35	5.67	10.91	8.94
CV (%)	7.56	7.21	4.40	13.95	7.57	6.14
Date of Sowing:	08.11.2022		Date of Harvesting: 30.04.2023			

Table 6.12.6. North Western Plains Zone		SPL-2		Karnal		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	61.98	503	38.48	32.12	158.33	105.41
Rec. N + one spray of nano urea at tillering	63.57	497	38.76	33.04	164.29	105.83
Rec. N + two spray of nano urea at tillering and jointing	62.90	465	38.59	35.07	159.13	104.99
Rec. N + two spray of urea (5%) at tillering and jointing	60.63	491	38.65	31.98	158.33	105.71
75% N + water spray at tillering and jointing	60.56	474	40.18	31.78	154.76	104.13
75% N + one spray of nano urea at tillering	59.09	483	39.95	30.62	155.56	105.26
75% N + two spray of nano urea at tillering and jointing	65.48	457	39.55	36.26	162.70	103.74
75% N + two spray of 5% urea at tillering and jointing	60.44	470	38.36	33.56	159.13	101.28
50% N + water spray at tillering and jointing	52.34	446	41.97	28.09	130.16	100.07
50% N + one spray of nano urea at tillering	52.34	443	41.76	28.33	129.37	102.24
50% N + two spray of nano urea at tillering and jointing	54.25	445	41.89	29.12	133.33	103.53
50% N + Two spray of 5% urea at tillering and jointing	55.56	438	40.81	31.21	139.68	104.20
Control (without N only)	26.47	343	39.37	19.61	68.25	84.31
Mean	56.58	458	39.87	30.83	144.08	102.36
SEm	1.63	7.77	0.51	1.14	2.48	1.12
CD (0.05)	3.93	18.79	1.24	2.75	6.01	2.71
CV (%)	4.98	2.94	2.22	6.38	2.99	1.90
Date of Sowing:	23.11.2022		Date of Harvesting: 26.04.2023			

Table 6.12.7. North Western Plains Zone		SPL-2		Ludhiana		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	59.33	282	47.76	44.12	142.86	91.33
Rec. N + one spray of nano urea at tillering	60.04	283	48.78	43.55	142.86	90.00
Rec. N + two spray of nano urea at tillering and jointing	60.39	282	49.13	43.73	142.86	91.00
Rec. N + two spray of urea (5%) at tillering and jointing	61.02	283	48.79	44.20	143.07	90.00
75% N + water spray at tillering and jointing	54.65	262	46.57	45.05	139.88	89.33
75% N + one spray of nano urea at tillering	54.02	262	45.11	45.62	139.52	89.00
75% N + two spray of nano urea at tillering and jointing	53.97	264	44.77	45.86	136.90	87.67
75% N + two spray of 5% urea at tillering and jointing	55.20	265	45.44	46.04	142.53	87.33
50% N + water spray at tillering and jointing	49.21	243	44.08	46.04	128.33	86.67
50% N + one spray of nano urea at tillering	49.22	245	42.89	46.88	127.98	86.67
50% N + two spray of nano urea at tillering and jointing	50.55	243	43.79	47.52	127.26	87.17
50% N + Two spray of 5% urea at tillering and jointing	51.36	245	44.03	47.59	133.93	86.33
Control (without N only)	37.89	217	36.75	47.68	92.26	79.67
Mean	53.60	260	45.22	45.68	133.87	87.86
SEm	1.33	6.78	1.54	1.05	4.28	2.21
CD (0.05)	3.23	16.41	3.72	2.54	10.35	5.35
CV (%)	4.31	4.53	5.88	3.98	5.53	4.36
Date of Sowing:	11.11.2022		Date of Harvesting:	15.04.2023		

Table 6.12.8. North Western Plains Zone		SPL-2		Pantnagar		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	38.41	458	40.05	21.11	107.50	97.33
Rec. N + one spray of nano urea at tillering	41.36	393	40.26	26.11	99.83	92.33
Rec. N + two spray of nano urea at tillering and jointing	38.79	454	39.41	21.83	99.32	93.93
Rec. N + two spray of urea (5%) at tillering and jointing	39.04	360	40.39	27.20	104.62	91.13
75% N + water spray at tillering and jointing	48.08	387	40.12	31.12	128.74	97.20
75% N + one spray of nano urea at tillering	52.14	458	41.17	27.86	146.46	95.00
75% N + two spray of nano urea at tillering and jointing	46.69	449	39.69	26.24	111.83	93.00
75% N + two spray of 5% urea at tillering and jointing	47.70	328	40.27	36.59	121.21	95.80
50% N + water spray at tillering and jointing	52.86	375	38.10	37.08	114.72	96.53
50% N + one spray of nano urea at tillering	54.50	465	41.38	28.43	122.66	98.53
50% N + two spray of nano urea at tillering and jointing	50.77	423	39.82	30.23	117.86	94.27
50% N + Two spray of 5% urea at tillering and jointing	49.59	318	40.99	38.02	112.15	93.13
Control (without N only)	38.78	337	40.23	28.84	84.03	91.20
Mean	46.05	400	40.14	29.28	113.15	94.57
SEm	2.05	18.74	1.34	1.79	6.30	2.03
CD (0.05)	4.96	45.36	3.24	4.33	15.25	4.92
CV (%)	7.70	8.11	5.79	10.59	9.65	3.72
Date of Sowing:	23.11.2022		Date of Harvesting:	14.04.2023		

Table 6.13.1. North Eastern Plains Zone	SPL-2		Burdwan			2022-23
Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Plant Ht, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	278	43.82	35.12	42.82	94.00	97.79
Rec. N + one spray of nano urea at tillering	278	44.11	35.43	43.20	95.67	98.94
Rec. N + two spray of nano urea at tillering and jointing	283	44.15	35.30	44.05	97.67	100.95
Rec. N + two spray of urea (5%) at tillering and jointing	290	44.22	35.72	45.82	99.67	104.42
75% N + water spray at tillering and jointing	260	42.23	34.62	37.99	91.00	86.12
75% N + one spray of nano urea at tillering	263	42.53	34.78	38.85	93.33	87.79
75% N + two spray of nano urea at tillering and jointing	263	42.76	35.43	39.86	93.67	90.04
75% N + two spray of 5% urea at tillering and jointing	270	42.99	35.61	41.33	95.67	93.50
50% N + water spray at tillering and jointing	240	41.97	32.01	32.21	89.33	72.11
50% N + one spray of nano urea at tillering	247	42.19	32.77	34.01	91.00	76.05
50% N + two spray of nano urea at tillering and jointing	253	42.36	33.10	35.48	92.33	80.31
50% N + Two spray of 5% urea at tillering and jointing	257	42.48	33.25	36.23	94.00	82.01
Control (without N only)	195	38.97	24.00	18.06	77.67	39.25
Mean	260	42.67	33.63	37.68	92.69	85.33
CD (0.05)	21.21	1.43	3.13	2.53	3.20	5.35
CV (%)	5.84	2.40	6.66	4.80	2.47	4.49
Date of Sowing :	15.11.2022		Date of Harvesting:			09.03.2023

Table 6.13.2. North Eastern Plains Zone	SPL-2		Coochbehar			2022-23
Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Plant Ht, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	273	39.97	43.65	47.43	92.67	115.40
Rec. N + one spray of nano urea at tillering	289	40.03	43.90	50.40	97.00	121.40
Rec. N + two spray of nano urea at tillering and jointing	301	40.53	46.49	56.23	98.33	135.63
Rec. N + two spray of urea (5%) at tillering and jointing	295	39.97	47.61	55.73	95.00	137.33
75% N + water spray at tillering and jointing	259	40.00	45.09	46.17	92.33	114.43
75% N + one spray of nano urea at tillering	273	40.40	45.17	49.33	94.33	123.53
75% N + two spray of nano urea at tillering and jointing	280	40.67	47.05	53.20	99.00	133.93
75% N + two spray of 5% urea at tillering and jointing	280	40.17	45.77	51.23	93.00	129.87
50% N + water spray at tillering and jointing	240	39.47	46.27	42.47	88.00	108.47
50% N + one spray of nano urea at tillering	250	39.57	44.76	44.03	90.33	113.33
50% N + two spray of nano urea at tillering and jointing	254	39.63	44.17	44.40	96.33	113.70
50% N + Two spray of 5% urea at tillering and jointing	249	39.43	42.44	41.20	95.33	107.63
Control (without N only)	205	38.10	35.31	27.50	82.00	76.57
Mean	265	39.84	44.44	46.87	93.36	117.79
CD (0.05)	24.37	0.81	7.19	5.66	4.07	12.56
CV (%)	6.58	1.45	11.57	8.65	3.12	7.63
Date of Sowing :	15.11.2022		Date of Harvesting:			21.03.2023

Table 6.13.3. North Eastern Plains Zone	SPL-2		Ranchi			2022-23
Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Plant Ht, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	360	41.40	33.53	49.38	94.33	111.85
Rec. N + one spray of nano urea at tillering	353	42.47	34.2	51.00	93.00	110.63
Rec. N + two spray of nano urea at tillering and jointing	383	44.50	32.0	53.93	102.67	115.99
Rec. N + two spray of urea (5%) at tillering and jointing	353	41.67	34.1	49.93	95.67	113.67
75% N + water spray at tillering and jointing	333	41.13	35.3	47.71	102.33	104.17
75% N + one spray of nano urea at tillering	347	41.67	34.5	49.57	100.67	112.80
75% N + two spray of nano urea at tillering and jointing	360	41.40	33.2	49.38	102.33	108.93
75% N + two spray of 5% urea at tillering and jointing	322	41.47	34.6	45.73	101.00	103.07
50% N + water spray at tillering and jointing	335	40.60	27.7	37.67	102.33	84.26
50% N + one spray of nano urea at tillering	307	40.13	32.7	39.99	100.00	94.94
50% N + two spray of nano urea at tillering and jointing	332	40.20	29.9	39.90	96.00	95.78
50% N + Two spray of 5% urea at tillering and jointing	318	39.60	29.6	37.10	95.67	82.37
Control (without N only)	285	37.80	19.1	20.31	72.67	42.41
Mean	338	41.08	31.6	43.97	96.82	98.53
CD (0.05)	39.89	1.66	5.21	3.82	6.93	10.18
CV (%)	8.46	2.89	11.81	6.21	5.13	7.39
Date of Sowing :	25.11.2022		Date of Harvesting:			10.04.2023

Table 6.13.4. North Eastern Plains Zone	SPL-2		Sabour			2022-23
Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Palnt Ht, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	332	42.40	30.65	42.10	92.80	92.55
Rec. N + one spray of nano urea at tillering	302	43.16	34.90	44.23	93.27	95.22
Rec. N + two spray of nano urea at tillering and jointing	306	46.19	34.66	44.92	94.64	77.28
Rec. N + two spray of urea (5%) at tillering and jointing	319	43.97	32.60	45.73	95.38	98.93
75% N + water spray at tillering and jointing	289	41.75	33.16	39.27	88.45	89.61
75% N + one spray of nano urea at tillering	279	42.22	34.25	40.30	85.89	91.73
75% N + two spray of nano urea at tillering and jointing	280	42.83	35.50	41.17	88.92	92.92
75% N + two spray of 5% urea at tillering and jointing	296	42.98	33.60	42.40	89.23	94.71
50% N + water spray at tillering and jointing	221	39.68	44.11	37.55	90.97	74.99
50% N + one spray of nano urea at tillering	232	40.22	36.89	33.92	91.58	78.86
50% N + two spray of nano urea at tillering and jointing	254	41.10	33.03	34.44	92.77	79.78
50% N + Two spray of 5% urea at tillering and jointing	268	41.70	31.31	34.69	93.32	80.76
Control (without N only)	186	38.30	41.74	29.38	90.02	67.47
Mean	274	41.83	35.11	39.24	91.32	85.75
CD (0.05)	52.29	4.60	11.17	8.07	10.66	16.27
CV (%)	13.66	7.88	22.77	14.72	8.35	13.58
Date of Sowing :	14.11.2022		Date of Harvesting:			25.04.2023

Table 6.13.5. North Eastern Plains Zone	SPL-2		Varanasi		2022-23
Nano urea application	Earheads/ sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	312	37.22	36.17	41.81	83.09
Rec. N + one spray of nano urea at tillering	360	35.36	33.28	42.33	84.73
Rec. N + two spray of nano urea at tillering and jointing	363	37.83	31.98	43.95	96.21
Rec. N + two spray of urea (5%) at tillering and jointing	295	35.39	39.75	41.51	83.37
75% N + water spray at tillering and jointing	224	37.82	46.19	39.06	74.35
75% N + one spray of nano urea at tillering	254	38.57	39.57	38.65	73.80
75% N + two spray of nano urea at tillering and jointing	252	38.53	41.14	39.85	76.81
75% N + two spray of 5% urea at tillering and jointing	303	38.68	34.11	39.93	78.17
50% N + water spray at tillering and jointing	208	39.81	34.20	28.11	56.03
50% N + one spray of nano urea at tillering	214	38.66	41.02	33.80	54.94
50% N + two spray of nano urea at tillering and jointing	236	38.89	35.77	32.80	57.67
50% N + Two spray of 5% urea at tillering and jointing	279	38.19	31.26	33.23	65.33
Control (without N only)	164	38.56	33.35	21.08	23.51
Mean	267	37.96	36.75	36.62	69.85
CD (0.05)	22.97	0.77	3.18	0.95	11.92
CV (%)	6.17	1.46	6.20	1.87	12.22
Date of Sowing :	09.11.2022		Date of Harvesting:		16.04.2023

Table 6.14.1. Central Zone			SPL-2		Gwalior	2022-23
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	448	27.8	42.0	52.28	88.3	136.1
Rec. N + one spray of nano urea at tillering	421	31.2	41.4	54.33	87.1	144.6
Rec. N + two spray of nano urea at tillering and jointing	476	27.3	43.0	55.65	86.4	149.7
Rec. N + two spray of urea (5%) at tillering and jointing	443	29.8	41.7	54.81	86.0	148.0
75% N + water spray at tillering and jointing	399	28.9	43.0	49.38	86.7	132.7
75% N + one spray of nano urea at tillering	423	29.6	40.8	51.03	87.6	137.8
75% N + two spray of nano urea at tillering and jointing	450	28.8	41.8	53.99	86.1	140.5
75% N + two spray of 5% urea at tillering and jointing	417	29.8	41.2	51.19	86.5	138.8
50% N + water spray at tillering and jointing	377	31.0	40.7	47.61	87.5	136.1
50% N + one spray of nano urea at tillering	389	30.7	41.1	48.91	86.3	139.5
50% N + two spray of nano urea at tillering and jointing	410	31.0	39.6	50.24	87.1	142.5
50% N + Two spray of 5% urea at tillering and jointing	394	30.3	41.4	49.32	87.1	140.1
Control (without N only)	338	29.4	40.2	40.00	86.0	113.9
CD (0.05)	26.00	3.10	1.70	3.55	1.70	16.50
Date of Sowing	10.11.2022			Date of Harvesting		06.04.2023

Table 6.14.2. Central Zone			SPL-2		Indore	2022-23
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	316	32.1	50.1	50.77	95.1	119.7
Rec. N + one spray of nano urea at tillering	304	33.1	48.5	48.57	93.9	115.7
Rec. N + two spray of nano urea at tillering and jointing	300	34.5	47.8	48.17	97.1	114.6
Rec. N + two spray of urea (5%) at tillering and jointing	302	33.5	47.8	48.33	94.5	115.8
75% N + water spray at tillering and jointing	283	33.7	50.3	48.07	92.3	115.9
75% N + one spray of nano urea at tillering	273	32.3	49.7	43.77	92.5	104.2
75% N + two spray of nano urea at tillering and jointing	252	37.0	49.2	45.77	93.0	110.5
75% N + two spray of 5% urea at tillering and jointing	244	38.3	49.2	45.90	94.9	111.7
50% N + water spray at tillering and jointing	236	34.5	50.1	40.27	93.2	92.6
50% N + one spray of nano urea at tillering	255	28.4	50.5	36.40	88.1	80.2
50% N + two spray of nano urea at tillering and jointing	263	27.5	51.2	36.83	90.2	85.9
50% N + Two spray of 5% urea at tillering and jointing	239	38.4	49.8	45.60	90.7	111.1
Control (without N only)	185	22.0	51.5	20.90	77.7	49.5
CD (0.05)	24.00	4.20	1.60	2.50	3.10	6.80
Date of Sowing	12.11.2022			Date of Harvesting		31.03.2023

Table 6.14.4. Central Zone			SPL-2		Junagadh	2022-23
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	492	24.6	52.7	63.63	73.7	129.6
Rec. N + one spray of nano urea at tillering	488	24.1	53.4	62.67	72.7	135.3
Rec. N + two spray of nano urea at tillering and jointing	505	24.4	52.8	64.96	72.0	133.5
Rec. N + two spray of urea (5%) at tillering and jointing	512	22.9	56.3	66.04	74.0	136.9
75% N + water spray at tillering and jointing	462	24.2	48.3	54.00	69.3	128.6
75% N + one spray of nano urea at tillering	461	23.4	49.4	53.33	70.3	121.3
75% N + two spray of nano urea at tillering and jointing	461	23.8	49.1	53.73	69.0	111.3
75% N + two spray of 5% urea at tillering and jointing	472	22.6	51.2	54.67	71.7	120.3
50% N + water spray at tillering and jointing	387	27.8	44.4	47.67	64.3	117.8
50% N + one spray of nano urea at tillering	392	27.8	43.3	47.00	67.3	118.3
50% N + two spray of nano urea at tillering and jointing	389	27.9	45.4	49.00	69.0	118.7
50% N + Two spray of 5% urea at tillering and jointing	389	28.8	46.8	52.33	65.7	111.7
Control (without N only)	315	31.6	42.3	42.00	61.7	106.9
CD (0.05)	27.00	3.50	1.60	5.19	2.30	9.60
Date of Sowing	15.11.2022			Date of Harvesting		06.03.2023

Table 6.14.5. Central Zone			SPL-2		Vijapur	2022-23
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	422	24.8	49.9	51.88	82.1	112.3
Rec. N + one spray of nano urea at tillering	435	22.9	52.5	51.67	81.4	113.3
Rec. N + two spray of nano urea at tillering and jointing	469	22.5	50.2	52.67	80.5	112.0
Rec. N + two spray of urea (5%) at tillering and jointing	477	22.2	51.6	54.08	82.4	118.9
75% N + water spray at tillering and jointing	415	21.6	51.6	46.21	79.4	109.8
75% N + one spray of nano urea at tillering	420	24.8	46.5	47.38	81.1	110.0
75% N + two spray of nano urea at tillering and jointing	413	23.8	50.1	49.17	81.8	110.8
75% N + two spray of 5% urea at tillering and jointing	419	23.1	51.8	50.21	80.2	111.8
50% N + water spray at tillering and jointing	370	23.4	50.1	42.92	76.3	95.1
50% N + one spray of nano urea at tillering	387	22.3	51.1	43.17	76.6	97.2
50% N + two spray of nano urea at tillering and jointing	375	23.7	50.4	44.08	76.7	99.8
50% N + Two spray of 5% urea at tillering and jointing	365	24.2	51.9	44.83	73.0	98.5
Control (without N only)	322	12.0	59.1	22.33	69.5	58.7
CD (0.05)	54.00	4.70	4.80	6.14	3.80	13.30
Date of Sowing	14.11.2022			Date of Harvesting		24.03.2023

Table 6.15.1. Peninsular Zone		SPL-2	Dharwad		2022-23	
Treatments	Earheads/ sqm	1000 Grains Wt, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant height, cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	488	43.61	20.15	41.76	87.01	79.55
Rec. N + one spray of nano urea at tillering	444	43.67	21.88	41.72	94.19	81.11
Rec. N + two spray of nano urea at tillering and jointing	437	41.88	22.96	41.99	88.24	74.44
Rec. N + two spray of urea (5%) at tillering and jointing	455	44.74	21.05	42.61	83.43	78.55
75% N + water spray at tillering and jointing	510	37.76	18.72	35.99	64.56	82.66
75% N + one spray of nano urea at tillering	503	45.85	19.19	43.40	80.12	78.55
75% N + two spray of nano urea at tillering and jointing	458	47.42	20.32	44.07	81.09	74.55
75% N + two spray of 5% urea at tillering and jointing	429	43.90	24.46	45.55	99.81	77.44
50% N + water spray at tillering and jointing	468	36.93	17.65	30.21	63.33	78.44
50% N + one spray of nano urea at tillering	471	44.68	17.82	36.64	78.08	85.89
50% N + two spray of nano urea at tillering and jointing	438	43.84	22.22	41.73	73.38	80.55
50% N + Two spray of 5% urea at tillering and jointing	444	42.71	22.55	42.34	67.22	77.00
Control (without N only)	524	30.34	17.02	26.28	49.33	79.33
CD(0.05)	65.39	5.33	5.46	6.27	12.85	11.15

Table 6.15.2 Peninsular Zone **SPL-2** **Niphad** **2022-23**

Treatments	Earheads/ sqm	1000 Grains Wt, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant height, cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	399	43.70	25.58	44.50	59.63	84.07
Rec. N + one spray of nano urea at tillering	411	44.20	26.84	48.83	66.41	84.33
Rec. N + two spray of nano urea at tillering and jointing	443	44.50	26.64	52.10	72.42	84.60
Rec. N + two spray of urea (5%) at tillering and jointing	407	44.10	25.77	46.07	62.65	84.40
75% N + water spray at tillering and jointing	356	42.30	26.15	39.17	51.31	81.53
75% N + one spray of nano urea at tillering	397	42.63	24.83	42.07	55.11	83.07
75% N + two spray of nano urea at tillering and jointing	396	43.17	24.79	42.37	55.92	83.67
75% N + two spray of 5% urea at tillering and jointing	363	42.60	26.71	41.00	56.58	82.00
50% N + water spray at tillering and jointing	330	42.20	27.18	38.07	51.01	80.07
50% N + one spray of nano urea at tillering	337	42.70	27.52	39.33	52.71	80.20
50% N + two spray of nano urea at tillering and jointing	363	42.90	26.39	40.90	57.26	81.33
50% N + Two spray of 5% urea at tillering and jointing	335	42.47	27.08	38.33	53.67	80.27
Control (without N only)	296	40.70	22.06	26.67	36.80	76.87
CD(0.05)	35.84	1.57	4.20	6.45	8.78	3.61

Table 6.15.3. Peninsular Zone **SPL-2** **Pune** **2022-23**

Treatments	Earheads/ sqm	1000 Grains Wt, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant height, cm
Rec. N doses (1/3rd basal, 1/3rd CRI, 1/3rd Tillering- Rec. N) + water spray at tillering and jointing	290	46.33	34.23	45.37	110.73	81.67
Rec. N + one spray of nano urea at tillering	343	47.33	30.53	49.47	108.83	80.00
Rec. N + two spray of nano urea at tillering and jointing	322	47.33	34.30	52.10	115.67	82.67
Rec. N + two spray of urea (5%) at tillering and jointing	343	48.33	33.53	55.53	117.87	81.00
75% N + water spray at tillering and jointing	323	49.00	28.95	45.90	97.80	79.33
75% N + one spray of nano urea at tillering	333	48.67	29.12	47.07	104.10	81.00
75% N + two spray of nano urea at tillering and jointing	307	49.33	29.55	44.43	107.70	82.33
75% N + two spray of 5% urea at tillering and jointing	312	47.33	36.68	54.23	123.97	82.33
50% N + water spray at tillering and jointing	303	47.67	32.59	47.03	103.67	83.33
50% N + one spray of nano urea at tillering	318	48.00	30.86	47.27	103.70	80.00
50% N + two spray of nano urea at tillering and jointing	320	48.33	27.31	42.17	92.47	81.33
50% N + Two spray of 5% urea at tillering and jointing	310	50.00	31.39	48.50	105.73	81.67
Control (without N only)	332	46.33	37.04	56.67	122.53	83.00
CD(0.05)	39.54	2.13	7.24	10.82	19.31	2.77

Table 6.16.1. Northern Hill Zone **SPL-3** **Bajaura** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	14.34	152	41.33	22.81	42.19	67.63
Two Nano Urea Spray at tillering & Jointing	14.48	162	40.67	21.95	44.24	67.93
Rec N (1/3rd basal, 2/3rd CRI)	29.24	202	44.33	32.70	74.87	83.17
Rec N + One Nano Urea Spray at tillering	29.24	210	44.67	31.10	80.96	83.10
Rec N + Two Nano Urea Spray at tillering & Jointing	29.71	218	43.00	31.56	80.59	84.37
Rec N + One Urea (5%) Spray at tillering	31.82	237	44.33	30.29	81.49	85.93
Rec N + Two Urea (5%) Spray at tillering & Jointing	32.01	238	43.67	30.74	83.87	86.40
Rec N + One Urea (5%) + Nano Urea spray at tillering	30.16	232	43.67	29.80	80.00	83.83
Absolute control (No Nitrogen)	14.15	139	41.33	24.51	39.69	66.40
Mean	25.02	199	43.00	28.38	67.54	78.75
SEm	1.82	8.28	1.01	0.82	3.67	2.02
CD (0.05)	4.50	20.45	2.49	2.02	9.05	5.00
CV (%)	12.60	7.22	4.06	5.00	9.40	4.45
Date of Sowing:	15.11.2022	Date of Harvesting: 23.06.2023				

Table 6.16.2. Northern Hill Zone **SPL-3** **MALAN** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	23.09	330	38.60	18.24	64.53	85.00
Two Nano Urea Spray at tillering & Jointing	25.95	327	39.93	19.89	71.47	87.67
Rec N (1/3rd basal, 2/3rd CRI)	45.75	388	45.73	25.85	109.53	93.00
Rec N + One Nano Urea Spray at tillering	46.65	391	45.63	26.14	115.60	90.00
Rec N + Two Nano Urea Spray at tillering & Jointing	47.29	381	47.13	26.37	113.80	88.00
Rec N + One Urea (5%) Spray at tillering	48.38	384	47.47	26.61	107.30	91.00
Rec N + Two Urea (5%) Spray at tillering & Jointing	49.41	383	47.80	27.04	109.53	92.33
Rec N + One Urea (5%) + Nano Urea spray at tillering	51.96	379	47.03	29.21	117.93	93.00
Absolute control (No Nitrogen)	19.04	324	35.33	16.81	59.70	83.33
Mean	39.72	365	43.85	24.02	96.60	89.26
SEm	1.10	5.85	1.01	1.14	2.95	1.73
CD (0.05)	2.71	14.44	2.48	2.81	7.28	4.28
CV (%)	4.79	2.77	3.97	8.20	5.28	3.36
Date of Sowing:	15.11.2022	Date of Harvesting: 10.05.2023				

Table 6.17.2. North Western Plains Zone **SPL-3** **Hisar** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	34.62	340	33.92	30.05	98.64	92.00
Two Nano Urea Spray at tillering & Jointing	37.48	347	33.93	31.84	106.46	94.10
Rec N (1/3rd basal, 2/3rd CRI)	49.25	391	33.07	38.15	137.07	101.53
Rec N + One Nano Urea Spray at tillering	50.97	395	33.02	39.12	141.16	102.00
Rec N + Two Nano Urea Spray at tillering & Jointing	54.05	410	34.23	38.58	148.98	103.67
Rec N + One Urea (5%) Spray at tillering	51.70	391	33.07	39.98	143.20	101.80
Rec N + Two Urea (5%) Spray at tillering & Jointing	53.74	406	34.18	38.82	148.30	104.00
Rec N + One Urea (5%) + Nano Urea spray at tillering	53.23	411	33.59	38.58	146.94	103.00
Absolute control (No Nitrogen)	32.51	330	35.42	27.88	92.86	86.33
Mean	46.40	380	33.83	35.89	129.29	98.71
SEm	1.29	12.16	0.43	0.90	3.40	1.70
CD (0.05)	3.19	30.02	1.07	2.22	8.39	4.21
CV (%)	4.82	5.54	2.22	4.33	4.55	2.99
Date of Sowing:	11.11.2022	Date of Harvesting: 12.04.2023				

Table 6.17.3. North Western Plains Zone **SPL-3** **Karnal** **2022-23**

Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	23.30	355	37.38	17.58	53.52	73.60
Two Nano Urea Spray at tillering & Jointing	23.44	350	36.25	19.54	51.11	72.80
Rec N (1/3rd basal, 2/3rd CRI)	36.60	430	38.97	21.90	102.38	99.40
Rec N + One Nano Urea Spray at tillering	39.62	403	42.25	23.68	108.50	102.20
Rec N + Two Nano Urea Spray at tillering & Jointing	34.99	433	40.72	20.21	93.54	98.47
Rec N + One Urea (5%) Spray at tillering	42.71	405	39.23	26.96	111.56	102.33
Rec N + Two Urea (5%) Spray at tillering & Jointing	44.71	423	38.83	27.92	118.37	102.07
Rec N + One Urea (5%) + Nano Urea spray at tillering	41.12	431	40.73	23.66	108.44	100.53
Absolute control (No Nitrogen)	20.72	341	36.53	16.73	53.23	72.53
Mean	34.14	397	38.99	22.02	88.96	91.55
SEm	1.78	24.48	2.08	1.90	7.99	4.56
CD (0.05)	4.39	60.45	5.13	4.69	19.74	11.27
CV (%)	9.02	10.69	9.23	14.95	15.56	8.64
Date of Sowing:	19.11.2022	Date of Harvesting: 05.04.2023				

Table 6.17.4. North Western Plains Zone		SPL-3		Pantnagar		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ Earhead	Biomass, q/ha	Plant Ht., cm
One Nano Urea Spray at tillering	46.99	284	48.68	34.28	83.77	90.47
Two Nano Urea Spray at tillering & Jointing	47.84	286	50.09	33.97	85.14	89.60
Rec N (1/3rd basal, 2/3rd CRI)	57.00	370	46.13	33.44	114.00	95.40
Rec N + One Nano Urea Spray at tillering	56.11	428	47.60	27.60	124.10	93.67
Rec N + Two Nano Urea Spray at tillering & Jointing	53.14	410	48.95	26.78	119.23	94.47
Rec N + One Urea (5%) Spray at tillering	52.65	393	44.83	30.16	126.26	96.27
Rec N + Two Urea (5%) Spray at tillering & Jointing	55.94	464	44.70	27.07	134.92	95.40
Rec N + One Urea (5%) + Nano Urea spray at tillering	54.35	406	47.06	29.13	121.93	95.13
Absolute control (No Nitrogen)	44.40	274	48.89	33.28	79.67	86.00
Mean	52.05	368	47.44	30.63	109.89	92.93
SEm	1.50	24.23	1.37	2.19	5.56	1.42
CD (0.05)	3.69	59.83	3.39	5.41	13.72	3.51
CV (%)	4.98	11.40	5.01	12.38	8.76	2.65
Date of Sowing:	20.11.2021		Date of Harvesting: 14.04.2023			

Table 6.18.1. North Eastern Plains Zone	SPL-3		Burdwan			2022-23
Nano urea application	Earheads/sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant Ht, cm
One Nano Urea Spray at tillering	172	38.94	26.14	17.48	36.63	76.33
Two Nano Urea Spray at tillering & Jointing	178	40.13	26.95	19.29	40.00	85.33
Rec N (1/3rd basal, 2/3rd CRI)	257	41.91	29.13	31.33	64.39	97.67
Rec N + One Nano Urea Spray at tillering	257	42.01	29.52	31.84	66.80	100.33
Rec N + Two Nano Urea Spray at tillering & Jointing	262	42.10	29.87	32.79	68.10	102.00
Rec N + One Urea (5%) Spray at tillering	263	42.23	30.80	34.25	70.81	103.00
Rec N + Two Urea (5%) Spray at tillering & Jointing	275	42.71	30.81	36.19	76.12	105.00
Rec N + One Urea (5%) + Nano Urea spray at tillering	268	42.02	30.99	34.97	73.23	102.00
Absolute control (No Nitrogen)	165	37.65	25.80	15.92	29.97	73.00
Mean	233	41.08	28.89	28.23	58.45	93.85
CD (0.05)	15.64	0.97	2.42	2.38	4.76	3.65
CV (%)	4.71	1.66	5.88	5.91	5.71	2.73
Date of Sowing : 04.11.2022	Date of Harvesting: 04.03.2022					

Table 6.18.2. North Eastern Plains Zone	SPL-3		Kanpur			2022-23
Nano urea application	Earheads/sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant Ht, cm
One Nano Urea Spray at tillering	264	44.70	21.76	25.60	99.27	75.60
Two Nano Urea Spray at tillering & Jointing	270	45.60	27.96	34.40	116.00	77.40
Rec N (1/3rd basal, 2/3rd CRI)	286	45.03	28.85	37.10	127.80	78.60
Rec N + One Nano Urea Spray at tillering	289	46.30	30.39	40.70	133.93	80.73
Rec N + Two Nano Urea Spray at tillering & Jointing	292	47.47	30.68	42.43	133.87	80.80
Rec N + One Urea (5%) Spray at tillering	298	45.50	30.25	41.00	133.33	82.87
Rec N + Two Urea (5%) Spray at tillering & Jointing	281	46.17	35.78	46.43	138.13	85.93
Rec N + One Urea (5%) + Nano Urea spray at tillering	287	46.03	33.50	44.20	134.80	84.53
Absolute control (No Nitrogen)	252	36.50	30.24	27.77	100.03	70.93
Mean	280	44.81	29.93	37.74	124.13	79.71
CD (0.05)	9.57	0.83	1.72	1.96	2.82	1.61
CV (%)	2.40	1.31	4.03	3.64	1.60	1.42
Date of Sowing : 26.11.2022	Date of Harvesting: 22.04.2023					

Table 6.18.3. North Eastern Plains Zone	SPL-3		RPCAU PUSA			2022-23
Nano urea application	Earheads/sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant Ht, cm
One Nano Urea Spray at tillering	217	32.48	36.07	25.45	57.27	81.67
Two Nano Urea Spray at tillering & Jointing	224	35.56	45.38	36.14	75.69	81.02
Rec N (1/3rd basal, 2/3rd CRI)	212	33.00	37.73	26.34	55.16	90.18
Rec N + One Nano Urea Spray at tillering	225	34.52	41.65	32.35	74.55	92.45
Rec N + Two Nano Urea Spray at tillering & Jointing	241	34.65	43.66	36.36	76.75	94.17
Rec N + One Urea (5%) Spray at tillering	238	34.95	50.83	42.22	83.74	93.43
Rec N + Two Urea (5%) Spray at tillering & Jointing	238	36.73	49.21	42.95	104.24	91.00
Rec N + One Urea (5%) + Nano Urea spray at tillering	250	35.04	49.26	43.12	100.50	93.83
Absolute control (No Nitrogen)	204	31.45	36.01	23.07	54.69	84.63
Mean	228	34.26	43.31	34.22	75.84	89.15
CD (0.05)	7.84	1.72	3.33	1.33	4.38	2.19
CV (%)	2.42	6.23	5.40	2.73	4.05	1.72
Date of Sowing : 01.12.2022	Date of Harvesting: 10.04.2023					

Table 6.18.4. North Eastern Plains Zone	SPL-3		Shillongani			2022-23
Nano urea application	Earheads/sqm	1000 GW, g	Grains/ Earhead	Yield, q/ha	Biomass, q/ha	Plant Ht, cm
One Nano Urea Spray at tillering	182	44.77	57.55	46.93	51.75	88.07
Two Nano Urea Spray at tillering & Jointing	176	45.77	59.68	47.96	49.84	90.60
Rec N (1/3rd basal, 2/3rd CRI)	173	45.73	58.66	46.11	85.13	96.80
Rec N + One Nano Urea Spray at tillering	185	45.13	59.70	49.36	72.17	98.47
Rec N + Two Nano Urea Spray at tillering & Jointing	163	51.20	50.95	42.29	66.51	98.20
Rec N + One Urea (5%) Spray at tillering	168	47.67	56.99	45.17	82.66	98.93
Rec N + Two Urea (5%) Spray at tillering & Jointing	197	49.23	57.15	55.38	85.04	95.33
Rec N + One Urea (5%) + Nano Urea spray at tillering	199	46.63	54.59	50.43	82.92	94.60
Absolute control (No Nitrogen)	156	41.60	56.22	36.42	51.62	86.23
Mean	178	46.41	56.83	46.67	69.74	94.14
CD (0.05)	19.51	1.62	10.02	5.48	9.41	6.58
CV (%)	7.70	2.44	12.37	8.24	9.47	4.00
Date of Sowing : 05.11.2022	Date of Harvesting: 28.03.2023					

Table 6.19.1. Central Zone		SPL-3			Gwalior	2022-2023
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
One Nano Urea Spray at tillering	246	30.6	39.89	29.86	86.6	90.1
Two Nano Urea Spray at tillering & Jointing	284	29.6	40.67	34.07	87.0	93.5
Rec N (1/3rd basal, 2/3rd CRI)	272	30.1	40.21	32.86	86.3	102.0
Rec N + One Nano Urea Spray at tillering	309	29.7	39.86	36.56	86.7	110.5
Rec N + Two Nano Urea Spray at tillering & Jointing	328	31.0	40.93	41.60	88.5	115.6
Rec N + One Urea (5%) Spray at tillering	288	32.6	40.11	37.55	87.3	107.1
Rec N + Two Urea (5%) Spray at tillering & Jointing	303	31.9	39.84	38.47	87.9	112.2
Rec N + One Urea (5%) + Nano Urea spray at tillering	320	30.2	40.80	39.39	87.3	111.9
Absolute control (No Nitrogen)	201	33.7	39.21	26.53	85.8	78.2
CD (0.05)	22	4.1	0.92	3.08	2.8	9.1
Date of Sowing:	11.11.2022		Date of Harvesting		Date of Harvesti	07.04.2023

Table 6.19.2. Central Zone		SPL-3			Indore	2022-2023
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
One Nano Urea Spray at tillering	186	24.2	41.97	18.87	83.9	44.6
Two Nano Urea Spray at tillering & Jointing	180	25.9	41.63	19.40	84.0	45.6
Rec N (1/3rd basal, 2/3rd CRI)	311	35.0	41.20	44.60	100.0	114.6
Rec N + One Nano Urea Spray at tillering	301	33.1	43.23	43.10	98.4	111.1
Rec N + Two Nano Urea Spray at tillering & Jointing	297	35.0	41.50	43.00	100.2	108.7
Rec N + One Urea (5%) Spray at tillering	314	34.8	41.60	45.37	97.6	112.9
Rec N + Two Urea (5%) Spray at tillering & Jointing	315	34.7	41.83	45.70	99.4	114.9
Rec N + One Urea (5%) + Nano Urea spray at tillering	301	34.9	41.80	43.70	98.7	112.2
Absolute control (No Nitrogen)	186	26.7	41.33	20.60	83.2	47.5
CD (0.05)	21	3.4	0.93	2.25	2.7	7.3
Date of Sowing:	12.11.2022		Date of Harvesting			31.03.2023

Table 6.19.3. Central Zone		SPL-3			Udaipur	2022-2023
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
One Nano Urea Spray at tillering	230	35.3	45.10	36.42	89.5	86.9
Two Nano Urea Spray at tillering & Jointing	232	35.2	46.82	37.88	92.5	89.8
Rec N (1/3rd basal, 2/3rd CRI)	246	35.2	47.00	40.52	94.7	96.3
Rec N + One Nano Urea Spray at tillering	323	26.3	53.90	45.68	92.5	107.8
Rec N + Two Nano Urea Spray at tillering & Jointing	328	27.4	54.20	48.78	92.5	114.2
Rec N + One Urea (5%) Spray at tillering	310	28.1	50.80	43.45	94.7	102.6
Rec N + Two Urea (5%) Spray at tillering & Jointing	312	27.6	51.80	44.20	95.1	104.2
Rec N + One Urea (5%) + Nano Urea spray at tillering	288	30.4	49.00	42.73	89.9	99.5
Absolute control (No Nitrogen)	220	33.0	42.90	31.12	89.5	74.7
CD (0.05)	26.00	5.80	2.87	4.61	9.30	7.60
Date of Sowing:	05.11.2022		Date of Harvesting			16.03.2023

Table 6.19.4. Central Zone		SPL-3			Vijapur	2022-2023
Treatments	Earheads/ sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant height, cm	Biomass, q/ha
One Nano Urea Spray at tillering	308	16.9	47.23	24.50	63.7	44.7
Two Nano Urea Spray at tillering & Jointing	341	17.8	46.65	27.71	63.1	47.3
Rec N (1/3rd basal, 2/3rd CRI)	437	16.8	48.89	35.92	66.7	66.1
Rec N + One Nano Urea Spray at tillering	435	16.4	48.15	34.29	68.8	63.9
Rec N + Two Nano Urea Spray at tillering & Jointing	439	17.2	48.15	36.13	65.3	66.3
Rec N + One Urea (5%) Spray at tillering	431	18.0	47.71	36.63	67.0	65.8
Rec N + Two Urea (5%) Spray at tillering & Jointing	454	16.2	52.09	38.13	68.3	72.5
Rec N + One Urea (5%) + Nano Urea spray at tillering	460	20.7	43.76	41.79	67.5	75.3
Absolute control (No Nitrogen)	298	17.7	44.42	23.21	45.7	39.7
CD (0.05)	39.00	4.10	6.01	6.88	7.70	11.30
Date of Sowing:	14.11.2022		Date of Harvesting			13.03.2023

Table 6.20.1. NWPZ SPL-4 Gurdaspur 2022-23

Nutrients foliar spray	Variety								Mean	Rk
	HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW 1 Zn	Rk		
Yield, q/ha										
No foliar fertilization	65.97	1	67.45	3	74.31	1	62.75	3	67.62	1
S (2% S)	57.87	5	67.78	2	71.25	3	61.69	4	64.65	4
N (2% Urea)	64.49	2	67.82	1	72.41	2	62.96	2	66.92	2
Zn (0.5% $ZnSO_4.7H_2O$)	57.92	4	54.44	5	60.83	5	58.17	6	57.84	5
KCl 1%	61.60	3	66.00	4	70.46	4	63.24	1	65.32	3
S+N+Zn+KCl	56.37	6	51.67	6	55.90	6	59.86	5	55.95	6
Mean	60.70		62.53		67.53		61.45		63.05	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		1.50		5.21		10.12			
Nutrients Spray (B)	**		1.02		2.91		5.60			
B within A	**		2.04		5.83					
A within B			2.39		6.84					
Earhead/sq.m.										
No foliar fertilization	324	5	311	6	329	6	327	6	323	6
S (2% S)	328	2	314	4	332	4	328	4	325	3
N (2% Urea)	323	6	315	3	333	3	328	3	325	4
Zn (0.5% $ZnSO_4.7H_2O$)	326	4	312	5	330	5	327	5	324	5
KCl 1%	328	2	316	2	337	2	329	1	327	2
S+N+Zn+KCl	329	1	316	1	337	1	329	2	328	1
Mean	326		314		333		328		325	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		2.40		8.31		3.13			
Nutrients Spray (B)	N.S.		4.43		12.66		4.72			
B within A	N.S.		8.86		25.33					
A within B			8.44		24.12					
1000 grains weight, g										
No foliar fertilization	39.97	1	38.97	4	41.88	6	39.07	5	39.97	5
S (2% S)	39.56	4	39.16	2	42.37	1	39.57	3	40.17	2
N (2% Urea)	39.63	3	39.45	1	42.23	3	39.67	1	40.24	1
Zn (0.5% $ZnSO_4.7H_2O$)	38.99	6	38.17	6	42.06	5	38.88	6	39.53	6
KCl 1%	39.45	5	39.09	3	42.22	4	39.55	4	40.08	4
S+N+Zn+KCl	39.67	2	38.76	5	42.34	2	39.61	2	40.10	3
Mean	39.54		38.93		42.18		39.39		40.01	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		0.18		0.64		1.95			
Nutrients Spray (B)	N.S.		0.35		0.99		3.01			
B within A	N.S.		0.69		1.98					
A within B			0.66		1.89					
Grains per ear head										
No foliar fertilization	51.24	1	55.87	1	54.18	1	49.18	1	52.62	1
S (2% S)	44.76	5	55.10	2	50.80	3	47.65	4	49.58	4
N (2% Urea)	50.41	2	54.70	3	51.46	2	48.36	3	51.23	2
Zn (0.5% $ZnSO_4.7H_2O$)	45.67	4	45.62	5	43.95	5	45.83	6	45.27	5
KCl 1%	47.93	3	53.51	4	49.62	4	48.60	2	49.92	3
S+N+Zn+KCl	43.22	6	42.34	6	39.21	6	46.06	5	42.71	6
Mean	47.21		51.19		48.20		47.61		48.55	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		1.40		4.83		12.19			
Nutrients Spray (B)	**		1.00		2.87		7.16			
B within A	N.S.		2.01		5.74					
A within B			2.30		6.58					

Biomass, q/ha										
No foliar fertilization	166.44	1	158.96	2	157.85	1	156.27	2	159.88	1
S (2% S)	152.73	5	151.18	4	155.02	3	152.15	4	152.77	4
N (2% Urea)	163.43	2	160.67	1	156.39	2	156.16	3	159.16	2
Zn (0.5% $ZnSO_4.7H_2O$)	154.77	4	132.50	5	140.72	5	146.39	5	143.59	5
KCl 1%	158.19	3	153.50	3	151.48	4	157.25	1	155.10	3
S+N+Zn+KCl	147.64	6	127.25	6	131.90	6	145.56	6	138.08	6
Mean	157.20		147.34		148.89		152.30		151.43	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		4.36		15.08		12.21			
Nutrients Spray (B)	**		2.67		7.62		6.10			
B within A	N.S.		5.33		15.24					
A within B			6.53		18.68					
Fe, ppm										
No foliar fertilization	46.17	1	40.40	5	47.30	3	57.10	4	47.74	1
S (2% S)	42.70	2	44.35	4	44.03	4	57.80	3	47.22	4
N (2% Urea)	41.53	4	46.57	2	42.43	6	59.47	1	47.50	3
Zn (0.5% $ZnSO_4.7H_2O$)	40.07	5	49.77	1	49.23	2	51.10	5	47.54	2
KCl 1%	39.82	6	39.93	6	52.95	1	44.37	6	44.27	6
S+N+Zn+KCl	41.72	3	44.37	3	43.67	5	58.07	2	46.95	5
Mean	42.00		44.23		46.60		54.65		46.87	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		4.05		14.00		36.62			
Nutrients Spray (B)	N.S.		1.91		5.46		14.13			
B within A	N.S.		3.82		10.93					
A within B			5.34		15.27					
Zn, ppm										
No foliar fertilization	34.47	5	31.60	5	48.15	2	52.80	2	41.75	1
S (2% S)	35.17	4	50.27	1	30.00	6	35.05	5	37.62	6
N (2% Urea)	33.77	6	34.43	4	38.13	3	56.03	1	40.59	2
Zn (0.5% $ZnSO_4.7H_2O$)	47.90	2	40.77	2	32.73	4	36.83	3	39.56	3
KCl 1%	36.92	3	28.57	6	50.25	1	34.80	6	37.63	5
S+N+Zn+KCl	49.70	1	38.77	3	32.70	5	36.35	4	39.38	4
Mean	39.65		37.40		38.66		41.98		39.42	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		2.08		7.20		22.38			
Nutrients Spray (B)	N.S.		1.96		5.61		17.26			
B within A	**		3.93		11.23					
A within B			4.14		11.85					
Protein, %										
No foliar fertilization	12.28	1	10.77	3	11.42	1	10.88	5	11.34	2
S (2% S)	12.23	2	11.27	2	10.21	6	10.86	6	11.14	5
N (2% Urea)	11.96	3	11.42	1	10.38	5	11.97	2	11.43	1
Zn (0.5% $ZnSO_4.7H_2O$)	11.54	4	10.65	4	10.94	4	11.95	3	11.27	3
KCl 1%	10.55	6	10.11	6	11.13	2	11.24	4	10.76	6
S+N+Zn+KCl	11.23	5	10.38	5	11.06	3	12.15	1	11.20	4
Mean	11.63		10.77		10.85		11.51		11.19	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.52		1.81		19.79			
Nutrients Spray (B)	N.S.		0.24		0.67		7.28			
B within A	N.S.		0.47		1.34					
A within B			0.68		1.93					

Table 6.20.2. NWPZ SPL-4 Hisar 2022-23

Nutrients foliar spray	Variety								Mean	Rk
	HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW 1 Zn	Rk		
Yield, q/ha										
No foliar fertilization	63.57	5	71.02	6	70.12	5	62.65	6	66.84	6
S (2% S)	62.92	6	71.49	5	70.06	6	63.62	4	67.02	5
N (2% Urea)	66.65	2	74.82	1	72.74	2	65.05	2	69.82	2
Zn (0.5% $ZnSO_4.7H_2O$)	65.03	4	71.84	4	70.64	4	64.04	3	67.89	4
KCl 1%	65.54	3	72.49	3	72.01	3	63.49	5	68.38	3
S+N+Zn+KCl	67.32	1	74.53	2	73.31	1	66.03	1	70.30	1
Mean	65.17		72.70		71.48		64.15		68.37	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		0.72		2.51		4.49			
Nutrients Spray (B)	**		0.75		2.16		3.82			
B within A	N.S.		1.51		4.31					
A within B			1.56		4.45					
Earhead/sq.m.										
No foliar fertilization	420	3	402	6	390	5	407	5	405	6
S (2% S)	418	5	410	4	393	4	405	6	407	5
N (2% Urea)	427	2	413	2	402	2	418	2	415	2
Zn (0.5% $ZnSO_4.7H_2O$)	420	3	412	3	387	6	415	3	408	4
KCl 1%	418	5	410	4	397	3	413	4	410	3
S+N+Zn+KCl	430	1	415	1	408	1	420	1	418	1
Mean	422		410		396		413		410	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	*		4.57		15.81		4.72			
Nutrients Spray (B)	N.S.		6.89		19.70		5.82			
B within A	N.S.		13.79		39.41					
A within B			13.39		38.27					
1000 grains weight, g										
No foliar fertilization	37.89	6	40.69	6	41.33	6	40.09	5	40.00	6
S (2% S)	39.36	3	41.63	3	42.12	3	41.05	3	41.04	3
N (2% Urea)	38.55	4	41.32	4	41.85	4	40.48	4	40.55	4
Zn (0.5% $ZnSO_4.7H_2O$)	38.37	5	41.03	5	41.72	5	39.98	6	40.28	5
KCl 1%	39.82	2	42.09	2	43.09	2	41.53	1	41.63	2
S+N+Zn+KCl	40.41	1	42.33	1	43.63	1	41.45	2	41.95	1
Mean	39.07		41.51		42.29		40.76		40.91	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		0.32		1.11		3.34			
Nutrients Spray (B)	**		0.41		1.17		3.45			
B within A	N.S.		0.82		2.33					
A within B			0.81		2.32					
Grains per ear head										
No foliar fertilization	40.07	3	43.50	2	43.69	2	38.52	2	41.44	3
S (2% S)	38.32	6	41.99	6	42.42	4	38.41	4	40.28	4
N (2% Urea)	40.63	1	43.93	1	43.32	3	38.45	3	41.58	1
Zn (0.5% $ZnSO_4.7H_2O$)	40.52	2	42.56	3	44.18	1	38.76	1	41.51	2
KCl 1%	39.41	4	42.23	5	42.20	5	37.12	6	40.24	6
S+N+Zn+KCl	39.05	5	42.51	4	41.30	6	38.12	5	40.24	5
Mean	39.66		42.78		42.85		38.23		40.88	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	*		0.74		2.58		7.73			
Nutrients Spray (B)	N.S.		0.96		2.74		8.12			
B within A	N.S.		1.92		5.48					
A within B			1.90		5.43					

Biomass, q/ha										
No foliar fertilization	186.95	5	179.41	6	184.75	5	191.01	6	185.53	6
S (2% S)	186.07	6	180.29	5	183.42	6	192.59	5	185.59	5
N (2% Urea)	196.60	2	187.39	1	191.71	1	196.78	2	193.12	2
Zn (0.5% $ZnSO_4.7H_2O$)	195.41	3	182.10	4	186.42	4	193.65	3	189.40	4
KCl 1%	193.52	4	183.38	3	187.65	3	193.30	4	189.46	3
S+N+Zn+KCl	198.68	1	186.77	2	190.65	2	197.48	1	193.40	1
Mean	192.87		183.22		187.43		194.14		189.42	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		2.87		9.93		6.43			
Nutrients Spray (B)	**		1.71		4.89		3.13			
B within A	N.S.		3.42		9.78					
A within B			4.24		12.12					
Fe, ppm										
No foliar fertilization	37.53	4	38.83	3	35.57	2	37.17	4	37.28	2
S (2% S)	36.23	5	36.17	6	35.97	1	37.97	2	36.58	6
N (2% Urea)	37.97	3	39.07	2	34.33	5	36.53	6	36.98	5
Zn (0.5% $ZnSO_4.7H_2O$)	36.17	6	37.70	5	35.50	3	39.07	1	37.11	4
KCl 1%	38.57	1	38.17	4	35.07	4	36.90	5	37.18	3
S+N+Zn+KCl	38.50	2	39.93	1	33.90	6	37.87	3	37.55	1
Mean	37.49		38.31		35.06		37.58		37.11	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		1.76		6.10		20.17			
Nutrients Spray (B)	N.S.		0.78		2.23		7.29			
B within A	N.S.		1.56		4.46					
A within B			2.27		6.48					
Zn, ppm										
No foliar fertilization	38.33	6	42.20	4	36.87	4	39.23	4	39.16	4
S (2% S)	40.23	5	39.00	6	36.80	5	40.27	3	39.08	5
N (2% Urea)	41.77	4	45.63	3	39.40	2	36.33	5	40.78	3
Zn (0.5% $ZnSO_4.7H_2O$)	42.37	3	45.87	2	40.70	1	46.13	1	43.77	1
KCl 1%	42.40	2	40.33	5	35.73	6	36.10	6	38.64	6
S+N+Zn+KCl	43.57	1	45.97	1	38.50	3	40.53	2	42.14	2
Mean	41.44		43.17		38.00		39.77		40.59	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		2.43		8.40		25.36			
Nutrients Spray (B)	N.S.		1.58		4.51		13.48			
B within A	N.S.		3.16		9.03					
A within B			3.77		10.77					
Protein, %										
No foliar fertilization	12.80	1	12.63	2	11.01	5	11.40	3	11.96	1
S (2% S)	12.57	2	11.79	5	11.07	4	11.43	2	11.72	4
N (2% Urea)	12.29	4	12.27	3	10.99	6	11.13	5	11.67	5
Zn (0.5% $ZnSO_4.7H_2O$)	12.05	5	12.63	1	11.64	2	11.45	1	11.94	2
KCl 1%	11.87	6	11.91	4	11.26	3	10.12	6	11.29	6
S+N+Zn+KCl	12.37	3	11.74	6	11.91	1	11.27	4	11.82	3
Mean	12.32		12.16		11.31		11.13		11.73	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.57		1.98		20.72			
Nutrients Spray (B)	N.S.		0.19		0.55		5.67			
B within A	N.S.		0.38		1.10					
A within B			0.67		1.92					
Date of Sowing:	01.11.2022		Date of Harvesting:				12.04.2023			

Table 6.20.3. NWPZ SPL-4 Ludhiana 2022-23

Nutrients foliar spray	Variety								Mean	Rk
	HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW 1 Zn	Rk		
Yield, q/ha										
No foliar fertilization	55.79	6	47.42	6	53.85	6	62.65	5	54.93	6
S (2% S)	60.27	2	53.14	2	56.18	4	68.54	1	59.53	2
N (2% Urea)	61.88	1	53.66	1	60.22	1	67.50	2	60.82	1
Zn (0.5% $ZnSO_4.7H_2O$)	59.61	4	52.23	3	58.81	3	62.89	4	58.39	4
KCl 1%	59.74	3	51.61	4	58.98	2	65.57	3	58.98	3
S+N+Zn+KCl	57.22	5	48.37	5	54.38	5	62.06	6	55.51	5
Mean	59.09		51.07		57.07		64.87		58.02	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		1.08		3.74		7.90			
Nutrients Spray (B)	**		0.87		2.50		5.21			
B within A	N.S.		1.75		4.99					
A within B			1.93		5.50					
Earhead/sq.m.										
No foliar fertilization	231	6	234	5	225	6	262	2	238	6
S (2% S)	234	3	235	4	229	5	263	1	240	3
N (2% Urea)	232	5	235	2	229	4	260	4	239	5
Zn (0.5% $ZnSO_4.7H_2O$)	235	1	234	6	233	3	259	6	240	4
KCl 1%	235	2	235	2	235	1	260	4	241	2
S+N+Zn+KCl	233	4	236	1	234	2	262	2	241	1
Mean	233		235		231		261		240	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	*		5.34		18.49		9.44			
Nutrients Spray (B)	N.S.		4.29		12.26		6.19			
B within A	N.S.		8.58		24.52					
A within B			9.48		27.10					
1000 grains weight, g										
No foliar fertilization	38.67	5	38.00	5	37.67	5	37.33	6	37.92	5
S (2% S)	42.67	1	39.00	3	42.00	2	39.33	3	40.75	2
N (2% Urea)	39.67	4	40.67	1	42.33	1	41.00	1	40.92	1
Zn (0.5% $ZnSO_4.7H_2O$)	42.67	1	39.00	3	40.67	3	40.00	2	40.58	3
KCl 1%	42.33	3	40.00	2	40.33	4	39.33	3	40.50	4
S+N+Zn+KCl	37.67	6	38.00	5	37.33	6	38.67	5	37.92	5
Mean	40.61		39.11		40.06		39.28		39.76	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.85		2.93		9.03			
Nutrients Spray (B)	**		0.72		2.06		6.28			
B within A	N.S.		1.44		4.12					
A within B			1.56		4.47					
Grains per ear head										
No foliar fertilization	62.69	3	53.45	6	64.69	1	64.38	3	61.30	2
S (2% S)	60.73	4	58.55	1	58.45	6	66.32	1	61.01	3
N (2% Urea)	67.57	1	56.57	3	62.66	3	63.52	4	62.58	1
Zn (0.5% $ZnSO_4.7H_2O$)	59.80	6	57.75	2	62.42	4	61.04	6	60.25	6
KCl 1%	60.28	5	55.56	4	62.72	2	64.94	2	60.88	5
S+N+Zn+KCl	65.86	2	54.34	5	62.34	5	61.48	5	61.01	4
Mean	62.82		56.04		62.21		63.61		61.17	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		2.53		8.74		17.52			
Nutrients Spray (B)	N.S.		1.89		5.40		10.69			
B within A	N.S.		3.78		10.79					
A within B			4.27		12.21					

Biomass, q/ha										
No foliar fertilization	154.76	6	110.12	6	148.81	4	169.64	4	145.83	5
S (2% S)	160.71	4	122.02	3	148.81	4	169.64	4	150.30	4
N (2% Urea)	172.62	1	125.00	1	154.76	1	169.64	3	155.51	2
Zn (0.5% $ZnSO_4.7H_2O$)	169.64	3	119.10	4	150.24	3	180.00	2	154.74	3
KCl 1%	169.64	2	125.00	1	154.76	1	187.50	1	159.23	1
S+N+Zn+KCl	157.74	5	115.36	5	145.83	6	160.71	6	144.91	6
Mean	164.19		119.43		150.54		172.86		151.75	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		4.02		13.90		11.23			
Nutrients Spray (B)	*		3.59		10.27		8.20			
B within A	N.S.		7.19		20.54					
A within B			7.69		21.99					
Fe, ppm										
No foliar fertilization	29.53	6	30.10	5	27.23	6	30.47	5	29.33	6
S (2% S)	31.37	2	31.43	1	27.57	5	32.77	2	30.78	2
N (2% Urea)	30.03	5	30.40	3	28.30	4	30.63	4	29.84	5
Zn (0.5% $ZnSO_4.7H_2O$)	32.27	1	29.80	6	29.40	1	33.17	1	31.16	1
KCl 1%	30.20	4	30.30	4	28.63	3	31.40	3	30.13	3
S+N+Zn+KCl	30.70	3	30.43	2	29.00	2	29.83	6	29.99	4
Mean	30.68		30.41		28.36		31.38		30.21	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.94		3.25		13.17			
Nutrients Spray (B)	N.S.		0.48		1.38		5.55			
B within A	N.S.		0.97		2.77					
A within B			1.29		3.68					
Zn, ppm										
No foliar fertilization	29.03	6	32.90	3	31.33	3	31.47	5	31.18	5
S (2% S)	32.00	4	32.73	4	29.10	5	32.47	4	31.58	4
N (2% Urea)	29.30	5	28.97	6	28.00	6	34.43	3	30.18	6
Zn (0.5% $ZnSO_4.7H_2O$)	45.57	1	36.20	1	39.30	1	37.20	1	39.57	1
KCl 1%	35.83	3	29.43	5	30.23	4	31.23	6	31.68	3
S+N+Zn+KCl	38.67	2	36.20	1	35.80	2	34.53	2	36.30	2
Mean	35.07		32.74		32.29		33.56		33.41	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		1.10		3.79		13.92			
Nutrients Spray (B)	**		1.56		4.46		16.18			
B within A	N.S.		3.12		8.92					
A within B			3.05		8.72					
Protein, %										
No foliar fertilization	10.34	6	10.41	4	10.57	3	10.02	5	10.34	6
S (2% S)	10.72	5	10.61	1	10.53	4	10.58	1	10.61	2
N (2% Urea)	11.13	2	10.61	2	10.61	2	10.24	2	10.65	1
Zn (0.5% $ZnSO_4.7H_2O$)	11.22	1	10.52	3	10.70	1	9.89	6	10.58	3
KCl 1%	11.06	3	10.34	6	10.44	5	10.21	3	10.51	4
S+N+Zn+KCl	10.80	4	10.35	5	10.24	6	10.09	4	10.37	5
Mean	10.88		10.47		10.52		10.17		10.51	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.22		0.76		8.88			
Nutrients Spray (B)	N.S.		0.13		0.37		4.26			
B within A	N.S.		0.26		0.74					
A within B			0.32		0.92					
Date of Sowing:	31.10.2022		Date of Harvesting:				17.04.2023			

Table 6.20.4. NWPZ	SPL-4		Pantnagar						2022-23	
Nutrients foliar spray	Variety								Mean	Rk
	HD 3226	Rk	HI 1544	Rk	DBW 187	Rk	PBW 1 Zn	Rk		
Yield, q/ha										
No foliar fertilization	41.68	5	41.54	3	43.10	5	44.32	4	42.66	3
S (2% S)	42.18	4	41.67	2	46.09	2	48.80	1	44.69	1
N (2% Urea)	39.94	6	39.77	4	45.67	3	44.95	2	42.58	4
Zn (0.5% $ZnSO_4.7H_2O$)	47.17	1	35.82	6	42.77	6	44.06	5	42.45	5
KCl 1%	43.57	2	37.58	5	43.90	4	44.63	3	42.42	6
S+N+Zn+KCl	43.10	3	42.59	1	48.85	1	42.98	6	44.38	2
Mean	42.94		39.83		45.06		44.96		43.20	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		0.30		1.03		2.93			
Nutrients Spray (B)	N.S.		0.95		2.72		7.63			
B within A	N.S.		1.90		5.44					
A within B			1.76		5.04					
Earhead/sq.m.										
No foliar fertilization	428	5	433	5	369	6	371	5	400	6
S (2% S)	413	6	500	2	413	5	461	1	447	2
N (2% Urea)	431	3	493	3	435	4	382	4	435	4
Zn (0.5% $ZnSO_4.7H_2O$)	446	2	438	4	445	3	303	6	408	5
KCl 1%	459	1	507	1	446	2	414	3	456	1
S+N+Zn+KCl	429	4	392	6	487	1	457	2	441	3
Mean	434		460		433		398		431	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		3.21		11.12		3.16			
Nutrients Spray (B)	**		10.36		29.62		8.33			
B within A	**		20.73		59.24					
A within B			19.19		54.85					
1000 grains weight, g										
No foliar fertilization	41.54	3	29.69	5	46.57	3	36.28	3	38.52	4
S (2% S)	38.23	5	30.75	4	40.11	6	41.48	1	37.64	5
N (2% Urea)	35.19	6	35.01	1	47.77	2	39.66	2	39.41	2
Zn (0.5% $ZnSO_4.7H_2O$)	43.00	2	25.63	6	46.23	4	33.22	6	37.02	6
KCl 1%	51.40	1	32.62	2	45.27	5	35.47	4	41.19	1
S+N+Zn+KCl	38.54	4	31.95	3	50.81	1	34.28	5	38.89	3
Mean	41.32		30.94		46.13		36.73		38.78	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		1.51		5.23		16.52			
Nutrients Spray (B)	N.S.		1.65		4.73		14.78			
B within A	N.S.		3.31		9.46					
A within B			3.38		9.65					
Grains per ear head										
No foliar fertilization	23.50	5	32.56	2	25.51	2	33.13	2	28.67	2
S (2% S)	27.12	1	27.25	4	27.86	1	25.69	6	26.98	4
N (2% Urea)	26.93	2	23.60	5	22.05	3	29.91	4	25.62	5
Zn (0.5% $ZnSO_4.7H_2O$)	25.16	4	32.12	3	20.88	5	44.39	1	30.64	1
KCl 1%	20.02	6	23.40	6	21.99	4	30.63	3	24.01	6
S+N+Zn+KCl	26.29	3	36.81	1	19.82	6	27.49	5	27.60	3
Mean	24.83		29.29		23.02		31.87		27.25	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	**		0.96		3.33		14.96			
Nutrients Spray (B)	*		1.41		4.02		17.89			
B within A	**		2.81		8.04					
A within B			2.74		7.84					

Biomass, q/ha										
No foliar fertilization	134.31	5	139.38	1	122.79	6	127.89	3	131.09	5
S (2% S)	133.57	6	121.77	3	137.75	4	138.77	1	132.97	4
N (2% Urea)	150.44	4	129.25	2	144.17	3	132.71	2	139.14	1
Zn (0.5% $ZnSO_4.7H_2O$)	151.02	2	114.28	5	149.95	1	127.37	4	135.65	2
KCl 1%	159.18	1	109.52	6	123.94	5	124.49	5	129.28	6
S+N+Zn+KCl	151.02	2	120.07	4	149.38	2	114.97	6	133.86	3
Mean	146.59		122.38		138.00		127.70		133.67	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	*		4.01		13.89		12.74			
Nutrients Spray (B)	N.S.		2.63		7.53		6.82			
B within A	**		5.27		15.05					
A within B			6.26		17.90					
Fe, ppm										
No foliar fertilization	40.33	3	41.33	1	40.50	3	41.63	1	40.95	1
S (2% S)	42.20	1	36.37	6	40.50	2	40.47	3	39.88	3
N (2% Urea)	41.33	2	37.67	4	38.80	4	41.60	2	39.85	4
Zn (0.5% $ZnSO_4.7H_2O$)	38.80	4	37.47	5	38.60	5	39.07	6	38.48	5
KCl 1%	37.20	5	38.47	3	34.83	6	39.60	5	37.53	6
S+N+Zn+KCl	36.40	6	40.43	2	43.07	1	39.67	4	39.89	2
Mean	39.38		38.62		39.38		40.34		39.43	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		1.56		5.38		16.74			
Nutrients Spray (B)	N.S.		1.02		2.90		8.92			
B within A	N.S.		2.03		5.80					
A within B			2.42		6.92					
Zn, ppm										
No foliar fertilization	32.13	1	30.87	4	32.37	3	33.80	1	32.29	1
S (2% S)	29.60	5	29.97	6	32.50	2	31.60	3	30.92	4
N (2% Urea)	29.90	3	30.47	5	36.00	1	29.23	6	31.40	2
Zn (0.5% $ZnSO_4.7H_2O$)	30.33	2	33.40	1	28.13	5	30.90	4	30.69	5
KCl 1%	25.17	6	33.03	2	26.50	6	29.70	5	28.60	6
S+N+Zn+KCl	29.77	4	32.77	3	30.33	4	31.83	2	31.18	3
Mean	29.48		31.75		30.97		31.18		30.85	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.87		2.99		11.90			
Nutrients Spray (B)	*		0.78		2.22		8.74			
B within A	*		1.56		4.45					
A within B			1.66		4.75					
Protein, %										
No foliar fertilization	13.79	1	12.59	5	13.35	3	12.60	4	13.08	1
S (2% S)	13.31	3	11.94	6	13.69	1	11.70	6	12.66	6
N (2% Urea)	13.46	2	12.74	4	13.46	2	12.64	3	13.08	2
Zn (0.5% $ZnSO_4.7H_2O$)	12.85	4	13.00	3	13.16	4	12.53	5	12.89	4
KCl 1%	12.38	6	13.04	2	12.22	6	13.34	1	12.74	5
S+N+Zn+KCl	12.85	5	13.16	1	12.73	5	13.33	2	13.02	3
Mean	13.10		12.75		13.10		12.69		12.91	
	F. Test		SEm		CD (0.05)		CV (%)			
Variety (A)	N.S.		0.51		1.78		16.90			
Nutrients Spray (B)	N.S.		0.18		0.52		4.89			
B within A	*		0.36		1.04					
A within B			0.61		1.75					
Date of Sowing:	20.11.2022		Date of Harvesting:				18.04.2023			

Table 6.23.1. North Western Plains Zone		SPL-5		Gurdaspur		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
Control (no seed trt. and no NPK)	34.98	263	37.27	36.14	96.25	88.07
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	39.10	283	38.80	35.59	106.30	89.17
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	39.12	284	39.05	35.31	106.43	90.67
75% Rec. NPK	40.82	306	39.30	33.95	113.28	93.33
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	43.71	314	40.03	34.96	118.93	93.73
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	43.87	313	40.15	35.09	118.12	94.00
100% Rec. NPK	47.12	335	40.21	35.23	122.50	94.47
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	49.97	346	40.31	35.96	127.44	94.80
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	48.87	345	40.41	35.11	127.37	95.13
Mean	43.06	310	39.50	35.26	115.18	92.60
CD (0.05)	6.78	29.59	1.39	6.65	14.53	4.50
CV (%)	11.05	6.70	2.46	13.24	8.85	3.41
Date of Sowing:	10.11.2022		Date of Harvesting:		13.04.2023	

Table 6.23.2. North Western Plains Zone		SPL-5		Hisar		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
Control (no seed trt. and no NPK)	25.43	262	41.01	23.79	65.65	82.80
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	27.66	268	40.57	25.99	71.09	83.97
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	28.20	273	40.62	25.44	72.11	84.20
75% Rec. NPK	54.15	368	38.97	37.73	134.01	93.27
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	56.21	380	38.76	38.40	136.74	95.70
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	57.02	378	38.88	39.06	137.76	94.17
100% Rec. NPK	61.70	420	37.81	38.89	147.96	96.80
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	62.86	422	37.90	39.39	150.00	96.47
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	62.24	426	37.95	38.62	149.32	98.00
Mean	48.38	355	39.16	34.14	118.29	91.71
CD (0.05)	3.33	28.24	1.75	4.56	8.57	4.18
CV (%)	4.83	5.58	3.13	9.37	5.08	3.19
Date of Sowing:	11.11.2022		Date of Harvesting:		10.04.2023	

Table 6.23.3. North Western Plains Zone		SPL-5		Jammu		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
Control (no seed trt. and no NPK)	26.43	369	35.64	20.23	63.07	91.22
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	32.87	377	37.34	23.38	82.00	98.13
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	32.07	375	36.88	23.25	76.96	97.67
75% Rec. NPK	44.49	409	37.54	29.04	110.36	100.10
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	46.16	406	37.82	30.17	112.98	103.42
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	45.57	404	37.79	29.95	109.85	101.43
100% Rec. NPK	46.30	418	37.97	29.31	114.09	104.01
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	48.14	423	39.29	28.96	116.44	106.01
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	47.24	419	38.68	29.22	116.37	104.40
Mean	41.03	400	37.66	27.06	100.24	100.71
CD (0.05)	3.07	34.35	1.83	3.12	6.96	8.87
CV (%)	5.24	6.02	3.41	8.10	4.87	6.18
Date of Sowing:	25.11.2022		Date of Harvesting:		30.04.2023	

Table 6.23.5. North Western Plains Zone		SPL-5		Ludhiana		2022-23
Treatments	Yield, q/ha	Earhead/ sq.m.	1000 grains weight, g	Grains/ earhead	Biomass, q/ha	Plant Ht., cm
Control (no seed trt. and no NPK)	25.33	218	46.36	25.05	65.12	70.00
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	26.62	220	45.61	26.63	65.48	69.00
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	27.22	224	46.06	26.46	66.43	71.00
75% Rec. NPK	44.62	251	45.39	39.27	113.02	83.33
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	44.67	251	44.69	39.93	113.10	84.00
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	44.71	253	44.54	39.81	113.10	84.33
100% Rec. NPK	49.11	287	44.04	39.02	127.69	85.00
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	48.13	286	44.03	38.19	130.95	87.00
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	49.57	288	44.05	39.19	130.95	86.00
Mean	40.00	253	44.97	34.84	102.87	79.96
CD (0.05)	2.89	16.53	1.64	3.21	9.44	5.21
CV (%)	5.06	4.59	2.57	6.47	6.43	4.57
Date of Sowing:	18.11.2022		Date of Harvesting:		15.04.2023	

Table 6.24.1. North Eastern Plains Zone		SPL-5	RPCAU, PUSA		2022-23
Treatments	Yield, q/ha	Earhead/ sqm	1000 grains weight, g	Grains/ earhead	Biomass, q/ha
Control (no seed trt. and no NPK)	26.79	197	33.19	40.96	90.91
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	27.96	207	36.25	40.12	89.05
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	28.09	208	33.83	39.97	90.33
75% Rec. NPK	34.37	209	35.46	46.34	93.01
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	34.80	209	37.19	44.82	96.03
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	34.58	212	37.52	43.57	97.50
100% Rec. NPK	38.20	210	38.23	47.51	102.17
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	39.65	210	38.55	49.01	106.48
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	39.71	212	39.21	47.86	108.19
Mean	36.26	208	35.07	44.46	97.07
CD (0.05)	1.09	4.13	9.26	2.42	5.62
CV (%)	2.26	1.39	18.53	3.83	4.06
Date of Sowing:	29.11.2022		Date of Harvesting:		08.04.2023

Table 6.24.2. North Eastern Plains Zone		SPL-5		Varanas	2022-23
Treatments	Yield, q/ha	Earhead/ sqm	1000 grains weight, g	Grains/ earhead	Biomass, q/ha
Control (no seed trt. and no NPK)	20.34	164	39.72	31.30	32.25
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	22.57	182	39.08	31.84	31.16
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	22.54	157	39.54	36.64	31.43
75% Rec. NPK	36.96	265	36.06	38.80	78.45
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	37.61	251	36.00	41.60	71.89
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	38.33	255	35.85	41.99	73.53
100% Rec. NPK	41.31	309	34.60	38.82	84.46
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	42.50	296	34.25	42.00	86.92
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	43.56	300	34.30	42.38	86.92
Mean	33.97	242	36.60	38.38	64.11
CD (0.05)	1.97	17.25	1.07	4.34	7.44
CV (%)	4.06	4.99	2.05	7.93	8.14
Date of Sowing:	15.11.2022		Date of Harvesting:		10.04.2023

Table 6.25.1. Central Zone			SPL-5		Indore	2022-23
Treatments	Earhead/sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant ht., cm	Biomass, q/ha
Control (no seed trt. and no NPK)	187	21.8	52.23	21.23	74.9	49.4
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	190	21.1	51.40	20.63	73.2	47.1
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	191	22.2	52.40	22.07	74.4	51.1
75% Rec. NPK	278	32.8	50.43	45.93	95.7	105.4
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	286	33.8	51.13	49.37	96.3	116.0
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	280	33.8	50.33	47.50	95.1	108.0
100% Rec. NPK	310	35.7	48.57	53.60	96.3	124.4
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	296	33.6	48.90	48.63	95.4	114.6
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	298	35.3	48.10	50.70	97.1	118.5
Mean	257	30.0	50.39	39.96	88.7	92.70
CD (0.05)	15.0	2.70	1.44	2.48	2.9	6.40
CV (%)	4.0	6.40	2.00	4.36	2.30	4.90
Date of Sowing	12.11.2022		Date of Harvesting			01.04.2023

Table 6.25.2. Central Zone			SPL-5		Junagadh	2022-23
Treatments	Earhead/sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant ht., cm	Biomass, q/ha
Control (no seed trt. and no NPK)	310	25.6	38.78	30.76	51.0	64.6
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	333	24.3	40.51	32.77	55.3	68.8
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	344	23.9	40.46	33.22	55.0	69.8
75% Rec. NPK	418	28.3	44.30	52.38	70.3	115.2
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	439	26.7	46.70	54.63	71.2	120.2
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	427	26.3	47.81	53.55	73.2	117.8
100% Rec. NPK	467	25.3	50.35	58.93	73.3	129.6
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	485	25.1	50.40	61.24	74.1	134.7
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	492	23.9	53.27	62.67	75.7	137.9
Mean	413	25.5	45.84	48.91	66.5	106.50
CD (0.05)	21	2.8	3.28	4.37	2.1	9.50
CV (%)	4.00	7.70	5.02	6.27	2.20	6.30
Date of Sowing	15.11.2022		Date of Harvesting			06.03.2023

Table 6.25.3. Central Zone			SPL-5		Vijapur	2022-23
Treatments	Earhead/sqm	Grains/ Earhead	1000 grain weight, g	Yield, q/ha	Plant ht., cm	Biomass, q/ha
Control (no seed trt. and no NPK)	288	5.6	46.58	7.54	50.9	22.1
No NPK + seed trt with Bio NPK@2.5 ml/kg seed	300	10.4	52.95	16.46	53.1	40.5
No NPK + seed trt with Bio GROW@2.5 ml/kg seed	330	11.4	54.35	20.46	63.7	55.7
75% Rec. NPK	359	24.2	49.80	43.38	77.0	98.8
75% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	373	23.9	49.81	44.17	76.3	100.1
75% Rec. NPK + seed trt with Bio GROW@2.5 ml/kg seed	392	23.5	50.01	45.75	77.5	104.4
100% Rec. NPK	395	25.7	46.27	46.63	76.4	104.8
100% Rec NPK+ seed trt with Bio NPK@ 2.5 ml/kg	405	22.7	52.00	47.50	76.5	105.4
100% Rec NPK + seed trt with Bio GROW @ 2.5 ml/ka	415	24.7	48.33	49.33	77.8	111.9
Mean	362	19.1	50.01	35.69	69.9	82.60
CD (0.05)	35	2.9	7.32	4.74	6.8	12.20
CV (%)	7.00	10.50	10.27	9.31	6.80	10.40
Date of Sowing	17.11.2022		Date of Harvesting			24.03.2023

METEOROLOGICAL INFORMATION: 2022-2023

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
NORTHERN HILLS ZONE								
ALMORA	**Latitude 29^{0}36' N**		**Longitude 79^{0}40' E**			**Height above MSL 1213 m**		
40 (01-07 Oct)	25.7	11.0			0.0			
41 (08-14 Oct)	27.1	7.2			0.0			
42 (15-21 Oct)	26.8	7.6			0.0			
43 (22-28 Oct)	24.9	7.1			0.0			
44 (29-04 Nov)	23.6	3.0			0.0			
45 (05-11 Nov)	24.3	2.4			0.0			
46 (12-18 Nov)	24.1	2.9			0.0			
47 (19-25 Nov)	23.6	1.9			0.0			
48 (26-02 Dec)	25.2	-2.1			0.0			
49 (03-09 Dec)	22.1	-0.8			0.0			
50 (10-16 Dec)	21.1	-1.4			0.0			
51 (17-23 Dec)	20.4	-2.8			0.0			
52 (24-31 Dec)	22.6	-0.2			0.0			
1 (01-07 Jan)	19.5	-0.9			0.0			
2 (08-14 Jan)	20.6	0.7			0.8			
3 (15-21 Jan)	20.8	1.9			1.4			
4 (22-28 Jan)	22.4	1.9			0.0			
5 (29-04 Feb)	24.1	1.0			0.0			
6 (05-11 Feb)	25.5	2.8			0.0			
7 (12-18 Feb)	25.4	3.2			0.0			
8 (19-25 Feb)	26.0	4.1			2.1			
9 (26-04 Mar)	24.2	7.1			4.3			
10 (05-11 Mar)	19.4	7.1			3.9			
11 (12-18 Mar)	23.4	7.7			5.0			
12 (19-25 Mar)	24.4	6.5			0.0			
13 (26-01 Apr)	29.9	7.7			0.0			
14 (02-08 Apr)	29.2	8.7			0.2			
15 (09-15 Apr)	26.6	7.1			1.4			
16 (16-22 Apr)	22.5	10.6			6.2			
17 (23-29 Apr)	29.6	10.1			0.0			
18 (30-06 May)	31.3	11.9			0.2			
BAJAURA	**Latitude 31^{0}48' N**		**Longitude 77^{0}00' E**			**Height above MSL 1090 m**		
40 (01-07 Oct)	31.2	13.1	78.0	42.0	0.0	22.0		
41 (08-14 Oct)	26.6	12.3	85.0	59.0	54.5	16.5		
42 (15-21 Oct)	27.7	7.4	88.0	38.0	0.0	16.7		
43 (22-28 Oct)	26.1	5.4	92.0	39.0	0.0	13.0		
44 (29-04 Nov)	26.4	5.3	91.0	44.0	0.0	12.7		
45 (05-11 Nov)	23.1	5.7	88.0	54.0	13.2	13.0		
46 (12-18 Nov)	19.6	2.4	86.0	53.0	22.0	8.4		
47 (19-25 Nov)	21.9	1.1	92.0	47.0	0.0	9.9		
48 (26-02 Dec)	23.0	2.5	92.0	41.0	0.0	10.2		
49 (03-09 Dec)	20.9	-0.4	91.0	37.0	0.0	7.4		
50 (10-16 Dec)	21.9	-1.2	91.0	41.0	0.0	8.9		
51 (17-23 Dec)	20.2	-2.7	91.0	29.0	0.0	10.6		
52 (24-31 Dec)	17.0	-0.6	90.0	50.0	9.5	7.2		
1 (01-07 Jan)	16.5	-1.6	88.0	37.0	0.0	6.8		
2 (08-14 Jan)	18.1	3.6	86.0	50.0	23.7	9.1		
3 (15-21 Jan)	15.1	0.4	89.0	42.0	12.0	7.7		
4 (22-28 Jan)	17.4	0.6	90.0	47.0	2.2	7.6		

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
5 (29-04 Feb)	17.7	1.3	91.0	49.0	6.4	8.2		
6 (05-11 Feb)	17.8	2.2	92.0	57.0	25.9	8.5		
7 (12-18 Feb)	21.0	2.1	90.0	39.0	2.5	10.3		
8 (19-25 Feb)	23.6	3.9	90.0	34.0	3.0	13.0		
9 (26-04 Mar)	21.5	4.9	89.0	40.0	12.3	18.0		
10 (05-11 Mar)	25.1	4.7	89.0	26.1	4.1	18.3		
11 (12-18 Mar)	24.1	6.9	90.0	43.0	6.7	17.9		
12 (19-25 Mar)	20.8	6.6	90.0	45.0	12.0	11.3		
13 (26-01 Apr)	21.6	6.2	90.0	55.0	46.6	12.8		
14 (02-08 Apr)	20.8	5.4	88.0	41.0	17.8	16.7		
15 (09-15 Apr)	28.8	7.6	86.0	36.0	0.4	18.9		
16 (16-22 Apr)	24.9	7.6	88.0	54.0	65.8	13.9		
17 (23-29 Apr)	24.5	7.1	87.0	41.0	14.4	16.4		
18 (30-06 May)	23.9	10.4	87.0	54.0	49.4	13.0		
19 (7-13 May)	26.6	7.5	78.0	37.0	18.3	19.2		
20 (14-20 May)	29.4	9.7	77.0	45.0	0.0	19.4		
21 (21-27 May)	29.9	11.7	81.0	51.0	44.6	17.8		
MALAN	**Latitude 31°37' N**		**Longitude 76^{0}2' E**			**Height above MSL 950 m**		
40 (01-07 Oct)	26.6	14.6	81.0	60.0	0.0			
41 (08-14 Oct)	24.3	14.4	81.0	60.0	0.0			
42 (15-21 Oct)	24.6	14.3	82.0	62.0	0.0			
43 (22-28 Oct)	24.4	15.7	80.0	68.0	0.0			
44 (29-04 Nov)	26.3	15.5	81.0	60.0	0.0			
45 (05-11 Nov)	26.9	14.2	82.0	62.0	0.0			
46 (12-18 Nov)	26.1	13.5	81.0	64.0	0.0			
47 (19-25 Nov)	26.2	13.6	80.0	60.0	0.0			
48 (26-02 Dec)	28.0	8.2	83.0	60.0	0.0			
49 (03-09 Dec)	24.2	6.4	77.0	62.0	0.0			
50 (10-16 Dec)	25.2	6.4	77.0	62.0	0.0			
51 (17-23 Dec)	25.2	5.6	80.0	62.0	0.0			
52 (24-31 Dec)	25.2	5.4	80.0	65.0	20.2			
1 (01-07 Jan)	25.2	6.5	77.0	60.0	0.0			
2 (08-14 Jan)	26.3	6.4	78.0	60.0	10.2			
3 (15-21 Jan)	25.4	5.4	78.0	62.0	19.2			
4 (22-28 Jan)	25.4	5.0	77.0	64.0	69.9			
5 (29-04 Feb)	27.0	6.2	81.0	70.0	9.4			
6 (05-11 Feb)	27.3	7.6	81.0	64.0	0.0			
7 (12-18 Feb)	27.2	8.4	81.0	60.0	0.0			
8 (19-25 Feb)	27.4	10.2	81.0	64.0	7.4			
9 (26-04 Mar)	28.0	12.2	81.0	60.0	0.0			
10 (05-11 Mar)	28.0	12.4	81.0	60.0	0.0			
11 (12-18 Mar)	28.2	12.2	82.0	60.0	25.2			
12 (19-25 Mar)	27.2	11.4	81.0	60.0	45.0			
13 (26-01 Apr)	27.4	12.2	80.0	60.0	20.8			
14 (02-08 Apr)	28.4	13.3	82.0	68.0	0.0			
15 (09-15 Apr)	32.4	15.3	81.0	60.0	0.0			
16 (16-22 Apr)	32.4	12.6	82.0	60.0	26.6			
17 (23-29 Apr)	31.2	14.2	81.0	70.0	5.4			
18 (30-06 May)	30.0	15.0	81.0	66.0	30.2			
19 (7-13 May)	32.4	15.0	80.0	67.0	12.8			
20 (14-20 May)	35.4	16.4	82.0	72.0	23.6			
SHIMLA	**Latitude 32^{0}1' N**		**Longitude 77°6' E**			**Height above MSL 2206 m**		
40 (01-07 Oct)	24.3	14.4	75.4	69.3	0.0			
41 (08-14 Oct)	20.8	11.9	88.7	81.0	37.0			
42 (15-21 Oct)	21.7	12.0	64.6	48.6	0.0			
43 (22-28 Oct)	21.0	11.1	61.6	42.7	0.0			
44 (29-04 Nov)	20.8	11.3	54.0	39.9	0.0			

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
45 (05-11 Nov)	20.1	10.6	55.1	46.9	0.8			
46 (12-18 Nov)	15.7	5.2	61.4	50.0	5.5			
47 (19-25 Nov)	18.5	7.9	57.1	46.4	0.0			
48 (26-02 Dec)	19.2	8.4	54.4	31.7	0.0			
49 (03-09 Dec)	17.3	7.3	48.9	29.7	0.0			
50 (10-16 Dec)	18.8	8.5	40.3	24.9	0.0			
51 (17-23 Dec)	16.6	6.1	40.5	28.8	0.0			
52 (24-31 Dec)	14.0	3.6	57.9	42.0	0.0			
1 (01-07 Jan)	13.0	2.8	62.9	54.7	2.4			
2 (08-14 Jan)	17.5	7.0	44.0	33.1	0.0			
3 (15-21 Jan)	12.1	1.9	79.7	57.1	30.1			
4 (22-28 Jan)	13.9	2.7	75.9	67.9	9.6			
5 (29-04 Feb)	16.7	4.8	52.3	32.3	20.4			
6 (05-11 Feb)	16.2	6.0	50.1	37.1	1.1			
7 (12-18 Feb)	17.3	6.0	65.7	46.1	3.6			
8 (19-25 Feb)	21.1	9.3	56.3	36.1	5.4			
9 (26-04 Mar)	18.2	7.5	60.7	48.0	4.8			
10 (05-11 Mar)	19.5	8.1	56.9	49.3	18.0			
11 (12-18 Mar)	19.8	9.3	63.7	54.3	2.0			
12 (19-25 Mar)	15.7	6.2	76.7	68.6	43.9			
13 (26-01 Apr)	18.1	7.2	65.1	55.4	23.7			
14 (02-08 Apr)	16.7	6.7	67.3	59.3	60.5			
15 (09-15 Apr)	22.2	11.4	43.7	29.9	0.0			
16 (16-22 Apr)	24.8	13.5	51.7	40.3	87.6			
17 (23-29 Apr)	20.4	9.3	48.7	41.7	23.7			

NORTH WESTERN PLAINS ZONE

DELHI	Latitude 28^0 40' N		Longitude 70^0 79' E				Height above MSL 163.4 m	
40(01-07 Oct)	34.2	23.7	88.7	65.9	0	4.4	4.2	7.0
41(08-14 Oct)	27.5	21.5	93.1	76.9	19.3	2.3	4.0	2.9
42(15-21 Oct)	32.4	19.4	86.7	41.6	0	3.9	1.7	8.3
43(22-28 Oct)	31.2	17.0	85.3	43.0	0	3.8	1.9	7.5
44(29-04 Nov)	31.3	16.0	92.1	41.6	0	2.2	1.2	2.6
45(05-11 Nov)	29.9	19.0	90.6	54.6	0	1.7	1.8	2.5
46(12-18 Nov)	27.5	16.2	88.9	40.3	0	1.7	3.1	6.8
47(19-25 Nov)	26.1	11.0	87.0	33.9	0	2.4	2.4	7.2
48(26-02 Dec)	25.9	8.6	87.6	40.3	0	2.8	1.4	5.8
49(03-09 Dec)	24.1	7.9	87.6	37.0	0	3.0	2.4	5.2
50(10-16 Dec)	25.6	7.9	86.3	39.4	0	2.9	3.5	7.0
51(17-23 Dec)	21.9	5.0	89.6	52.6	0	2.5	1.9	5.6
52(24-31 Dec)	18.7	5.7	87.6	62.3	0	2.3	3.9	3.6
1(01-07 Jan)	16.7	4.3	91.7	68.6	0	1.7	2.9	2.2
2(08-14 Jan)	17.7	4.6	92.0	62.3	0	1.7	3.6	2.5
3(15-21 Jan)	18.3	3.6	87.4	43.0	0	2.1	3.8	7.3
4(22-28 Jan)	20.8	9.0	87.3	57.6	0	2.1	4.0	2.3
5(29-04 Feb)	21.0	8.0	83.9	64.0	4.8	2.2	5.3	5.5
6(05-11 Feb)	26.3	11.7	80.3	43.0	0	3.0	3.6	8.2
7(12-18 Feb)	26.2	9.2	78.1	45.3	0	3.1	6.0	7.5
8(19-25 Feb)	30.8	11.5	90.8	45.3	0	3.5	2.6	7.6
9(26-04 Mar)	30.5	13.5	81.0	41.3	0	3.5	3.2	7.2
10(05-11 Mar)	29.6	13.9	82.3	39.1	0	4.0	3.6	7.4
11(12-18 Mar)	32.3	16.3	79.6	38.6	0	4.1	2.5	7.0
12(19-25 Mar)	26.7	13.8	90.7	54.4	8	3.0	3.5	5.0
13(26-01 Apr)	30.7	15.9	86.7	44.7	7.7	4.0	4.4	8.3
GURDASPUR	**Latitude 32^0 05' N**		**Longitude 75^0 42' E**				**Height above MSL 221.9 m**	
40(01-07 Oct)	32.4	22.4	81	63	0	5.3	2.4	27.1
41(08-14 Oct)	30.4	19.2	85	73	0.3	4.1	2.7	20.4
42(15-21 Oct)	30.6	16.5	91	69	0	6	1.1	22.4

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
43(22-28 Oct)	30.5	14	92	67	0	6.7	1.5	23.8
44(29-04 Nov)	29.1	15.5	90	69	0	4.5	1.3	23.3
45(05-11 Nov)	26.8	15.1	91	66	9.9	3.3	2.7	21
46(12-18 Nov)	24.6	10.3	92	50	6	6.3	2.9	22.2
47(19-25 Nov)	24.5	8	90	41	0	7.3	2.2	26.4
48(26-02 Dec)	24.2	7.6	91	41	0	6.6	1.3	27.5
49(03-09 Dec)	23	6.9	90	49	0	4.6	0.5	24.4
50(10-16 Dec)	23.2	5.5	93	49	0	6	0.9	23.6
51(17-23 Dec)	18.4	4.8	96	64	0	3	0.7	19.8
52(24-31 Dec)	13.2	5	96	82	0	0.6	1.8	11
1(01-07 Jan)	11.1	3.6	98	88	0	0.7	2.5	8.5
2(08-14 Jan)	13.2	5.9	97	79	2.7	1.6	3.4	6.7
3(15-21 Jan)	16.3	4.4	95	71	1.9	4.8	2.7	18.9
4(22-28 Jan)	17.8	6.5	81	65	6.8	3.9	2.9	19.8
5(29-04 Feb)	18.8	6.6	92	66	18	3.8	2.7	17
6(05-11 Feb)	22.4	9.3	90	49	1.4	4.9	3.8	23.1
7(12-18 Feb)	23.8	8.4	85	52	0	6.6	2.4	28.9
8(19-25 Feb)	26	10.6	85	53	0	4.6	2.4	27.8
9(26-04 Mar)	25.8	13	86	57	3.2	5.3	2.5	23.4
10(05-11 Mar)	28.2	13.3	81	52	0	7.2	2.8	31
11(12-18 Mar)	28.1	14.8	84	57	16	4	3	22.3
12(19-25 Mar)	24.5	14.2	88	58	36.4	2.6	4	19.7
13(26-01 Apr)	26	15.1	87	60	19.5	4.1	3.3	23.5
14(02-08 Apr)	27.9	14.9	83	51	6.1	6.7	2.4	27.5
15(09-15 Apr)	35.3	17.5	75	34	0	8.6	2.3	37.5
16(16-22 Apr)	34.6	18.6	74	45	10.4	4.4	4.5	28.4
17(23-29 Apr)	35.4	18.6	74	39	8.8	7.5	4.4	29.5
18(30-06 May)	32	21.5	69	45	0	5.2	3.4	4.6
HISAR	**Latitude 29º10' N**		**Longitude 75º 46' E**			**Height above MSL 215.2 m**		
40(01-07 Oct)	33.5	23.4	84.3	51.6	0	4.1	3.8	8.2
41(08-14 Oct)	27	20.5	93.8	72.1	1.3	2.8	4.3	3.6
42(15-21 Oct)	32.9	18.2	83.9	40.5	0	2.6	1.5	8.4
43(22-28 Oct)	31.5	15.5	89.5	48.8	0	2.8	1.4	7.9
44(29-04 Nov)	32.2	16	92.8	55.4	0	2.7	1	5.1
45(05-11 Nov)	29.9	16.5	94	60.7	4.2	2.2	3.7	3.9
46(12-18 Nov)	26.6	12	87.6	48.1	0	1.9	2.8	6.8
47(19-25 Nov)	25.8	8	84.7	47.6	0	2.1	2.1	7.8
48(26-02 Dec)	26	7.2	93.7	53.3	0	1.9	1.2	6.9
49(03-09 Dec)	23.5	7.4	94.5	66.9	0	1.1	1.6	6.4
50(10-16 Dec)	24.6	6.9	91.6	46.4	0	1.9	2.1	7.8
51(17-23 Dec)	19.3	5.6	97.8	76.5	0	1.3	2	5.5
52(24-31 Dec)	15.7	5.7	97.5	76.2	0	1.1	3.9	3.5
1(01-07 Jan)	14.6	4.4	100	85.2	0	0.9	3	2.6
2(08-14 Jan)	15.2	6.3	99.6	84.2	0	1.1	3.6	2.3
3(15-21 Jan)	18	3.6	91.3	51.7	0.7	1.4	3.2	6.5
4(22-28 Jan)	19.2	7.4	97.6	70.6	4	1.4	3.5	4.5
5(29-04 Feb)	20.5	6.6	96.7	66.1	0	1.5	4.6	5.9
6(05-11 Feb)	25.3	9.2	92.9	56.1	0	2.3	4	8.2
7(12-18 Feb)	25.3	7.4	94.6	53.9	0	2.1	2.9	7.2
8(19-25 Feb)	28.1	11.1	95.6	61.4	0	1.9	3.2	6.5
9(26-04 Mar)	28.1	12.2	93.4	57	0	2.6	3.3	6.7
10(05-11 Mar)	29	11.3	88.3	51.3	0	2.8	2.3	7
11(12-18 Mar)	30.7	15.2	88.9	60.4	5.4	2.8	3.6	5.2
12(19-25 Mar)	27.3	15.1	90.9	60.1	3.6	3.4	5.5	5
13(26-01 Apr)	29.3	15.1	86.9	51.5	3.8	3.6	5.1	5.3
14(02-08 Apr)	31.8	14.8	77	30.5	5.2	5	5	8.8
15(09-15 Apr)	37.3	17.3	64.4	16.8	0	5.6	2.8	8.9
16(16-22 Apr)	37.4	19.1	58.9	25	0	7.3	5.9	8.7

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
17(23-29 Apr)	34.5	19.6	52.3	32.2	0	6	5.6	5.7
JAMMU	**Latitude 32º44' N**		**Longitude 74º54'' E**			**Height Above MSL 356 m**		
40(01-07 Oct)	34.3	22.0	83.3	48.1	0.0	38.2	1.5	8.0
41(08-14 Oct)	30.2	18.9	89.6	58.6	45.8	26.6	2.3	5.4
42(15-21 Oct)	30.1	16.5	81.7	45.0	2.4	26.4	2.4	7.1
43(22-28 Oct)	30.6	12.9	83.9	40.9	0.0	29.2	1.1	9.1
44(29-04 Nov)	30.0	14.4	87.9	45.4	0.0	28.2	1.1	6.1
45(05-11 Nov)	25.9	13.1	85.1	55.1	14.2	23.2	2.8	3.6
46(12-18 Nov)	24.5	9.3	91.1	49.3	10.6	18.8	1.7	5.9
47(19-25 Nov)	25.3	7.3	93.7	42.4	0.0	17.4	0.8	7.0
48(26-02 Dec)	24.5	7.5	94.6	47.0	0.0	23.2	0.7	6.3
49(03-09 Dec)	23.9	6.4	92.1	43.7	0.0	19.0	1.3	6.3
50(10-16 Dec)	24.1	6.3	90.0	38.3	0.0	21.0	1.9	7.3
51(17-23 Dec)	19.2	5.1	94.6	57.6	0.0	16.0	1.3	4.8
52(24-31 Dec)	16.5	4.4	95.1	68.0	9.6	8.6	2.1	3.5
1(01-07 Jan)	12.4	4.0	95	81	0.0	6.6	2.0	1.6
2(08-14 Jan)	13.7	6.7	96	85	14.0	3.4	2.4	1.1
3(15-21 Jan)	17.6	3.9	95	56	5.0	8.2	1.6	4.3
4(22-28 Jan)	19.1	4.7	95	64	0.6	9.0	1.7	3.2
5(29-04 Feb)	20.3	6.4	92	64	32.2	10.4	2.2	4.2
6(05-11 Feb)	22.4	8.6	86	55	0.4	17.2	3.0	4.8
7(12-18 Feb)	24.8	6.4	91	49	0.0	23.2	2.0	6.1
8(19-25 Feb)	27.0	9.5	88	44	0.0	24.8	1.7	5.1
9(26-04 Mar)	27.0	11.5	86	44	0.2	24.0	2.5	5.3
10(05-11 Mar)	28.7	11.1	91	44	0.0	27.6	2.3	7.7
11(12-18 Mar)	27.7	14.1	92	56	20.0	23.8	2.7	3.8
12(19-25 Mar)	24.6	12.7	92	57	18.2	19.2	3.0	3.4
13(26-01 Apr)	26.2	13.1	95	55	57.8	19.0	3.7	4.9
14(02-08 Apr)	28.5	12.4	93	45	28.6	18.6	2.6	7.0
15(09-15 Apr)	35.1	15.6	85	28	0.0	34.8	1.9	8.5
16(16-22 Apr)	32.9	19.8	69	32	11.8	30.6	5.0	4.4
17(23-29 Apr)	34.1	16.0	61	24	0.2	36.6	5.3	7.5
18(30-06 May)	29.7	17.5	84	51	73.6	26.8	3.7	5.3
KARNAL	**Latitude 29^{0}43' N**		**Longitude 76^{0}58' E**			**Height above MSL 245 m**		
44(29-04 Nov)	30.2	15.4	96.9	48.1	00.0	01.7	00.1	04.4
45(05-11 Nov)	28.5	16.2	94.7	58.7	00.0	01.4	00.6	00.0
46(12-18 Nov)	27.0	12.2	90.3	41.9	00.0	02.3	00.7	06.5
47(19-25 Nov)	26.1	09.1	88.7	33.9	00.0	01.8	00.2	07.5
48(26-02 Dec)	25.7	09.1	94.9	42.7	00.0	01.5	00.1	06.8
49(03-09 Dec)	24.2	08.7	97.4	54.9	00.0	01.6	00.3	05.7
50(10-16 Dec)	24.2	08.5	94.4	47.4	00.0	02.0	00.5	07.9
51(17-23 Dec)	18.3	07.5	100.0	76.3	00.0	00.6	00.3	03.1
52(24-31 Dec)	16.0	06.8	97.1	72.0	01.2	00.8	00.8	02.2
1(01-07 Jan)	13.1	06.1	99.1	80.3	00.0	00.6	00.3	00.8
2(08-14 Jan)	15.5	08.6	99.0	81.3	03.8	00.9	00.9	00.6
3(15-21 Jan)	17.0	04.5	91.9	53.9	10.6	01.5	00.4	05.3
4(22-28 Jan)	19.4	07.4	94.6	70.9	00.0	01.3	00.6	04.4
5(29-04 Feb)	20.1	07.8	97.3	69.7	08.2	01.7	02.5	06.5
6(05-11 Feb)	23.9	09.3	95.0	51.0	00.0	02.3	01.4	08.3
7(12-18 Feb)	23.8	08.1	92.0	46.9	00.0	02.5	01.6	07.7
8(19-25 Feb)	27.4	11.2	95.4	50.9	00.0	02.3	01.0	07.3
9(26-04 Mar)	28.2	12.1	90.1	50.7	00.0	03.0	00.6	08.1
10(05-11 Mar)	27.9	12.9	93.7	50.6	00.0	03.4	00.7	07.6
11(12-18 Mar)	30.4	14.4	92.1	48.7	00.5	03.4	01.1	06.5
12(19-25 Mar)	25.2	14.3	92.9	65.0	81.2	02.4	02.0	05.3
13(26-01 Apr)	28.1	14.5	84.0	51.3	14.5	04.0	01.3	06.9
14(02-08 Apr)	30.3	14.4	76.9	31.0	05.6	04.4	01.1	09.1
15(09-15 Apr)	36.3	16.5	59.1	16.7	00.0	06.5	00.9	09.6

Julian weeks	Temperature ^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
16(16-22 Apr)	37.9	20.4	56.7	25.6	14.0	07.0	01.7	09.3
17(23-29 Apr)	33.8	18.9	57.0	29.3	18.6	06.8	02.1	07.3
18(30-06 May)	27.6	18.7	86.0	58.7	25.9	02.9	02.7	03.8
19(07-13 May)	36.3	18.9	57.6	24.4	00.0	07.3	02.0	10.1
20 (14-20 May)	37.9	23.3	57.7	27.9	26.4	07.8	02.5	09.1
LUDHIANA	**Latitude 30^{o}54' N**		**Longitude 75^{o}52' E**				**Height above MSL 247 m**	
40(01-07 Oct)	32.9	22.9	91	51	2.8	23.6	8.9	2.4
41(08-14 Oct)	29.6	19.9	90	55	2.6	19.8	6.9	2.9
42(15-21 Oct)	32.1	18.5	79	34	0	20.9	8.7	2.7
43(22-28 Oct)	31.0	15.1	88	32	0	20.1	8.4	1.3
44(29-04 Nov)	30.3	16.3	88	39	0	13.8	1.8	1.3
45(05-11 Nov)	28.2	16.7	85	45	0	12	1.6	2.6
46(12-18 Nov)	25.6	11.5	89	35	0	14.8	6.8	2.3
47(19-25 Nov)	26.2	8.7	93	27	0	14.8	8.4	1.8
48(26-02 Dec)	25.1	8.5	94	35	0	10	7.5	1.2
49(03-09 Dec)	23.8	8.2	93	37	0	10.5	7.3	1.7
50(10-16 Dec)	23.6	7.9	91	33	0	14.8	8.7	2.9
51(17-23 Dec)	17.3	7.5	95	66	0	8.4	2.8	2.7
52(24-31 Dec)	15.6	6.6	95	67	0.6	7	2.9	3.6
1(01-07 Jan)	13.3	5.5	93	70	0	4.9	1.4	2.7
2(08-14 Jan)	14.8	7.9	95	72	0	6.2	1.4	3.3
3(15-21 Jan)	18.1	4.3	89	37	0	12.8	6.9	3
4(22-28 Jan)	19.4	7.6	90	56	18.1	12.6	5.4	3.6
5(29-04 Feb)	20.3	8.6	93	57	14	14.4	6.7	4.7
6(05-11 Feb)	23.0	10.0	87	45	0	15.2	6.9	4.2
7(12-18 Feb)	24.6	9.2	87	38	0	17.4	7.8	3.2
8(19-25 Feb)	27.5	12.1	90	43	0	17.4	8.4	2.8
9(26-04 Mar)	26.8	13.7	88	43	2.8	19.4	8.1	3.1
10(05-11 Mar)	28.5	13.6	89	40	0	26.4	10.3	2.8
11(12-18 Mar)	28.2	15.8	87	46	19.2	25.6	7.5	3.6
12(19-25 Mar)	25.5	14.7	88	53	33	21.8	6.8	4
13(26-01 Apr)	26.5	15.7	87	49	10.4	23.3	7.4	4.2
14(02-08 Apr)	28.0	14.4	81	41	14.6	28.7	10.4	3.4
15(09-15 Apr)	36.1	17.7	75	19	0	44.2	11.1	2.7
16(16-22 Apr)	35.8	19.9	62	25	5.8	50.2	9.3	4.8
PANTNAGAR	**Latitude 29^0 N**		**Longitude 79^0 30' E**				**Height above MSL 243.84 m**	
40(01-07 Oct)	32.4	23.0	88.4	62.0	60.6	3.9	2.8	7.8
41(08-14 Oct)	26.3	19.5	89.9	69.0	233.7	4.5	3.8	3.9
42(15-21 Oct)	30.7	18.0	84.9	50.3	0.0	3.3	0.9	8.2
43(22-28 Oct)	30.4	14.3	87.7	42.6	0.0	3.8	0.4	9.5
44(29-04 Nov)	28.7	15.3	89.0	49.1	0.0	2.8	0.3	7
45(05-11 Nov)	27.8	15.6	88.3	55.3	0.0	1.9	0.5	1.5
46(12-18 Nov)	26.8	10.2	90.7	40.3	0.0	2.4	0.8	7.5
47(19-25 Nov)	26.6	9.6	92.9	40.9	0.0	2.4	0.6	7.9
48(26-02 Dec)	26.8	10.6	91.4	43.0	0.0	2.3	0.4	8.2
49(03-09 Dec)	24.8	9.0	95.0	46.3	0.0	1.9	0.8	6.8
50(10-16 Dec)	24.6	6.0	94.1	42.6	0.0	1.8	1.1	8.1
51(17-23 Dec)	22.9	6.8	90.7	55.1	0.0	1.6	1.6	6.7
52(24-31 Dec)	18.2	6.0	93.1	65.1	0.0	1.3	2.1	3.7
1(01-07 Jan)	13.0	6.6	92.7	87.6	0.0	1.1	1.7	1.3
2(08-14 Jan)	14.8	7.1	90.1	69.7	3.8	1.6	2.0	2.3
3(15-21 Jan)	18.6	6.5	88.3	49.3	0.0	1.9	2.1	4.1
4(22-28 Jan)	22.6	9.9	91.3	60.7	10.7	2.9	3.0	5.2
5(29-04 Feb)	19.1	9.1	92.4	72.0	1.2	2.4	3.9	2.9
6(05-11 Feb)	24.2	9.1	92.6	46.7	0.0	2.5	1.9	7.2
7(12-18 Feb)	25.1	8.9	84.9	35.7	0.0	3.0	5.0	7.5
8(19-25 Feb)	28.1	11.0	88.7	42.9	8.4	3.3	2.9	8.6
9(26-04 Mar)	29.3	12.2	87.1	36.4	0.0	3.5	3.9	8.5

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
10(05-11 Mar)	29.5	12.3	88.4	32.4	0.0	4.3	3.1	8.5
11(12-18 Mar)	30.5	14.3	85.1	42.3	0.0	4.0	1.7	8.2
12(19-25 Mar)	25.7	13.8	89.7	53.6	69.0	4.1	2.5	4.9
13(26-01 Apr)	29.6	14.0	85.4	36.3	32.4	4.2	4.5	8.9
14(02-08 Apr)	29.9	13.5	80.1	28.3	9.2	4.9	4.2	9.6
15(09-15 Apr)	34.9	14.8	80.4	18.7	0.0	6.3	3.3	10.7
16(16-22 Apr)	37.4	18.6	62.7	19.4	0.0	7.6	3.2	9.8
SRIGANGANAGAR	**Latitude 29^{0}66' N**				**Longitude 75^{0}53' E**		**Height above MSL 175 m**	
40(01-07 Oct)	36.21	25.14	80.57	47.29	0	4.81		6.09
41(08-14 Oct)	32.77	23.37	85.14	55.29	0	4.04		5.27
42(15-21 Oct)	33.69	20.06	86.43	58.86	0	3.77		5.29
43(22-28 Oct)	32.47	18.99	92.14	67.43	0	3.1		5.46
44(29-04 Nov)	32.83	18.36	93	60.43	0	2.66		5.14
45(05-11 Nov)	31.73	17.54	84	55.29	0	1.71		3.89
46(12-18 Nov)	29.06	15.77	88.57	62	1.4	0.76		1.8
47(19-25 Nov)	27.67	14.36	86.57	53.14	0	1.79		4.77
48(26-02 Dec)	26.81	13.24	75.71	55.14	0	1.93		4.37
49(03-09 Dec)	25.13	11.1	80.86	52.43	0	0.83		2.41
50(10-16 Dec)	25.77	10.39	81.29	48.86	0	0.77		3.24
51(17-23 Dec)	20.29	8.33	89.86	55.71	0	0.6		3.04
52(24-31 Dec)	15.48	6.99	86.13	78.88	0	0.83		3.04
1(01-07 Jan)	16.63	4.57	78.29	65.57	0	0.46		2.74
2(08-14 Jan)	14.54	5.26	89.43	74.43	0	0.09		0.89
3(15-21 Jan)	17.34	4.97	83.71	54.71	1.1	0.67		3.99
4(22-28 Jan)	19.39	7.6	85	50.14	0	0.51		2.94
5(29-04 Feb)	20.06	11.09	83.86	62.14	0	0.99		3.74
6(05-11 Feb)	24.99	12.97	78.29	54.43	0	1.97		5.66
7(12-18 Feb)	27.27	14.16	82.71	62.57	0	2.47		6.16
8(19-25 Feb)	28.4	14.27	79.14	57.29	0	2.3		5.06
9(26-04 Mar)	27.56	14.54	76.29	50.86	0	2.53		5.7
10(05-11 Mar)	29.51	15.57	69.71	44.29	0	3		6.31
11(12-18 Mar)	30.73	15.33	73.57	52.71	0	3.36		5.86
12(19-25 Mar)	25.39	14.9	74.86	69.00	15.1	0.66		2.4
13(26-01 Apr)	28.34	16.53	74.29	68.14	22.6	1.5		5.06
14(02-08 Apr)	30.16	16.27	74.57	67.29	2.8	1.71		3.59
15(09-15 Apr)	37.39	18.77	64.86	53.00	0	5.1		7.34
16(16-22 Apr)	37.06	19.43	68	60.43	4.8	4.86		7
17(23-29 Apr)	36.16	21.21	53.14	66.57	0	4.13		5.64
18(30-06 May)	33.5	22.43	64.43	66.14	7.2	2.41		4.2
19(07-13 May)	39.34	22.41	44.71	57.43	0	6.34		7.24
20(14-20 May)	39.29	21.33	52.12	55.34	0	4.33		6.51
21(21-27 May)	39.84	22.14	58.37	68.29	0	3.41		4.38

NORTH EASTERN PLAINS ZONE

BURDWAN	Latitude 23^{0}15' N		Longitude 87^{0}52'E		Height above MSL 32 m			
40(01-07 Oct)	32.97	25.61			22.8			
41(08-14 Oct)	34.21	24.98			33			
42(15-21 Oct)	33.02	22.98			0			
43(22-28 Oct)	31.15	21.75			0.4			
44 (29-04 Nov)	30.71	19.35			0			
45 (05-11 Nov)	30.94	18.27			0			
46 (12-18 Nov)	29.8	15.34			0			
47 (19-25 Nov)	29.11	14.95			0			
48 (26-02 Dec)	29.27	15.41			0			
49 (03-09 Dec)	27.82	13.98			0			

Julian weeks	Temperature ^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
50 (10-16 Dec)	28.6	13.45			0			
51 (17-23 Dec)	26.35	12.75			0			
52 (24-31 Dec)	27.15	13.16			0			
1 (01-07 Jan)	23.28	11.14			0			
2 (08-14 Jan)	25.84	10.41			0			
3 (15-21 Jan)	23.72	12.07			0			
4 (22-28 Jan)	28.62	15.78			0			
5 (29-04 Feb)	27.3	13.3			0			
6 (05-11 Feb)	29.65	14.01			0			
7 (12-18 Feb)	29.15	14.08			0			
8 (19-25 Feb)	32.35	20.4			0			
9 (26-04 Mar)	33.88	17.7			0			
10 (05-11 Mar)	34.42	18.7			0			
11 (12-18 Mar)	32.62	20.2			18.6			
12 (19-25 Mar)	30.88	20.57			14.6			
13 (26-01 Apr)	33.47	23			20.8			
14 (02-08 Apr)	34.35	22.22			0			
15 (09-15 Apr)	38.84	23.6			0			
16 (16-22 Apr)	41.38	26.41			0			
17 (23-29 Apr)	35.57	23.77			0			
COOCHBEHAR	**Latitude 26^{0}19'86" N**		**Longitude 89^{0}23'53" E**				**Height above MSL 43 m**	
45(05-11 Nov)	31.14	13.37	74.43	57.14	0.0			6.71
46(12-18 Nov)	30.03	12.06	72.71	52.14	0.0			6.43
47(19-25 Nov)	29.51	9.80	70.14	46.86	0.0			7.17
48(26-02 Dec)	29.46	9.24	68.57	45.43	0.0			7.10
49(03-09 Dec)	29.41	8.86	71.71	46.29	0.0			6.79
50(10-16 Dec)	27.51	8.84	84.43	50.14	0.0			5.84
51(17-23 Dec)	27.07	8.84	82.71	53.29	0.0			5.19
52(24-31 Dec)	24.01	8.04	96.57	56.29	0.0			2.87
1(01-07 Jan)	23.19	6.56	93.86	56.86	0.0			5.57
2(08-14 Jan)	24.81	6.86	96.00	52.14	0.0			5.71
3(15-21 Jan)	20.91	8.41	95.14	63.29	0.0			5.57
4(22-28 Jan)	25.40	8.69	82.14	45.57	0.0			5.43
5(29-04 Feb)	25.93	12.61	93.14	60.43	0.0			3.29
6(05-11 Feb)	24.36	12.27	91.29	61.29	0.0			6.29
7(12-18 Feb)	26.14	11.40	76.00	47.71	0.0			5.29
8(19-25 Feb)	28.53	15.51	83.00	54.71	0.0			5.29
9(26-04 Mar)	29.60	15.91	71.14	48.71	0.0			5.29
10(05-11 Mar)	31.24	16.39	69.57	42.57	0.0			3.71
11(12-18 Mar)	31.31	16.46	67.57	42.43	2.9			3.33
12(19-25 Mar)	26.43	16.47	83.29	65.43	12.0			3.33
13(26-01 Apr)	29.60	18.31	82.00	56.43	0.0			6.10
KANPUR	**Latitude 26^{0}29'N**		**Longitude 80^{0}18'E**				**Height above MSL 125.9 m**	
40 (01-07 Oct)	36.81	26.01	91.14	67.31	62.3			
41 (08-14 Oct)	28.7	21.7	94	71	159			
42 (15-21 Oct)	31.65	18.7	83.7	47.85				
43 (22-28 Oct)	31.36	15.97	87.85	42				
44 (29-04 Nov)	30.73	13.77	88.42	44.28				
45 (05-11 Nov)	30.02	16.2	93.71	50.71				
46 (12-18 Nov)	28.45	11.08	71.85	39.14				
47 (19-25 Nov)	26.1	10.02	87.42	35				
48 (26-02 Dec)	27.08	10.32	91.85	41.14				
49 (03-09 Dec)	24.7	8.1	90.85	54				
50 (10-16 Dec)	22.51	10.28	86.57	41.57				
51 (17-23 Dec)	23.2	7.6	95	54				
52 (24-31 Dec)	22.42	7.72	91.87	55.87				
1 (01-07 Jan)	23.38	10.31	90.14	47.85				
2 (08-14 Jan)	26.51	11.45	85.42	48.85				

Julian weeks	Temperature ^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
3 (15-21 Jan)	28.7	9.45	91	52.85				
4 (22-28 Jan)	31.1	12.21	92.14	45.42	96			
5 (29-04 Feb)	15.1	7.05	95.25	60.75				
6 (05-11 Feb)	14.07	4.08	96.14	75.28				
7 (12-18 Feb)	19.38	5.8	92.14	56.14				
8 (19-25 Feb)	22.11	16.94	93.83	61.42				
9 (26-04 Mar)	21.56	18.1	90.8	66.25	3.3			
10 (05-11 Mar)	30.68	15.25	87	55.14				
11 (12-18 Mar)	29.7	15.8	91.42	59.28				
12 (19-25 Mar)	24.3	15.71	92.57	67.28				
13 (26-01 Apr)	32.82	16.4	82.28	46.57	12.2			
14 (02-08 Apr)	32.1	16.51	68.42	27.57	18.2			
15 (09-15 Apr)	37.2	17.8	58.42	18.42				
16 (16-22 Apr)	39.62	22.51	58.57	19.42				
17 (23-29 Apr)	34.31	19.25	57.85	38.85	14.6			
RANCHI	**Latitude 23^{0}21'N**		**Longitude 85^{0}20'E**				**Height above MSL 629 m**	
40 (01-07 Oct)	31.9	23.8	86	69	5.1	19.8	2.5	55.9
41 (08-14 Oct)	32.0	22.5	85	69	0	25.1	2.0	61.8
42 (15-21 Oct)	31.7	22.1	87	69	0	16.6	2.1	35
43 (22-28 Oct)	29.8	19.0	86	69	0	19	1.9	55.9
44 (29-04 Nov)	29.8	19.6	85	70	0	19.6	2.1	53
45 (05-11 Nov)	28.8	17.4	84	68	4.2	16.2	2.1	55.7
46 (12-18 Nov)	28.7	17.7	86	70	0	16.9	2.0	25.8
47 (19-25 Nov)	29.0	19.2	86	68	0	23	2.2	54.9
48 (26-02 Dec)	26.0	9.3	85	70	0	24	2.5	54.8
49 (03-09 Dec)	26.8	9.9	85	69	0	20.6	2.2	54.2
50 (10-16 Dec)	25.7	7.5	85	69	0	20	2.4	61.6
51 (17-23 Dec)	22.0	3.6	86	69	0	17.6	3.4	60.1
52 (24-31 Dec)	23.3	8.0	87	69	0	18.7	2.7	34
1 (01-07 Jan)	21.0	5.6	87	69	0	11.5	39.4	11.5
2 (08-14 Jan)	25.9	13.2	86	69	0	0	11.8	0
3 (15-21 Jan)	23.4	7.4	86	68	0	16.6	61.6	16.6
4 (22-28 Jan)	24.5	10.9	86	70	0	20.7	54.9	20.7
5 (29-04 Feb)	25.8	12.6	85	70	0	19.9	62.9	19.9
6 (05-11 Feb)	26.2	12.8	85	69	0	21.4	60.6	21.4
7 (12-18 Feb)	25.2	8.8	85	70	0	23.2	47.3	23.2
8 (19-25 Feb)	27.8	14.8	86	69	0	25.6	65.2	25.6
9 (26-04 Mar)	30.8	16.8	85	68	0	23.7	66.3	23.7
10 (05-11 Mar)	31.8	13.5	85	69	0	24.7	65.2	24.7
11 (12-18 Mar)	32.3	16.2	87	70	0	23.7	60.5	23.7
12 (19-25 Mar)	34.9	16.6	85	70	2.1	25.6	66.4	25.6
13 (26-01 Apr)	34.4	18.8	85	70	0	26.6	67	26.6
14 (02-08 Apr)	36.1	24.8	87	70	0	29.7	66.1	29.7
15 (09-15 Apr)	38.1	22.4	85	69	0	28.2	66.9	28.2
SABOUR	**Latitude 25^0 23' N**		**Longitude 87^0 07' E**				**Height above MSL 37.1m**	
40 (01-07 Oct)	32.1	24.3	90.3	72.1	119.0		10.0	5.8
41 (08-14 Oct)	32.9	23.8	95.1	66.7	15.6		6.6	7.2
42 (15-21 Oct)	31.6	21.2	91.1	66.3	0.0		4.1	6.8
43 (22-28 Oct)	31.1	18.4	93.0	70.1	0.0		5.3	8.2
44 (29-04 Nov)	31.1	16.9	95.3	71.9	0.0		3.8	8.2
45 (05-11 Nov)	31.4	16.2	95.7	70.9	0.0		3.4	6.2
46 (12-18 Nov)	29.5	13.3	95.3	63.3	0.0		6.3	6.5
47 (19-25 Nov)	28.0	10.7	93.7	70.0	0.0		8.5	6.9
48 (26-02 Dec)	28.1	11.4	97.7	63.9	0.0		5.8	7.1
49 (03-09 Dec)	25.7	9.1	95.0	75.0	0.0		9.5	5.8
50 (10-16 Dec)	25.6	9.5	95.1	72.7	0.0		5.1	4.2
51 (17-23 Dec)	24.3	8.5	96.9	62.1	0.0		7.1	2.5
52 (24-31 Dec)	23.5	8.4	96.5	66.5	0.0		6.0	2.2

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
1 (01-07 Jan)	15.8	8.9	96.4	79.7	0.0		14.8	0.0
2 (08-14 Jan)	17.3	5.7	98.3	75.4	0.0		13.6	1.4
3 (15-21 Jan)	21.6	5.0	94.9	72.4	0.0		7.8	4.7
4 (22-28 Jan)	24.6	10.5	93.6	65.0	0.0		6.7	2.6
5 (29-04 Feb)	25.0	10.3	92.9	57.6	0.0		15.0	4.2
6 (05-11 Feb)	28.4	10.2	89.1	50.7	0.0		9.2	6.6
7 (12-18 Feb)	27.1	9.6	87.7	56.0	0.0		11.1	6.6
8 (19-25 Feb)	29.6	12.9	85.7	50.4	0.0		3.7	5.9
9 (26-04 Mar)	32.1	12.9	90.7	49.9	0.0		6.1	8.8
10 (05-11 Mar)	32.5	13.8	85.6	53.0	0.8		9.1	7.0
11 (12-18 Mar)	32.0	16.9	88.0	52.7	0.0		9.7	3.5
12 (19-25 Mar)	29.1	17.3	92.7	57.7	46.6		11.2	5.4
13 (26-01 Apr)	33.4	17.7	85.3	54.6	22.0		9.6	7.3
14 (02-08 Apr)	34.7	17.1	78.3	50.3	0.0		7.0	9.4
15 (09-15 Apr)	38.1	18.1	75.4	39.0	0.0		6.6	8.9
16 (16-22 Apr)	40.4	21.1	75.1	46.6	0.0		9.1	7.2
SHILLONGANI	**Latitude 26^0 21' N**		**Longitude 90^{0}45' E**				**Height above MSL 50.2 m**	
40 (01-07 Oct)	32.6	25.3	95	76	76.0			
41 (08-14 Oct)	30.9	23.6	95	80	40.4			
42 (15-21 Oct)	32.3	23.4	92	69	0.0			
43 (22-28 Oct)	28.9	17.4	95	86	52.4			
44 (29-04 Nov)	30.5	19.8	91	65	0.0			
45 (05-11 Nov)	29.6	19.2	89	65	0.0			
46 (12-18 Nov)	28.4	16.9	89	66	0.0			
47 (19-25 Nov)	28.9	14.9	88	65	0.0			
48 (26-02 Dec)	28.2	14.5	88	63	0.0			
49 (03-09 Dec)	28.0	14.2	88	62	0.0			
50 (10-16 Dec)	27.1	13.8	86	65	0.0			
51 (17-23 Dec)	26.4	13.7	87	67	0.0			
52 (24-31 Dec)	22.8	12.4	89	74	2.5			
1 (01-07 Jan)	24.6	9.9	93	58	0.0			
2 (08-14 Jan)	25.8	10.9	88	55	0.0			
3 (15-21 Jan)	22.3	11.4	93	57	0.0			
4 (22-28 Jan)	25.2	11.1	87	49	0.0			
5 (29-04 Feb)	26.9	14.6	91	55	0.0			
6 (05-11 Feb)	24.7	14.9	89	59	0.1			
7 (12-18 Feb)	26.6	14.6	86	55	0.0			
8 (19-25 Feb)	26.6	16.4	94	69	21.2			
9 (26-04 Mar)	28.6	15.9	85	60	0.0			
10 (05-11 Mar)	29.9	18.1	88	53	0.0			
11 (12-18 Mar)	28.8	17.6	90	60	6.6			
12 (19-25 Mar)	24.8	17.6	91	67	42.4			
13 (26-01 Apr)	28.1	18.1	84	59	11.8			
14 (02-08 Apr)	28.8	17.9	87	60	32.6			
15 (09-15 Apr)	33.2	19.9	82	53	0.0			
16 (16-22 Apr)	32.4	21.6	91	62	25.2			
17 (23-29 Apr)	30.2	18.4	89	65	15.8			
VARANASI	**Latitude 25^0 20' N**		**Longitude 83^0 03' E**				**Height above MSL 128.93 m**	
45 (05-11 Nov)	32.9	20.6	93	70	24.8	2.8	2.8	4
46 (12-18 Nov)	32.3	20.5	94	66	2.6	2.6	2	4.6
47 (19-25 Nov)	32	16.8	87	52	0	3	1	7.7
48 (26-02 Dec)	32.1	15.4	86	46	0	2.8	1.7	8.8
49 (03-09 Dec)	31.7	14.1	92	46	0	2.4	1	8.4
50 (10-16 Dec)	30.4	12.9	95	55	0	2	0.9	6.8
51 (17-23 Dec)	28.3	11.1	91	40	0	1.9	1.8	6.7
52 (24-31 Dec)	26.9	9	94	42	0	1.9	1.6	8.1
1 (01-07 Jan)	26.8	9.6	94	50	0	1.2	1	6.6

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
2 (08-14 Jan)	25.1	8.4	94	51	0	1.2	1.5	5.6
3 (15-21 Jan)	26.6	8.8	90	44	0	1.8	2.5	7.5
4 (22-28 Jan)	24.5	7.4	94	54	0	1.3	1.7	6.1
5 (29-04 Feb)	23.4	8.8	92	51	0.2	1.4	2	4.8
6 (05-11 Feb)	16.1	6.2	88	74	0	0.9	2.9	0.7
7 (12-18 Feb)	20.1	6	95	61	0	1	2.1	5
8 (19-25 Feb)	21.9	4.8	93	52	1.6	1.7	2.5	6.4
9 (26-04 Mar)	24.7	9.4	92	61	0.4	1.4	3	3.4
10 (05-11 Mar)	24.1	7.2	85	51	0	2.4	4.1	8.1
11 (12-18 Mar)	29.9	8.4	89	43	0	2.9	2.9	9.4
12 (19-25 Mar)	25.5	8.8	82	49	0	2.9	3.7	8.6
13 (26-01 Apr)	30.4	10.5	89	40	0	3	1.9	9
14 (02-08 Apr)	31.8	12.9	87	40	0	3.5	2.3	9.4
15 (09-15 Apr)	31.4	15.9	80	44	0	4.2	3.4	9

CENTRAL ZONE

BILASPUR	Latitude 22^{0}9' N		Longitude 82^{0}12' E			Height above MSL 292.3 m		
44 (29-04 Nov)	29.83	14.89	90.00	74.86	0.00	3.43	1.29	8.83
45 (05-11 Nov)	31.20	16.20	91.00	64.29	0.00	3.29	0.27	7.49
46 (12-18 Nov)	29.69	13.17	86.57	46.29	0.00	3.77	0.81	8.61
47 (19-25 Nov)	29.69	13.17	91.86	47.00	0.00	3.23	0.33	8.61
48 (26-02 Dec)	28.97	11.29	91.29	49.57	0.00	3.17	0.18	8.14
49 (03-09 Dec)	27.86	11.79	85.71	38.86	0.00	2.94	0.38	7.26
50 (10-16 Dec)	29.49	16.63	85.71	38.86	0.00	2.94	0.38	3.89
51 (17-23 Dec)	28.46	10.43	94.86	45.00	0.00	3.00	0.22	9.20
52 (24-31 Dec)	29.73	12.53	89.43	45.29	0.00	3.17	0.86	8.31
1 (01-07 Jan)	25.6	11.74	91	57.43	0	2.94	0.69	4.71
2 (08-14 Jan)	28.69	9.63	88.14	55.29	0.00	2.31	0.16	8.97
3 (15-21 Jan)	27.97	13.46	87.86	58.14	0.00	2.57	0.77	4.33
4 (22-28 Jan)	31.31	14.14	93.00	67.29	0.00	3.20	0.10	8.24
5 (29-04 Feb)	28.75	12.65	90.00	52.47	0.00	2.88	0.45	6.81
6 (05-11 Feb)	31.49	11.26	80.43	31.14	0.00	3.77	0.07	9.97
7 (12-18 Feb)	30.97	11.34	86.43	61.86	0.00	5.03	0.44	9.61
8 (19-25 Feb)	33.91	14.51	83.57	47.29	0.00	5.06	0.19	9.16
9 (26-04 Mar)	34.54	16.60	74.43	39.43	0.00	5.06	0.44	8.44
10 (05-11 Mar)	34.37	17.20	74.71	42.71	2.00	5.54	1.09	8.96
11 (12-18 Mar)	34.11	19.03	75.71	50.29	11.10	5.33	0.87	5.51
12 (19-25 Mar)	28.89	17.26	92.43	54.00	29.10	3.34	1.15	6.93
Dhanduka	**Latitude 22°30' N**		**Longitude 72°30' E**			**Height above MSL 39.78 m**		
40 (01-07 Oct)	33.8	17.4	65.7	55.5	-		2.10	3.70
41 (08-14 Oct)	34.4	20.9	70.4	52	-		2.00	6.10
42 (15-21 Oct)	35.7	21.9	55	37.4	-		1.70	6.30
43 (22-28 Oct)	34.1	20.3	53	38.8	-		1.50	6.30
44 (29-04 Nov)	34.6	20.4	47.7	29.2	-		1.00	6.70
45 (05-11 Nov)	35.1	20.4	50.4	26.1	-		0.50	7.20
46 (12-18 Nov)	33.6	18.8	46.2	26.2	-		0.60	7.50
47 (19-25 Nov)	31.8	15.9	42.5	24.1	-		1.00	7.50
48 (26-02 Dec)	31.8	16.2	43.7	23.1	-		0.90	8.20
49 (03-09 Dec)	31	17.2	57	35.7	-		1.00	8.40
50 (10-16 Dec)	30.2	17.9	63.4	32.4	-		1.40	7.70
51 (17-23 Dec)	32	17.6	54.7	31.1	-		0.50	8.60
52 (24-31 Dec)	27.8	14.6	56	35	-		1.50	9.20
1 (01-07 Jan)	25.9	13.6	60.2	34.4	-		0.90	8.90
2 (08-14 Jan)	28.3	13.3	60.5	34.2	-		1.00	8.90
3 (15-21 Jan)	26.2	10.8	52	26.7	-		1.50	9.50
4 (22-28 Jan)	26.1	11.8	61.4	27	-		1.70	8.40
5 (29-04 Feb)	27.5	14.8	53.7	29.8	-		2.40	6.80

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
6 (05-11 Feb)	32.3	13.9	49.2	25.4	-		1.00	10.20
7 (12-18 Feb)	34.1	14.5	45.2	20.8	-		1.30	10.40
8 (19-25 Feb)	36.2	15.9	54.7	19	-		0.70	10.40
9 (26-04 Mar)	36.3	17.3	53.1	19.4	-		1.10	10.10
10 (05-11 Mar)	35.7	19	53.5	32.8	6		2.80	9.70
11 (12-18 Mar)	35.2	19.3	60.8	38.7	-		2.00	6.80
12 (19-25 Mar)	34.2	20.2	67.4	38.5	6.4		1.20	9.40
13 (26-01 Apr)	34.8	19.8	49.4	25.4	-		1.30	9.00
INDORE	**Latitude 22^{0}37'N**		**Longitude 75^{0}50' N**		**Height above MSL 557 m**			
40 (01-07 Oct)	31.1	22.1	82.6	62.7	37.3	0	0.05	0
41 (08-14 Oct)	28.7	20.9	88.4	84.2	24.3	0	0.1	0
42 (15-21 Oct)	29.9	16.3	79.9	79.4	0	0	0.05	0
43 (22-28 Oct)	30.3	14.4	76.6	73.2	0	0	0.04	0
44 (29-04 Nov)	30	13.1	82.3	78	0	0	0.09	0
45 (05-11 Nov)	31	15.7	86.8	77	0	0	0.15	0
46 (12-18 Nov)	28.1	12	87.8	82.2	0	0	0.15	0
47 (19-25 Nov)	25.9	8.6	84.5	81.6	0	0	0.05	0
48 (26-02 Dec)	27	8.7	83.7	79.3	0	0	0.04	0
49 (03-09 Dec)	26.7	11.7	86.2	81.3	0	0	0.05	0
50 (10-16 Dec)	26.5	14.3	84.7	78.5	4.1	0	0.14	0
51 (17-23 Dec)	28.1	11.4	79.7	78.6	0	0	0.04	0
52 (24-31 Dec)	25.4	9.8	84.5	81.7	0	0	0.05	0
1 (01-07 Jan)	21.1	7.3	88.9	87.3	0	0	0.19	0
2 (08-14 Jan)	24.6	6.9	86.8	84.9	0	0	0.08	0
3 (15-21 Jan)	22.4	6.3	84.6	84.6	0	0	0.16	0
4 (22-28 Jan)	24.1	11.9	85.5	85.2	0	0	0.28	0
5 (29-04 Feb)	25.6	9.1	82.4	81.8	0	0	0.97	0
6 (05-11 Feb)	28.4	9.6	77.6	77	0	0	0.13	0
7 (12-18 Feb)	30.1	9	75.6	65	0	0	0.07	0
8 (19-25 Feb)	32.7	11	81.1	72.4	0	0	0.1	0
9 (26-04 Mar)	34.3	15.1	77.2	66.5	0	0	0.15	0
10 (05-11 Mar)	31.5	15.1	76	72.7	0	0	0.42	0
11 (12-18 Mar)	32.8	17.2	79.2	75.6	0	0	0.33	0
12 (19-25 Mar)	29.2	16.4	86.2	78.5	2.6	0	0.23	0
13 (26-01 Apr)	33.5	17.2	83	82.9	0	0	0.31	0
14 (02-08 Apr)	34.4	18.8	84.6	75.8	0	0	0.31	0
15 (09-15 Apr)	37.7	20.8	79.4	76.3	0	0	0.13	0
16 (16-22 Apr)	39	22.5	81.5	78.4	0	0	0.33	0
JABALPUR	**Latitude 23^{0}09' N**		**Longitude 79^{0}58' E**			**Height above MSL 411 m**		
40 (01-07 Oct)	31.5	22.6	88	67	27.4	3.1	2.3	6.2
41 (08-14 Oct)	30.9	22.4	90	64	62.3	3.7	3.4	7.0
42 (15-21 Oct)	29.4	16.0	84	49	0.0	3.4	2.4	9.2
43 (22-28 Oct)	30.0	13.5	83	40	0.0	2.7	1.8	9.2
44 (29-04 Nov)	29.8	12.6	85	39	0.0	2.7	1.6	8.9
45 (05-11 Nov)	30.8	13.4	85	41	0.0	2.3	1.5	7.8
46 (12-18 Nov)	28.6	10.1	78	33	0.0	2.3	1.7	7.2
47 (19-25 Nov)	26.2	7.0	80	34	0.0	1.9	1.6	7.7
48 (26-02 Dec)	26.6	7.1	79	42	0.0	1.8	1.2	7.1
49 (03-09 Dec)	26.2	7.4	85	43	0.0	2.0	2.0	7.4
50 (10-16 Dec)	26.7	11.5	84	41	0.0	2.1	2.4	6.0
51 (17-23 Dec)	26.1	8.0	77	35	0.0	2.2	1.9	9.2
52 (24-31 Dec)	26.1	9.9	81	47	0.0	1.8	1.9	6.5
1 (01-07 Jan)	20.6	6.8	88	52	0.0	1.6	4.4	5.1
2 (08-14 Jan)	24.7	5.2	74	37	0.0	2.3	1.8	9.3
3 (15-21 Jan)	22.2	6.8	85	51	0.0	1.8	3.0	5.9
4 (22-28 Jan)	27.7	13.1	90	50	1.2	2.0	3.0	4.6
5 (29-04 Feb)	27.9	11.6	87	49	0.9	2.9	4.1	6.9
6 (05-11 Feb)	28.5	7.5	74	32	0.0	2.6	1.7	10.2

Julian weeks	Temperature ^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
7 (12-18 Feb)	27.9	7.7	73	31	0.0	3.0	2.9	9.9
8 (19-25 Feb)	31.5	10.5	77	32	0.0	3.4	2.0	9.9
9 (26-04 Mar)	31.8	12.6	78	34	0.0	3.1	1.8	8.3
10 (05-11 Mar)	30.5	12.9	78	39	1.8	3.1	2.6	6.9
11 (12-18 Mar)	32.3	14.8	72	33	0.0	3.9	2.5	7.2
12 (19-25 Mar)	31.2	16.0	73	38	7.2	4.2	3.5	6.7
13 (26-01 Apr)	34.4	17.6	76	30	1.0	4.7	3.5	7.9
14 (02-08 Apr)	34.1	15.4	58	25	0.0	4.9	3.5	8.8
JUNAGARH	**Latitude 21^{0}31' N**		**Longitude 70^{0}33' E**				**Height above MSL 83 m**	
40 (01-07 Oct)	33.8	23.4	81	49	0		3.9	8.3
41 (08-14 Oct)	35	23.4	85	47	0		2.9	6.9
42 (15-21 Oct)	35.9	20.2	62	25	0		2.7	10.1
43 (22-28 Oct)	35.6	19.7	67	27	0		2.6	9.5
44 (29-04 Nov)	35.8	17.8	65	26	0		2.2	9.3
45 (05-11 Nov)	35.4	18.2	61	28	0		2.7	9
46 (12-18 Nov)	33.9	16.9	72	27	0		2.4	9.1
47 (19-25 Nov)	32.3	13.8	67	26	0		2.3	9.5
48 (26-02 Dec)	32.6	14.9	68	31	0		2.6	9.2
49 (03-09 Dec)	31.4	15.3	68	32	0		3.8	8.2
50 (10-16 Dec)	31.6	17.7	73	39	0		4.3	5.2
51 (17-23 Dec)	32.2	17.3	63	26	0		4	8.1
52 (24-31 Dec)	28.7	11.7	70	30	0		4.5	8.3
1 (01-07 Jan)	27.2	13.3	68	35	0		5.4	6.7
2 (08-14 Jan)	30	15.3	78	36	0		3.5	4.2
3 (15-21 Jan)	27.8	9.4	73	36	0		5	8.9
4 (22-28 Jan)	25.7	13.7	57	32	0		7.6	9
5 (29-04 Feb)	30.1	13.8	67	27	0		4.8	8.4
6 (05-11 Feb)	32.9	14	70	26	0		3.7	9.3
7 (12-18 Feb)	35.4	13.8	72	20	0		3.9	9.5
8 (19-25 Feb)	35.8	14.5	75	19	0		3.6	9.4
9 (26-04 Mar)	36.5	17.1	68	17	0		3.9	9.5
10 (05-11 Mar)	37.7	18.6	59	18	0		3.9	9
11 (12-18 Mar)	37	21	52	20	1.6		4.1	6.2
12 (19-25 Mar)	33.2	19.8	78	39	13.2		5.3	8.3
13 (26-01 Apr)	34.3	21.3	77	31	0		5.5	9.8
14 (02-08 Apr)	36.4	21.6	67	24	0		5.1	8
15 (09-15 Apr)	39.3	21.3	63	20	0		4.9	8.9
POWARKHEDA	**Latitude 22^{0}44'N**			**Longitude 77^{0}42' E**			**Height above MSL 299 m**	
40 (01-07 Oct)	33.9	20.9	100	58	19.4			
41 (08-14 Oct)	32.7	16.4	100	50	52.2			
42 (15-21 Oct)	31.1	15.7	96	41	0			
43 (22-28 Oct)	33.5	13.1	96	33	0			
44 (29-04 Nov)	33.5	12.2	94	36	0			
45 (05-11 Nov)	34.3	13.7	95	34	0			
46 (12-18 Nov)	31.6	10.6	94	32	0			
47 (19-25 Nov)	29.3	8.5	93	33	0			
48 (26-02 Dec)	28.5	8.2	94	34	0			
49 (03-09 Dec)	28.8	6.6	91	31	0			
50 (10-16 Dec)	30.1	8.4	86	39	0			
51 (17-23 Dec)	29.6	9.5	92	39	0			
52 (24-31 Dec)	29.6	7.9	96	25	0			
1 (01-07 Jan)	28.7	7	96	44	0			
2 (08-14 Jan)	26.5	5.1	98	40	0			
3 (15-21 Jan)	28.4	6.2	97	54	0			
4 (22-28 Jan)	28.9	13.1	96	46	0.7			
5 (29-04 Feb)	29.1	6.4	96	49	0			
6 (05-11 Feb)	30.8	6.5	95	37	0			
7 (12-18 Feb)	31.5	5.9	96	37	0			

Julian weeks	Temperature ^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
8 (19-25 Feb)	34.5	8.7	97	25	0			
9 (26-04 Mar)	34.2	10	93	37	0			
10 (05-11 Mar)	32.4	11.6	95	35	0.2			
11 (12-18 Mar)	34.9	13.3	93	20	0.8			
12 (19-25 Mar)	34.8	14.9	95	28	0			
13 (26-01 Apr)	37.8	13.6	91	38	2.6			
14 (02-08 Apr)	38.3	13.8	81	17	0			
15 (09-15 Apr)	41.5	18.9	82	22	0			
16 (16-22 Apr)	41.2	19.9	80	20	8.5			
17 (23-29 Apr)	37.8	17.7	94	19	44.3			
UDAIPUR	**Latitude 24^{0}35' N**		**Longitude 73^{0}42'E**				**Height above MSL 582 m**	
40 (01-07 Oct)	34.30	18.90	68	48	8.2	5.2	3.9	8.0
41 (08-14 Oct)	32.36	17.21	80	50	25.8	5.5	3.1	4.9
42 (15-21 Oct)	32.04	13.66	70	38	0	5.6	2.4	8.2
43 (22-28 Oct)	31.61	12.14	63	53	0	5.2	2.9	8.7
44 (29-04 Nov)	32.23	11.89	67	32	0	4.2	2.7	8.8
45 (05-11 Nov)	33.37	13.79	60	29	0	4.6	2.4	8.3
46 (12-18 Nov)	30.09	10.27	66	34	0	3.7	2.5	8.3
47 (19-25 Nov)	28.57	8.00	71	26	0	3.6	2.3	8.5
48 (26-02 Dec)	28.10	6.46	81	28	0	2.9	2.0	8.6
49 (03-09 Dec)	26.97	6.50	81	30	0	2.5	2.3	8.4
50 (10-16 Dec)	27.37	7.93	72	33	0	2.4	2.2	7.8
51 (17-23 Dec)	29.67	8.64	77	30	0	2.7	2.0	7.9
52 (24-31 Dec)	25.41	4.49	74	31	0	2.3	2.5	7.7
1 (01-07 Jan)	22.50	3.11	78	36	0	2.0	3.1	8.4
2 (08-14 Jan)	27.51	7.19	83	33	0	2.9	3.0	8.2
3 (15-21 Jan)	22.31	1.89	78	34	0	2.4	2.2	8.5
4 (22-28 Jan)	23.91	3.94	76	37	0	2.4	2.8	5.8
5 (29-04 Feb)	23.74	6.80	84	38	37.2	2.2	3.4	6.5
6 (05-11 Feb)	29.80	7.47	73	30	0	3.5	3.2	9.3
7 (12-18 Feb)	32.47	7.53	69	38	0	3.9	1.9	9.1
8 (19-25 Feb)	33.94	9.03	72	24	0	4.3	2.6	9.4
9 (26-04 Mar)	33.13	11.47	69	57	0	5.0	2.3	9.6
10 (05-11 Mar)	32.70	11.67	62	55	2.4	5.1	3.3	6.0
11 (12-18 Mar)	33.41	13.47	72	73	0.8	5.3	2.7	4.8
12 (19-25 Mar)	30.46	13.34	83	75	17.4	5.1	2.9	5.9
13 (26-01 Apr)	32.84	13.53	72	79	0.6	6.1	3.9	8.6
14 (02-08 Apr)	35.04	14.87	44	59	0	6.6	4.4	8.9
15 (09-15 Apr)	37.54	17.16	42	65	0	7.3	3.3	8.8
16 (16-22 Apr)	38.36	18.44	47	51	0	7.9	4.6	8.7
17 (23-29 Apr)	35.70	16.84	53	57	23	8.1	5.6	7.2
VIJAPUR	**Latitude 23^{0}15' N**		**Longitude 72^{0}55' E**				**Height above MSL 126 m**	
40 (01-07 Oct)	34.4	24.7	79.6	57.4				
41 (08-14 Oct)	35.9	21.2	72.1	40.4				
42 (15-21 Oct)	35.1	20.1	58.3	29.4				
43 (22-28 Oct)	35.0	20.2	58.6	31.7				
44 (29-04 Nov)	35.2	19.8	58.6	29.6				
45 (05-11 Nov)	32.7	19.0	63.3	30.4				
46 (12-18 Nov)	32.0	17.0	60.4	30.4				
47 (19-25 Nov)	31.0	15.8	57.9	28.9				
48 (26-02 Dec)	30.4	14.8	64.3	31.7				
49 (03-09 Dec)	30.2	15.4	66.9	33.6				
50 (10-16 Dec)	31.9	17.6	59.7	42.3				
51 (17-23 Dec)	28.9	14.2	62.3	28.7				
52 (24-31 Dec)	27.5	13.1	65.3	36.3				
1 (01-07 Jan)	26.7	13.4	62.9	37.7				
2 (08-14 Jan)	27.2	11.9	71.6	37.4				
3 (15-21 Jan)	26.3	10.5	49.1	27.7				

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
4 (22-28 Jan)	26.1	12.8	64.1	40.7				
5 (29-04 Feb)	27.8	13.2	68.7	31.6				
6 (05-11 Feb)	31.0	15.1	67.0	28.7				
7 (12-18 Feb)	34.4	15.3	46.0	17.4				
8 (19-25 Feb)	33.7	17.6	62.6	36.6				
9 (26-04 Mar)	36.2	20.8	44.0	19.1				
10 (05-11 Mar)	37.6	21.4	50.0	23.3				
11 (12-18 Mar)	34.0	22.2	55.4	29.9				
12 (19-25 Mar)	33.6	21.3	68.4	32.1				
13 (26-01 Apr)	34.5	22.2	54.9	23.0				
14 (02-08 Apr)	37.3	23.3	48.6	20.1				
15 (09-15 Apr)	39.2	24.2	46.3	19.7				
16 (16-22 Apr)	40.2	25.8	53.4	24.1				

PENINSULAR ZONE

AKOLA	Latitude 20^0 70' N		Longitude 77^{0}03' E			Height above MSL 282 m		
40(01-07 Oct)	31.83	20.47	86	53	55.7	3.8	1.24	6.64
41(08-14 Oct)	30.31	21.29	90	62	20	2.9	0.99	4.01
42(15-21 Oct)	30.97	18.71	88	57	40.9	3.5	1.49	5.60
43(22-28 Oct)	31.77	13.86	88	39	0	3.8	1.30	8.19
44(29-04 Nov)	31.83	12.20	87	41	0	3.9	0.59	8.50
45(05-11 Nov)	33.26	13.46	83	37	0	3.6	0.47	8.40
46(12-18 Nov)	31.29	11.81	82	38	0	3.9	0.61	7.89
47(19-25 Nov)	29.11	8.39	80	34	0	3.4	0.66	8.31
48(26-02 Dec)	29.89	8.94	86	35	0	3.3	0.26	8.31
49(03-09 Dec)	29.94	12.01	83	38	0	2.9	0.69	4.91
50(10-16 Dec)	30.37	15.41	85	45	3.8	3.0	1.31	5.13
51(17-23 Dec)	30.91	11.60	84	40	0	3.3	0.93	8.71
52(24-31 Dec)	30.98	12.53	85	42	0	3.2	0.89	8.10
1(01-07 Jan)	26.66	11.37	84	52	0	2.7	1.23	4.23
2(08-14 Jan)	28.83	9.31	84	33	0	2.8	0.76	8.59
3(15-21 Jan)	29.09	11.59	82	38	0	3.0	1.09	7.87
4(22-28 Jan)	31.26	13.43	80	36	0	3.8	1.93	6.91
5(29-04 Feb)	30.79	11.31	80	34	0	4.0	0.84	8.04
6(05-11 Feb)	32.46	10.67	78	28	0	4.2	0.26	9.40
7(12-18 Feb)	33.29	10.77	75	25	0	4.5	1.00	9.57
8(19-25 Feb)	35.54	11.70	68	16	0	4.9	1.21	9.17
9(26-04 Mar)	36.09	15.23	71	18	0	4.8	1.26	8.34
10(05-11 Mar)	33.26	14.63	77	28	3.2	4.6	2.01	5.89
11(12-18 Mar)	33.86	15.27	78	31	11	5.9	2.00	5.17
12(19-25 Mar)	32.57	15.91	68	32	0	5.4	3.17	7.54
13(26-01 Apr)	37.46	18.37	48	18	0	7.1	3.86	9.01
DHARWAD	**Latitude 15^0 26'N**		**Longitude 75^0 07' E**			**Height above MSL 678 m**		
40(01-07 Oct)	28.80	19.59	91	75	35.8			
41(08-14 Oct)	28.43	20.66	94	83	85.2			
42(15-21 Oct)	29.66	20.50	90	71	54			
43(22-28 Oct)	28.97	14.77	73	45	0			
44(29-04 Nov)	29.56	16.30	72	45	0			
45(05-11 Nov)	30.10	15.64	66	41	0			
46(12-18 Nov)	29.63	15.27	68	43	0			
47(19-25 Nov)	28.66	16.89	75	45	2.8			
48(26-02 Dec)	32.43	17.51	79	50	0.01			
49(03-09 Dec)	29.64	14.50	74	44	0			
50(10-16 Dec)	27.63	17.74	84	56	3.2			

Julian weeks	Temperature ^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
51(17-23 Dec)	29.80	13.51	72	39	0			
52(24-31 Dec)	30.80	16.59	78	40	0			
1(01-07 Jan)	29.64	14.86	75	42	0			
2(08-14 Jan)	28.86	11.80	68	29	0			
3(15-21 Jan)	30.74	13.86	68	29	0			
4(22-28 Jan)	30.09	14.39	73	36	0			
5(29-04 Feb)	30.49	14.69	67	30	0			
6(05-11 Feb)	32.83	15.69	61	29	0			
7(12-18 Feb)	33.06	14.21	54	27	0			
8(19-25 Feb)	33.63	15.20	70	26	0			
9(26-04 Mar)	33.68	16.16	64	25	0			
10(05-11 Mar)	33.60	16.73	65	34	0			
11(12-18 Mar)	34.11	19.10	72	52	0			
12(19-25 Mar)	34.63	17.59	71	40	0			
13(26-01 Apr)	34.74	16.66	63	50	0			
14 (02-08 Apr)	36.11	17.11	75	59	16			
15 (09-15 Apr)	37.26	18.69	73	58	10.4			
16 (16-22 Apr)	37.29	18.80	79	53	0			
17 (23-29 Apr)	35.56	17.68	67	55	0			
NIPHAD	**Latitude 20.6^0 N**		**Longitude 74.6^0 E**			**Height above MSL 548.6 m**		
40(01-07 Oct)	31.3	20.7	90.7	68.3	50.4	0.8	5.4	7.0
41(08-14 Oct)	29.6	21.0	92.3	71.6	101.4	0.0	3.6	4.4
42(15-21 Oct)	30.2	19.2	90.3	66.1	54.5	0.1	3.7	6.9
43(22-28 Oct)	30.6	14.5	85.0	43.1	0	1.6	2.5	9.5
44(29-04 Nov)	29.8	11.7	83.4	36.4	0	1.0	3.2	9.4
45(05-11 Nov)	31.2	11.8	84.0	37.3	0	1.4	2.1	9.2
46(12-18 Nov)	30.3	11.9	85.4	37.9	0	1.6	2.5	8.4
47(19-25 Nov)	29.2	8.4	86.9	36.9	0	0.9	2.4	9.0
48(26-02 Dec)	30.4	11.4	88.7	43.1	0	1.6	1.7	8.2
49(03-09 Dec)	30.6	11.6	90.6	46.7	0	0.7	1.7	6.9
50(10-16 Dec)	30.0	13.5	92.0	49.9	0.8	0.6	3.1	4.9
51(17-23 Dec)	31.2	12.8	90.4	41.0	0	1.7	1.5	8.6
52(24-31 Dec)	31.3	8.5	89.6	50.4	0	2.3	1.5	9.2
1(01-07 Jan)	27.8	10.6	84.7	52.4	0.0	0.4	2.6	4.8
2(08-14 Jan)	29.1	6.7	91.3	47.0	0.0	0.9	2.0	9.0
3(15-21 Jan)	30.3	7.9	92.4	40.1	0.0	0.9	1.8	8.1
4(22-28 Jan)	29.0	10.0	92.0	48.1	0.0	0.5	2.3	7.3
5(29-04 Feb)	28.9	10.5	91.9	50.4	0.0	0.4	2.4	7.3
6(05-11 Feb)	32.9	8.4	89.4	41.3	0.0	1.4	0.9	9.9
7(12-18 Feb)	33.5	6.5	84.9	40.0	0.0	1.9	2.2	9.8
8(19-25 Feb)	34.9	8.0	86.6	33.0	0.0	2.2	0.7	9.9
9(26-04 Mar)	34.7	10.8	91.4	34.9	0.0	1.6	0.9	8.2
10(05-11 Mar)	32.2	12.8	87.3	40.6	7.0	0.5	2.7	5.8
11(12-18 Mar)	33.5	13.9	89.4	44.9	7.5	0.3	2.9	5.7
12(19-25 Mar)	33.3	13.4	92.4	46.4	1.0	0.9	5.1	8.1
13(26-01 Apr)	33.6	12.1	91.0	37.0	0.0	1.8	4.8	9.3
14(02-08 Apr)	35.4	14.6	89.7	45.7	0.0	2.4	4.0	8.2
15(09-15 Apr)	38.0	17.7	92.0	47.3	10.3	0.6	3.8	8.3
16(16-22 Apr)	39.0	16.8	89.1	39.7	3.2	2.1	5.1	9.6
17(23-29 Apr)	38.0	20.1	90.1	45.3	3.8	2.7	5.1	9.1
PUNE	**Latitude 18^{0}04' N**		**Longitude 74^{0}21' E**			**Height above MSL 548.6 m**		
40(01-07 Oct)	32.3	20.7	91	61	42.3			
41(08-14 Oct)	29.6	21.6	93	69	85.1			
42(15-21 Oct)	30.0	21.6	93	62	89.5			
43(22-28 Oct)	30.4	14.4	89	29	0.0			
44(29-04 Nov)	30.6	14.1	83	35	0.0			
45(05-11 Nov)	31.1	14.3	86	27	0.0			
46(12-18 Nov)	30.0	13.7	84	37	0.0			

Julian weeks	Temperature^{0}C		RH (%)		Rainfall	Pan-E	Wind Speed	Sunshine
	Max	Min	Max	Min	mm	mm	km/hr	hrs/day
47(19-25 Nov)	30.3	14.1	81	42	0.0			
48(26-02 Dec)	30.9	15.5	85	40	0.0			
49(03-09 Dec)	30.4	14.1	85	58	0.0			
50(10-16 Dec)	29.9	18.2	88	55	0.0			
51(17-23 Dec)	31.4	13.7	89	45	0.0			
52(24-31 Dec)	32.2	14.4	91	37	0.0			
1(01-07 Jan)	30.0	14.8	86	41	0.0			
2(08-14 Jan)	30.2	9.5	90	28	0.0			
3(15-21 Jan)	31.6	11.8	90	58	0.0			
4(22-28 Jan)	30.6	14.4	85	39	0.0			
5(29-04 Feb)	30.4	13.3	89	37	0.0			
6(05-11 Feb)	33.2	11.9	86	32	0.0			
7(12-18 Feb)	33.2	10.4	79	28	0.0			
8(19-25 Feb)	34.3	12.0	81	33	0.0			
9(26-04 Mar)	34.5	14.4	81	27	0.0			
10(05-11 Mar)	32.9	15.4	77	33	0.0			
11(12-18 Mar)	32.6	16.5	79	32	0.7			
12(19-25 Mar)	33.3	14.3	75	29	0.0			
13(26-01 Apr)	35.1	14.6	78	24	0.0			
14(02-08 Apr)	35.6	19.7	77	35	0.0			
15(09-15 Apr)	37.8	20.8	71	32	3.2			
16 (16-22 Apr)	36.5	19.6	71	29	0.0			
17 (23-29 Apr)	37.2	19.8	67	27	0.0			

SOIL PHYSICO-CHEMICAL PROPERTIES

Name of Centre	Textural class	Sand %	Silt %	Clay %	Db Mg m^{-3}	FC %	PWP %	OC %	Avail. N kg/ha	Avail. P kg/ha	Avail. K kg/ha	pH	EC dsm^{-1}
NORTHERN HILLS ZONE													
Almora	Silty clay loam	-	-	-	-	-	-	1.02	-	-	171.0	6.0	-
Bajaura	Silty clay loam	18.0	45.0	37.0	1.41	-	-	0.73	250	63	187	6.5	0.2
Malan	Silty clay loam	-	-	-	1.55	30	13.5	0.85	341	41.8	229	5.5	168
Shimla	Silty clay loam	-	-	-	1.52	31	14	0.71	320	40.6	251	5.4	162
NORTH WESTERN PLAINS ZONE													
Agra	Sandy loam	57.49	22.16	19.93	-	18.51	9.57	0.41	180.56	27.52	279.78	8.48	1.75
Delhi	Sandy Loam	59.5	13.9	26.5	1.39	-	-	0.55	152.3	13.74	251	7.2	-
Durgapura	Loamy Sand	81	9.4	7.6	1.53	11.23	3.15	0.24	187	27.66	232	8.1	0.26
Gurdaspur	Loam	-	-	-	-	-	-	0.26	-	18.48	88.95	7.57	0.12
Hisar	Sandy loam	72	18.5	9.5	1.4	-	-	0.35	148	16.8	270	7.9	0.22
Jammu	Sandy Loam	41.32	30.52	28.16	1.46	21.30		0.44	174.10	15.00	138.90	7.25	0.21
Karnal	Sandy Loam	42.5	30.8	26.7	1.46	20.5	-	0.47	189.60	16.5	171.7	8.16	0.23
Ludhiana	Loamy sand	83.5	7.9	8.5	1.46	-	-	0.28	25.08	29.07	82.21	6.88	0.16
Pantnagar	Loam	36	47.6	16.4	1.368	22.8	8.2	0.7	225.4	40.6	143.6	7.3	0.4
Sriganganagar	Sandy Loam	-	-	-	-	-	-	-	Low	Medium	High	7.6	-
NORTH EASTERN PLAINS ZONE													
Burdwan	-	-	-	-	-	-	-	0.71	-	163	98	5.57	0.15
Coochbehar	Sandy Loam	65	24	11	1.39	-	-	0.70	160	50	193.1	5.1	-
Kanpur	Sandy Loam	57	30	13	-	-	-	0.31	-	17.0	167	7.7	0.19
Ranchi	clay loam	33.3	30.7	36.0	1.41	26.97	15.07	0.49	233.3	14.53	207.7	6.3	-
RP CAU Pusa	Sandy Loam	58	30	12	1.41	-	-	0.42	226	25.5	145	8.3	0.4
Sabour	Loamy clay	25	42.5	33.5	1.43	23	12	0.5	220.5	25.0	206	7.2	0.15
Shillongani	Sandy Clay Loam	51.4	22.0	26.7	1.4	42.4	7.23	1.2	226.7	16.2	263.4	5.5	0.28
Varanasi	Sandy Clay Loam	49.6	28.3	22.2	1.45	22.6	5.8	0.43	195.2	18.5	232.8	7.7	0.18
CENTRAL ZONE													
Bilaspur	Sandy clay loam	40.87	22.35	35.21	1.29	21.32	8.4	0.34	271	12.5	283	7.4	0.17
Dhanduka	Black cotton	28.2	37.3	34.5	-	-	-	0.58	221	5.46	375	8.1	0.15
Gwalior	Sandy clay loam	56	17.20	20	-	-	-	0.46	180	12.5	200	7.4	-
Indore	Vertisols	19.1	26.1	54.8	1.43	38	15	0.46	239.7	16.7	413	8.26	0.22
Junagadh	Medium Black	35.83	31.38	32.79	1.35	-	-	0.75	307	89.25	259	7.83	0.19
Powarkheda		26	24.5	47.5	1.53	-	0.48	0.24	95	21.72	300.26	7.42	0.16
Udaipur	Clay-loam	38.75	26.78	34.47	1.46			0.55	287.52	23.67	365.15	8.05	0.9
Vijapur	Sandy Loam	80.5	6.0	5.75	1.56	9.74	3.7	0.31	128.1	63.8	251.2	7.61	0.32
PENINSULAR ZONE													
Dharwad	Clay	20	26	50	1.2-1.3	32-35	16-18	0.3-0.5	230-272	29-42.8	378-418	7.2-7.8	0.2-0.3
Niphad	Clay	20.30	24.10	45.6	1.3	-	-	0.60	136.4	23.68	302.0	8.27	0.22
Pune	Clay	8.9-9.6	52.64	18.3-24.2	1.28-1.38	-	-	1.15-1.32	277-318	8.24-8.87	6.34-825	7.93-7.95	0.43-0.56

SOWING DATES FOR DIFFERENT ZONES UNDER IRRIGATED CONDITIONS

ZONE		*Triticum aestivum*	*Triticum durum*
NORTHERN HILLS ZONE			
	Timely	5th Nov. to 11th Nov.	
	Late	26th Nov. to 2nd Dec.	
	Very Late	17th Dec. to 23rd Dec.	
NORTH WESTERN PLAINS ZONE			
	Early	25th Oct. to 04th Nov.	
	Timely	5th Nov. to 11th Nov.	29th Oct. to 4th Nov.
	Late	10th Dec. to 16th Dec.	26th Nov. to 2nd Dec.
	Very Late	1st Jan. to 7th Jan.	
NORTH EASTERN PLAINS ZONE			
	Timely	12th Nov. to 18th Nov.	
	Late	10th Dec. to 16th Dec.	
	Very Late	1st Jan. to 7th Jan.	
CENTRAL ZONE			
	Timely	12th Nov. to 18th Nov.	5th Nov. to 11th Nov.
	Late	3rd Dec. to 9th Dec.	
	Very Late	24th Dec. to 31st Dec.	
PENINSULAR ZONE			
	Timely	5th Nov. to 11th Nov.	5th Nov. to 11th Nov.
	Late	26th Nov. to 2nd Dec.	
	Very Late	17th Dec. to 23rd Dec.	
SOUTHERN HILLS ZONE			
	Timely	26th Nov. to 2nd Dec.	
	Late	24th Dec. to 31th Dec.	

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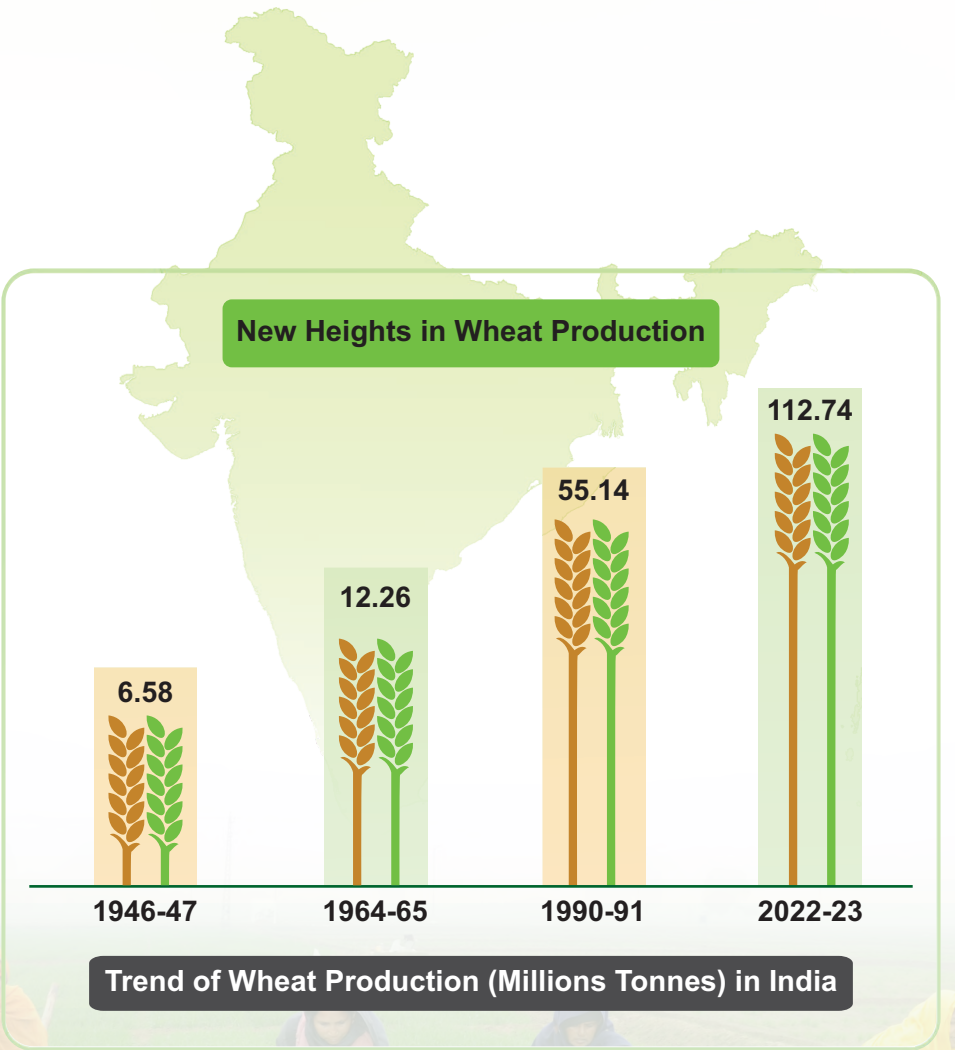

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