
بسم الله الرحمن الرحيم

Annual Wheat Planning Meeting (2018-19)

Wheat Research Institute, Faisalabad

1. TITLE | CROSSING BLOCK AND HYBRIDIZATION

OBJECTIVES

- To maintain genotypes/lines with their typical characteristics.
- To combine high yield, adaptability and tolerance to biotic & abiotic stresses, quality and other desirable characteristics.
- To incorporate effective rust resistance genes in local germplasm.

TREATMENTS & METHODOLOGY

Total entries: 428

Sowings: 2 (during 1st and 3rd week of Nov.)

Plot size: 2 rows of 2.5 meter length each

About 700-750 crosses will be attempted during 2018-19

GERMPLASM GROUPS

Sr. #	Germplasm Groups	No. of varieties / lines
1	Current varieties of Pak.	31
2	Old varieties	35
3	Exotic lines	20
4	Disease resistant	65
5	Drought tolerant	10
6	Salt tolerant	07
7	Heat tolerant	48
8	Grain quality	17
9	High grain weight	14
10	High yielding	142
11	Harvest plus	34
12	*Triticum pyrum*	05
Total		**428**

PREVIOUS YEAR'S RESULTS

Last year crossing block comprised of 594 entries.

Sr. #	Traits	Range
1	Plant height (cm)	65-130
2	Days to heading	96-111
3	Days to maturity	124-141
4	1000 grain weight (g)	18.1-51.3
5	Tiller/plant	5-11
6	Protein content (%)	12.4-17.2
7	Gluten content (%)	33-38
8	Canopy temperature (^{0}c) (booting & anthesis)	15.2-20.5 16.8-21.9
9	NDVI range (booting & anthesis)	0.69-0.84 0.67-0.81
10	Leaf & yellow rust reactions	0- 100 S
11	Leaf color, size & orientation	Wide range
12	**Number of crosses: 979**	

2. TITLE EVALUATION OF PREBREEDING NURSERY

OBJECTIVES

Enhancement of genetic stock for inclusion in crossing block

TREATMENTS & METHODOLOGY

Total entries: about 300

Sowings: (during 1st week of Nov.)

Plot size: 2 rows of 2.5 meter length each

Parameters: Agronomic, physiological and pathological traits

PREVIOUS YEAR'S RESULTS

- Last year 140 entries were tested.
- 25 entries having desirable genetic background were selected and added in the crossing block.

TITLE 3, 4, 6 & 7	STUDY OF FILIAL GENERATIONS (F_1-F_7) OF BREAD WHEAT

OBJECTIVES

- To evaluate the generations in their respective environment (irrigated, heat, drought, durable etc.).
- Selection of single plants resistant to diseases and having good plant type in F_2 _ F_5 generations (selected bulk method).
- Selection of desirable single head progenies (F_6).
- F_7 generation (single head row progenies) selection for grain yield testing in preliminary yield trials.

TREATMENTS & METHODOLOGY

F_1 generation: Under normal environment

F_2 to F_7 : will be exposed to;

- Artificial epidemic to rust condition
- Heat stress
- Drought stress etc

Filial Generations 2018-19

Generations	No. of crosses	Entries	Plot size
F_1 (single crosses)	1071	1256	1 row × 2.5m
F_2	970	979	12 rows×8m
F_3	587	587SHB	3 rows ×3m
F_4	360	360SHB	3 rows×3m
F_5	232	232SHB	3 rows×3m
F_6	161	2135 SHR	1 rowx 2.5m
F_7	77	391 SHRP	6 rows ×6m

PREVIOUS YEAR'S RESULTS

Generations	Crosses Studied /SHB	Selected	
		Crosses	Entries
F_1 single crosses	1070	979	579
F_2	789	587	587 SHB
F_3	508	360	360SHB
F_4	345	232	2321 SHB
F_5	209	161	161 SHB
F_6	99 (1814) SHR	77	340 SHRP
F_7	20 (228SHRP)	15	129 SHRP

5. TITLE	STUDY OF PROMISING ADVANCED LINES OF BREAD WHEAT UNDER DROUGHT STRESS CONDITIONS

OBJECTIVES

- To evaluate advanced lines/varieties suitable for rainfed / water stressed areas.

TREATMENTS & METHODOLOGY

Advanced lines: 12 advance lines from different sources

Treatments: 3 sets
One set in rainfed condition, 2nd with one irrigation at reproductive stage, 3rd in normal irrigated conditions

Layout: Split plot Design

Parameters: Canopy temperature Depression (CTD), days to 50% heading, days to 50% maturity, plant height, chlorophyll contents with NDVI, grains per spike, 1000-grain weight and grain yield

PREVIOUS YEAR'S RESULTS

•Twelve advanced lines of bread wheat along with check varieties (Fsd-08 and CK-50) in triplicate

•Sowing Time=November 27, 2017,

•Levels of irrigations=03

one set with rain fed condition

2nd with one irrigation and

3rd with normal irrigated condition

• V-15100 gave highest grain yield 2840.58 & 2300.99 kg/ha (One and zero irrigation)

•V-15028 gave highest grain yield 3860.77 kg/ha (Normal irrigation)

8. TITLE	EVALUATION OF BREAD WHEAT GERMPLASM FOR POST-ANTHESIS HEAT STRESS

OBJECTIVES

- Development of heat tolerant varieties to combat the effect of global warming
- Evaluation of bread wheat germplasm for yield and yield components under post-anthesis heat stress conditions.

Treatments & methodology

- Varieties/lines = 50,
- Set = 3 (in & out side tunnel (normal planting) & late planting
- Layout = Alpha Lattice, Reps = 2
- Post anthesis heat shock will be induced by covering the tunnel with clear poly propylene sheet for about three weeks.

Parameters = days to heading, canopy temperature, chlorophyll content, plant height, days to maturity, rust reactions, Grains/spike, 1000- grain weight and grain yield.

PREVIOUS YEAR'S RESULTS

Sr#	Genotypes	Yield (kg/ha)			1000 Grain Weight (g)		
		Normal	Tunnel	Late sown	Normal	Tunnel	Late
1	Galaxy-13	3355	3248	2954	33.7	31.8	30.1
2	JNRB.5/PIFED/5/BJY/COC//PRL/ BOW/3/SARA/THB//VEE/4/PIFED	2861	2547	2280	33.1	31.2	29.3
3	JNRB.5/PIFED/5/BJY/COC//PRL/ BOW/3/SARA/THB//VEE/4/PIFED	3701	3040	2533	34.3	32.3	29.1
4	JNRB.5/PIFED/5/BJY/COC//PRL/ BOW/3/SARA/THB//VEE/4/PIFED	3234	2347	1920	33.3	31.1	29.6
5	SERI/BAV92//PUB94.15.1.12/ WBLLI	1840	1740	1213	34.1	32.8	28.2
6	Ujala-16	2094	1794	1093	36.4	33.9	31.6

9. TITLE	YIELD EVALUATION OF CIMMYT MATERIAL IN NORMAL AND LATE SOWN CONDITIONS

OBJECTIVES

To evaluate CIMMYT candidate lines under local climatic conditions.

TREATMENTS & METHODOLOGY

Entries:	600
Source:	CIMMYT
Plot size:	6 rows x 5 m
Sowing time:	Normal (1st week of Nov.)
	Late (last week of Dec.)
Parameters:	NDVI, Canopy Temperature, Days to heading, Plant Height, Lodging Score, Days to maturity, Yield & 1000 grain weight

PREVIOUS YEAR'S RESULTS

Ninety (90) promising lines were selected from candidate lines received from CIMMYT for further study in yield trials. The yield performance of top five high yielding lines compared to check variety is as under

Entry No.	Yield (kg ha-^{1})	% increase over Faisalabad-08
2053	5490	23.43%
4001	5372	20.77%
1039	5094	14.52%
6016	4854	9.12%
3045	4851	9.06%

10. TITLE EVALUATION OF INTERNATIONAL BREAD WHEAT MATERIAL (CIMMYT / ICARDA).

OBJECTIVES

To evaluate and select promising lines from CIMMYT / ICARDA materials for strengthening bread wheat germplasm and testing in station yield trials

TREATMENTS & METHODOLOGY

The following yield trials/nurseries are expected from (CIMMYT, ICARDA & NARC)

Sr. No	Trials/ Nurseries	Source	Sr. No.	Trials/ Nurseries	Source	Status
1	39th ESWYT	CIMMYT	11	46th IBWSN	CIMMYT	All are expected for rabi, 2017-18
2	26th SAWYT	CIMMYT	12	11th Stem RRSN	CIMMYT	
3	9th EBWYT	CIMMYT	13	23rd ISPTON	CIMMYT	
4	15th HTWYT	CIMMYT	14	17thSSR-FA/ IR ISBWYT	ICARDA	
5	6th WYCYT	CIMMYT	15	18th CWANA SBWON	ICARDA	
6	WPEPYT	CIMMYT	16	18th CWANA ESBWYT	ICARDA	
7	7th HPYT	CIMMYT	17	17th CWANA HTSBWON	ICARDA	
8	2nd SATYT	CIMMYT	18	18thDSBWYT	ICARDA	
9	35th SAWSN	CIMMYT	19	NARC HPRYT	NARC	
10	6th CSISA	CIMMYT				

PREVIOUS YEAR'S RESULTS

- 394 entries were selected from 19 international trials/nurseries

11. TITLE | PRELIMINARY WHEAT YIELD TRIALS (A-TRIALS)

OBJECTIVES

- To evaluate the newly developed stable lines for yield and other agronomic parameters under irrigated and rainfed conditions.

TREATMENTS & METHODOLOGY

Irrigated:

- Entries = 376
- Check varieties =3 (Fsd-08, Anaj-17 and Galaxy-13)

Rainfed:

- Entries = 76
- Check varieties = 4 (Fsd-08, Chk-50, Dharabi-13 and Galaxy-13)
- Layout = Alpha lattice, Reps = 3

PREVIOUS YEAR'S RESULTS

- 26 advanced lines (out of 90) of bread wheat were found higher yielding than high yielding check (Galaxy-13) in their respective trials under irrigated conditions.

- Similarly, 33 advanced lines were found higher yielding than high yielding checks (Fsd.08, Chakwal.50, Durrabi.11 and Galaxy.13) in their respective trials under rainfed condition

12. TITLE REGULAR WHEAT YIELD TRIALS (B-TRIALS)

OBJECTIVES

To evaluate the promising lines of bread wheat selected from preliminary yield trials for yield and other agronomic parameters under irrigated and rainfed conditions.

TREATMENTS & METHODOLOGY

Irrigated:

- Entries =138 Checks =4(Fsd-08, Galaxy-13, Jouhar-16, Anaaj-17).

Rainfed:

- Entries = 45 Checks= 4 (Fsd-08, Chk-50, Galaxy-13, Dharabi-11)
- Layout = Alpha lattice, Reps = 3

PREVIOUS YEAR'S RESULTS

- Twenty-five advance lines performed better than checks in their respective trials under normal irrigated conditions.

- Nine advance lines were found higher yielder than checks in their respective trials in rainfed condition

13. TITLE | PUNJAB UNIFORM WHEAT YIELD TRIAL (PUWYT)

OBJECTIVES

To assess the yield performance and adaptability of promising lines in different ecological zones of the Punjab.

TREATMENTS & METHODOLOGY

Locations: Govt. farms in Punjab.

Contributing Institutes: AARI, BARI, AZRI, UAF,NIBGE, NIAB, Private Sector, NARC etc.

Trials: 20, Sowing time:2nd week of November

Design: Alpha Lattice, Plot size:1.2mx5m,

Replications:02, Fertilizer: 120-90-60 kg/ha

PREVIOUS YEAR'S RESULTS

Fifty entries including two check varieties i.e. Johar-16 and local check Fsd-08 were planted at 20 locations during first fortnight of November, 2017.

Ranking	Variety/line	Yield (kg ha^{-1})
1	V-15166	4305
2	NR-529	4304
3	V-16005	4254
4	NS-76	4238
5	V-15212	4218
6	V-15309	4214
13	Jouhar-16	4022

14. TITLE	NATIONAL UNIFORM WHEAT YIELD TRIALS (NUWYT)

OBJECTIVES

To confirm the yield and adaptability of elite lines contributed by the wheat breeders of Pakistan.

TREATMENTS & METHODOLOGY

- Eight lines (six for irrigated & two for rainfed) will be provided by WRI, Faisalabad.
- National Wheat Coordinator, PARC, will design the trial.
- Trials with coded entries will be supplied to Director Wheat for planting and harvesting on the selected sites in the Punjab.

PREVIOUS YEAR'S RESULTS

The previous year results

The advanced lines contributed by WRI, Faisalabad

- V-12304 (4029 kg ha^{-1}), HYT 80-34 (3969 kg ha^{-1}), V-14124 (3933 kg ha^{-1}), HYT 60-5 (3924 kg ha^{-1}), produced higher yield than check Pakistan-13 (3857 kg ha^{-1}) under irrigated condition all over Punjab.

15. TITLE HYBRID SEED PROGRAM

OBJECTIVES

- To maintain CMS (A), maintainer (B) and fertility restorer (R) lines

TREATMENTS & METHODOLOGY

33 A-lines (CMS lines), 33 B-lines (maintainers)

•A-lines will be maintained by pollinating with its corresponding maintainer.

•Sixteen lines with fertility restorer gene (Rf) will also be maintained.

•Seed of F_1 will be planted for back crosses

PREVIOUS YEAR'S RESULTS

•Thirty three CMS lines were maintained by crossing with their respective maintainer (B-lines).

•Sixteen fertility restorers were also maintained by selfing.

SEED PRODUCTION

16. TITLE	PRODUCTION OF BREEDERS NUCLEUS SEED OF WHEAT ADVANCED LINES AND VARIETIES

OBJECTIVES

- To maintain true to type seed of bread/durum wheat varieties.
- To obtain the phenotypic stability of advanced wheat lines.

TREATMENTS & METHODOLOGY

- 40-200 single heads of all commercial varieties and elite lines will be planted in 2.5 meters long row.
- Head rows of each commercial variety will be observed at different stages of plant development.
- Head rows deviating from the original variety will be discarded.
- Uniform vigorous head rows will be harvested and threshed separately for further study as head rows progenies

PREVIOUS YEAR'S RESULTS

Sr.#	Varieties/ lines	No. of heads	Sr.#	Varieties/ lines	No. of heads
1.	Punjab-11	160	20.	V-15153	40
2.	Faisalabad-08	160	21.	V-15166	40
3.	Galaxy-13	160	22.	V-15168	40
4.	Ujalla-16	160	23.	V-15174	40
5.	Anaj-17	160	24.	V-15203	40
6.	V-12304	40	25.	V-15212	40
7.	V-14154	40	26.	V-15216	40
8.	V-14124	40	27.	V-15291	40
9.	V-15235	40	28.	V-15309	40
10.	V-13348	40	29.	V-15327	40
11.	V-16005	40	30.	V-16202	40
12.	V-14058	40	31.	HYT-20-6	40
13.	V-14061	40	32.	HYT-20-19	40
14.	V-14116	40	33.	HYT-55-33	40
15.	V-15070	40	34.	HYT-55-40	40
16.	V-15082	40	35.	HYT-60-5	40
17.	V-15099	40	36.	HYT-60-57	40
18.	V-15100	40	37.	HYT-80-34	40
19.	V-15113	40	38.	HYT-80-44	40

17. TITLE	PRE-BASIC SEED PRODUCTION OF WHEAT AND BARLEY CULTIVARS AND ADVANCED LINES.

OBJECTIVE

- To produce pure seed of commercial wheat cultivars/ lines for supplying to the Punjab Seed Corporation and Private Seed Companies

TREATMENTS & METHODOLOGY

- Two to four kanals of 10 cultivars/lines will be sown using seeds of selected head rows for head row progeny.
- Each single head row progeny will be planted 24m x 1.65m and field will be inspected at different stages of plant growth.

PREVIOUS YEAR'S RESULTS

Sr. #	Varieties	kg
1.	Faisalabad-08	2000
2.	Punjab-11	2000
3.	Galaxy-13	1500
4.	Ujalla-16	1450
5.	Anaj-17	150
6.	Sultan-17	480
7.	Jau-17	470

18. TITLE	SEED PRODUCTION OF WHEAT AND BARLEY CULTIVARS AND ADVANCED LINES

OBJECTIVES

To produce pure seed of commercial wheat cultivars/lines for farmers

TREATMENTS & METHODOLOGY

One to four acres of the following cultivars will be sown

Sr. No.	Varieties
1.	Punjab-11
2.	Faisalabad-08
3.	Galaxy-13
4.	Ujala-16
5.	Anaj-17
6.	Sultan-17
7.	Jau-17

PREVIOUS YEAR'S RESULTS

Sr. No.	Varieties	kg
1.	Faisalabad-08	5470
2.	Anaj-17	5096
3.	Punjab-11	2700
4.	Ujala-16	4700
5.	Zincole-16	600

SHUTTLE BREEDING

WHEAT RESEARCH SUB STATION, MURREE

19. TITLE SCREENING OF GERMPLASM AT SEEDLING STAGE

OBJECTIVE

A set of germplasm including advanced lines and existing varieties screened against yellow and stem rust

TREATMENTS & METHODOLOGY

Sowing methods=Small pots in green house under controlled conditions. Inoculation= Rust spores (seedling stage)f
Reaction type will be then recorded to evaluate the resistant and susceptible material.

PREVIOUS YEAR'S RESULTS

No. of lines=100 lines obtained from main station.
Resistant=32 lines (against aculture 17LSPK84 of leaf rust showing a reaction type 1-2.)

20. TITLE SUMMER DISEASE SCREENING NURSERY

OBJECTIVE

A set of germplasm including advanced lines and existing varieties screened against available races of yellow and stem rust

TREATMENTS & METHODOLOGY

Near Isogenic lines representing the differential sets for each type of rust disease along with existing susceptible varieties will be sown in field plots during March –April 2019. Disease data will be recorded on appearance of any rust spore.

PREVIOUS YEAR'S RESULTS

A set of 353 lines were sown in field in three blocks along with spreader. A few lines were found to be susceptible to leaf rust while majority of lines were susceptible to powdery mildew due to high humidity showing a reaction type 3-4.

21. TITLE	OFF- SEASON TRIALS OF ADVANCED GENERATIONS

OBJECTIVE

Off season trails of wheat advanced generations to speed up the variety development process

TREATMENTS & METHODOLOGY

A Set of germplasm including wheat advance lines will be sown in field area.

PREVIOUS YEAR'S RESULTS

A set of 53 F1 lines were sown in field area. Some good lines selected and used in crossing. Upon maturity seed of these lines was harvested and send back to main station.

22. TITLE	SEED INCREASE OF RUST DIFFERENTIAL SETS (NEAR ISOGENIC LINES)

OBJECTIVES

Near Isogenic lines representing the differential sets for each type of rust disease will be sown in field plots during March –April 2019. Spikes will be harvested at maturity and seed will be saved for use in next analysis

TREATMENTS & METHODOLOGY

A set of germplasm including wheat advance lines will be sown in field area.

PREVIOUS YEAR'S RESULTS

Seed of 30 entries of leaf rust, 18 entries of stem rust and 18 entries of yellow rust harvested and stored for future use in race analysis experiments.

RESEARCH IN WHEAT-RICE SYSTEM
RRI, KSK

23. TITLE	DEVELOPMENT OF HIGH YIELDING AND DISEASE RESISTANT WHEAT VARIETY FOR RICE ZONE

OBJECTIVES

- To develop high yielding, disease resistant and well adapted wheat varieties for rice zone.
- To screen wheat germplasm against rusts.

TREATMENT AND METHODOLOGY

Following material will be planted:

- Track record of wheat varieties
- Segregating generations
- Local Disease screening nursery (LDSN).
- Advanced lines evaluation trial.
- PUWYT and NUWYT

PREVIOUS YEAR'S RESULTS

1. Varieties/lines in track record of wheat varieties

Varieties/ Lines	Yield	Disease reaction	
		Lr	Yr
Ujala-16	3466	0	0
Galaxy-13	3723	20M	10M
Punjab-11	3291	10M	0
Fsd-08	2463	10M	10M
Anaj-17	3447	0	0
V-12304	3040	TM	0
V-14154	3270	20M	0
V-14124	2770	10M	0
V-15235	3832	0	0

PREVIOUS YEAR'S RESULTS

2. Filial Generations

- In segregating generations, 215 entries of $F_{2,}$ 105 entries of F_3,99 entries of F_4 and 55 entries of F_5 were studied. Out of them 123, 74, 30 and 26 entries were selected respectively
- 28 crosses of F_6(252 SHR) were planted and from 24 crosses (63 SHR) were selected.

3. Local Disease screening nursery (LDSN).

- Three hundred and seventy (370) entries including advance lines from NUWYT, PUWYT, A, B as well as commercial varieties were planted for screening against rust diseases, due to unfavorable climatic conditions diseases did not appear

4. Advanced lines evaluation trial

- The trial consisted of 20 entries including local check variety Anaj-17.
- Four lines (V15166, V16005, V15327, V15099) gave higher yield 4879 kg ha-1,4591 kg ha-1, 4183 kg ha-1 and 4160 kg ha-1 than Check variety (4100 kg ha-1).

24. TITLE	SUMMER WHEAT SCREENING NURSERY, KAGHAN

OBJECTIVES

- To screen the wheat germplasm against rusts and powdery mildew.
- To incorporate effective rust resistant genes in local germplasm.
- To select the resistant material for further studies.
- To advance the generations for speedy variety development.

TREATMENT AND METHODOLOGY

Entries:1000, Sowing date: Last week of May, 2019

Plot Size: Single rows of 2 meters

Initiatives: Hybridization, generation advancement and diseases data

PREVIOUS YEAR'S RESULTS

- Out of 1059 entries including disease screening nursery, F_2-F_7 generations, advance lines from NUWYT and PUWYT, 75 lines showed susceptible reaction to rust while remaining entries showed moderate to resistant disease reaction.
- Moreover, 197 entries showed highly susceptible reaction against powdery mildew and remaining showed moderately resistant reaction.

PATHOLOGICAL STUDIES

25. TITLE	INVESTIGATION ON NEWLY EMERGING FOLIAR DISEASES OF WHEAT UNDER CHANGING CLIMATIC CONDITIONS

OBJECTIVES

- To determine the prevalence/status of newly emerging foliar diseases of wheat with major emphasis on wheat blast, in Punjab.

TREATMENTS & METHODOLOGY

- The survey will be conducted in two phase
  - 1st Phase pre harvest (Last week of Feb to Last week of March) &
  - 2nd Phase after harvest (Mid April to Mid May)
- Infected wheat leaf/spike/seed samples will be collected from lines of PUWYT and NUWYT throughout the Punjab.
- These samples would be analyzed in Pathology Lab. to identify the pathogens

PREVIOUS YEAR'S RESULTS

- Surveyed wheat fields revealed that all these fields were from blast disease which is characterized by brown to whitish discoloration of spikes.

26. TITLE | DISEASE TRAP NURSERIES.

OBJECTIVES

- To trap the early landed rust inoculums and its multiplication.
- To monitor the rust virulence pattern at different locations.
- To observe the blast symptoms on foliar part of plant especially head/spike.

TREATMENTS & METHODOLOGY

No. of entries	LR Differentials = 40 YR Differentials = 28 SR Differentials = 16 Commercial Varieties/lines = 140
Susceptible Check	Morocco at border and every 10th entry
Sowing Date	Last week of September & Mid December
Plot Size	2 rows x 2 m
Assessment Scale	Rust data will be recorded on Modified Cobb's Scale (Peterson et al., 1948).

PREVIOUS YEAR'S RESULTS

Leaf rust was trapped on 11-12-2017 while yellow rust on 17-02-2018 in 1st trap nursery.

The isogenic lines showed resistant response to leaf and stripe rusts.	
Isogenic lines for LR	*Lr 2a, Lr 19, Lr 26, Lr 27 +31, Lr 36, and Lr 23+Gaza*
Isogenic lines for YR	*Yr 5, Yr 10, Yr 15, Yr 24, and Yr 26*
Isogenic lines for SR	None of the tested entries showed the symptoms of stem rust during 2017-18.

27. TITLE	SCREENING OF WHEAT AND BARLEY ADVANCED LINES/VARIETIES AGAINST RUSTS AT DIFFERENT LOCATIONS

OBJECTIVES

To screen advanced lines of wheat and barley against leaf, yellow and stem rusts at adult stage.

TREATMENTS & METHODOLOGY:

No. of entries	500
Susceptible Check	Morocco at boarder & at every 10th entry
Sowing Date	2nd and 3rd week of November
Plot Size	1 row x 2 m
Rust Assessment date (s)	• At adult plant stage • 2nd and 4th week of March
Locations	WRI, Faisalabad, Islamabad and RARI, Bahawalpur (Artificial Screening) Kala Shah Kaku, Khanewal, Kot Naina, , Pirsabak & Peshawar (Natural)

PREVIOUS YEAR'S RESULTS

Out of three hundred and seventy test entries,

-Thirty nine entries showed susceptible reaction to leaf rust

-One hundred and eleven showed susceptibility to yellow rust

-Thirty six entries showed susceptible reaction to both rusts (YR & LR).

-Moreover, entry showing rust rating up to 30 MRMS under artificial inoculation were promoted / selected for further evaluation.

28. TITLE	EVALUATION OF ADVANCED LINES/VARIEITIES FOR SEEDLING AND ADULT PLANT RESISTANCE TO LEAF RUST

OBJECTIVES

- To identify rust resistant genes in advanced lines/varieties of wheat.

TREATMENTS & METHODOLOGY

For Seedling Study

- The seed of different lines/varieties will be sown in pots.
- After 7-9 days of germination, the plants will be inoculated with leaf rust.
- The inoculated plants will be kept in dew chamber at 15-20 ^{o}C and 100 % relative humidity for 12 hours and then shifted into glass house.
- After 14-16 days of inoculation, scoring will be done for leaf rust.

For Adult Plant Study

- Inoculation of rust to create artificial epidemic conditions will be done in field.
- Rust data will be recorded twice at adult plant stage.

For Molecular Study

- Molecular markers will be applied for gene identification.

PREVIOUS YEAR'S RESULTS

Among test entries

- Twenty-four entries showed resistance to leaf rust while the fifteen entries showed resistant to moderately resistant response in field.
- Marker application by ABRI showed that out of 60, Lr34/Yr29/Pm38 was present in two genotypes
- Lr46/Yr29/Pm39 was present in 47 genotypes
- Sr2 in 47 genotypes
- Lr19/Sr25 in 47 genotypes

29. TITLE	SCREENING OF ADVANCED WHEAT MATERIAL AGAINST KARNAL BUNT (*Tilletia indica*).

OBJECTIVES

- To identify bunt resistant material for utilization in hybridization program.

TREATMENTS & METHODOLOGY

- Advanced lines/varieties of wheat will be tested under inoculated condition in the field.
- The trial will be sown in two different sowing dates in order to minimizing the chances of disease escape (1st set during 2nd week of Nov. & 2nd set during 2nd week of Dec.)
- Each entry will be sown in single row of 1 m length.
- The inoculum will be prepared and spore suspension will be injected by Syringe method to 10 heads of each variety at boot stage.
- Disease incidence and severity of each spike will be recorded according to the scale of Augil e*t al.,*(1989).

PREVIOUS YEAR'S RESULTS

- Out of 85 entries, ten entries showed highly resistant, 15 entries showed resistant, 11 entries showed moderately resistant, 17 entries showed moderately susceptible, 12 entries showed susceptible and 19 entries highly susceptible reaction against karnal or partial bunt

30. TITLE | SURVEY OF KARNAL BUNT AND BLACK POINT OF WHEAT

OBJECTIVES

- To find out the prevalence of karnal bunt and black point diseases in different agro ecological zones of Punjab.

TREATMENTS & METHODOLOGY

- Grain samples (250 grams each) will be collected from lines of PUWYT and NUWYT throughout the Punjab.
- These samples would be analyzed in Wheat Pathology Lab.
- The disease prevalence of karnal bunt and black point diseases will be recorded on the basis of following formula;

Disease prevalence (%age) = No. of infected samples / total X 100

PREVIOUS YEAR'S RESULTS

Locations	Infected Samples							
	NUWYT (out of 60 samples)				PWYT (out of 60 samples)			
	Karnal Bunt		Black Point		Karnal Bunt		Black Point	
	Infected	Prevalence (%)	Infected	Prevalence (%)	Infected	Prevalence (%)	Infected	Prevalence (%)
Kot Nina	23	38.33	20	33.33	17	28.33	22	36.66
K.S. Kaku	11	18.33	12	20.00	06	10.00	11	18.33
R.Khurd	03	5.00	02	3.33	01	1.66	06	10.00
Gujjarwala	05	8.33	04	6.66	03	5.00	03	5.00
Khannewal	00	00	01	1.66	00	00	07	11.66
Sahiwal	00	00	00	00	00	00	07	11.66
Faisalabad	01	1.66	01	1.66	00	00	06	10.00
Sargodha	00	00	00	00	00	00	11	18.33
Pakpattan	02	3.33	01	1.66	01	1.66	09	15.00
Bahwalnagar	03	5.00	02	3.33	02	3.33	08	13.33
Note: Disease prevalence (%age) = No. of infected samples/total X 100								

WHEAT ENTOMOLOGY

31. TITLE	EFFECT OF DIFFERENT CLIMATIC FACTORS ON APHID POPULATION IN WHEAT CROP

OBJECTIVES

To know the population intensities of wheat aphid in relation to climatic factors.

TREATMENTS & METHODOLOGY

- Three Moericke Yellow water tray traps will be used
- Daily alate aphid population will be recorded
- The weekly counts of trapped alate aphids will be correlated with climatic factors by taking average aphid population throughout the season

PREVIOUS YEAR'S RESULTS

- Aphid population was started trapping on yellow water tray traps during 1st week of January-2018 (51.25) per trap per week and aphid population gradually increased during subsequent weeks and its peek was observed during 2nd week of March (1475.0/trap/week).

- Aphid population was positively correlated with maximum temperature, rainfall but there was non-significant correlation with minimum temperature. But in case of relative humidity, a negative and significant correlation was recorded at 5.0 pm.

32. TITLE	VARIETAL SCREENING OF WHEAT AGAINST APHID

OBJECTIVES

- To evaluate the wheat varieties / advance lines against aphids.

TREATMENTS & METHODOLOGY

- Design: RCBD, Reps:3, Plot size: 5m x 1.8m.
- The data regarding aphids population will be recorded during the month of March, 2019 till crop maturity at 10 days interval per tiller basis for aphids by selecting randomly 10 tillers per plot.
- Varieties/ lines will be screened out by taking average aphid population throughout the season.

PREVIOUS YEAR'S RESULTS

- Lowest aphid population per tiller was found on variety/line V-12304 (8.29) followed by Anaj-17 (9.2), Ujala-16 (9.39), Galaxy-13 (10.5), Faisalabd-08 (10.553) and HYT-60-57 (11.623).
- Highest aphid population per tiller was recorded on HYT-80-34 (18.89).

33. TITLE	MASS SCREENING OF WHEAT GERMPLASM AGAINST APHIDS

OBJECTIVE

To find out resistant/ tolerant varieties/lines against aphid attack.

TREATMENTS & METHODOLOGY

The data will be recorded on 10 days interval from 10 randomly selected tillers on each lines/variety especially during the month of March,2019.

PREVIOUS YEAR'S RESULTS

Aphid population ranged from 1.0-121 aphid/tiller. Only 69 varieties/lines had upto 5 aphids per tiller and they showed tolerance/resistance against aphids and these varieties / lines are proposed to breeding program for variety evolving process.

34. TITLE	SURVEY OF APHID POPULATION ON WHEAT CROP IN DIFFERENT CLIMATIC ZONES OF THE PUNJAB.

OBJECTIVES

To find out the occurrence and fluctuation of aphids population on wheat crop in different ecological zones of the Punjab

TREATMENTS & METHODOLOGY

- The survey will be conducted to record aphid infestation on two commercial Wheat varieties in 16 different districts of the Punjab. Aphid population will be recorded for per tiller basis by selecting 10 tillers randomly from each variety/line.

PREVIOUS YEAR'S RESULTS

- Survey revealed that aphid population ranged from 8.6-15.2 and 9.00-39.8 aphid/tiller on Faisalabad-08 and Galaxy-13, respectively.
- Aphid population was recorded more on Faisalabad-08 and Galaxy-13 in Faisalabad District and low in Narowal, Seikhupura and Gujranwala districts, respectively.

AGRONOMIC STUDIES

35. TITLE	EFFECT OF CLIMATE CHANGE ON SOWING TIME OF WHEAT CROP

OBJECTIVES

- To determine the shift in sowing time of wheat under changing climatic scenario.
- To explore optimum sowing time of promising lines of wheat.

TREATMENTS & METHODOLOGY

A) Date of sowing = 07		
D_1 = 1st November	D_2 = 10th November	D_3 = 20th November
D_4 = 30th November	D_5 = 10th December	D_6 = 20th December
D_7 = 30th December		
B) Varieties/Advanced lines = 12		

1.	Plant count per m^2	2.	Productive tillers/m^2
3.	Days to heading	4.	Days to Physiological maturity
5.	Plant height (cm)	6.	Lodging % age
7.	No. of grains/spike.	8.	1000-grain weight (g)
9.	Grain yield (kg ha^{-1}).		

Layout	RCBD, (Split plot arrangement)
Reps	3
Plot size	1.62m x 6 m
Fertilizer NPK	120-90-60 kg ha^{-1}
Seed Rate	100 kg ha^{-1}

PREVIOUS YEAR'S RESULTS

•Out of twelve varieties/ advanced lines V-14124 produced maximum grain yield 4557 kg/ha followed by 14154 gave yield of 4356 kg/ ha whereas lowest grain yield (3758 kg/ha) was obtained by check variety (Ujala-16).

•Out of seven sowing dates, max. grain yield of 5643 kg/ha was recorded when crop was sown on 1st November and minimum grain yield of 2634 kg/ha was recoded when crop was sown on 30th December.

36. TITLE	RESPONSE OF SEED RATE ON GRAIN YIELD OF WHEAT ADVANCED LINES

OBJECTIVE

- To determine optimum seed rate of advanced lines of wheat

TREATMENTS & METHODOLOGY

A) Varieties/Lines = 08
B) Seed Rate (kg ha^{-1}) = 04
S_1 = 75, S_2 = 100, S_3 = 125, S_4 = 150

Layout	Split plot Design
Rep	03
Plot size	1.62m x 6 m
Fertilizer NPK	120-90-60 (kg ha^{-1})

PREVIOUS YEAR'S RESULTS

- Out of eight varieties, max. grain yield 4441 kg/ ha was recorded by V-14154 whereas lowest grain yield 3969 was obtained by check variety (FSD-08).

- Among four seed rates, max. grain yield of 4570 kg/ha was recorded when 100 kg/ ha seed rate was used whereas low grain yield of 3708 kg/ ha was observed by seed rate of 75 kg/ ha.

37. TITLE EFFECT OF DIFFERENT LEVELS OF FERTILIZER ON GRAIN YIELD OF WHEAT

OBJECTIVE

To explore optimum fertilizer requirement of advanced lines of wheat

TREATMENTS & METHODOLOGY

Varieties/advanced lines = 08 (b) Fertilizer level = 04

Fertilizer levels NPK (kg ha^{-1})
Level 1 = 0 – 0 – 0 , Level 2= 90 – 60 – 60
Level 3 = 120-90-60, Level 4= 150-120-60

Layout	Split plot Design
Rep	03
Plot size	1.62m x 6 m
Fertilizer NPK (Kg/ha.)	According to treatment
Seed Rate	100 (kg ha^{-1})
Sowing time	1st fortnight of Nov

PREVIOUS YEAR'S RESULTS

- Out of eight varieties/ advance lines max. grain yield of 3711 kg/ ha was recorded by advance line V-14154 whereas lowest grain yield of 3283 kg/ ha was noted by check variety named as Fsd-08.

- Out of four fertilizer level max. grain yield (4147 kg/ ha) was recorded by fertilizer level NPK @ 120-90-60 kg/ ha and lowest grain yield (2558 kg/ ha) was noted when no fertilizer was applied.

38. TITLE EFFECT OF IRRIGATION SCHEDULING ON DIFFERENT GROWTH STAGES OF WHEAT

OBJECTIVE

•To determine the proper stage of crop and optimum requirement of water for yield enhancement.

TREATMENTS & METHODOLOGY

Variety: Anaj-17, Plot Size: 1.62x6m, Seed rate=100 kg ha^{-1}Layout = RCBD Reps=3

Treatments
T_1 = no irrigation
T_2 = 1 irrigation (at crown root stage)
T_3 = 2 irrigations (1st at crown root and 2nd at booting)
T_4 = 2 irrigations (1st at crown root and 2nd at heading)
T_5 = 2 Irrigations (1st at crown root and 2nd at grain filling)
T_6 = 3 irrigations (1st at crown root, 2nd at booting and 3rd at heading)
T_7 =3 Irrigations (1^{st} at crown root, 2^{nd} at booting and 3rd at grain filling)
T_8 = 3 Irrigations (1st at crown root , 2^{nd} at heading and 3rd grain filling)
T_9 = 4 irrigations (1st at crown root , 2nd at booting, 3rd at heading and 4th at grain filling)
T_{10} = 5 irrigations (1st at crown root , 2nd at stem elongation, 3rd at booting, 4th at heading and 5th at grain filling)

PREVIOUS YEAR'S RESULTS

- Out of ten treatments max. grain yield (4676 kg/ ha) was recorded by T7 (three irrigations, 1st at crown root, 2nd booting and 3rd grain filling stage) whereas lowest grain yield of 2791 kg/ ha was observed by T1 (no irrigation).

CEREAL TECHONOLGY

39. TITLE	QUALITATIVE IMPACT OF APPLICATION TECHNIQUES ON IRON AND ZINC FORTIFIED WHEAT

OBJECTIVES

To compare the quality of wheat treated with foliar & fertilizer bio-fortification of iron and zinc.

TREATMENTS & METHODOLOGY

- Bio fortification
- Gluten content
- Chapatti quality

PREVIOUS YEAR'S RESULTS

Parameter	Range	Topper Line/Variety /Treatment
Protein (%)	13.4-14.3	Zn/P1
Starch (%)	53.2-54.3	Zn/P17 Zn/P18
Gluten	25-28	Zn/P1 Zn/P14

40. TITLE	EFFECT OF LOCAL STORAGE CONDITIONS OF THE PREVIOUS CROP YEARS ON QUALITY AND GERMINATION BEHAVIOR OF CURRENT WHEAT VARIETIES/LINES

OBJECTIVES

To determine the impact of local storage conditions of previous crop years on quality and germination behavior of current wheat varieties/lines.

TREATMENTS & METHODOLOGY

- Collection of 22 wheat lines from crossing block for the crop year 2016-17, 2017-18 and 2018-19
- Storage under local conditions
- Quality characteristics
- Germination behavior

PREVIOUS YEAR'S RESULTS

- As the moisture increased in the same samples during two years storage, their protein content were dropped significantly.
- Moreover, dry gluten and wet gluten of these samples followed similar pattern or vice versa.
- Minimum germination % age of 62 was recorded in coded sample No. 25 of first year (2016-17) having 32.55% germination energy (GE)
- Maximum value of 96% germination was observed in second year (2017-18) coded sample No. 27 possessing 49.0% GE.

41. TITLE	IMPACT OF SOWING TIME ON PHYTIC ACID, IRON AND ZINC CONTENTS IN WHEAT GRAIN

OBJECTIVES

To determine the variation in iron and Zinc contents due to different sowing time in wheat varieties.

TREATMENTS & METHODOLOGY

- Collection of grains from three planting dates (one month interval)
- Determination of Phytic acid and Iron (through spectrophotometer)
- Determination of zinc (through Atomic absorption spectrophotometer)
- Measurement of grain hardness
- Determination of alpha amylase activity

PREVIOUS YEAR'S RESULTS

In progress

42. TITLE	PREPARATION OF CHAPATTI FROM ALEURON FLOUR

OBJECTIVES

To have benefits of functional properties of aleuoron flour (red dog).

TREATMENTS & METHODOLOGY

- Grains Collection of three varieties/lines (to be selected)
- Fractional milling to get aleuron flour
- Composite Formulation
- Rheology Studies
- Chapati Baking
- Bread Baking
- Colour Impact
- Sedimentation values

PREVIOUS YEAR'S RESULTS

In progress

43. TITLE	QUALITY EVALUATION OF BREAD WHEAT ADVANCED LINES/VARIETIES

OBJECTIVES

To screen advanced lines for different quality traits

TREATMENTS & METHODOLOGY

Collection of Advanced lines included in National Uniform Wheat Yield Trials and Punjab Wheat Yield Trials for the year 2018-19.

- Thousand grain weight, Test weight, Protein, Starch, Gluten, Chapati quality,

PREVIOUS YEAR'S RESULTS

In progress

44. TITLE	EFFECT OF PLANTING TIME ON GRAIN QUALITY TRAITS

OBJECTIVES

To study the effect of planting time on grain quality traits

TREATMENTS & METHODOLOGY

- Collection of Samples included in sowing date trials for the year 2018-19.
- 1000 grain weight, Test weight, Starch, Gluten, Protein, Alpha amylase activity, Falling number value, Baking behavior

PREVIOUS YEAR'S RESULTS

- V-14124 produces maximum thousand grain weight (D2)
- Maximum value of gluten quality was observed in V-HYT-60-5 and Fsd-08 (D6 & D7).
- Highest protein content found in V-12304 and Fsd-08 (D2).

45. TITLE	ANALYZING THE EFFECT OF DIFFERENT FERTILIZER TREATMENTS ON WHEAT GRAIN QUALITY

OBJECTIVES

To study the effect of fertilizer combinations and time of their application on physio-chemical quality parameters in advanced wheat lines/varieties.

TREATMENTS & METHODOLOGY

- Advanced wheat lines incorporated in fertilizer trial for the year 2018-19 will be tested
- Quality parameters especially grain weight (using seed counter & electric balance), test weight (through test weight/bushel weight apparatus), starch, gluten and protein, contents using Kernelyzer).

PREVIOUS YEAR'S RESULTS

Treat	Parameters				
	1000 g. wt. gm	Test Weight kg/hL	Protein %	Starch %	Gluten %
F1	32.50-44.80	73.7-80.0	11.2-15.3	52.9-56.7	17-32
F2	31.40-43.20	71.3-79.6	13.7-15.5	52.0-56.6	17-33
F3	29.20-44.60	70.4-78.7	14.8-16.2	51.0-53.5	28-34
F4	27.90-42.70	71.5-79.4	13.9-16.2	50.9-54.2	27-37

46. TITLE	DETERMINATION OF QUALITY TRAITS IN ADVANCED LINES OF BARLEY

OBJECTIVES

Evaluation of high yielding barley lines/varieties for different quality parameters

TREATMENTS & METHODOLOGY

Advanced lines of barley will be evaluated for 1000 kernel weight, test weight and protein content

PREVIOUS YEAR'S RESULTS

In progress

47. TITLE	EFFECT OF DIFFERENT TEMPERING CONDITIONS ON MILLING YIELD IN RELATION TO DOUGH EXTENSIBILITY

OBJECTIVES

To determine the correlation of flour yield and dough extensibility

TREATMENTS & METHODOLOGY

- Three wheat varieties/lines (to be selected) for determination of suitable tempering conditions.
- Each wheat variety will be tempered at moisture contents of 14, 15 and 16% for time intervals of 8, 16, & 24 hours.
- Milling for flour yield will be recorded to appraise the suitable tempering moisture content and time for maximum flour recovery.
- Resultant flours will be tested for dough extensibility, chapatti quality and alpha amylase activity.

PREVIOUS YEAR'S RESULTS

In progress

NEW INITIATIVES

48. TITLE EVALUATION OF WHEAT ADVANCED LINES IN SUB-HUMID CONDITIONS

OBJECTIVE

To evaluate wheat lines suitable for high rainfall condition

TREATMENTS & METHODOLOGY

Sixteen advanced wheat lines selected from nurseries (28th HRWSN and 25th HRWYT) along with two checks will be sown in RCBD design with three reps during 2nd week of November at rice research institute Kala Shah Kaku. The most promising lines will be selected on the basis of important economic traits.

PREVIOUS YEAR'S RESULTS

New Experiment

49. TITLE	IDENTIFICATION OF CLIMATE RESILIENT WHEAT GENOTYPES

OBJECTIVE

To develop short duration varieties in climatic changing scenario.

TREATMENTS & METHODOLOGY

Lines selected from F6 on basis of short duration will be evaluated in late sown condition. Data regarding yield and yield related traits will be taken. Plot size will be 1.8x4m. All recommended agronomic practices will be conducted

PREVIOUS YEAR'S RESULTS

New Experiment

50. TITLE PHYSIOLOGICAL ANALYSIS OF SENSITIVE AND RESISTANT GERMPLASM OF WHEAT UNDER DROUGHT STRESS

OBJECTIVE

-Screening of best genotypes under drought by improving plant physiological rate
-To overcome yield losses due to lodging in wheat plants

TREATMENTS & METHODOLOGY

Fifty bread wheat genotypes including five checks Fsd-08, Millet-11, Chakwal-50, Ujala-16 and Anaj-17 will be sown in 4-inch PVC pipes of 1-meter length filled with sand (measured quantity of sand and water) following CRD layout in two reps. Four seeds of each genotype will be planted in each pipe.
Data regarding root length, root weight, dry rot weight, total plant fresh weight, total plant dry weight, root-shoot ratio RWC (relative water content) and WLR (water loss rate) will be recorded in lab. One set of the material will be planted in the field in irrigated as well drought conditions in replicated alpha lattice design. Relative and absolute yield in water stress conditions will be recorded

PREVIOUS YEAR'S RESULTS

New Experiment

51. TITLE EVALUATION OF WHEAT ADVANCED LINES FOR SALT TOLERANCE

OBJECTIVE

To evaluate advanced wheat lines for salt tolerance

TREATMENTS & METHODOLOGY

Advanced lines= 50

Plot size=1.8m x 4m, Reps=3

Pre sowing soil analysis will be done.

Data regarding plant population and yield will be recorded.

PREVIOUS YEAR'S RESULTS

New experiment

52. TITLE BREEDING FOR SALT TOLERANT WHEAT GERMPLASM

OBJECTIVE

To develop salt tolerant wheat germplasm

TREATMENTS & METHODOLOGY

- Ten salt tolerant parents *viz* GAMDOW-6, LAKTA-1, NL 750, NEELKANT'S', PASBAN 90, V01180, Durum NaX-1, Durum NaX-2, Bread Wheat NaX-1 and PF 70402/ALD'S'//PAT 72/160//ALD'S'/3/PEW'S' will be crossed with high yielding advanced lines/varieties.
- No. of crosses=30.

PREVIOUS YEAR'S RESULTS

New experiment

53. TITLE DEVELOPMENT OF BACK CROSSES AT MURREE

OBJECTIVE

To speed up the process of varietal development through back crossing during off season

TREATMENTS & METHODOLOGY

- Generations' F1 to onwards along with their parents obtained from back cross breeding trials and will be sown in the field.
- Back crosses of targeted lines will be made and harvested seed will be send back to main station.

PREVIOUS YEAR'S RESULTS

New experiment

54. TITLE MULTIPLE GENERATIONS TRIAL AT MURREE

OBJECTIVE

To produce a number of generations in a single year by sowing the plants in pots under green house conditions

TREATMENTS & METHODOLOGY

A set of germplasm will be sown in small pots and kept in green house conditions and generations will be taken from it.

PREVIOUS YEAR'S RESULTS

New experiment

55. TITLE EVALUATION OF WHEAT HYBRIDS

OBJECTIVE

To evaluate wheat hybrids

TREATMENTS & METHODOLOGY

- Hybrids=4
- Checks=Aanaj-17, Ujala-16, Galaxy-13 and FSD-08
- Plot size = 0.6 x 2.5 m, Reps=2, Design=RCBD.
- Sowing date:1st fortnight of November 2018.
- All the entries will be evaluated for important yield components.

PREVIOUS YEAR'S RESULTS

New experiment

56. TITLE

COMPARISON OF BROAD CAST AND DRILL SOWING METHODS FOR WHEAT

OBJECTIVE

To find out the optimum sowing method for wheat.

TREATMENTS & METHODOLOGY

Layout	**RCBD**
Rep	3
Plot size	1 kanal
Fertilizer NPK	120-90-60 (kg ha^{-1})
Seed Rate	100 (kg ha^{-1})
Sowing time	1st fortnight of Nov.
Variety	Galaxy-13

PREVIOUS YEAR'S RESULTS

New experiment

57. TITLE	QUALITY ASSESSMENT OF COOKIES PRODUCED FROM BLENDS OF WHOLE WHEAT FLOUR AND DIFFERENT FORMS OF BARLEY (MALTED AND UNMALTED)

OBJECTIVES

To produce and assess the chemical, physical and sensory properties of cookies prepared with composite flours of wheat and different forms of barley i.e. malted and unmalted, at different substitution levels to analyze them for good nutritional value

TREATMENTS & METHODOLOGY

- Formulation of composite flours
- Cookies Preparation, Chemical parameters
- Proximate composition, Water Activity
- Food energy value, Physical characters
- Sensory evaluation properties

PREVIOUS YEAR'S RESULTS

New experiment

58. TITLE	QUALITATIVE ANALYSIS OF WHEAT BREEDING MATERIAL FOR IRON AND ZINC

OBJECTIVES

To analyze qualitatively massive wheat breeding material for the assessment of iron and zinc content

TREATMENTS & METHODOLOGY

- Flour of wheat breeding material will be made through UDY Cyclone sample mill.
- Flour will be used for the qualitative estimation of iron and zinc concentration
- Dithizone staining (Zn).
- Prussian Blue Procedure (Fe).

Previous year' results

New experiment

59. TITLE	EXTRACTION OF WHEAT GERM OIL FOR THE ASSESSMENT OF VITAMIN E IN THE CURRENT WHEAT VARIETIES/LINES USING HPLC

OBJECTIVES

To assess vitamin E in the current wheat varieties/lines using HPLC.

TREATMENTS & METHODOLOGY

- Grains of three promising varieties (to be selected) will be preceded for fractional milling to get germ.
- Oil will be extracted from wheat germ.
- Estimation of Vitamin E using standard procedure by HPLC and suitable detector will be carried out.

Previous year' results

New experiment

60. TITLE	EFFECT OF GERMINATED BARLEY FLOUR ADDITION ON THE QUALITY OF BISCUITS, CAKES AND BREAD

OBJECTIVES

To assess impact of germinated barley flour addition on biscuits, cake and bread quality

TREATMENTS & METHODOLOGY

T_0 = 100% Flour of Anaj-17

T_1 = 5% germinated barley Flour + 95% Faisalabad-08 flour

T_2 = 10% germinated barley Flour + 90% Faisalabad-08 flour

T_3 = 15% germinated barley Flour + 85% Faisalabad-08 flour

T_4 = 20% germinated barley Flour + 80% Faisalabad-08 flour

Previous year's results

New experiment

PROJECTS

61. TITLE	NUTRITION ENHANCEMENT OF CROPS, FRUITS, VEGETABLES AND THEIR PRODUCTS UNDER CLIMATE CHANGE SCENARIO (a)Genetic fortification PARB Project-904

OBJECTIVES

Development of improved wheat varieties enriched with zinc and iron contents in grain through genetic fortification

TREATMENTS & METHODOLOGY

- Collections of wheat genotypes enriched with zinc and iron
- Hybridization, screening, and generation advancement of selected filial generations
- Biochemical analysis for Fe and Zn contents

PREVIOUS YEAR'S RESULTS

- 53 crosses were made among lines having high Zn and Fe contents at Wheat Research Institute, Faisalabad.
- One set of these crosses has been planted at Wheat Research Substation, Murree for advance generations while remaining two set will be planted at Wheat Research Institute, Faisalabad and Rice Research Institute, Kala Shah Kaku in November.
- Sixty crosses were made at Kaghan Research Institute using harvest plus lines enriched with zinc and iron contents based on analysis results. These crosses have been harvested and will be planted at Wheat Research Institute, Faisalabad for further evaluation and screening.

62. TITLE	NUTRITION ENHANCEMENT OF CROPS, FRUITS, VEGETABLES AND THEIR PRODUCTS UNDER CLIMATE CHANGE SCENARIO (Agronomic fortification) PARB Project-904

OBJECTIVES

Development of improved wheat varieties enriched with zinc and iron contents in grain through genetic fortification

Treatments

T1 Control (No application of Fe & Zn)

T2 Foliar application of 0.5 % $ZnSO_4$

T3 Foliar application of 1.0 % $FeSO_4$

T4 Foliar application combination of $ZnSO_4$ & $FeSO_4$

T5 Soil application of 10 kg Zn ha^{-1}

T6 Soil application of 12 kg Fe ha^{-1}

T7 Soil application combination of Zn & Fe

PREVIOUS YEAR'S RESULTS

Treatments	Mean	Fe content ppm	Zn Content ppm
T_1= Control (No application of Fe & Zn)	3420 c	141.33 d	44.85 c
T_2= Foliar application of 0.5 % ZnSO4	3802 b	175.33 d	64.37 a
T_3= Foliar application of 1.0 % Fe SO4	3724 b	305.67 a	46.66 c
T_4= Foliar application combination of Zn & Fe	3691 b	287.33 ab	60.73 ab
T_5= Soil application of 10 kg Zn ha^{-1}	3823 b	194.67 cd	52.68 bc
T_6= Soil application of 12 kg Fe ha^{-1}	4161 a	284 ab	48.47 c
T_7= Soil application combination of Zn & Fe	3576bc	245.33 bc	50.73c
LSD(0.05) 259			

63. TITLE	NUTRITION ENHANCEMENT OF CROPS, FRUITS, VEGETABLES AND THEIR PRODUCTS UNDER CLIMATE CHANGE SCENARIO (Flour Fortification) PARB Project-904

OBJECTIVES

Preparation of Value Added Pasta Products Enriched with Zinc and Iron contents and assessing the stabilized fortification Treatments and determining their Zinc and Iron contents.

TREATMENTS & METHODOLOGY

- Fortification of different flours for production of pasta, using various levels of fortificants and standardizing the fortified treatments.
- Determination of Zinc and Iron content in the prepared pasta products.
- Parallel quantification of Zinc and Iron content, enhanced in wheat grain through Bio fortification

PREVIOUS YEAR'S RESULTS

- Trials were conducted against recipe development and standardization through trials and control treatments were finalized.
- Trial Sheets and sensory performas were compiled in terms of organoleptic interpretation of prepared products.
- For selection of fortificants to be used for product fortification, ZnO is selected as a zinc fortificant and NaFeEDTA as an iron fortificant.
- Assortment of fortificants was based on preceding research and literature, physico-chemical effects and economic factors.

64. TITLE	DEVELOPMENT AND DISSEMINATION OF RICE AND WHEAT VARIETIES SUITABLE FOR IRRIGATED RICE-WHEAT CROPPING SYSTEM IN THE CLIMATE CHANGE SCENARIO PARB Project-770

OBJECTIVES

To develop and disseminate wheat varieties suitable for irrigated rice-wheat cropping system

TREATMENTS & METHODOLOGY

Genotypes (from available germplasm) will be screened in the field under natural environmental conditions to administer waterlogging stress on heavy soil at Rice Research Institute, Kala Shah Kaku.

Better performing lines will be selected for hybridization.

previous year' results

1st year

65. TITLE	CROPPING SYSTEM TRIALS (RICE-WHEAT TRIAL)

OBJECTIVES

To evaluate Zero till technology planting wheat after rice

To evaluate Zero till technology planting rice after wheat crop

TREATMENTS & METHODOLOGY

- ZDSR (Zero till Direct seeder rice) &ZT wheat
- DSR (Direct seeded rice with conventional till) & ZT wheat
- TP (Transplanted rice) with CT (conventional till) wheat
- TP (Transplanted rice) with ZT (zero till) wheat
- Total 04 plots and 2 replications
- Plot size: 65 feet wide with 100 feet length

PREVIOUS YEAR'S RESULTS

Treatments	Yield Kg/Acre
T1= ZDSR (Zero till Direct seeder rice) & ZT wheat	1600
T2= DSR (Direct seeded rice with conventional till) & ZT	1000
T3=TP (Transplanted rice) with CT (conventional till) wheat	1000
T4= TP (Transplanted rice) with ZT (zero till) wheat	1200

66. TITLE	CROPPING SYSTEM TRIALS (COTTON-WHEAT TRIAL)

OBJECTIVES

- To evaluate Relay cropping technology planting wheat in standing cotton in wide beds and ridges
- To evaluate Zero till technology planting wheat on permanent beds after cotton crop

TREATMENTS & METHODOLOGY

- (T1) Relay cropping wheat in wide bed cotton
- (T2) Conventional planting
- Total 03 plots and 2 replications
- Plot size: 65 feet wide with 100 feet length

PREVIOUS YEAR'S RESULTS

Treatments	Yield Kg/Acre
T1= Relay cropping wheat in wide bed cotton	800
T2=Conventional planting	700

67. TITLE | USE OF GREEN SEEKER FOR SENSOR-BASED N MANAGEMENT

OBJECTIVES

To assess optimum requirements of Nitrogen in wheat for yield maximization using Green Seeker at 2nd irrigation

TREATMENTS & METHODOLOGY

(T1) DAP-1.5 bag as basal dose (Farmers practice)
Urea 1 bag at 1st irrigation
Urea 1 bag at 2nd irrigation

(T2) DAP-1.5 bag as basal dose (Green Seeker treated)

- Urea 1 bag at 1st irrigation
- Urea as advised by GS at 2nd irrigation
- Total 2 plots and 1 replication
- Plot size: One acre divided into two equal parts
- Fertilizer application in three splits

PREVIOUS YEAR'S RESULTS

Treatments	Yield Kg/Acre
T1= DAP-1.5 bag as basal dose, Urea 1 bag at 1st irrigation, Urea 1 bag at 2nd irrigation (Farmers practice)	1300
T2= DAP-1.5 bag as basal dose (Green Seeker treated), urea 1 bag at 1st irrigation. Urea as advised by GS at 2nd irrigation	1400

68. TITLE	WHEAT PRODUCTIVITY ENHANCEMENT PROGRAMME (W-PEP)

OBJECTIVES

To enhance wheat productivity by provision of high yielding varieties with rust resistance especially Ug99.

TREATMENTS & METHODOLOGY

This project has four objectives i.e.

i) Objective-1 (Surveillance), ii) Objective-2 (Host resistance), iii) Objective-3 (Breeding) and iv) Objective-4 (Seed). Work will be carried out according to specified plan of the project.

PREVIOUS YEAR'S RESULTS

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DURUM WHEAT

(*Triticum durum*)

69. TITLE	MAINTENANCE AND UTILIZATION OF DURUM AND TRITICALE GERMPLASM

OBJECTIVES

Enhancement of genetic variability in durum and triticale germplasm

TREATMENTS & METHODOLOGY

No. of entries = Durum: 170 and Triticale: 77

Plot size = 2 rows x 2.5 m

Desirable lines will be utilized in hybridization program.

PREVIOUS YEAR'S RESULTS

One hundred and sixty one entries of Durum and seventy nine entries of Triticale were maintained.

Sr. No.	Traits	Variability range	
		Durum	Triticale
1	Days To Heading	99 - 113	101 – 114
2	Days To Maturity	124 - 135	128 - 138
3	Plant Height (cm)	75 - 130	75 – 138
4	1000-grain weight (gm)	30 - 44	-
5	Rust Reaction (L.R)	0 - 30 MS	0 - 20 S
6	Rust Reaction (Y.R)	0 – 20MR	0 - 10 MS

70. TITLE | DURUM HYBRIDIZATION PROGRAM

OBJECTIVES

Hybridization for improvement of durum wheat

TREATMENTS & METHODOLOGY

- Durum germplasm with better quality attributes received from CIMMYT will be crossed with the local durum germplasm for pyramiding genes for yield and quality.
- **PREVIOUS YEAR'S RESULTS**
- Fifty five crosses were attempted out of these 51 crosses were harvested

71. TITLE | STUDY OF FILIAL GENERATIONS (F_1-F_7).

OBJECTIVES

- To advance the generations.
- To select the superior segregates from segregating generation
- To select the homozygous and uniform lines for yield Testing

TREATMENTS & METHODOLOGY

Generations	No. of entries	Plot size
DF_1	51	1 row x 2.5m
DF_2	39	12 rows x 9.0m
DF_3	25	3 rows x 3.0m
DF_4	17	3 rows x 3.0m
DF_5	12	3 rows x 3.0m
DF_6	240 S.H (12 Crosses)	1 row x 2.5m
DF_7	35 SHRP	4 rows x 3.0m

PREVIOUS YEAR'S RESULTS

Sr. #	Generations	Entries Studied	Entries Selected
1	DF_1	50	39
2	DF_2	41	25
3	DF_3	24	17
4	DF_4	16	12
5	DF_5	15	240 S.H (12 Crosses)
6	DF_6	242 SHR	35 SHRP
7	DF_7	75	18

72. TITLE	PRELIMINARY DURUM WHEAT YIELD TRIAL (DA-TRIALS)

OBJECTIVES

- To evaluate the genotypes for yield and other agronomic parameters under irrigated conditions.

TREATMENTS & METHODOLOGY

- Entries = 30
- Check varieties =3 (Durum-97, Wadanak-85 and Ujala-16)
- Layout = Alpha lattice, Reps = 3

PREVIOUS YEAR'S RESULTS

- Thirteen advanced lines (out of 30) of durum wheat were found higher yielding than check varieties in their respective trials.

73. TITLE	REGULAR DURUM WHEAT YIELD TRIALS (DB-TRIALS)

OBJECTIVES

- To evaluate the promising lines of durum wheat selected from preliminary yield trials for yield and other agronomic parameters under irrigated conditions.

TREATMENTS & METHODOLOGY

- Entries = 30
- Check varieties =3 (Durum-97, Wadanak-85 and Ujala-16)
- Layout = alpha lattice, Replications = 3

PREVIOUS YEAR'S RESULTS

Six advanced line of durum wheat was found higher yielding than all three check varieties.

74. TITLE PUNJAB UNIFORM DURUM YIELD TRIAL (PUDYT).

OBJECTIVES

To assess the yield performance and adaptability of promising durum lines at Govt. farms in different ecological zones of the Punjab.

TREATMENTS & METHODOLOGY

Set of trial	Trials	Entries	Sowing time
Normal duration	5	12	2nd week of Nov.
Layout	RCBD	Reps	03
Plot size	1.20 m x 5 m	Fertilizer	120-90-0 NPK kg ha^{-1}

PREVIOUS YEAR'S RESULTS

Variety/line	Yield (kg ha^{-1})
D-16732	3665
FSD-08	3624
D-15728	3576
D-16744	3559
D-97	3249

75. TITLE	EVALUATION OF INTERNATIONAL YIELD TRIALS OF (CIMMYT/ICARDA) DURUM WHEAT

OBJECTIVES

To evaluate the CIMMYT material for incorporation in yield trials

TREATMENTS & METHODOLOGY

International Durum Screening Nursery (IDSN) and International Durum Yield Trials (IDYT) are expected, which will be laid out according to the instructions supplied by the donor agency

PREVIOUS YEAR'S RESULTS

49th INTERNATIONAL DURUM YIELD NURSERY

- Twelve lines out of 50 lines of this Nursery were selected on the basis of their yield performance and resistance against diseases.
- The yield performance of top three high yielding lines (E-706, E-718 and E-732) were 5765, 5308 and 5000 kg ha^{-1} compared to check variety (3864 kg ha^{-1})

49th INTERNATIONAL DURUM SCREENING NURSERY

- 10 lines out of 124 lines were selected on the basis of their performance against diseases and 1000-grain weight.
- The line E- 7024, E-7067 and E-7110 gave the highest 1000- grain weight (45.32, 44.24 & 43.40 g).
  The 1000-grain weight of Durum-97 (check) was 43.32g.

BARLEY

(Hordeum vulgare)

76. TITLE MAINTENANCE AND IMPROVEMENT OF BARLEY GERMPLASM

OBJECTIVES

- To conserve existing genetic variability and broaden the base of genetic diversity
- To combine high yield, tolerance to biotic & abiotic stresses, quality and other desirable characteristics.

TREATMENTS & METHODOLOGY

Entries = 80, Plot size = 0.6m x 2.5m, 20 crosses will be attempted

PREVIOUS YEAR'S RESULTS

Sr. #	Character	Range
1	Plant height	53-120 cm
2	Days to heading	86-115 days
3	Spike length	4.1-11.2 cm
4	grains per spike	12-84

77. TITLE | STUDY OF FILIAL GENERATIONS (F_5-F_7) OF BARLEY

OBJECTIVE

- To advance generations for developing homozygous lines with desirable traits.

TREATMENTS & METHODOLOGY

Generations	Crosses	Entries	Plot size
F_5	05	05	1row x 2.5 m
F_6	17	17	1row x 2.5 m
F_7	09	09	4 row x 2.5 m

PREVIOUS YEAR'S RESULTS

Five entries from F_4 were harvested for planting F_5 in the next year. Desirable plants were selected from Seventeen entries of F_5, 09 F_6 and 16 F_7 entries and single heads from the selected plants were harvested. Heads of each entry were threshed in bulk to advance the generation

78. TITLE	PRELIMINARY BARLEY YIELD TRIALS

OBJECTIVES

To test different lines of barley for yield and other desirable traits.

TREATMENTS & METHODOLOGY

Entries = 28, Check varieties =2 (Sultan-17, Haider-93),
No. of Trials = 2
Layout =RCBD, Reps = 3, Plot size = 1.2m x 5m

PREVIOUS YEAR'S RESULTS

18 advanced lines of barley were found higher yielding than the check (Haider-93) in two preliminary trials

79. TITLE | REGULAR BARLEY YIELD TRIALS

OBJECTIVE

To test advanced lines of barley for yield and other desirable traits.

TREATMENTS & METHODOLOGY

Entries = 14, Check varieties =2 (Sultan-17 & Jau-17)

Layout = RCBD, Reps = 3, Plot size = 1.2m x 5m

PREVIOUS YEAR'S RESULTS

BB		
Rank	**Line/Var.**	**Yield (Kg/ha.)**
1	B-17039	4303
2	B-16011	3952
3	B-16020	3764
4	B-16030	3733
5	B-16028	3596
14	Haider-93	3117

80. TITLE PUNJAB UNIFORM BARLEY YIELD TRIAL

OBJECTIVES

To test advanced lines of barley for yield and other desirable traits.

TREATMENTS & METHODOLOGY

Entries = 14, Check varieties =2 (Sultan-17 & Haider-93)

Layout = RCBD, Reps = 3, Plot size = 1.2m x 5m

PREVIOUS YEAR'S RESULTS

On overall mean basis the advanced line B-15018 produced maximum grain yield (3444kg ha^{-1}) followed by B-14035 (3300 kg ha^{-1}) and B-14003 (3205 kg ha^{-1}) while check varieties Sultan-17 and Haider-93 could produce the grain yield of 3073 kg ha^{-1} and 2863 kg ha^{-1} respectively

81. TITLE | INTERNATIONAL BARLEY NURSERIES AND YIELD TRIALS

OBJECTIVE

To test adaptability of different exotic genotypes of barley for yield and other desirable traits.

TREATMENTS & METHODOLOGY

The following expected international nurseries/yield trials will be planted as per instructions of donor agency:

Sr. #	Trial Name	Source
1	International Barley Observation Nursery	ICARDA
2	Global Spring Barley Screening Nursery	ICARDA
3	International Naked Barley Observation Nursery	ICARDA
4	Global Spring Barley Yield Trial	ICARDA
5	International Barley Yield Trial	ICARDA
6	International Naked Barley Yield Trial	ICARDA
Total		06

PREVIOUS YEAR'S RESULTS

No trial was conducted because of unavailability of the seed material

82. TITLE SOWING DATE TRIAL OF BARLEY

OBJECTIVE

- To find out best sowing time of barley advanced lines.

TREATMENTS & METHODOLOGY

- Entries = 10, Check varieties =2 (Haider-93 & Sultan-17), Sowing dates = 3
- Layout = RCBD, Reps = 3, Plot size = 1.2m x 5m

PREVIOUS YEAR'S RESULTS

Name	SD1 5-Nov	SD2 20-Nov	SD3 5-Dec	Grand Mean
B-14003	4883	4249	4130	4421
B-15018	4878	4019	3636	4178
B-15035	4794	4343	3293	4143
B-15006	4486	4267	3638	4130
Jau-17	4631	3989	3676	4098
Sultan-17	4575	3828	3746	4049

83. TITLE BARLEY RAINFED YIELD TRIAL

OBJECTIVES

To test different lines/varieties of barley for yield potential and other desirable traits in rainfed conditions

TREATMENTS & METHODOLOGY

Entries =14, Check varieties =1 (Haider-93 & Jau-17),
Layout = RCBD, Reps = 3, Plot size = 1.2m x 5m

PREVIOUS YEAR'S RESULTS

Eight advanced lines performed better than check variety Haider-93. On overall mean basis the advanced line B-15018 produced maximum grain yield of 3097 kg ha^{-1} followed by B-16033 (2972 kg ha^{-1}) and B-14003 (2875 kg ha^{-1}) while the check variety Haider-93 could produce the grain yield of 2736 kg ha^{-1}while in rainfed conditions the maximum grain yield was produced by B-16033 (2848 kg ha^{-1}).

84. TITLE SEED PRODUCTION OF BARLEY VARIETIES AND ADVANCED LINES

OBJECTIVE

To produce pure seed of barley varieties/lines for experimental use and farmers

TREATMENTS & METHODOLOGY

Barley varieties and advanced lines will be sown as per needs of next year planting.

PREVIOUS YEAR'S RESULTS

Sr. No.	Varieties/ lines	Quantity (kg)	Sr. No.	Varieties/ lines	Quantity (kg)
1	Sultan-17	210	8	B-14035	15
2	Jau-17	122	9	B-14003	16
3	Jau-83	12	10	B-15006	14
4	Jau-87	12	11	B-15035	14
5	Haider-93	20	12	B-14009	12
6	B-15018	18	13	B-14007	15
7	B-05011	16	14	B-15012	14

86. TITLE CAPACITY BUILDING

OBJECTIVE

To provide practical training to the scientists and stake holders of different university

TREATMENTS & METHODOLOGY

- The scientists of this institute will participate in administrative and technical trainings offered by different national and international institutes.
- Extension workers and farmers will be provided training on technical new advances in wheat production technology, diseases and insect pest management.
- Practical training for university students will be provided in the field of breeding, agronomy, entomology, pathology and cereal technology

PREVIOUS YEAR'S RESULTS

1	Foreign trainings of scientists	03
2	Local training of scientists	45
3	Extension worker training	56
4	Internee trainings	60
5	Farmers days	06

THANK YOU