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OVERVIEW

Agronomy is generally referred to as the mother of agricultural sciences. In the scenario of burgeoning increase in population, its role in abridging the gap between food demand and supply is of pivotal importance. Agronomic Research Institute, Faisalabad was established in 1984 in order to cater the agricultural research needs of Punjab Province. Keeping in view the climatic variations, different sections and stations of this institute were set up in different agro-ecological zones of the province viz. Faisalabad, Farooqabad (Sheikhupura), Bahawalpur, Pakpattan, Khanewal and Karor (Layyah). The main focus of this institute is to develop and standardize the crop production technologies and to revisit the existing crop production plans in the context of changing climate. Integrated weed management, optimizing time and methods of water and fertilizer application, crop diversification through introduction of new and high value crops, production and multiplication of basic and certified seed of different crops are some other areas of research focus of this institute. The production technologies developed by this institute have not only improved per acre yield of different field crops but also raised the living standard of the farming community. The current threat of abrupt climate change has called for revisiting the crop production technologies. Strenuous efforts are being made to develop new production technologies containing the solutions of the growers in relation to climate change.

Experiments were conducted for evaluating different water smart bed planting techniques in cotton. Results revealed that planting of cotton as relay crop through new bed planting technique (105 cm top + 45 cm furrow in standing wheat) gave 47% higher seed cotton yield than conventional sowing of cotton. Study of feasibility of de-topping in cotton revealed that cotton crop may be sown at 15 cm intra-row distance and de-topped at 90 days after sowing to get higher seed cotton yield. An experiment was conducted to evaluate the effect of various sowing and nitrogen application methods on grain yield of wheat. It was concluded that wheat should be sown on beds and fertilizer should be applied by band placement method to obtain higher grain yield. Relay cropping is important eco-friendly approach to avoid delay in timely sowing of crops. Canola @ 6 kg/ha was successfully relayed in standing cotton. Effect of different transplanting dates on yield of coarse rice varieties was evaluated. Maximum paddy yield (5733) kg/ha was obtained from coarse rice variety KSK-434 sown on 20th of June. 15th of March was optimized as best sowing date for mung bean under Thal irrigated conditions.

New herbicides (pre and post emergence) were tested in cotton, maize, rice, wheat and sugarcane to check their bio-efficacy. A PARB Funded project focusing on bio fortification of crops is in process. An ADP project on Research and Promotion of Medicinal Plants is also in progress in which different medicinal plants such as Ajwain, Saunf, Isabgol etc. were grown and tested at different locations across Punjab. Results of the research work carried out during Kharif 2020 and Rabi 2020-21 are elaborated briefly as under:

COTTON

Evaluation of water smart bed planting techniques for water saving in cotton

This study was conducted to evaluate new technique of cotton planting in comparison with conventional method for water saving and final productivity of the technology. Experimental treatments were comprised of three bed planting techniques *viz;* conventional bed and furrow planting (75 cm bed top and 75 cm furrow), new bed planting technique (105 cm bed top+ 45 cm furrow) and new bed planting technique in standing wheat crop (105 cm bed top+ 45 cm furrow). Results of this study showed that higher number of bolls per plant (53), average boll weight (2.90 g) and seed cotton yield (4018 kg ha^{-1}) was obtained by planting cotton through new bed planting technique as relay crop in standing wheat than conventional sowing of cotton (Table 1). Likewise, less amount of water was required to irrigate the field sown by new bed planting technique as compared to conventional bed planting technique (Fig. 1). Moreover, sowing of wheat by using new bed planting technique also resulted in higher water use efficiency (Fig. 2). In conclusion planting of cotton as relay crop through new bed planting technique gave 47% higher seed cotton yield than conventional sowing of cotton. Moreover, water use efficiency of this technique was also 50% higher than conventional bed-furrow planting of cotton.

Table 1. Effect of various sowing techniques on yield and yield components of cotton.

Treatments	Plant population/ha	Plant height (cm)	Monopodial branches per plant	Total number of bolls per plant	Average boll weight (g)	Seed cotton yield (kg/ha)
Conventional bed and furrow planting	55833	144	3	34 B	2.40 B	698 C
New Bed technique (105 cm Top + 45 cm Furrow)	57778	143	3	37 B	2.57 B	1543 B
New Bed technique (105 cm Top + 45 cm Furrow) in standing wheat	59259	158	2	53 A	2.90 A	2352 A
LSD p 0.05	--	-	-	4.62	0.30	150.38

Means sharing same case letter do not differ significantly at p 0.05

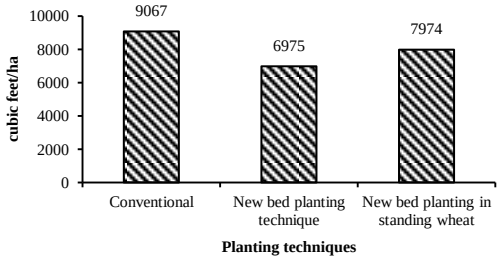

Fig.1. Total amount of irrigation water applied to wheat crop sown by various sowing techniques.

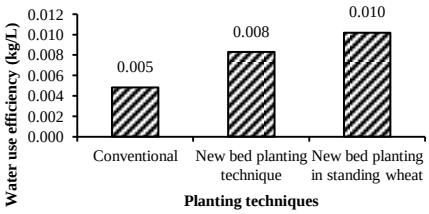

Fig.2. Water use efficiency of various sowing techniques of wheat.

Study on feasibility of de-topping in cotton

This experiment was conducted to improve cotton yield by cutting energy requirement for fruiting of crop through topping. This experiment was comprised of two factors i.eplant spacing; 30, 23, 15 cm and de-topping; de-topping at 90, 105 and 120 days after sowing. Results of this experiment revealed that cotton crop sown at 15 cm intra-row distance and de-topped at 90 days after sowing (DAS) resulted in higher number of bolls per plant than other treatments (Table 2) Likewise cotton sown at 15 cm intra-row distance gave higher average boll weight (3.22 g) while in case of de-topping treatments, higher average boll weight (3.32 g) was recorded when cotton was de-topped at 90 DAS than other treatments (Table 2). Moreover higher seed cotton yield was recorded when cotton was sown at 15 cm intra-row distance and de-topped at 90 DAS followed by cotton sown at 23 cm intra-row distance and de-topped at 90 DAS as compared with other treatments (Table 2). Hence it may be concluded that cotton crop may be sown at 15 cm intra-row distance and de-topped at 90 days after sowing to get higher seed cotton yield.

Table 2. Influence of plant spacing and De-topping on yield and yield components of cotton.

Treatments	Plant population/ha	Plant height (cm)	Monopodial branches per plant	Sympodial branches per plant	Total number of bolls per plant	Average boll weight (g)	Seed cotton yield (kg/ha)
Plant spacing (S)							
30 cm (S_1)	47889	122	34	34	39 A	3.17 B	1354 C
23 cm (S_2)	41167	127	37	33	35 B	3.21 A	1403 B
15 cm (S_3)	56611	128	40	33	41 A	3.22 A	1460 A
LSD p 0.05	-	-	-	-	3.57	0.25	36.44
De-topping (T)							
De-topping at 90 DAS (T_1)	47000	118	44	39 A	46 A	3.32 A	1703 A
De-topping at 105 DAS (T_2)	51222	128	38	34 B	30 B	3.23 B	1331 B
De-topping at 120 DAS (T_3)	47444	131	30	26 C	30 C	3.04 B	1182 C
LSD p 0.05	-	-	-	2.64	2.91	0.34	23.03
SxT							
S1T1	51833	116	4	41	48 ab	3.20	1542 c
S1T2	44667	123	4	35	45 b	3.23	1355 d
S1T3	47167	127	2	25	23 e	3.07	1165 g
S2T1	28333	117	3	39	41 c	3.23	1738 b
S2T2	49833	131	3	33	36 cd	3.13	1342 de
S2T3	45333	133	3	27	31 d	2.97	1128 g
S3T1	60833	122	4	39	53 a	3.53	1830 a
S3T2	59167	129	3	33	37 c	3.33	1297 e
S3T3	49833	134	3	27	34 cd	3.10	1252 f
LSD p 0.05	-	-	-	-	5.03	-	39.89

Means sharing same case letter do not differ significantly at p 0.05

RICE

Effect of different transplanting dates on yield of coarse rice varieties

To standardize the transplanting time to avoid grain sterility and to get maximum yield of coarse rice an experiment was conducted at Agronomic Research Station Farooqabad (Fig.3).

Experiment consists of following two factors

A. Transplanting Dates

There were four different transplanting dates as 5th of June, 20th of June, 5th of July and 20th of July

B. Rice Varieties

Three different coarse rice varieties KSK-133, KSK-434 and PK-386 were used as testing material

Table 3. Effect of different transplanting dates and coarse rice varieties on paddy yield (kg/ha).

Transplanting dates / Verities	5th of June	20th of June	5th of July	20th of July	Means
KSK-133	4266 fgh	5333 ab	4667 cdef	3867 h	4533 B
KSK-434	4533def	5733 a	5067 bc	4800 cde	5033 A
PK-386	4400 efg	4880 cd	3997 gh	3867 h	4286 C
Means	4400 BC	5316 A	4577 B	4178 C	

LSD @ 5% value for sowing date=252.31,
LSD value for Varieties=224.79,
LSD value for interaction=444.49

According to data maximum paddy yield (5733) kg/ha was obtained from the treatment where coarse rice variety KSK-434 was sown on 20th of June (Table 3).

Fig.3. Pictorial view of effect of different transplanting dates on yield of coarse rice varieties.

Performance evaluation of fine rice varieties under rice wheat cropping system

To evaluate the performance of rice varieties in rice wheat cropping system and to find out best suited fine rice variety for rice wheat cropping system an experiment was conducted at Agronomic Research Station Farooqabad (Fig. 5).

Experiment was consist of seven fine rice varieties, Super basmati, Basmati 515, Kissan Basmati, Chenab Basmati, Punjab Basmati, Super gold, Basmati 2019 (Table 4) (Fig. 4).

Table 4. Effect of different fine rice varieties on Paddy yield (kg/ha) under rice wheat cropping system.

Varieties	Paddy yield (kg/ha)
Kissan Basmati	4667 A
Super gold	4500 A
Chenab Basmati	3867 B
Punjab Basmati	3833B
Basmati 2019	3700 B
Super basmati	3667 B
Basmati 515	3400 B
LSD at 5 %	572.52

According to data maximum paddy yield (4667 kg/ha) was obtained from the treatment where fine rice variety Kissan basmati was used as testing material.

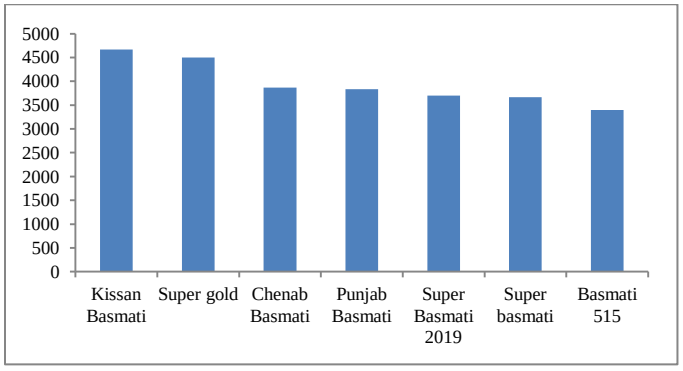

Fig.4. Performance evaluation of fine rice varieties under rice wheat cropping system.

Fig.5. Pictorial view of Performance evaluation of fine rice varieties under rice wheat cropping system.

Bio-efficacy/screening of herbicides for Rice (*Oryza Sativa* L.)

This trial was conducted with the objective to find out comparative efficacy of weedicides of different sources and formulations on individual weed species in rice crop. Fiftteen herbicides formulations viz. Machete 60EC, Acetore 50EC, Council Active 30WG, Kelion 50WG, Total Care 14.4OD, Greensun 10EC, Daokda 100D, Crop tech 10EC, Ricer 60 D, Pyranex 30WG, Winsta 30WG, Engro 1 14 SE, Engro 2 210 OD, Pomextra 16 OD and Tetris 75 EC were tested against Control (weedy check) (Fig. 6) All herbicides gave comparatively better weed control as compared to check and paddy yield was comparatively maximum (3733 kg/ha) with Council active 30 WG and minimum (2133 kg/ha) paddy yield was obtained with weedy check.

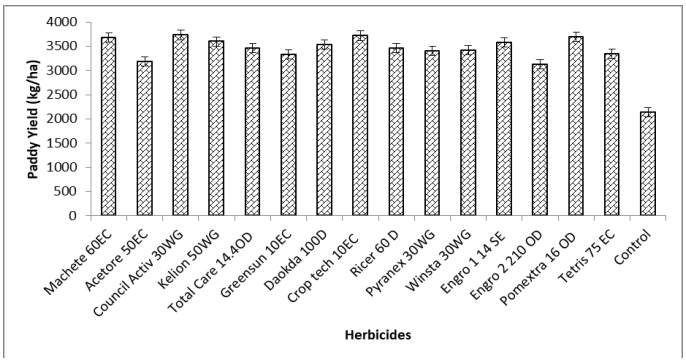

Fig.6. Effect of herbicides on paddy yield (kg/ha).

MAIZE

Testing of new herbicides for Maize (*Zea mays* L.)

Different pre and post emergence herbicide formulations viz. Fallisto gold 55 SC, Calaris Xtra 275 SC, Fallisto super 63 SC, Mission 15 SC, Connect 48 SC, Snapshot 70 WDG, Edingo 645 SC, Voltril 63SC, Primextra gold 720SC, Clio combo 33.6SC, Commit Ulta 24WDG, Halt Plus 31WDG, Landmaster 58WDG, Lumax gold 56.5 SC and Clio 33.6 SC were tested against Control (weedy check) (Fig. 7). Highest maize grain yield (4167 kg/ha) was recorded in treatment where Connect 48 SC @ 1250 ml/ha (post emergence) was sprayed. The lowest grain yield of 2333 kg/ha was produced in case of weedy check.

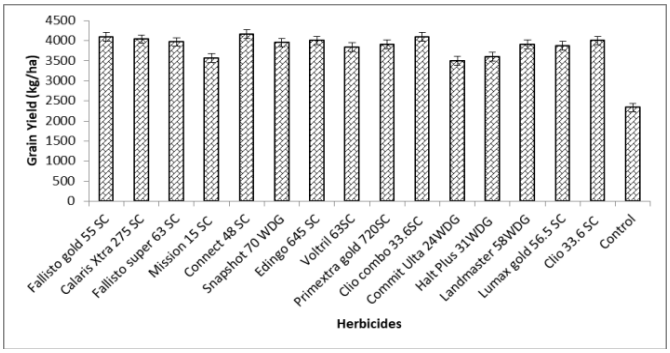

Fig.7. Effect of different herbicides on grain yield of maize (kg/ha).

SUGARCANE

Bio-efficacy/screening of post-emergence herbicides for Sugarcane (*Saccharum officinarum* L.)

The experiment was conducted to find the efficacy of new herbicides to control weeds (grasses, broad leaf weeds and sedges) and evaluation of prevailing herbicides in sugarcane crop. Fifteen post emergence herbicides i.e Primextra gold 720 SC, Commit ultra 24 WDG, Halt Plus 31 WDG, Calaris Xtra 275 SC , Connect 48SL, Clio Combo 33.6 SC, Keeper 73 WP, Maxpro 80WG, Connect 48 SL, Keeper 73 WP, Fallisto gold 55 SC, Land Master 58WDG, Lumax gold 56.5 SC, Keeper 73 WP and Mission 15 SC were tested along-

with control (Fig. 8). Amongst these herbicides Connect 48 SL @ 2500 ml/ha gave highest cane yield of 69 t/ha. The lowest cane yield of 46.25 t/ha was obtained with weedy check.

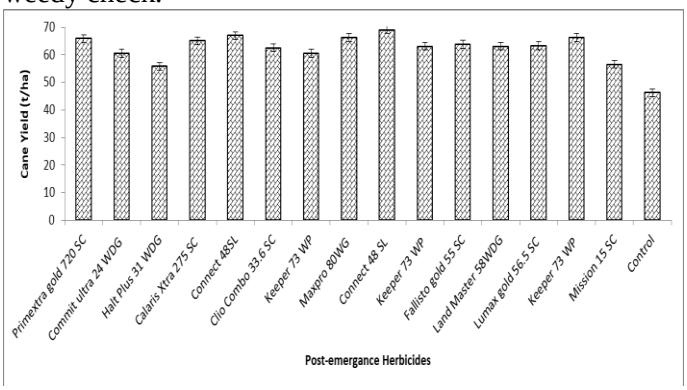

Fig.8. Effect of post emergence herbicides on cane yield (t/ha).

Bio-efficacy/screening of pre-emergence herbicides for sugarcane (*Saccharum officinarum* L.*)*

The experiment was conducted to find the efficacy of new herbicides to control weeds (grasses, broad leaf weeds and sedges) and evaluation of prevailing herbicides in sugarcane crop. Twelve pre emergence herbicides i.e Topmax 96 EC, Preact 96 EC, Stomp 455 gl CS, Dual gold 960 EC, Rapta gold 53 SC, Quintle 96 EC, Wintle 96 EC, High guard 960 EC, Voltril 63 SE, Primextra gold 720 SC, Metribuzine 70 WP and Click 72.7 SE were tested along-with control. Amongst these herbicides Dual gold 960 EC @ 2500 ml/ha gave highest cane yield of 63 t/ha (Fig. 9). The lowest cane yield of 36.66 t/ha was obtained with weedy check.

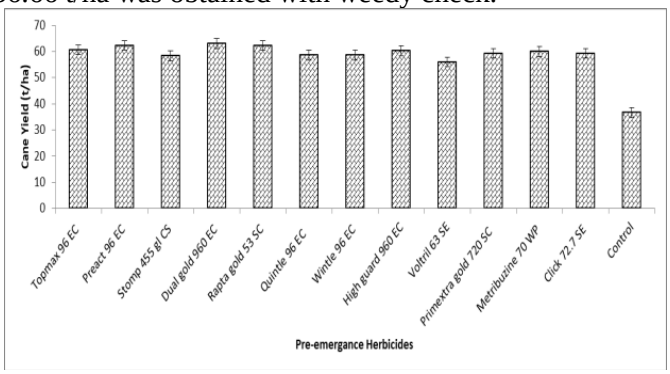

Fig.9. Effect of pre-emergence herbicides on cane yield (t/ha).

MUNG BEAN

Optimizing planting time of mungbean varieties for higher grain yield

A filed study was designed during Kharif season 2020 with an objective to find out optimum sowing time of mungbean varieties for higher grain production. The two genotypes of mungbean (NIAB MOONG 2016, AZRI MOONG 2018) were placed in main plots while different five planting times (15th of March to 15th of May with 15 days interval) were kept in subplots (Fig.10).

The data illustrated that there was no statistically significant differences for grain yield among both mungbean cultivars. The mung bean crop produced higher grain yield of 2162 kg/ha when planed on 15th of March. The grain yield gradually decreased with delayed planting of a crop. The lowest grain yield i.e 1270 kg/ha was attained with crop was sown on 15th of May. As for as interaction is concerned the higher grain yield (2253 kg/ha) was produced by mungbean variety AZRI-2018 which was at par with NIAB-2016 when planted on 15th of March. The same decreasing yield trend was observed in remaining time of sowing. The mungbean variety NIAB-2016 produced minimum grain yield of 1131 kg/ha when sown on 15th of May, 2020.

Fig.10. Pictorial View of mung bean varieties sown at different planting time.

CANOLA

Studies on feasibility of relay cropping of canola in cotton

This experiment was conducted to explore the feasibility of relay cropping of canola in standing cotton and the optimum seed rate for relay sown canola. Experimental treatments were comprised of conventional sowing; relay sowing of canola with seed rate 5.0 kg/ha, 6.0 kg/ha and 7.0 kg/ha. Higher plant population (10587 plants ha) was recorded when canola was sown as relay crop with seed rate 7 kg/ha (Table 6). Higher number of pods per plants was recorded in all relay sowing treatments as compared with conventional sowing of canola (Table 5). However higher pod length (8.70 cm) was recorded when canola was sown as relay crop with seed rate 5 kg/ha than conventional sowing (6.70 cm) (Table 5). Moreover, all relay sowing treatments gave higher number of seeds per pod than conventional sowing of canola (Table 5. However relay sowing of canola with seed rate 6 kg/ha gave higher

yield (921 kg/ha) as compared with conventional sowing of canola (409 kg/ha), followed by relay sowing of canola (829 kg/ha) with seed rate 7 kg/ha (Table 6). Hence, it was concluded that relay sowing of canola with seed rate 6.0 kg/ha in standing cotton is a feasible approach.

Table 5. Effect of relay cropping and seed rate on yield of canola.

Treatments	PP (ha^{-1})	PH (cm)	Branches per plant	Number of pods per plant	Pod length (cm)	Seeds per pod	1000-seed weight (g)	Seed yield (kg/ha)
Conventional sowing (5 kg/ha)	6669 D	136	3	99 B	6.70 C	23 B	3.40 C	409 C
Relay sowing (5 kg/ha)	7604 C	139	3	141 A	8.70 A	27 A	5.57 A	722 B
Relay sowing (6 kg/ha)	9560 B	131	4	136 A	7.50 B	26 A	5.37 A	921 A
Relay sowing (7 kg/ha)	10587 A	127	4	131 A	7.20 B	25 AB	4.73 B	829 AB
LSD p 0.05	85.74	-	-	12.23	0.50	2.08	0.46	143.21

Means sharing same case letter do not differ significantly at p 0.05

Table 6. Economic analysis of various relay cropping techniques of canola in cotton.

Treatments	Cost of production (Rs./ha)	Gross Income (Rs./ha)	Net income (Rs./ha)	Cost Benefit Ratio
Conventional	54468	54718	250	1:0.005
Relay with seed rate 5 kg/ha`	54468	77654	23186	1:0.426
Relay with seed rate 6 kg/ha	56570	99014	42444	1:0.750
Relay with seed rate 7 kg/ha	58452	89153	30701	1:.0.525

WHEAT

Determining advanced planting techniques with curtailed seed rate in wheat crop

An experiment was conducted with objective to decrease the use of seed rate by using different sowing methods for wheat crop. The experiment was conducted during Rabi 2020-21 at ARS, BWP. The experiment was laid out in randomized complete block design under split plot arrangement with three replications. The fertilizer was applied @ 120-90-60 NPK kg/ha. Sowing was done in mid of November. Plot size will be 7.0 m x 3.0 m. All other agronomic practices were kept normal. Data regarding grain yield was recorded. Results showed that Highest grain yield (3396 kg/ha) was achieved in SR_4 with line sowing method (3434 kg/ha) (Table 7).

Table 7. Effect of planting methods and seed rates on grain yield of wheat.

Seed rates/ planting methods	P_1= Broadcast method	P_2= Bed sowing	P_3= Line sowing	Means
SR_1= 125 kg/ha	2889	3134	3442	3155 CD
SR_2= 10 kg/ha	2669	2918	3102	2897 E
SR_3= 20 kg/ha	2789	3096	3318	3068 D
SR_4= 30 kg/ha	3226	3331	3631	3396 A
SR_5= 40 kg/ha	3134	3278	3595	3336 AB
SR_6= 50 kg/ha	3091	3183	3517	3264 BC
Means	2966 C	3156 B	3434 A	
Tukey's HSD for planting methods ($p \leq 0.05$)= 124.8 Tukey's HSD for planting methods ($p \leq 0.05$)=126.1				

Evaluation of different planting time of wheat under local conditions

This experiment was conducted to determine the optimum sowing time of wheat in prevailing climatic conditions to address the issue of erratic weather patterns. Wheat was sown on different times, starting from 5th November to 15th December with interval of 10 days. Higher number of days to reach at tillering, booting, heading, anthesis, grain filling and maturity were recorded when crop was sown on 15.11.2020 (Fig. 11 and 12). Likewise, results of this study showed that higher plant height (93 cm), spike length (8.48 cm), spikelets per spike (17), grains per spike (36), 1000-grains weight (35.99 g), biological yield (12513 kg/ha) and grain yield (3633 kg/ha) of wheat was recorded when wheat was planted on 15.11.2019 however further delay in sowing resulted in significant reduction in grain yield (Table 8). Hence it might be concluded and recommended that optimum sowing time of wheat is 2nd week of November in Khanewal.

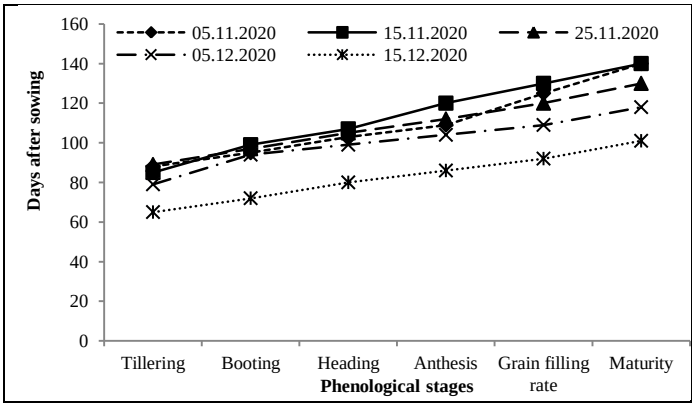

Fig.11. Effect of various planting time on phonological stages of wheat.

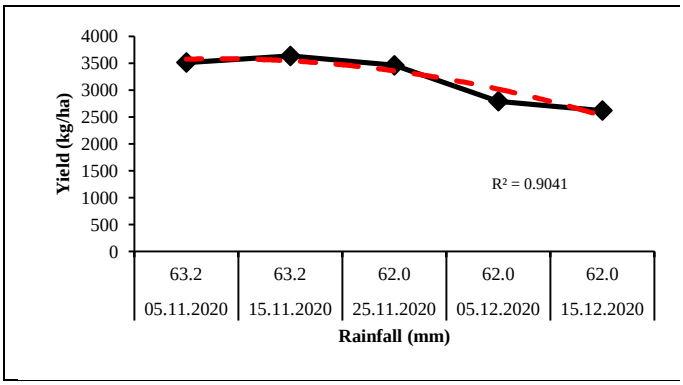

Fig.12. Interaction of grain yield with rainfall pattern.

Table 8. Effect of planting time on yield and yield components of wheat.

Treatments	Plant height (cm)	Productive tillers (m^{-2})	Spike length (cm)	Spikelets per spike (cm)	Grains per spike	1000-grains weight (g)	Biological yield (kg/ha)	Grain yield (kg/ha)
05.11.2020	91 A	339	7.67 B	14 B	28 C	26.00 C	9950 B	3513 B
15.11.2020	93 A	436	8.48 A	17 A	36 A	35.99 A	12513 A	3633 A
25.11.2020	93 A	376	8.09 AB	17 A	33 B	32.16 B	11500 A	3460 B
05.12.2020	92 A	361	7.73 B	14 B	31 B	27.02 C	10087 B	2793 C
15.12.2020	80 B	296	7.54 B	10 C	28 C	22.00 D	7500 C	2620 D
LSD p 0.05	4.23	-	0.59	1.99	2.04	2.99	1108.30	64.68

Means sharing same case letter do not differ significantly at p 0.05

Screening/bio-efficacy of broad spectrum herbicides for weed control in wheat (*Triticum aestivum* L.)

This study was conducted under Faisalabad conditions during Rabi 2020-21 to evaluate twenty one herbicides viz; Atlantis super 6 WG, Findus extra 6 WG, Uprite super 6 WG, Fire up 60 WP, Dual clean 6WG, Judo Ultra 25 OD, Ultron 435G, Pallas 45OD, Outklass 12.4 WP, BW-Engro, Ferrary 16E C, Salute 23 OD, Axial+Allymax, Focal 10.5 WDG, Axial+metribuzin, Axial+Buctril S, Pacific 6WDG, Punch Plus 6WG, Walrus 55EC, Owsome 21SG and Topchoice 3.6 WG against control for broad spectrum weeds control in wheat (Fig. 13). The experiment was laid out in randomized complete block design with plot size of 2.75 m x 9.0 m having three replications. The results revealed that the maximum grain yield (4167 kg/ha) was obtained where Axial + Buctril Super was applied while minimum yield (3000 kg/ha) was obtained when no herbicide was applied (control).

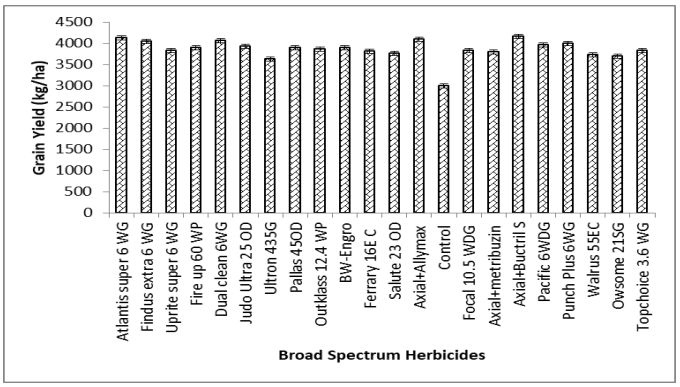

Fig.13. Grain yield (kg/ha) of wheat as affected by different broad spectrum herbicides.

SCREENING AND EVALUATION OF MEDICINAL PLANTS

TULSI

Screening and evaluation of tulsi (*Ocimum tenuiflorum*) germplasm

Ocimum tenuiflorum, commonly known as ***tulsi***, is an aromatic perennial plant in the family Lamiaceae. Tulsi is cultivated for religious and traditional medicine purposes and also for its essential oil. A trial was laid out in RCBD having three replications with plot size of 1.8 m x 5.0 m. Tulsi was sown on ridges (Rx R=75 cm) (Fig.14). Fertilizer @ 60-60 NP kg/ha was applied at the time of sowing. All other agronomic practices were kept normal and uniform during the course of study. Results revealed that the maximum plant height (148.33 cm) and seed yield (2387.6 kg/ha) was recorded in genotype 7 (Fig.15).

Fig.14. Pictorial view of different genotypes of Tulsi at maturity.

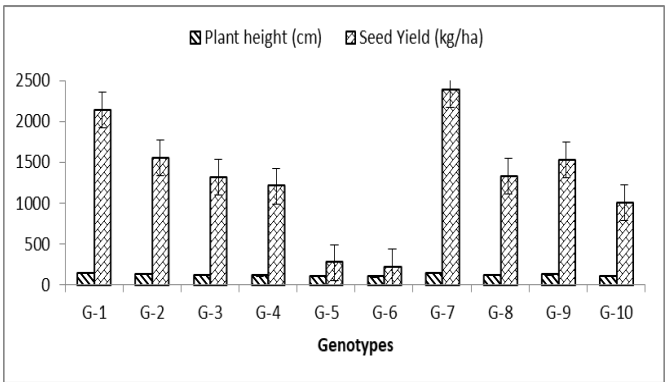

Fig.15. Seed yield (kg/ha) of different genotypes of Tulsi.

NIGELLA

Screening and evaluation of nigella (*Nigella sativa*) germplasm

Nigella (Kalonji) is an annual flowering plant investigated recently for its potential as a crop in Pakistan. This study was conducted to screen and evaluate the performance of twelve Kalonji lines collected from different sources. The experiment was laid out in randomized complete block design with net plot size of 2.25 m x 4.5 m having three replications. Kalonji was sown on beds (Rx R=75 cm) (Fig.16). Fertilizer @ 55-25 NP kg/ha was applied at the time of sowing. All other agronomic practices were kept normal and uniform during the course of study. The results revealed that kalonji genotype PP-K-2 produced the maximum number of capsules (79.67) per plant, number of seeds per capsule (127.67), 1000-seed weight (4.10 g) and seed yield (900 kg/ha). Whereas, minimum seed yield (362 kg/ha) was recorded in genotype PP-K-3 (Fig.17).


Fig.16. Pictorial view of different genotypes of nigella at maturity.

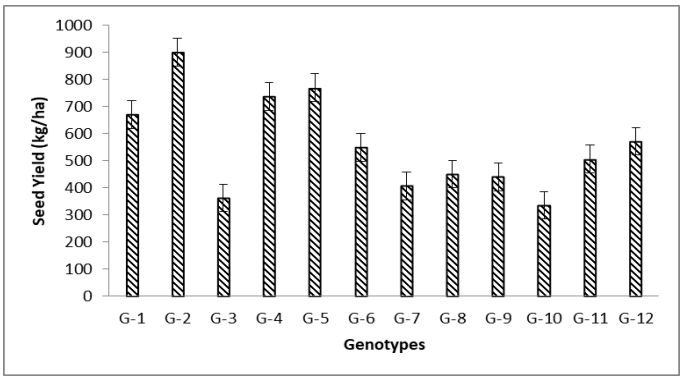

Fig.17. Seed yield (kg/ha) of different genotypes of nigella.

Evaluation and multiplication of local quinoa (*Chenopodium quinoa*) genotypes

This study was conducted to evaluate the performance of ten (UAF-6, UAF-9, UAF-11, UAF-15, UAF-17, UAF-24, UAF-51, UAF-81, UAF-82 and UAF-126) Quinoa lines from UAF selection. The experiment was laid out in randomized complete block design with plot size of 1.4 m x 9.0 m having three replications. The significantly maximum grain yield (2663 kg/ha) was found in UAF-Q-6 line and comparatively minimum grain yield (1086 kg/ha) were recorded in UAF-Q-17 (Fig.18).

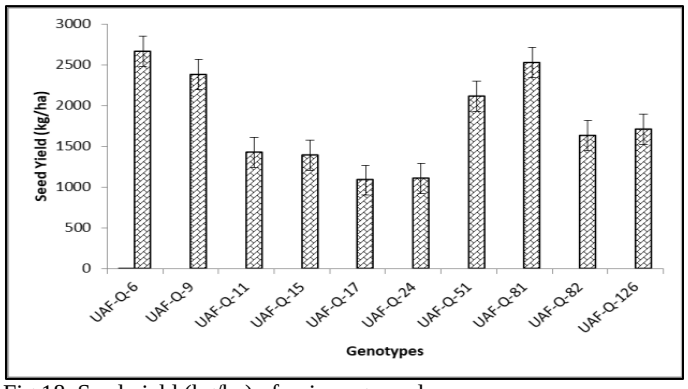

Fig.18. Seed yield (kg/ha) of quinoa germplasm.

Screening and evaluation of fennel (*Foeniculum vulgare*) germplasm

Fennel is the most important medicinal crop in indigenous therapy. An experiment was conducted with objective to screen and evaluate the performance of local fennel. Seed was collected from different sources and the treatments were comprised 12 locally acquired genotypes. Experiment was conducted using randomized complete block design having a plot size of 3*14 meter having three replications. Crop was sown on beds having row to row distance of 75 cm. Uniform agronomic practices were applied for all the treatments. Data were recorded for yield and yield components. Considerable yield differences were observed and Fennel-01 (1666 kg/ha) performed better (Fig.19).

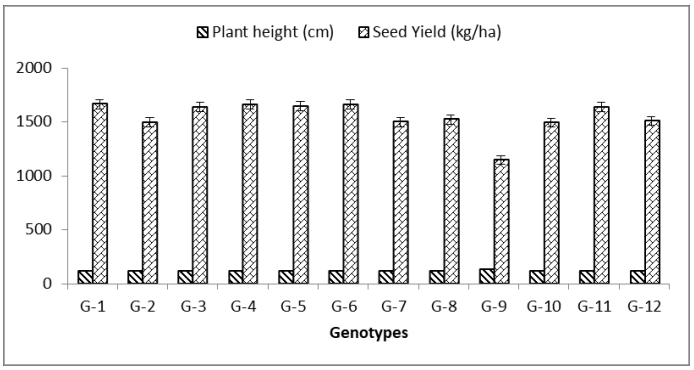

Fig.19. Plant height (cm) and seed yield (kg/ha) of different genotypes of fennel.

ON-GOING PROJECTS

PARB PROJECT-904
Nutrition enhancement of crops, fruits, vegetables and their products under climate change scenario.

ADP Project on "Research and promotion of medicinal plants in Punjab"

MISCELLANEOUS ACTIVITIES

Urdu/English articles:	435
Radio talks:	35
Seminars attended/delivered:	19
Internee supervised:	30
Class visits:	4
Capacity building:	12
Farmer days conducted:	2
Varieties Approved:	2
Production of Stevia Plants:	12500
Seed germination tested:	220

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