



# **BARLEY IMPROVEMENT**

**(AICRP on Wheat & Barley)**

## **TECHNICAL PROGRAMME**

*Rabi 2022-23*

**Dr. R. P. S. Verma**  
Principal Investigator

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

## Coordinated Yield Trials (*Rabi 2022-23*)

### *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 <sup>st</sup> December (Timely sown)
4.	Last date for supply of filled data books to ICAR-IIWBR, Karnal	15 <sup>th</sup> May (Plains), 15 <sup>th</sup> 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. (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

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. 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. 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. 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	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.)		

**BARLEY IMPROVEMENT**  
(AICW&BIP)  
**TECHNICAL PROGRAMME (RABI 2022-23)**  
**ICAR-INDIAN INSTITUTE OF WHEAT & BARLEY RESEARCH, KARNAL-132001**

CROP	BARLEY	
Name of Trial	Advanced Varietal Trial	
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	6	
Contributing Centers	No.	Name of varieties
Karnal	1	DWRB226
Kanpur	1	KB2004
Pantnagar	1	UPB1106
Checks	3	BH 946, DWRB137, HUB113
Experimental Design	RBD	
Replications	4	
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	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. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

KB2004 and UPB1106 are for NWPZ and DWRB226 for NEPZ in the AVT-IR-FB (1<sup>st</sup> year)

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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	9	
Contributing Centers	No.	Name of varieties
Durgapura	1	RD3053
Hisar	1	BH1045
Kanpur	2	KB2004, KB2015
Ludhiana	1	PL937
Varanasi	1	HUB281
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. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain 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	5	
Contributing Centers	No.	Name of varieties
Karnal	1	DWRB219*
Checks	4	DWRB137, DWRUB52, RD2849, DWRB182
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. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)

\*AVT final year entry

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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	BH1050, BH1051, BH1052
Kanpur	2	KB2131, KB2145
Pantnagar	2	UPB1116, UPB1117
IIWBR, Karnal	6	DWRB235, DWRB236, DWRB237, DWRB238, DWRB239, DWRB240
Durgapura	4	RD3064, RD3065, RD3066, RD3067
Ludhiana	4	PL941, PL942, PL943, PL945
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. RPS Verma, 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	
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	KB2145 <sup>@</sup> , KB2127, KB2133
Varanasi	2	HUB283, HUB284
Hisar	3	BH1047, BH1048, BH1049
Durgapura	4	RD3068, RD3069, RD3070, RD3071,
Pantnagar	2	UPB1114, UPB1115
Ludhiana	4	PL946, PL947, PL948, PL949
Karnal	3	DWRB 241, DWRB242, DWRB 243
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. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

*@ = Two row type entries*



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CROP	BARLEY	
Name of Trial	Initial Varietal Trial/Advance 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	9	
Contributing Centers	No.	Name of varieties
Karnal	3	<b>DWRB223</b> , DWRB244, DWRB245@
Pantnagar	3	<b>UPB1104</b> , UPB1112, UPB1113
Checks	3*	PL891, K1149, Karan16
Experimental Design	RBD	
Replications	3 (Three)	
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. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

***DWRB223** in AVT 1<sup>st</sup> Year of NWPZ only and **UPB1104** is for Central Zone \*Seed for NDB943 is not available from Kumarganj, hence K1149 is included @ = **Two row type entries***

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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	1	HUB282
Kanpur	4	KB2155, KB2158, KB2159, KB2160
Ludhiana	4	PL950, PL951 <sup>@</sup> , PL952 <sup>@</sup> , PL953
Durgapura	4	RD3076, RD3077, RD3078, RD3079
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)	

<sup>@</sup> = *Two row type entries*

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CROP	BARLEY	
Name of Trial	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
Karnal	2	<b>DWRB228</b> , DWRB246
Kanpur	5	<b>KB2031</b> , KB2120 <sup>@</sup> , KB2127, KB2158, KB2160
Varanasi	2	HUB285, HUB286
Hisar	2	BH1053, BH1054
Durgapura	4	RD3080, RD3081, RD3082, RD3083
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. RPS Verma, PI Barley, ICAR-IIWBR, P.B. 158, Agrasain Road, Karnal – 132001 (HARYANA)	

*\*KB1425 is replacement of NDB1173 for which seed is not available @ = Two row type entries  
KB2031 and DWRB228 are for AVT-I<sup>st</sup> 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	24	
Contributing Centres	No.	Name of varieties
IARI, RS, Shimla	5	BHS493, BHS494, BHS495 <sup>@</sup> , BHS496, BHS497 <sup>#</sup>
Pantnagar	3	UPB1109, UPB1110, UPB1111
Almora	6	<b>VLB175</b> , VLB180 <sup>@</sup> , VLB181 <sup>@</sup> , VLB182 <sup>@</sup> , VLB183 <sup>@</sup> , VLB184
Bajaura	5	HBL879, HBL880, HBL881, HBL882, HBL883
Checks	5	HBL113 <sup>@</sup> , BHS352 <sup>#</sup> , 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	<b>4.5 Kg/Entry</b>	
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)	

*VLB175 is for first year AVT in normal as well as Dual purpose trials.*

*# = Huskless barley, @ = 2 Row type*

## **BARLEY Quality (AICW&BIP) 2022-23**

### **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 = 5, IVT = 25 Total = 30 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

**Entries:** AVT = 13, IVT = 89 Total = 102 genotypes

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

# AICW&BIP BARLEY WORK PLAN

## Barley Crop Protection (2022-23)

1. **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 infected samples of rust will 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:

2. **Evaluation for status of host resistance in test entries:**

- i. **Initial Barley Disease Screening Nursery (IBDSN):**

This nursery will comprise of 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)

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

*Note: Two or six row spike type information should be recorded along with disease score on each entry for data verification purpose in case required*

- 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.

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

S. No.	Treatment	Dosages
1	Tebuconazole 50% + Trifloxystrobin 25%,	0.06%
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, 3 replications.

## **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) New trial**

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 (2022-23)

### ZONE-WISE DATE OF SUBMISSION

1.	NORTHERN HILLS ZONE	15 <sup>th</sup> JUNE
2.	NORTH WESTERN PLAINS ZONE	15 <sup>th</sup> MAY
3.	NORTH EASTERN PLAINS ZONE	15 <sup>th</sup> MAY
4.	CENTRAL ZONE	15 <sup>th</sup> 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/m<sup>2</sup> 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.

### NORTH WESTERN PLAIN ZONE (AVT Malt Barley Entries) 2022-23

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

#### OBJECTIVES

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

#### TREATMENTS

##### A. Nitrogen Levels (Main Plots): 3

N1-60 kg

N2-90 kg

N3-120 kg

##### B. Varieties (Sub-Plots): 6

Test Variety: DWRB219 Checks: DWRUB52, DWRB182, RD2849, DWRB137

**FERTILISER:** Nitrogen as per treatment and P & K @ 40 & 30 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:** Karnal, Hisar, Durgapura, Ludhiana



## **BARLEY AGRONOMY EXPERIMENT NO. SPL-1**

**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% ZnSO<sub>4</sub>.7H<sub>2</sub>O 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% ZnSO<sub>4</sub>.7H<sub>2</sub>O 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% ZnSO<sub>4</sub>.7H<sub>2</sub>O 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-2**

**TITLE:** Enhancing nutrient use efficiency through nano fertiliser in barley

**OBJECTIVE:** To enhance the nutrient use efficiency and to optimise dose of nano fertiliser 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    NEPZ: DWRB137    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. Nutrient use efficiency
3. Economics

**CENTRES:** NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana    CZ: Udaipur

NEPZ: Kanpur, Kumarganj, Varanasi,    NHZ: Bajaura, Malan

## **BARLEY AGRONOMY EXPERIMENT NO. SPL-3**

**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)

Sowing Method (2)

SM1 : Sowing at 20cm var. DWRB137

SM2 : Sowing in paired row (20cm: skip one row after two rows) DWRB137

### **Sub plot: Seeding rate (3)**

Seed rate 75, 87.5, 100 kg/ha

Variety: DWRB137 Design: Split plot Replications: Three

**FERTILIZER:** As per Zone Recommendations

**SEED RATE:** As per given treatments

### **OBSERVATIONS:**

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

### **Centres**

NWPZ: Agra, Ludhiana, Hisar, Karnal, Durgapura

## 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)
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).
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).

## Technical Recommendations

1. Information on *row type and hulled/ hulless* 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<sup>-1</sup> at GS<sub>30-31</sub> followed by Ethephon (Cerone) @0.5 L ha<sup>-1</sup> at GS<sub>39-40</sub>}* is recommended in all the zones for barley cultivation.
5. *Soil application with ZnSO<sub>4</sub>@ 25 kg/ha or soil application @12.5 kg ZnSO<sub>4</sub>/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*.