



BARLEY IMPROVEMENT

(AICRP on Wheat & Barley)

TECHNICAL PROGRAMME

Rabi 2021-22

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ICAR-Indian Institute of Wheat & Barley Research,
Karnal-132001 (Haryana)

Coordinated Yield Trials (*Rabi 2021-22*)

Entries, Locations and Guidelines for Centres

Important points for breeders, zonal coordinators and trial conducting centres

1.	Last date for seed supply to trial coordinator	Rainfed (15 September) Irrigated (20 September)
2.	Last date for trial supply	At least 10 days before the due sowing date
3.	Last date for information of trial conduct by centre to ICAR-IIWBR, Karnal	1 st December (Timely sown)
4.	Last date for supply of filled data books to ICAR-IIWBR, Karnal	15 th May (Plains), 15 th June (Hills)

5. Breeders must supply the insect free, untreated viable seed of new entries **along with the germination %age and 1000 gw data** to PI Barley for in time trial constitution and despatch to the testing centres.
6. The trial coordinators shall supply about 200g seed of coded entries for the disease nursery (NBDSN) from the same seed lot, received for constitution of yield trial to Dr. RPS Verma, P.I. (Barley Network), ICAR-IIWBR, PB 158, Karnal-132001, Haryana. (Action: All concerned & Dr. RPS Verma)
7. Also, each centre must supply the seed of their new station trial entries for **IBDSN to Dr. RPS Verma, Principal Scientist & P.I. Barley Network, IIWBR, PB 158, Karnal-132001**, failing which no entry will be accepted for IVT next year.
8. Observations on disease incidence made by **the monitoring team at the centre must be reported** by the trial conducting centres in the data book along with other data. In case higher scores are recorded after the visit same may be included in data, but in no case the disease data should missed in the data reporting.
9. The ancillary data on disease/ pest incidence, agronomic and grain characters must be reported in the trial by all centres.
10. Grain yield should be reported in the fractions of 1 to 5 grams in grams/ plot only on each replication and **not in q/ha per plot**.
11. Trial's coordinator will have to supply these guidelines to the testing centres for the conduct of trial, along with the other trial details.
12. The trial conducting centres are requested to submit excel data file in the format provided for each trial separately. The file may be right protected or cell protected to avoid unpermitted editing of data.
13. Because of introduction of double coding system in AICW&BIP, the trial packets of entries are carrying entry code and plot number only. The trial may be sown by arranging by the plot numbers, because all replications of one entry are packed in one polythene envelope to avoid the transportation damage. (eg. If there are 25 entries in a trial with 4 replications, then **arrange by plot number** 1 →25 in R1, 26→50 in R2, 51→75 in R3 →76-100 in R4 and likewise depending on number of replications).

R1	1--→	25
R2	26--→	50
R3	51---→	75
R4	76---→	100

14. All the entries of coordinated yield trials are to be genotyped with molecular markers. This will facilitate the use of markers for diversity analysis as well as for step towards MAS in barley improvement.

LIST OF BARLEY BREEDING CENTERS

Centre	Name & Address	Centre	Name & Address
Almora	Dr. Lakshmi Kant, Principal Scientist Division of Crop Improvement, ICAR-VPKAS, ALMORA-263601 Uttarakhand	Karnal	Dr. RPS Verma PI, Barley Barley Improvement Unit ICAR-IIWBR, PO Box-158, Agrasain Road KARNAL-132001 (Haryana)
Bajaura	Dr. Vijay Rana Barley Breeder, HAREC (H.P.K.V.), BAJAURA – 175125 Distt. Kulu (H.P.)	Ludhiana	Dr. Simarjit Kaur Barley Breeder, Deptt. of Plant Breeding, P.A.U., LUDHIANA - 141004 (Punjab)
Durgapura	Dr. Ved Prakash Barley breeder RARI, DURGAPURA, Jaipur - 302018 (Rajasthan)	Pantnagar	Dr. J P Jaiswal, Professor G&PB College of Agriculture, GBP University of Ag. & Tech. PANTNAGAR-263145, Uttarakhand
Kumarganj	Dr. R.B. Singh, Barley Breeder, Deptt. of Plant Breeding, N.D. University of Agric. and Tech., KUMARGANJ, Ayodhya - 224001 (U.P.)	Shimla	Dr DP Walia / Dr. Madhu Chauhan ICAR-IARI, Regional Station, Tutikandi, SHIMLA - 171004 (H.P.)
Hisar	Dr. Y K Gulia, Barley Breeder, Deptt. of Plant Breeding, CCS H.A.U., HISAR- 125004 (Haryana)	Varanasi	Dr. Sandeep Sharma, Barley Breeder, Deptt. of Plant Breeding, Institute of Agricultural Sciences, BHU, VARANASI- 221005 (U.P.)
Kanpur	Dr. P.K Gupta, Barley Breeder, Section of E.B.(R), CSAUA& T, KANPUR- 208002 (U.P.)		

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ICAR-INDIAN INSTITUTE OF WHEAT & BARLEY RESEARCH, KARNAL-132001**

CROP	BARLEY	
Name of Trial	IVT	
Production Condition	Rainfed	
Zone	NH Zone	
No. of Trial Centres	10	
State	NO.	Name of centres
Himachal	6	Bajaura, Berthein, Kangra, Katrain, Malan, Shimla
Uttarakhand	2	Almora, Majhera
J&K	2	Rajauri, Khudwani
No. of varieties including checks	23	
Contributing Centres	No.	Name of varieties
IARI, RS, Shimla	5	BHS488, BHS489, BHS490, BHS491, BHS492
Pantnagar	3	UPB1101, UPB1102, UPB1103
Almora	5	VLB175, VLB176, VLB177, VLB178, VLB179
Bajaura	5	HBL874, HBL875, HBL876, HBL877, HBL878
Checks	5	HBL113, BHS352, BHS380, BHS400, VLB118
Experimental Design		RBD
Replications		4 (2 for green forage cut at 70-75 DAS and 2 as non-cut)
Plot Size		Gross: 3.5 m x 1.38 m (6 Rows) Net: 3.5 x 0.92 m (4 Rows)
Fertilizer dose		40 Kg N: 30 Kg P: 20 kg K/ha (All as basal) In two cut replications 20 Kg/ha N to be broadcasted after cut
Irrigation		NONE
Date of sowing (Between)		NHZ (15 October-10 November)
Seed requirement		4.0 Kg/Entry
Last date of seed supply		15 September
Seed to be supplied to Trial Coordinator		Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

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CROP	BARLEY	
Name of Trial	Advanced Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	NEPZ	
No. of Trial Centers	7	
State	NO.	Name of centers
U. P	3	Kanpur, Varanasi, Kumarganj
Bihar	2	Pusa (CAU), Sabour
Jharkhand	1	Ranchi
West Bengal	1	Kalyani
No. of varieties including checks	6	
Contributing Centers	No.	Name of varieties
Durgapura	1	RD3034
Ludhiana	1	PL917*
Pantnagar	1	UPB1095
Kumarganj	1	NDB1756
Checks	2	HUB113, DWRB137
Experimental Design	RBD	
Replications	4	
Plot Size	Gross: 5m x 2.76m (12 rows) Net: 4.5 x 2.30 (10 rows)	
Fertilizer dose	60 Kg. N : 30Kg P: 20Kg K /ha	
Irrigation	2-3	
Date of sowing (Between)	10-25 November	
Seed requirement	5.50 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)	
Last date of seed supply	20 September	
Seed to be supplied to Trial Coordinator	Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Atrasain Road, Karnal – 132001 (HARYANA)	

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CROP	BARLEY	
Name of Trial	AVT-MB	
Production Condition	Malt Barley	
Zone	NWPZ (Timely Sown)	
No. of Trial Centers	11	
State	NO.	Name of centres
Haryana	3	Bawal, Hisar, Karnal
Punjab	2	Ludhiana, Bathinda
Rajasthan	4	Durgapura, SG Nagar, Navgaon, Tabiji
U.P.	1	Modipuram
Uttarakhand	1	Pantnagar
No. of varieties including checks	6	
Contributing Centers	No.	Name of varieties
Karnal	2	DWRB219, DWRB221
Checks	4	BH946, DWRUB52, RD2849, DWRB182
Experimental Design		RBD
Replications		4
Plot Size		Gross: 5 m x 2.40 m (12 Rows@ 20 cm)
Fertilizer dose		90 Kg. N : 40Kg P: 20Kg per ha
Irrigation		2-3 or more if required at certain locations
Date of sowing (Between)		1-20 November (TS)
Seed requirement		7.50 Kg / Entry (At 45* gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)
Last date of seed supply		20 September
Seed to be supplied to Trial Coordinator		Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

DWRB221 is having higher MQ score (24) higher than check DWRB182 (22). It is significantly superior in yield from another check RD2849 (with equal MQ score 24).

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CROP	BARLEY	
Name of Trial	IVT-MB	
Production Condition	Malt Barley	
Zone	NWPZ (Timely Sown)	
No. of Trial Centers	11	
State	NO.	Name of centres
Haryana	3	Bawal, Hisar, Karnal
Punjab	2	Ludhiana, Bathinda
Rajasthan	4	Durgapura, SG Nagar, Navgaon, Tabiji
U.P.	1	Modipuram
Uttarakhand	1	Pantnagar
No. of varieties including checks	25	
Contributing Centers	No.	Name of varieties
Hisar	4	BH1040, BH1041, BH1042, BH1043
Pantnagar	2	UPB1107, UPB1108
IIWBR, Karnal	6	DWRB229, DWRB230, DWRB231 DWRB232, DWRB233, DWRB234
Durgapura	5	RD3055, RD3056, RD3057, RD3058, RD3063
Ludhiana	4	PL933, PL934, PL935, PL938
Checks	4	BH946, DWRUB52, RD2849, DWRB182
Experimental Design	Lattice (5x5)	
Replications	2	
Plot Size	Gross: 5 m x 1.08 m (6 Rows@ 20 cm) Net: 4.5 x 0.80 (4 rows)	
Fertilizer dose	90 Kg. N : 40Kg P: 20Kg per ha	
Irrigation	2-3 or more if required at certain locations	
Date of sowing (Between)	1-20 November (TS)	
Seed requirement	4.00 Kg / Entry (At 45* gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)	
Last date of seed supply	20 September	
Seed to be supplied to Trial Coordinator	Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

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CROP	BARLEY	
Name of Trial	Initial Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	NWPZ/ NEPZ / CZ	
No. of Trial Centers	20	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Punjab	1	Ludhiana
Rajasthan	4	Durgapura, Tabiji, Udaipur, Samdari
Uttarakhand	1	Pantnagar
U. P	4	Kanpur, Varanasi, Kumarganj, Modipuram
M. P	3	Gwalior, Morena, Tikamgarh
Bihar	2	Pusa (CAU), Sabour
Jharkhand	1	Ranchi
Gujarat	1	Vijapur
West Bengal	1	Kalyani
No. of varieties including checks	25	
Contributing Centers	No.	Name of varieties
Kanpur	3	KB2004, KB2015, KB2031
Varanasi	1	HUB281
Kumarganj	2	NDB 1793, NDB1800
Hisar	2	BH1043, BH1044
Durgapura	4	RD3051, RD3052, RD3053, RD3054,
Pantnagar	2	UPB1105, UPB1106
Ludhiana	4	PL936, PL937, PL939, PL940
Karnal	2	DWRB225, DWRB226
Checks	4	BH 946, DWRB137, RD2899, HUB113
Experimental Design	Lattice	
Replications	2 (Two)	
Plot Size	Gross: 5m x 1.38m (6 rows) Net: 4.5 x 0.92 (4 rows)	
Fertilizer dose	60 Kg. N : 30Kg P: 20Kg K /ha	
Irrigation	2-3	
Date of sowing (Between)	10-25 November	
Seed requirement	4.0 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)	
Last date of seed supply	20 September	
Seed to be supplied to Trial Coordinator	Dr. RPS Verma, P.I. Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

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CROP	BARLEY	
Name of Trial	Initial Varietal Trial/Advance Varietal Trial	
Production Condition	Irrigated Feed barley (Hulless)	
Zone	NWPZ/ NEPZ / CZ	
No. of Trial Centers	14	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Punjab	1	Ludhiana
Rajasthan	2	Durgapura, Udaipur
Uttarakhand	1	Pantnagar
U. P	4	Kanpur, Varanasi, Kumarganj, Modipuram,
M. P	3	Gwalior, Morena, Tikamgarh
Gujarat	1	Vijapur
No. of varieties including checks	7	
Contributing Centers	No.	Name of varieties
Kanpur	1	KB2019
Karnal	2	DWRB223, DWRB227
Pantnagar	2	UPB1086, UPB1104
Checks	2	NDB943, PL891
Experimental Design	RBD	
Replications	4 (Four)	
Plot Size	Gross: 5m x 1.38m (6 rows) Net: 4.5 x 0.92 (4 rows)	
Fertilizer dose	60 Kg. N : 30Kg P: 20Kg K /ha	
Irrigation	2-3	
Date of sowing (Between)	10-25 November	
Seed requirement	5.5 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)	
Last date of seed supply	20 September	
Seed to be supplied to Trial Coordinator	Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

UPB1086 in AVT 1st Year of NEPZ and CZ only

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CROP	BARLEY	
Name of Trial	IVT	
Production Condition	Rainfed	
Zone	NEPZ	
No. of Trial Centers	8	
State	NO.	Name of centres
UP	4	Kanpur, Varanasi, Kumarganj, Saini
Bihar	2	Pusa (CAU), Sabour
Jharkhand	2	Ranchi, Chiyanki
No. of varieties including checks	13	
Contributing Centers	No.	Name of varieties
Kanpur	2	KB2008, KB2018
Karnal	1	DWRB225
Kumarganj	3	NDB1784, NDB1785, NDB1789
Durgapura	5	RD3037 , RD3047, RD3048, RD3049, RD3050
Checks	2	K603, Lakhan
Experimental Design	RBD	
Replications	4	
Plot Size	Gross: 5m x 1.38 m (6 Rows), Net: 4.5 x 0.92 m (4 Rows)	
Fertilizer dose	40 Kg N : 30 Kg. P: 20Kg K /ha	
Irrigation	None	
Date of sowing	NEPZ (20 October - 10 November)	
Seed requirement	3.50 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)	
Last date of seed supply	15 September	
Seed to be supplied to Trial Coordinator	Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

RD3037 will be tested in IVT-RF-NEPZ of 2021-22 as AVT-1st year as it is the only entry promoted to AVT.

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CROP	BARLEY	
Name of Trial	AVT-SST	
Production Condition	SAL / ALK	
Zone	NWPZ / NEPZ	
No. of Trial Centers	08	
State	No.	Name of centres
U.P.	2	Dalipnagar, Kumarganj
Haryana	3	CCSHAU Hisar, IIWBR (Hisar), CSSRI Karnal
Rajasthan	3	Fatehpur, Bhilwara, Samdari
No. of varieties including checks	14	
Contributing Centers	No.	Name of varieties
Hisar	1	BH1045
Kanpur	2	KB2013, KB2031
Kumarganj	3	NDB1776, NDB1782, NDB1783
Karnal	1	DWRB228
Durgapura	4	RD3059, RD3060, RD3061, RD3062
Checks	3	NDB1173, RD2794, RD2907
Experimental Design		RBD
Replications		4 (Four)
Plot Size		Gross: 5 x 1.38 m (6 Rows) Net: 4.5 x 0.92m (4 Rows)
Fertilizer dose		60 Kg N : 30 Kg P :20 Kg K /ha(1/2N + full P&K as basel)
Irrigation		2-3
Date of sowing (Between)		NWPZ / NEPZ (10-25 November)
Seed requirement		4. 0 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is more, then increase seed quantity accordingly)
Last date of seed supply		20 September
Seed to be supplied to Trial Coordinator		Dr. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

Barley Quality (2021-22):

1. Malt Barley Yield Trials

Identification of Promising genotypes for malting quality traits

Trial: Advanced Varietal Trial (Malt Barley) and Initial Varietal Trial (Malt Barley)

Number of Locations: 11 each

Entries: AVT = 6, IVT = 25 Total = 31 genotypes

Traits to be analysed:

Grain Traits: Test weight, Thousand Grain weight, Kernel Plumpness, Husk Content, Germination percentage, Protein Content, Starch Content, Beta Glucan content

Malt traits: Malt yield, Friability, Homogeneity, Wort Filtration rate, Wort pH, Wort Colour, Saccharification Rate, Hot Water Extract, Wort Beta Glucan, Wort Free Amino Nitrogen

2. Barley Quality Component Screening Nursery

Identification of promising sources of quality traits with respect to malt and food barley for use in Quality Improvement Programme

Malt Barley Genotypes: 20 **Food Barley Genotypes:** 15

Number of Locations: 5 (Karnal, Hisar, Ludhiana, Pantnagar & Durgapura)

3. Feed & Hulless Barley

Quality Evaluation of Feed and Hulless Barley Genotypes

Trials: Feed Barley/Hulless Barley

Zones: NWPZ, NEPZ, CZ & NHZ

Grain Traits:

Test Weight, Thousand Grain Weight, Protein, Starch, and Beta Glucan (in selected entries of hulless genotypes)

Barley Crop Protection (2021-22)

Crop Health Survey: All barley cooperating centres in their area of command will carry out the survey and record the incidence and infestation of disease and insect pest in the farmer's fields. **The samples of rust are to be sent to IIWBR, RS Flowerdale and leaf blight to IIWBR, Karnal for further analysis.** Any entry showing > 40S rust reaction in the trials has to be informed to IIWBR, Karnal and sample should be sent to RS Flowerdale, Shimla for race analysis.

Plant pathology:

1. Evaluation for status of host resistance in test entries:

i. Initial Barley Disease Screening Nursery (IBDSN):

This nursery will comprise test entries of station trial of barley breeding centres. The entries will be screened against rusts and leaf blight at hot spot locations.

Yellow rust: Ludhiana, Durgapura, Bajaura, Karnal, Almora and Jammu (6)

Leaf blight: Pantnagar, Kanpur, Faizabad, and Varanasi (4)

ii. National Barley Disease Screening Nursery (NBDSN):

This nursery will comprise of entries from yield trials (IVT and AVT) which will be screened against rusts and leaf blight.

Yellow rust: Ludhiana, Durgapura, Bajaura, Hisar, Almora, Karnal and Jammu (7)

Leaf rust: Ludhiana and Jammu (2)

Stem rust: Dharwad and Arabhavi (2)

Leaf blight: Pantnagar, Kanpur, Faizabad, Varanasi, and Dharwad (5)

iii. Elite Barley Disease Screening Nursery (EBDSN):

This nursery will have resistant entries identified in NBDSN and EBDSN tested at hot spot locations. The confirmed sources of resistance would later be shared with different barley breeders for their utilization.

Yellow rust: Ludhiana, Durgapura, Bajaura, Hisar, Almora, Karnal and Jammu (7)

Leaf rust: Ludhiana and Jammu (2)

Leaf blight: Pantnagar, Kanpur, Faizabad, and Varanasi (4)

iv. Seedling Resistant Test (SRT) of NBDSN and EBDSN:

The test would be conducted against different pathotypes of three rusts at RS, Flowerdale, Shimla.

2. Chemical control of leaf blight (Centres: Pantnagar, Kanpur, Faizabad, and Varanasi)

S. No.	Treatment	Dosages
1	Tebuconazole 50% + Trifloxystrobin 25%,	0.1%
2	Propiconazole 13.9% + Difenconazole 13.9%	0.1%
3	Azoxystrobin 12.5% + Tebuconazole 12.5%	0.1%
4	Picoxystrobin 7.05% + Propiconazole 11.7%	0.1%
5	Kresoxim Methyl 44.3% SC	0.1%
6	Propiconazole 25%	0.1%
7	Tebuconazole 25.9%	0.1%
8	Mancozeb 75%	0.2%
9	Control	-

The chemical will be evaluated under artificial inoculated condition and spray will be done on initiation of diseases and repeated once after 15 days.

Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

Entomology:

1. ***Screening of NBDSN and Elite lines against foliar aphids (Centres: Ludhiana, Kanpur, Khudwani, Pantnagar, Durgapura, Hisar and Karnal).***

The national barley aphid screening nursery (NBDSN) will be continued. It will comprise entries from coordinated trials. Besides, 10-20 extra entries found promising for aphid resistance at Karnal will be screened against aphids at four centres; Ludhiana, Kanpur, Durgapura and Karnal.

2. ***Survey and surveillance of insect-pests and their natural enemies in barley (All centres)***

Roving surveys will be carried out at fortnightly intervals during the cropping season for insect-pests and their natural enemies. Population and damage levels of different insect-pests will be recorded and indicated as grades or percent damage inflicted to crop. The peak period of pest activity and its severity of damage will also be recorded.

3. ***Management of aphids through foliar application of new bio-chemical molecules (Centres: Vijapur, Ludhiana, Kanpur, Durgapura and Karnal)***

New chemical molecules will be evaluated against foliar aphids in barley. Insect population counts before and after the treatment will be recorded along with yield to determine efficacy of each treatment.

4. ***Effect of silicon on the incidence of foliar aphids and natural enemies***

(Centres: Karnal and Ludhiana) Foliar application of Monosilicic acid (MSA) will be tested against aphids and natural enemies in barley crop.

Nematology

1. ***Screening of NBDSN and EBDSN against CCN:***

The entries of NBDSN and EBDSN will be tested against Cereal Cyst nematode (CCN) at Durgapura and Hisar centers in sick plots/field.

BARLEY RESOURCE MANAGEMENT (2021-22)

ZONE-WISE DATE OF SUBMISSION

- | | | |
|----|---------------------------|-----------------------|
| 1. | NORTHERN HILLS ZONE | 15 th JUNE |
| 2. | NORTH WESTERN PLAINS ZONE | 15 th MAY |
| 3. | NORTH EASTERN PLAINS ZONE | 15 th MAY |
| 4. | CENTRAL ZONE | 15 th MAY |

FOR UNIFORMITY IN DATA RECORDING AND REPORTING FOLLOWING POINTS SHOULD BE STRICTLY FOLLOWED

1. Sequence of treatments should be strictly as per the technical programme. Columns/Rows for the missing treatment/variety should be kept blank. Data should be submitted as per the stipulated date given above.
2. To record observations on stand count, earhead/m² etc., two fixed quadrates may be marked in each plot.
3. For recording observations on weeds, wherever necessary, two fixed quadrates/plot may be marked.
4. Yield, 1000-grain weight and biomass may be reported at 12% moisture. For this purpose, grain and straw samples may be taken for determining moisture content at the time of recording and data corrected to 12% moisture content.
5. For calculating lodging score following formula may be used

$$\text{Lodging Score} = \frac{(\text{Lodged area/Net plot area}) * 100 * \text{Angle of lodging}}{90}$$

6. Data should be reported strictly as per the units given at the top of each page for different parameters.

SOWING DATES FOR DIFFERENT ZONES UNDER IRRIGATED CONDITIONS

ZONE	Date of sowing
NORTHERN HILLS ZONE	
Normal	10 th Nov. to 24 th Nov.
Late	25 th Nov. to 1 st Dec.
NORTH WESTERN PLAINS ZONE	
Normal	6 th Nov. to 15 th Nov.
Late	1 st Dec. to 10 th Dec.
NORTH EASTERN PLAINS ZONE	
Normal	15 th Nov. to 30 th Nov.
Late	15 th Dec. to 22 nd Dec.
CENTRAL ZONE	
Normal	12 th Nov. to 18 th Nov.
Late	2 nd Dec. to 10 th Dec.

TITLE: Response of new barley genotypes to different N levels and sowing dates conditions (NEPZ).

OBJECTIVES

1. To work out optimum nitrogen level & sowing time for different barley genotypes

TREATMENTS

A. Nitrogen Levels (Main Plots): 3

N1-45 kg N2-60 kg N3-75 kg

B. Sowing conditions and Varieties (Sub-Plots): 6

S1V1: Timely sown PL917 S2V1: Late sown PL 917
 S1V2: Timely sown DWRB137 S2V2: Late sown DWRB137
 S1V3: Timely sown HUB 113 S2V1: Late sown HUB113

Codes will be given after coding

DESIGN: Double split plot

REPLICATION: Three

PLOT SIZE: GROSS = 1.38 m x 8 m = 11.04 m² (6 Rows at 23 cm apart)
 NET = 0.92 m x 7 m = 6.44 m² (4 inner rows of 7 m)

FERTILISER: Nitrogen as per treatment and P & K @ 30&20 kg/ha, respectively. Apply 1/2 of N and full P & K as basal and rest 1/2 N after first irrigation.

SEED RATE: 100 kg/ha (Adjust seed rate taking 1000 seeds weight of 45 g).

CENTRES: Varanasi, Kanpur, Kumarganj

OBSERVATIONS:

1. Yield and yield attributing characters.

LAYOUT

S1 V1	S1 V2	S1 V3	S2 V2 N1	S2 V3	S2 V2	S1 V2 N2	S1 V3	S1 V1	S2 V2	S2 V3	S2 V1	S1 V3	S1 V1	S1 V2 N3	S2 V3	S2 V1	S2 V2
S2 V2	S2 V3	S2 V1	S1 V2 N2	S1 V1	S1 V3	S2 V3	S2 V1	S2 V2 N3	S1 V3	S1 V1	S1 V2	S2 V2	S2 V3	S2 V1 N1	S1 V1	S1 V2	S1 V3
S1 V3	S1 V1	S1 V2 N3	S2 V1	S2 V3	S2 V2	S1 V1	S1 V2	S1 V3 N1	S2 V2	S2 V1	S2 V3	S1 V2	S1 V3	S1 V1 N2	S2 V2	S2 V3	S2 V1

BARLEY AGRONOMY EXPERIMENT NO. SPL-1

2021-22

Title: Productivity enhancement through adjusting sowing dates in barley

Objective: To optimise sowing dates for increasing the feed and malt barley productivity

Treatments:

Main plot: Sowing dates

NWPZ, CZ	NEPZ	NHZ
1-5 November	11-15 November	25-30 October
11-15 November	21-25 November	5-10 November
21-25 November	1-5 December	15-20 November
1-5 December	11-15 December	25-30 November

Subplot: Varieties

NWPZ: BH 946, DWRB160 NEPZ: DWRB137, HUB113

CZ: DWRB137, RD2899 NHZ: BH 400, VLB 118

Replication: 3

Design: Split plot Design

FERTILIZER: As per Zonal recommendation

SEED RATE: 100 kg/ha (Adjust seed rate taking 1000 seeds weight of 40 g for six row and 45g for two row cultivars).

OBSERVATIONS:

Yield and yield attributing characters.

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana

NEPZ: Varanasi, Kumarganj, Kanpur

NHZ: Bajaura, Malan

CZ: Udaipur

BARLEY AGRONOMY EXPERIMENT NO. SPL-2

2021-22

Title: Productivity and quality enhancement of barley through Nitrogen and Zinc scheduling

Objective: To enhance quality and productivity through different N and Zinc scheduling

Treatments: N and Zn scheduling

1. 1/2 at basal+1/2 at tillering (35-40 DAS)
2. 1/2 at basal+1/4 at tillering (35-40 DAS) +1/4 at anthesis stage (80-90DAS)
3. 1/3 at basal+1/3 at tillering (35-40 DAS) +1/3 at flag leaf stage (65-70DAS)
4. 1/2 at basal+1/2 at tillering (35-40 DAS) +5.0% urea spray at anthesis stage (80-90DAS)
5. 1/2 at basal+1/2 at tillering (35-40 DAS) +5.0% urea + 0.5% ZnSO₄.7H₂O spray at anthesis stage (80-90DAS)
6. 1/2 at basal+1/4 at tillering (35-40 DAS) +5.0% urea spray at anthesis stage (65-70DAS)
7. 1/2 at basal+1/4 at tillering (35-40 DAS) +5.0% urea + 0.5% ZnSO₄.7H₂O spray at flag leaf (65-70DAS) and 0.5% urea spray at anthesis stage (80-90DAS)
8. 1/3 at basal+1/3 at tillering (35-40 DAS) +5.0% urea spray at flag leaf stage (80-90DAS)
9. 1/3 at basal+1/3 at tillering (35-40 DAS) +5.0% urea + 0.5% ZnSO₄.7H₂O spray at anthesis (80-90DAS)

Variety: NWPZ: DWRB160

Design: RBD

Replications:3

FERTILIZER: As per Zone Recommendations and given treatment

SEED RATE: as per recommendation

OBSERVATIONS:

1. Yield and yield attributing characters.
2. Benefit: cost ratio

CENTRES:

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana

BARLEY AGRONOMY EXPERIMENT NO. SPL-3

2021-22

TITLE: Yield maximisation of barley through integrated nutrient supply and PGRs application

OBJECTIVE: To increase barley productivity and nutrient use efficiency.

TREATMENTS:

1. Control (No fertiliser)
2. RDF 50%+10t FYM
3. RDF 50%+10t FYM+PGR
4. RDF 75%+10t FYM
5. RDF 75%+10t FYM+PGR
6. RDF
7. RDF+PGR
8. RDF + 10t FYM
9. RDF + 10t FYM+PGR
10. RDF 125%+PGR
11. RDF 125%+10t FYM+PGR
12. RDF 150%+PGR

Plant Growth regulator: chlormequat-chlorid (CCC) @ 1.25 L ha⁻¹ at GS₃₀₋₃₁ followed by ethephon (Cerone) @ 0.5 L ha⁻¹ at GS₃₉₋₄₀ as per recommendations

Variety: NWPZ: BH946 NEPZ: DWRB 137 CZ: DWRB137, NHZ: BHS400

Design: RBD

Replications:3

FERTILIZER: As per Zone Recommendations and given treatment

SEED RATE: as per recommendation

OBSERVATIONS:

1. Yield and yield attributing characters.
2. Economics

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana

NEPZ: Varanasi, Kumarganj, Kanpur

NHZ: Bajaura, Malan,

CZ: Udaipur

BARLEY AGRONOMY EXPERIMENT NO. SPL-4

2021-22

TITLE: Enhancing nutrient use efficiency through nano fertiliser in barley

OBJECTIVE: To enhance the nutrient use efficiency and to optimise dose of nano fertiser in barley.

TREATMENTS:

1. Control (P+K only)
2. Control (P+K only) +1000 ml NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS
3. 50% RDN + 500ml NN/ha at 30-35 DAS+500ml/ha at 60-65 DAS
4. 50% RDN + 1000 NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS
5. 75% RDN +500ml NN at 30-35 DAS+500ml NN at 60-65 DAS
6. 75% RDN + 1000ml NN at 30-35 DAS+1000ml NN at 60-65 DAS
7. RDN + 500ml NN/ha at 30-35 DAS+500ml/ha at 60-65 DAS
8. RDN + 1000ml NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS
9. Recommended doses of fertiliser

Variety: NWPZ: BH 946

CZ: DWRB137

Design: RBD

Replications:3

FERTILIZER: As per Zone Recommendations and given treatment

SEED RATE: as per recommendation

OBSERVATIONS:

1. Yield and yield attributing characters.
2. Nutrient use efficiency
3. Economics

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana

CZ: Udaipur

BARLEY AGRONOMY EXPERIMENT NO. SPL-5

2021-22

Title: Effect of Zn application on quality and productivity of barley

Objective: To enhance the quality and productivity of barley

Treatments:

A Main Plot: Zinc Application

1. No zinc application
2. Soil application of zinc (12.5 kg Zinc sulphate/ha)
3. Soil application of zinc (25.0kg Zinc sulphate/ha)
4. Two Foliar application of zinc (0.5 % Zinc sulphate at heading and early milk stage)
5. T2+T4
6. T3+T4

B Sub Plot: Varieties

NWPZ: BH 946, DWRB123,

NEPZ: DWRB137, HUB 113

NHZ: BHS 400, VLB118 and

CZ: DWRB137, RD2899

Design: Split Plot **Replication:** 3

SEED RATE: 100 kg/ha (Adjust seed rate taking 1000 seeds weight of 40 g).

Observations: Yield and yield attributes, Zinc status of soil before sowing and harvesting of crop, Zinc content in grain and straw

CENTRES:

NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana

NEPZ: Varanasi, Kumarganj, Kanpur

NHZ: Bajaura, Malan

CZ: Udaipur

BARLEY AGRONOMY EXPERIMENT NO. SPL-6

2021-22

Title: Enhancing productivity and quality of barley using Silicon in low moisture areas.

Objectives: To evaluate the performance of barley cultivars under Silicon application

Treatments

Main Plots: Irrigation levels (3)

I1 : No irrigation

I2 : One irrigation (between 30-35 DAS)

I3 : Two irrigations (30-35 DAS and 80-85 DAS)

I4 : Three irrigations (30-35 DAS, 60-65DAS and 90-95 DAS)

Sub plot: Silicon (4)

Control (No silicon), Silicon @ 100 kg ha⁻¹, Silicon @ 150 kg ha⁻¹ Silicon @ 200 kg ha⁻¹

Design: Split Plot **Replication:** 3 **Varieties:** BH 946

FERTILIZER: As per Zone Recommendations and given treatment

SEED RATE: as per recommendation

OBSERVATIONS:

1. Yield and yield attributing characters
2. Lodging
3. Benefit: cost ratio

Centres

NWPZ: Agra, Durgapura, Hisar

CZ: Udaipur

BARLEY AGRONOMY EXPERIMENT NO. SPL-7

2021-22

Title: Enhancing yield and quality through sowing methods and seeding rate in different barley varieties

Objectives: To evaluate the performance of barley cultivars under sowing methods and seeding rate

Treatments

Sowing Method and Seed rate (6)

T1: Sowing at 23cm with 75 kg seed per ha

T2: Sowing in paired row (23cm: skip one row after two rows) with 75 kg seed per ha

T3: Sowing at 23cm with 87.5 kg seed per ha

T4: Sowing in paired row (23cm: skip one row after two rows) with 100 kg seed per ha

T5: Sowing at 23cm with 87.5 kg seed per ha

T6: Sowing in paired row (23cm: skip one row after two rows) with 100 kg seed per ha

Sub plot: Seeding rate (3)

Variety: DWRB137

Design: Split plot

Replications: Three

FERTILIZER: As per Zone Recommendations

SEED RATE: As per given treatment

OBSERVATIONS:

1. Yield and yield attributing characters
2. Lodging
3. Benefit: cost ratio

Centres

NWPZ: Agra, Ludhiana, Hisar, Karnal, Durgapura,

AICRP on Wheat and Barley Centers and Cooperating Scientists (2021-22)

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