



BARLEY IMPROVEMENT

(AICRP on Wheat & Barley)

TECHNICAL PROGRAMME

Rabi 2023-24

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

Coordinated Yield Trials (*Rabi 2023-24*)

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. Breeders also provide information on format for NIVT proposals about *two/ six row and hulled / hullless types on each new entry* being proposed for AICRP testing.
7. 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 P.I. (Barley Network), ICAR-IIWBR, PB 158, Karnal-132001, Haryana. (Action: All concerned)
8. Also, each centre must supply the seed of their new station trial entries for **IBDSN to P.I. Barley Network, ICAR- IIWBR, PB 158, Karnal-132001**, failing which no entry will be accepted for IVT next year.
9. 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.
10. The ancillary data on disease/ pest incidence, agronomic and grain characters must be reported in the trial by all centres.
11. 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**.
12. Trial's coordinator will have to supply these guidelines to the testing centres for the conduct of trial, along with the other trial details.
13. 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.
14. 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. (e.g. 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

15. 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. N. C. Gahtyari, Barley Breeder Division of Crop Improvement, ICAR-VPKAS, ALMORA- 263601 Uttarakhand	Karnal	Dr. Om Vir Singh PI, Barley Barley Improvement Unit ICAR-IIWBR, PO Box-158, Agrasain Road KARNAL-132001 (Haryana)
Bajaura	Dr. Neha Sharma 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. S.S. Rajput 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	Piyush 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. V.K. Yadav 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	Advanced Varietal Trial-II (AVT-II)	
Production Condition	Irrigated Feed barley	
Zone	NWPZ + NEPZ (Combined)	
No. of Trial Centers	14	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Punjab	1	Ludhiana
Rajasthan	2	Durgapura, Tabiji,
Uttarakhand	1	Pantnagar
U. P	1	Modipuram, Kanpur, Varanasi, Kumarganj
Bihar	3	Pusa (CAU), Sabour, BISA Samastipur
Jharkhand	1	Ranchi
No. of varieties including checks	5	
Contributing Centers	No.	Name of varieties
Karnal	1	DWRB226
Pantnagar	1	UPB1106
Checks	3	BH 946, DWRB137, HUB113
Experimental Design	RBD	
Replications	4	
Plot Size	Gross: 5m x 2.76m (12 rows)	
Fertilizer dose	60 Kg. N : 30Kg P: 20Kg K /ha	
Irrigation	2-3	
Date of sowing (Between)	10-25 November	
Seed requirement	10.000 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. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

UPB 1106 and DWRB 226 will be tested in AVT 2nd year in NWPZ and NEPZ.

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CROP	BARLEY	
Name of Trial	Advanced Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	Central Zone	
No. of Trial Centers	7	
State	NO.	Name of centers
Rajasthan	2	Udaipur, Kota
M. P	3	Gwalior, Morena, Tikamgarh
Gujarat	1	Vijapur
UP	1	Banda
No. of varieties including checks		
Contributing Centers	No.	Name of varieties
Durgapura		
Hisar		
Kanpur		
Ludhiana		
Varanasi		
Checks	2	DWRB137, RD2899
Experimental Design		RBD
Replications		4 (Four)
Plot Size		Gross: 5m x 2.76m (12 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. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

Trial will not be formulated as none of the entries qualified. Check RD 2899 out yielded all entries significantly.

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CROP	BARLEY	
Name of Trial	AVT-MB-IR (First year)	
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	7	
Contributing Centers	No.	Name of varieties
Karnal	2	DWRB 235, DWRB 238
Durgapura	1	RD 3064
Checks	4	DWRB137, DWRUB 52, RD 2849, DWRB 182
Experimental Design		RBD
Replications		5 (Five)
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. Om Vir Singh , PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

Some more entries may also be considered on the basis of quality traits.

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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	3	BH 1055, BH 1056, BH 1057
Pantnagar	2	UPB 1124, UPB 1125
IIWBR, Karnal	9	DWRB 2307, DWRB 2308, DWRB 2309, DWRB 2310, DWRB 2311, DWRB 2312, DWRB 2313, DWRB 2314, DWRB 2315
Durgapura	4	RD 3084, RD 3085, RD 3086, RD 3087
Ludhiana	3	PL 957, PL 958, PL 959
Checks	4	DWRB137*, 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		3.500 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. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

* Six row check

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CROP	BARLEY	
Name of Trial	Initial Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	NWPZ/ NEPZ / CZ also to be known as WCEPZ	
No. of Trial Centers	20	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Punjab	1	Ludhiana
Rajasthan	3	Durgapura, Tabiji, Udaipur,
Uttarakhand	1	Pantnagar
U. P	4	Kanpur, Varanasi, Kumarganj, Modipuram
M. P	4	Gwalior, Morena, Tikamgarh, Banda
Bihar	3	CAU Pusa, BISA Samastipur, Sabour
Jharkhand	1	Ranchi
Gujarat	1	Vijapur
No. of varieties including checks	25	
Contributing Centers	No.	Name of varieties
Kanpur	3	KB 2211, KB 2212, KB 2258
Varanasi	2	HUB 290, HUB 291,
Hisar	3	BH1058, BH1059, BH1060
Durgapura	3	RD 3093, RD 3095, RD3096
Pantnagar	2	UPB 1122, UPB 1123
Ludhiana	3	PL 954, PL 955, PL 956
Karnal IIWBR	3	DWRB 2301, DWRB 2302, DWRB 2303
Vijapur	2	GB 1, GB 2
Checks	4	DWRB137, BH 946, 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		4.500 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. Om Vir Singh, 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 Food barley (Hulless)	
Zone	NWPZ/ NEPZ / CZ	
No. of Trial Centers	15	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Jharkhand	1	Ranchi
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	15	
Contributing Centers	No.	Name of varieties
Durgapura	5	RD 3088, RD 3089, RD 3090, RD 3091, RD 3092
Karnal	3	DWRB 2304, DWRB 2305, DWRB 2306
Pantnagar	2	UPB 1121
Kanpur	1	KB 2234
Ludhiana	1	PL 960
Checks	3	PL891, K1149, Karan16
Experimental Design	RBD	
Replications	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	4.5 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is different, then adjust seed quantity accordingly)	
Last date of seed supply	20 September	
Seed to be supplied to Trial Coordinator	Dr. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Atrasain Road, Karnal – 132001 (HARYANA)	

RD 3091, DWRB 2305 and 2306 are two rowed genotypes.

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CROP	BARLEY	
Name of Trial	Advance Varietal Trial	
Production Condition	Irrigated Food barley (Hulless)	
Zone	NWPZ	
No. of Trial Centers	8	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Punjab	1	Ludhiana
Rajasthan	2	Durgapura, Tabiji, Sriganganagar
Uttarakhand	1	Pantnagar
U. P	1	Modipuram,
No. of varieties including checks & filler	4	
Contributing Centers	No.	Name of varieties
Karnal	2	DWRB 223, DWRB 244,
Checks	2	PL891, Karan16
Experimental Design	RBD	
Replications	Five	
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	4.5 Kg / Entry (At 40 gm thousand grain weight, If thousand grain weight is different, then adjust seed quantity accordingly)	
Last date of seed supply	20 September	
Seed to be supplied to Trial Coordinator	Dr. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

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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	15	
Contributing Centers	No.	Name of varieties
Varanasi	2	HUB 287, HUB 288
Ayodhya	2	NDB 1821, NDB 1833
Kanpur	5	KB 2201, KB 2215, KB 2231, KB 2247, KB 2255
Durgapura	4	RD 3097, RD 3098, RD 3099, RD 3100
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. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

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CROP	BARLEY	
Name of Trial	IVT/AVT-SST	
Production Condition	SAL / ALK	
Zone	NWPZ / NEPZ	
No. of Trial Centers	07	
State	No.	Name of centres
U.P.	2	Dalipnagar, Kumarganj
Haryana	3	IIWBR, Hisar (two sets at different salinity levels), CSSRI Karnal
Rajasthan	2	Fatehpur, Bhilwara,
No. of varieties including checks	18	
Contributing Centers	No.	Name of varieties
Ayodhya	1	NDB 1829
Varanasi	2	HUB 293, HUB 294
Kanpur	3	KB 2203, KB 2216, KB 2232, KB 2031, KB 2158
Hisar	2	BH1061, BH1062
Durgapura	3	RD 3102, RD 3103, RD 3104, RD 3080
Checks	3	RD2794, RD2907, KB1425*
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. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

KB 2031, KB 2158, RD 3080 these entries are in AVT –I year testing

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CROP	BARLEY	
Name of Trial	IVT	
Production Condition	Rainfed	
Zone	NH Zone	
No. of Trial Centres	9	
State	NO.	Name of centres
Himachal	4	Bajaura, Berthein, Malan, Shimla
Uttarakhand	3	Almora, Gaza, Majhera
J&K	2	Khudwani, Wadura
No. of varieties including checks	18	
Contributing Centres	No.	Name of varieties
IARI, RS, Shimla	5	BHS 498, BHS 499 [#] , BHS 500 [#] , BHS 501 [@] , BHS 502
Pantnagar	3	UPB 1118 [@] , UPB 1119, UPB 1120
Almora	5	VLB 185 [@] , VLB 186, VLB 187, VLB 188 [@] , VLB 189 [@]
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	4.5 Kg/Entry	
Last date of seed supply	15 September	
Seed to be supplied to Trial Coordinator	Dr. Om Vir Singh, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

= Huskless barley, @ = 2 Row type

BARLEY Quality (AICW&BIP) 2023-24

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 = 7, IVT = 25 Total = 32 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: 25: **Food Barley Genotypes:** 20

Number of Locations: 6 (Karnal, Hisar, Ludhiana, Pant Nagar, Kanpur & Durgapura)

3. Feed & Hulless Barley Trials

Quality Evaluation of Feed and Hulless Barley Genotypes

Trials: AVT and IVT of 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)

Major recommendations –General

1. Decreasing trend of breeder seed indents in barley is a serious issue and it should be improved by all concerned states. (Action: All concerned)
Action: Needs to increase consumption and area of barley. We have been trying hard for the same by organizing meetings, publishing in news papers and folders.
2. New centre at Banda (CZ) and BISA Samastipur (NEPZ) are proposed, while Samdari (Central Zone), Kalyani (NEPZ), Katrain, Kangra, Rajauri (all in NHZ) have been discontinued. (Action: PI, Barley Improvement).
Action: Banda and Bisa Samastipur are part of AICRP as testing centres.
3. Under the current situation Kumarganj center (the center lost all the breeding material, crossing block as well as seed of station as well as coordinated trials) will continue under AICRP *only as testing center for 2022-23 season. The center should make sincere efforts to again get status as breeding center as soon as possible.* (Action: Dr. Vinod Singh/ Director Research, NDU&T Kumarganj Ayodhya & PI Barley, IIWBR Karnal).
Action: They have collected breeding materials and contributed new entries in IVTs of Feed Barley, SST/ALK and rainfed trials.

Technical Recommendations

1. Information on *row type and hulled/ hullless* should be supplied by the centre at the time of nomination of their entries to ICAR-IIWBR, Karnal for constitution of trials, in addition to the germination report as per last year recommendation. (Action: all the cooperating centres).
2. All the centres *must adhere to the technical programme* sent to them and should follow the plot size and layout mentioned for each trial (Action: all the cooperating centres).
3. The *recommended sowing dates* after three years of experimentation in different zones for better productivity of barley are (NHZ: 20 October-05 November, NWPZ: 01-15 November; CZ: 01-15 November and NEPZ: 11-15 November).
4. To get higher productivity and economics, *recommended dose of Fertiliser (RDF)+10 t/ha FYM+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}* is recommended in all the zones for barley cultivation.
5. *Soil application with ZnSO₄@ 25 kg/ha or soil application @12.5 kg ZnSO₄/ha followed by foliar spray (0.5% zinc sulphate) were recommended* for all the zones.
6. To enhance the productivity in low moisture areas *application of Silicon @ 150kg/ha with three irrigations is recommended.*

