

ANNUAL PROGRAM

OF

RESEARCH WORK

RABI 2017-18



VEGETABLE RESEARCH INSTITUTE

FAISALABAD

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1. TOMATO (*Solanum lycopersicum* L.)

1. TITLE	COLLECTION AND MAINTENANCE OF DETERMINATE TOMATO GERMPLASM										
OBJECTIVE	Collection and maintenance of local and exotic germplasm for future use in breeding programme.										
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Amir Latif Mr. Muhammad Najeebullah										
LOCATION	Faisalabad										
DURATION /TREATMENTS	Continuous Entries (Existing) = 109 (local and exotic).										
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = Non replicated Plant spacing = 50 cm Bed width = 1.25 m Off-type plants will be rouged out to maintain the purity.										
PREVIOUS YEAR'S RESULTS	109 entries of determinate tomato were maintained for further use in breeding program. Selected 15 entries will be used in breeding program. <table border="1" data-bbox="766 1234 1377 1415"> <thead> <tr> <th>Characteristics</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Fruit length (mm)</td> <td>17.3 – 78.6</td> </tr> <tr> <td>Fruit width (mm)</td> <td>15.4 – 60.2</td> </tr> <tr> <td>Fruit firmness (kg/cm²)</td> <td>1.9 – 4.5</td> </tr> <tr> <td>Fruit weight (g)</td> <td>9.7 – 127</td> </tr> </tbody> </table>	Characteristics	Range	Fruit length (mm)	17.3 – 78.6	Fruit width (mm)	15.4 – 60.2	Fruit firmness (kg/cm ²)	1.9 – 4.5	Fruit weight (g)	9.7 – 127
Characteristics	Range										
Fruit length (mm)	17.3 – 78.6										
Fruit width (mm)	15.4 – 60.2										
Fruit firmness (kg/cm ²)	1.9 – 4.5										
Fruit weight (g)	9.7 – 127										
2. TITLE	STUDY OF FILIAL GENERATIONS IN DETERMINATE TOMATO										
OBJECTIVE	To develop/select high yielding, disease resistant, good quality determinate tomato purelines.										
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Amir Latif Mr. Muhammad Najeebullah										
LOCATION	Faisalabad										
DURATION	Continuous										
TREATMENTS	i) F ₂ = 26 cross combinations										

	ii) F ₃ = 39 single plant progenies of 22 crosses iii) F ₄ = 70 single plant progenies of 21 crosses iv) F ₅ = 76 single plant progenies of 11 crosses v) F ₆ = 23 single plant progenies of 7 crosses vi) F ₇ = 19 single plant progenies of 5 crosses																																		
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Plant to plant distance = 50 cm Experimental design = Non-replicated F ₂ – F ₆ will be advanced by using Pedigree method. Desirable plant progenies will be selected for further studies.																																		
PREVIOUS YEAR'S RESULTS	<table border="1"> <thead> <tr> <th rowspan="2">S. No.</th> <th rowspan="2">Generation</th> <th colspan="2">No. of Crosses / Progeny</th> </tr> <tr> <th>Studied</th> <th>Selected</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>F₁</td> <td>50</td> <td>26</td> </tr> <tr> <td>2</td> <td>F₂</td> <td>25</td> <td>22/39</td> </tr> <tr> <td>3</td> <td>F₃</td> <td>23/34</td> <td>21/70</td> </tr> <tr> <td>4</td> <td>F₄</td> <td>11/20</td> <td>11/76</td> </tr> <tr> <td>5</td> <td>F₅</td> <td>7/15</td> <td>7/23</td> </tr> <tr> <td>6</td> <td>F₆</td> <td>5/11</td> <td>5/19</td> </tr> <tr> <td>7</td> <td>F₇</td> <td>4/14</td> <td>4/52</td> </tr> </tbody> </table>	S. No.	Generation	No. of Crosses / Progeny		Studied	Selected	1	F ₁	50	26	2	F ₂	25	22/39	3	F ₃	23/34	21/70	4	F ₄	11/20	11/76	5	F ₅	7/15	7/23	6	F ₆	5/11	5/19	7	F ₇	4/14	4/52
S. No.	Generation			No. of Crosses / Progeny																															
		Studied	Selected																																
1	F ₁	50	26																																
2	F ₂	25	22/39																																
3	F ₃	23/34	21/70																																
4	F ₄	11/20	11/76																																
5	F ₅	7/15	7/23																																
6	F ₆	5/11	5/19																																
7	F ₇	4/14	4/52																																
3. TITLE	PRELIMINARY EVALUATION OF DETERMINATE TOMATO PURELINES																																		
OBJECTIVE	To evaluate determinate tomato purelines selected from advanced generations.																																		
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah																																		
LOCATION	Faisalabad																																		
DURATION	2017-18																																		
TREATMENTS	Entries = 22 (including 3 checks) viz; 17254, 17255, 17256, 17257, 17258, 17259, 17260, 17261, 17262, 17263, 17264, 17265, 17266, 17267, 17268, 17269, 17270, 17271, 17272, Nadir (Check), Naqeeb (Check) & Rio Grande (Check).																																		
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3 Data regarding fruit length, fruit width, fruit firmness, fruit weight and																																		

	fruit yield will be recorded.																																																															
PREVIOUS YEAR'S RESULTS	During previous year 14 entries including three checks were studied. Data recorded for fruit length, fruit width, fruit firmness, fruit weight and fruit yield is given below.																																																															
<table border="1"> <thead> <tr> <th>Rank</th> <th>Entry</th> <th>Fruit length (mm)</th> <th>Fruit width (mm)</th> <th>Fruit firmness (kg/cm²)</th> <th>Fruit weight (g)</th> <th>Fruit yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>16244</td> <td>55.3</td> <td>56.8</td> <td>3.78</td> <td>120.5</td> <td>44.54</td> </tr> <tr> <td>2</td> <td>Nadir (Check)</td> <td>57.6</td> <td>49.0</td> <td>3.92</td> <td>83.6</td> <td>43.51</td> </tr> <tr> <td>3</td> <td>16243</td> <td>53.4</td> <td>54.8</td> <td>3.90</td> <td>112.2</td> <td>43.18</td> </tr> <tr> <td>4</td> <td>Naqeeb (Check)</td> <td>58.7</td> <td>50.2</td> <td>3.88</td> <td>82.2</td> <td>39.38</td> </tr> <tr> <td>5</td> <td>16249</td> <td>55.2</td> <td>46.8</td> <td>4.10</td> <td>75.0</td> <td>37.47</td> </tr> <tr> <td>6</td> <td>Rio Grande (Check)</td> <td>57.5</td> <td>47.1</td> <td>4.06</td> <td>80.9</td> <td>36.91</td> </tr> <tr> <td>14</td> <td>16251</td> <td>48.9</td> <td>45.6</td> <td>3.70</td> <td>67.1</td> <td>22.79</td> </tr> <tr> <td colspan="6">LSD (0.05)</td> <td>2.91</td> </tr> </tbody> </table>		Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)	1	16244	55.3	56.8	3.78	120.5	44.54	2	Nadir (Check)	57.6	49.0	3.92	83.6	43.51	3	16243	53.4	54.8	3.90	112.2	43.18	4	Naqeeb (Check)	58.7	50.2	3.88	82.2	39.38	5	16249	55.2	46.8	4.10	75.0	37.47	6	Rio Grande (Check)	57.5	47.1	4.06	80.9	36.91	14	16251	48.9	45.6	3.70	67.1	22.79	LSD (0.05)						2.91
Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)																																																										
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14	16251	48.9	45.6	3.70	67.1	22.79																																																										
LSD (0.05)						2.91																																																										
4. TITLE	SECONDARY EVALUATION OF DETERMINATE TOMATO PURELINES																																																															
OBJECTIVE	To evaluate the selected determinate tomato purelines for open field cultivation.																																																															
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah																																																															
LOCATION	Faisalabad																																																															
DURATION	2017-18																																																															
TREATMENTS	Entries = 10 (including 3 checks) viz; 13229, 13234, 13239, 13240, 16245, 16249, 16252, Nadir (Check), Naqeeb (Check) & Rio Grande (Check).																																																															
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Exp. Design = RCBD Plot size = 8.0 × 1.25 m Repeats = 3 Plant spacing = 50 cm Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded.																																																															
PREVIOUS YEAR'S RESULTS	During previous year 11 entries including 3 checks were evaluated. Data recorded for fruit length, fruit width, fruit firmness, fruit weight and fruit yield is given below.																																																															

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	13240	45.7	42.7	3.58	67.1	50.17
2	Naqeeb (Check)	56.7	47.1	3.86	79.5	41.02
3	Nadir (Check)	57.7	49.8	3.90	81.6	40.60
4	13239	53.6	48.3	3.98	83.7	40.39
5	10139	54.4	45.9	3.84	78.0	36.90
7	Rio Grande (Check)	58.5	50.1	4.04	87.0	35.82
11	13232	56.9	44.8	3.58	80.4	25.17
LSD (0.05)						2.62

5. TITLE	MULTI-LOCATIONAL / ZONAL EVALUATION OF DETERMINATE TOMATO PURELINES
OBJECTIVE	To evaluate the selected determinate tomato purelines for open field cultivation at different locations.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah Dr. Ghulam Nabi Mr. Abrar Ahmad Mr. Shoaib Liaqat
LOCATION	Faisalabad, Sheikhpura, Multan & Bahawalpur
DURATION	2017-18
TREATMENTS	Entries = 08 (including 3 checks) viz; 10139, 10142, 10173, 13198, 13239, Nadir (Check), Naqeeb (Check) & Rio Grande (Check).
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3 Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded at VRI, Faisalabad whereas; only yield data will be recorded at out-stations.
PREVIOUS YEAR'S RESULTS	During previous year 11 entries including 3 checks were studied at four different locations. Data is presented below.

Rank	Entry	Fruit yield (T/ha)				
		FSD	S. Pura	Multan	B. Pur	Average
1	10139	37.70	34.40	30.67	25.01	31.95
2	Nadir (Check)	37.10	33.45	29.62	23.50	30.92
3	13198	35.76	32.95	29.90	23.81	30.61
4	10142	34.76	32.32	27.81	23.60	29.62
5	Naqeeb (Check)	33.75	30.95	27.68	24.06	29.11
6	10173	35.47	29.92	28.42	22.23	29.01
7	Rio Grande (Check)	30.71	29.89	24.97	22.67	27.06
11	NB-242	19.41	15.16	14.91	13.92	15.85
LSD (0.05)		2.67	3.31	2.19	2.04	-

6. TITLE	MULTILOCATIONAL EVALUATION OF TOMATO ADVANCED LINES/ HYBRIDS FOR AUTUMN PLANTING
OBJECTIVE	To select high yielding and disease tolerant tomato genotypes suitable for early / Autumn planting.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah
LOCATION(S)	Faisalabad & Chakwal
DURATION	2017-18
TREATMENTS	10 entries including 3 checks = AUT-302, AUT-305, AUT-309, AUT-312, AUT-315, AUT-318, AUT-324, AUT-330, 10139 (Check) & RS-1312 F ₁ (Check).
METHODOLOGY	Nursery sowing = 2 nd week of August, 2017 Transplanting = 2 nd week of September, 2017 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3 Data regarding fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	12 selected lines along with 3 checks were studied during the previous year. Data regarding fruit yield is presented below:

Det. Advanced Lines:

Rank	Entry	Fruit yield (T/ha)		
		VRI, Faisalabad	BARI, Chakwal	Average
1	RS-1312 F ₁ (Check)	27.22	-	27.22
2	T-1359 F ₁ (Check)	21.54	15.89	18.71
3	AUT-312	18.39	13.98	16.18
4	AUT-315	19.35	12.30	15.82
5	AUT-318	18.77	11.81	15.29
7	Kanwal F ₁ (Check)	14.35	-	14.35
12	AUT-330	9.65	6.97	8.31
LSD (0.05)		2.86	1.39	-

7. TITLE	INTERCROPPING STUDIES IN DETERMINATE TOMATO
OBJECTIVE	To determine the suitable intercropping combination for increasing the income on per unit area basis
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Tomato variety = Nadir Vegetables to be intercropped = Peas, Strawberry & Onion T ₁ = Sole crop (Tomato) T ₂ = Tomato + Peas T ₃ = Tomato + Strawberry T ₄ = Tomato + Onion T ₅ = Tomato + Turnip
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant spacing = 50 cm (Tomato) Repeats = 4 Tomato seedlings will be transplanted on one side of bed while rest of the crops (each treatment) will be transplanted on other side of bed.
PREVIOUS YEAR'S RESULTS	New experiment
8. TITLE	SEED PRODUCTION OF APPROVED DETERMINATE TOMATO VARIETIES FOR GENERAL CULTIVATION
OBJECTIVE	To produce the seed of approved determinate tomato varieties suitable

	for low tunnels and open fields.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Determinate variety(s) = 02
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Area = 04 Kanals Spacing = 50 cm 4.0 kg seed of approved determinate varieties will be produced (As per target of PARB Project No. 916).
PREVIOUS YEAR'S RESULTS	6.0 kg pre-basic seed of two determinate tomato varieties namely Nadir and Naqeeb was produced for further multiplication/ cultivation.
9. TITLE	ADAPTABILITY TRIAL OF EXOTIC TOMATO VARIETIES / HYBRIDS
OBJECTIVE	To find out high yielding, well adapted, better quality and disease resistant / tolerant tomato varieties / hybrids.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Amir Latif Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Varieties / hybrids will be supplied by the Seed Companies and commercial cultivars will be used as standard checks.
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3 Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	79 determinate tomato varieties / F ₁ hybrids were studied in open field along with two checks in each of four sets whereas; 3 indeterminate tomato F ₁ hybrids along with two checks were studied under high tunnel in a separate trial. Data recorded for fruit yield and quality parameters is given below:

Set-1 (Det.)

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (T/ha)
1	TAI-14-6242	50.3	48.3	3.64	76.5	58.51
2	GTH-1	65.4	46.0	2.56	80.3	58.09
3	Hiker F ₁	56.5	44.9	2.86	73.1	57.07
4	CBS-292	60.7	40.3	3.32	69.7	56.86
5	TAI-2120	47.0	44.9	2.72	64.4	55.49
10	T-1359 F₁ (Check)	51.2	43.4	3.12	68.1	47.43
19	Nadir (Check)	57.8	50.1	3.18	82.6	40.19
23	Red Boss	49.1	41.0	2.56	61.9	34.92
LSD (0.05)						3.28

Set-2 (Det.)

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (T/ha)
1	Rover F ₁	55.6	47.3	3.32	78.7	71.54
2	Avenue F ₁	57.5	47.8	3.22	71.5	70.90
3	Miracle F ₁	55.9	46.1	3.18	72.9	66.52
4	Mehran-670	50.4	46.6	2.86	67.2	63.72
5	Rani	54.7	46.2	3.54	73.5	61.47
8	T-1359 F₁ (Check)	51.3	42.3	3.20	63.6	59.53
11	Nadir (Check)	57.0	47.9	3.44	79.8	57.87
23	TTM-503	53.1	45.3	2.98	68.1	32.68
LSD (0.05)						4.06

Set-3 (Det.)

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (T/ha)
1	Yaqui	61.1	51.3	3.26	97.2	71.13
2	Prasun	56.7	46.9	3.12	72.5	69.83
3	SV-3466 TE	50.5	44.6	3.40	65.9	59.64
4	Fonto	62.6	48.3	3.44	88.3	58.24
5	T-1359 F₁ (Check)	53.8	45.5	3.50	70.2	56.28
6	SV-6605 TE	57.9	48.1	3.28	79.1	56.03
9	Nadir (Check)	59.5	51.4	3.66	88.1	46.14
23	Neon F ₁	65.5	55.5	3.46	105.7	17.76
LSD (0.05)						4.75

Set-4 (Det.)

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (T/ha)
1	V-369 F ₁	69.8	52.4	3.30	95.3	33.26
2	Albi F ₁	54.8	46.8	3.26	74.9	29.46
3	Fulham F ₁	58.1	49.7	3.38	80.2	27.31
4	Red Cross F ₁	50.8	46.0	3.32	61.5	26.89
5	Kama F ₁	60.3	49.4	3.58	77.0	24.50
10	T-1359 F₁ (Check)	50.3	44.6	3.54	62.7	22.64
15	Nadir (Check)	54.3	46.3	3.70	75.6	20.25
18	Nasdette F ₁	60.9	50.6	3.72	79.3	14.89
LSD (0.05)						3.60

Indeterminate

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (T/ha)
1	Salar F₁ (Check)	57.2	48.6	3.94	82.3	145.22
2	Sahel F₁ (Check)	60.6	52.0	4.06	106.7	143.20
3	Cosmic F ₁	59.2	50.1	3.90	96.2	120.43
LSD (0.05)						6.66

10. TITLE	SYNTHESIS OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION
OBJECTIVES	To develop high yielding determinate tomato hybrids suitable for low tunnels and open field cultivation.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Amir Latif Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Parents = 15
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Plot size = 8.0 × 1.75 m / as per requirements Plant Spacing = 50 cm The crosses amongst desirable parents will be made to develop 30 new and 20 selected/ promising F ₁ hybrids.

PREVIOUS YEAR'S RESULTS	A total of 60 F ₁ crosses seed (40 fresh & 20 under evaluation hybrids) was produced.
11. TITLE	PRELIMINARY EVALUATION OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION
OBJECTIVES	To evaluate locally developed determinate tomato hybrids suitable for low tunnels and open field cultivation.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Amir Latif Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	F ₁ hybrids = 42 (including 2 checks) viz; LTH-451, LTH-452, LTH-453, LTH-454, LTH-455, LTH-456, LTH-457, LTH-458, LTH-459, LTH-460, LTH-461, LTH-462, LTH-463, LTH-464, LTH-465, LTH-466, LTH-467, LTH-468, LTH-469, LTH-470, LTH-471, LTH-472, LTH-473, LTH-474, LTH-475, LTH-476, LTH-477, LTH-478, LTH-479, LTH-480, LTH-481, LTH-482, LTH-483, LTH-484, LTH-485, LTH-486, LTH-487, LTH-488, LTH-489, LTH-490, T-1359 F ₁ (Check) and Ahmar Hybrid (Check).
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3 Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	40 locally developed determinate F ₁ hybrids along with one check were evaluated in two different sets (20 F ₁ hybrids & 1 check in each set). Data recorded for fruit length, fruit width, fruit firmness, fruit weight and fruit yield is given below.

Set-1

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	LTH-420	56.9	47.3	3.32	77.9	50.05
2	LTH-421	54.5	47.4	3.42	82.5	47.73
3	LTH-418	46.2	50.7	3.76	73.4	46.81
4	T-1359 F₁ (Check)	51.9	43.7	3.78	65.1	46.17
5	LTH-429	52.5	57.2	3.78	88.5	46.05
6	LTH-423	54.1	47.9	3.72	73.2	44.53
7	LTH-422	61.4	50.9	3.82	90.0	43.81
21	LTH-426	35.9	36.4	2.42	34.8	24.21
LSD (0.05)						4.18

Set-2

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	LTH-440	51.0	42.9	3.78	68.2	55.09
2	LTH-433	53.0	42.8	3.64	63.8	53.48
3	LTH-444	54.6	46.2	3.56	74.2	52.88
4	LTH-445	50.4	45.2	3.52	69.8	50.26
5	LTH-432	49.5	45.7	3.76	62.5	50.02
9	T-1359 F₁ (Check)	51.3	42.2	3.84	62.5	48.18
10	LTH-431	41.0	43.2	3.68	54.9	48.05
21	LTH-435	54.5	44.7	3.68	68.1	32.81
LSD (0.05)						3.83

12. TITLE	SECONDARY / STATION YIELD EVALUATION OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION
OBJECTIVES	To evaluate the selected locally developed tomato hybrids suitable for low tunnels and open field cultivation.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Amir Latif Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	F ₁ hybrids = 10 (including 3 checks) viz; LTH-405, LTH-420, LTH-421, LTH-422, LTH-436, LTH-440, LTH-444, 10139, T-1359 F ₁ (Check), TO-1057 F ₁ (Check) and Ahmar Hybrid (Check).
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017

	<p>Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3</p> <p>Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded.</p>																																																																						
PREVIOUS YEAR'S RESULTS	10 determinate F ₁ hybrids along with one exotic check were evaluated. Data recorded for fruit length, fruit width, fruit firmness, fruit weight and fruit yield is given below.																																																																						
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13. TITLE	MULTI-LOCATIONAL / ZONAL EVALUATION OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION																																																																						
OBJECTIVES	To evaluate the selected locally developed tomato hybrids suitable for low tunnels and open field cultivation at different locations.																																																																						
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Amir Latif Mr. Muhammad Najeebullah Dr. Ghulam Nabi Mr. Abrar Ahmad Mr. Shoaib Liaqat																																																																						
LOCATION	Faisalabad, Sheikhpura, Multan & Bahawalpur																																																																						
DURATION	2017-18																																																																						
TREATMENTS	Entries = 5 F ₁ hybrids along with 3 checks viz; LTH-324, LTH-350, LTH-366, LTH-379, LTH-405, T-1359 F ₁ (Check), TO-1057 F ₁ (Check) and Ahmar Hybrid (Check).																																																																						
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PREVIOUS YEAR'S RESULTS	10 F ₁ hybrids along with two checks were studied at four different locations. Data recorded for fruit yield is presented below.																																																																											
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Rank</th> <th rowspan="2">Entry</th> <th colspan="5">Fruit yield (T/ha)</th> </tr> <tr> <th>FSD</th> <th>S. Pura</th> <th>Multan</th> <th>B. Pur</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NBH-149</td> <td>58.24</td> <td>53.90</td> <td>50.44</td> <td>32.30</td> <td>48.72</td> </tr> <tr> <td>2</td> <td>NBH-5</td> <td>54.54</td> <td>52.93</td> <td>47.60</td> <td>34.42</td> <td>47.37</td> </tr> <tr> <td>3</td> <td>LTH-297</td> <td>52.89</td> <td>48.57</td> <td>45.52</td> <td>29.47</td> <td>44.11</td> </tr> <tr> <td>4</td> <td>NBH-1</td> <td>49.11</td> <td>46.82</td> <td>44.21</td> <td>29.62</td> <td>42.44</td> </tr> <tr> <td>5</td> <td>T-1359 F₁ (Check)</td> <td>48.41</td> <td>46.55</td> <td>42.59</td> <td>31.58</td> <td>42.28</td> </tr> <tr> <td>6</td> <td>LTH-291</td> <td>47.32</td> <td>43.77</td> <td>41.14</td> <td>27.03</td> <td>39.82</td> </tr> <tr> <td>7</td> <td>Ahmar F₁ (Check)</td> <td>45.03</td> <td>40.04</td> <td>38.36</td> <td>28.08</td> <td>37.88</td> </tr> <tr> <td>12</td> <td>LTH-324</td> <td>47.52</td> <td>40.88</td> <td>33.87</td> <td>22.17</td> <td>36.11</td> </tr> <tr> <td colspan="2">LSD (0.05)</td> <td>4.64</td> <td>2.57</td> <td>3.07</td> <td>2.29</td> <td>-</td> </tr> </tbody> </table>		Rank	Entry	Fruit yield (T/ha)					FSD	S. Pura	Multan	B. Pur	Average	1	NBH-149	58.24	53.90	50.44	32.30	48.72	2	NBH-5	54.54	52.93	47.60	34.42	47.37	3	LTH-297	52.89	48.57	45.52	29.47	44.11	4	NBH-1	49.11	46.82	44.21	29.62	42.44	5	T-1359 F₁ (Check)	48.41	46.55	42.59	31.58	42.28	6	LTH-291	47.32	43.77	41.14	27.03	39.82	7	Ahmar F₁ (Check)	45.03	40.04	38.36	28.08	37.88	12	LTH-324	47.52	40.88	33.87	22.17	36.11	LSD (0.05)		4.64	2.57	3.07	2.29	-
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14. TITLE	COLLECTION AND MAINTENANCE OF INDETERMINATE TOMATO GERMPLASM																																																																											
OBJECTIVE	Collection and maintenance of local and exotic germplasm for future use in breeding programme.																																																																											
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah																																																																											
LOCATION	Faisalabad																																																																											
DURATION /TREATMENTS	Continuous Entries (Existing) = 74 (local and exotic).																																																																											
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = Non replicated Plant spacing = 40 cm Bed width = 1.50 m (on both sides) Off-type plants will be rouged out to maintain the purity.																																																																											

PREVIOUS YEAR'S RESULTS	<p>74 entries of indeterminate tomato were maintained for further use in breeding program. Selected 15 entries will be used in breeding program.</p> <table border="1" data-bbox="781 327 1393 516"> <thead> <tr> <th>Characteristics</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Fruit length (mm)</td> <td>19.6 – 90.8</td> </tr> <tr> <td>Fruit width (mm)</td> <td>16.7 – 65.4</td> </tr> <tr> <td>Fruit firmness (kg/cm²)</td> <td>1.8 – 4.6</td> </tr> <tr> <td>Fruit weight (g)</td> <td>7.3 – 224</td> </tr> </tbody> </table>	Characteristics	Range	Fruit length (mm)	19.6 – 90.8	Fruit width (mm)	16.7 – 65.4	Fruit firmness (kg/cm ²)	1.8 – 4.6	Fruit weight (g)	7.3 – 224																								
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15. TITLE	STUDY OF FILIAL GENERATIONS IN INDETERMINATE TOMATO																																		
OBJECTIVE	To develop/select high yielding, disease resistant, good quality indeterminate tomato purelines.																																		
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Amir Latif Mr. Muhammad Najeebullah																																		
LOCATION	Faisalabad																																		
DURATION	Continuous																																		
TREATMENTS	i) F ₂ = 21 cross combinations ii) F ₃ = 25 single plant progenies of 18 crosses iii) F ₄ = 17 single plant progenies of 10 crosses iv) F ₅ = 30 single plant progenies of 10 crosses v) F ₆ = 42 single plant progenies of 5 crosses vi) F ₇ = 30 single plant progenies of 6 crosses																																		
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Plant to plant distance = 50 cm Experimental design = Non-replicated Plant spacing = 40 cm Bed width = 1.50 m (on both sides) F ₂ – F ₆ will be advanced by using Pedigree method. Desirable plant progenies will be selected for further studies.																																		
PREVIOUS YEAR'S RESULTS	<table border="1" data-bbox="683 1545 1373 1860"> <thead> <tr> <th rowspan="2">S. No.</th> <th rowspan="2">Generation</th> <th colspan="2">No. of Crosses / Progeny</th> </tr> <tr> <th>Studied</th> <th>Selected</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>F₁</td> <td>50</td> <td>21</td> </tr> <tr> <td>2</td> <td>F₂</td> <td>21</td> <td>18/25</td> </tr> <tr> <td>3</td> <td>F₃</td> <td>12/23</td> <td>10/17</td> </tr> <tr> <td>4</td> <td>F₄</td> <td>10/38</td> <td>10/30</td> </tr> <tr> <td>5</td> <td>F₅</td> <td>6/17</td> <td>5/42</td> </tr> <tr> <td>6</td> <td>F₆</td> <td>6/10</td> <td>6/30</td> </tr> <tr> <td>7</td> <td>F₇</td> <td>3/4</td> <td>3/5</td> </tr> </tbody> </table>	S. No.	Generation	No. of Crosses / Progeny		Studied	Selected	1	F ₁	50	21	2	F ₂	21	18/25	3	F ₃	12/23	10/17	4	F ₄	10/38	10/30	5	F ₅	6/17	5/42	6	F ₆	6/10	6/30	7	F ₇	3/4	3/5
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7	F ₇	3/4	3/5																																

16. TITLE	SYNTHESIS OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION
OBJECTIVES	To develop high yielding indeterminate tomato hybrids suitable for tunnel cultivation.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Parents =15
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Plot size = 4.0 × 1.50 m (on both sides) Plant Spacing = 40 cm The crosses amongst desirable parents will be made to develop 30 new and 20 selected/ promising F ₁ hybrids.
PREVIOUS YEAR'S RESULTS	A total of 62 F ₁ crosses seed (40 fresh & 22 under evaluation hybrids) was produced.
17. TITLE	PRELIMINARY EVALUATION OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION
OBJECTIVES	To evaluate locally developed indeterminate tomato hybrids suitable for tunnel cultivation.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Bashir Hussain Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	43 F ₁ hybrids (including one exotic check) viz: LITTH-872, LITTH-873, LITTH-874, LITTH-875, LITTH-876, LITTH-877, LITTH-878, LITTH-879, LITTH-880, LITTH-881, LITTH-882, LITTH-884, LITTH-885, LITTH-886, LITTH-887, LITTH-888, LITTH-890, LITTH-891, LITTH-892, LITTH-893, LITTH-894, LITTH-895, LITTH-896, LITTH-897, LITTH-898, LITTH-899, LITTH-900, LITTH-901, LITTH-902, LITTH-903, LITTH-904, LITTH-905, LITTH-907, LITTH-908, LITTH-909, LITTH-910, LITTH-911, LITTH-912, LITTH-913, LITTH-914, LITTH-915, LITTH-916 & Sahel F ₁ (Exotic check).
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017

	<p>Experimental design = RCBD Plot size = 4.0 × 0.75 m Plant Spacing = 40 cm</p> <p>Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded.</p>
<p>PREVIOUS YEAR'S RESULTS</p>	<p>42 locally developed indeterminate F₁ hybrids along with one exotic check were evaluated in three different sets (14 F₁ hybrids & 1 check in each set). Data recorded for fruit length, fruit width, fruit firmness, fruit weight and fruit yield is given below.</p>

Set-1

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	LITTH-834	48.6	49.6	3.58	78.3	137.94
2	Sahel F₁ (Check)	63.2	53.9	3.94	119.7	135.49
3	LITTH-835	59.0	52.2	3.52	92.5	133.47
4	LITTH-841	52.2	45.6	3.66	71.9	130.47
5	LITTH-842	67.7	46.9	3.52	96.8	128.25
6	LITTH-832	57.9	46.5	4.12	79.6	126.00
15	LITTH-831	56.0	44.7	3.64	68.8	82.37
LSD (0.05)						7.03

Set-2

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	LITTH-857	56.3	59.4	3.52	123.1	145.20
2	LITTH-849	47.2	56.3	3.66	93.0	144.35
3	LITTH-854	45.6	44.5	3.76	66.8	140.20
4	Sahel F₁ (Check)	65.3	54.6	3.78	122.6	137.75
5	LITTH-844	62.6	50.3	3.30	100.3	136.87
6	LITTH-845	53.2	48.0	3.62	78.6	131.48
15	LITTH-848	49.0	50.7	3.26	80.4	90.81
LSD (0.05)						5.44

Set-3

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	LITTH-865	45.7	57.4	3.60	100.6	159.57
2	LITTH-862	44.5	57.7	3.72	96.9	154.82
3	LITTH-861	63.2	51.1	3.86	105.2	147.30
4	LITTH-859	54.4	54.0	3.68	99.7	145.47
5	Sahel F₁ (Check)	62.3	53.8	3.94	118.1	143.97
6	LITTH-869	57.3	51.5	3.82	98.5	143.86
15	LITTH-858	49.5	48.5	3.56	81.4	90.13
LSD (0.05)						4.89

18. TITLE**SECONDARY / STATION YIELD EVALUATION OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION****OBJECTIVE**

To evaluate selected locally developed tomato hybrids suitable for tunnel cultivation.

RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Bashir Hussain Mr. Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	9 F ₁ Hybrids (including two checks) viz: LITTH-832, LITTH-835, LITTH-842, LITTH-844, LITTH-852, LITTH-861, LITTH-869, Sahel F ₁ (Exotic check) & Saandal F ₁ (Local check).
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3 rd week of November, 2017 Experimental design = RCBD Plot size = 4.0 × 1.5 m Plant Spacing = 40 cm Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	7 locally developed indeterminate F ₁ hybrids along with two checks (one exotic & one local) were evaluated. Data recorded for fruit length, fruit width, fruit firmness, fruit weight and fruit yield is given below.

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit firmness (kg/cm ²)	Fruit weight (g)	Fruit yield (t/ha)
1	LITTH-818	53.1	52.9	3.70	103.4	147.27
2	Saandal F ₁ (Check)	62.8	57.1	3.92	126.8	146.59
3	Sahel F ₁ (Check)	67.2	55.6	3.80	117.4	136.23
4	LITTH-779	53.1	52.3	3.72	96.1	129.54
5	LITTH-778	53.6	53.0	3.68	93.6	113.29
6	LITTH-799	63.3	50.0	3.88	91.3	110.11
9	LITTH-811	58.6	52.7	3.78	97.5	93.56
LSD (0.05)						4.84

19. TITLE	MULTI-LOCATIONAL / ZONAL EVALUATION OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION
OBJECTIVE	To evaluate selected locally developed tomato hybrids suitable for tunnel cultivation at different locations.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah Dr. Ghulam Nabi

	Mr. Abrar Ahmad Mrs. Naveeda Anjum Mr. Bashir Hussain
LOCATION	Faisalabad, Sheikhpura, Multan and Chakwal
DURATION	2017-18
TREATMENTS	8 F ₁ Hybrids (including three checks) viz: LITTH-682, LITTH-710, LITTH-765, LITTH-779, LITTH-818, Sahel F ₁ (Exotic check), Salar F ₁ & Saandal F ₁ (Local checks).
METHODOLOGY	Nursery sowing = Mid October, 2017 Transplanting = 3rd week of November, 2017 Experimental design = RCBD Plot size = 4.0 × 1.50 m Plant Spacing = 40 cm Data regarding fruit length, fruit width, fruit firmness, fruit weight and fruit yield will be recorded at VRI, Faisalabad whereas; only fruit yield data will be recorded at out-stations.
PREVIOUS YEAR'S RESULTS	7 F ₁ tomato hybrids along with three checks were studied at four different locations. Data recorded for fruit yield is presented below.

Rank	Entry	Fruit yield (T/ha)				
		FSD	S. Pura	Multan	NIAB, FSD	Average
1	Salar F ₁ (Check)	156.35	140.34	136.97	-	144.55
2	LITTH-691	144.25	137.39	134.59	127.83	136.02
3	Saandal F ₁ (Check)	149.73	137.75	133.33	122.50	135.83
4	LITTH-682	142.14	134.24	132.49	-	135.29
5	Sahel F ₁ (Check)	142.38	136.13	134.87	124.96	134.59
6	LITTH-765	142.54	126.47	117.44	-	128.82
9	NBH-167	93.65	-	-	-	93.65
10	NBH-166	86.23	-	-	-	86.23
	LSD (0.05)	4.85	9.92	8.20	4.12	-

20. TITLE	SECONDARY EVALUATION OF INDETERMINATE TOMATO HYBRIDS FOR EARLY PLANTING
OBJECTIVE	To select high yielding and disease tolerant tomato genotypes suitable for early / Autumn planting.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah
LOCATION(S)	Faisalabad
DURATION	2017-18
TREATMENTS	3 entries = Saandal F ₁ , Salar F ₁ & Sahel F ₁ .

METHODOLOGY	Nursery sowing = 1 st week of September, 2017 Transplanting = 1 st week of October, 2017 Experimental design = Non-replicated Plant Spacing = 40 cm Bed width = 1.50 m (on both sides) Data regarding fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	New experiment

2. ONION (*Allium cepa* L.)

1. TITLE	COLLECTION AND MAINTENANCE OF GERMPLASM		
OBJECTIVE	Collection and maintenance of local and exotic germplasm for future use.		
RESEARCH WORKERS	Ms. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti		
LOCATION	VRI, Faisalabad		
DURATION	Continuous		
TREATMENTS	Varieties for sets production = 20 Varieties for seed production = 30		
METHODOLOGY	For sets production Nursery sowing = 2nd fortnight of November, 2017 Harvesting of nursery sets = 1st fortnight of May, 2017 For seed production Transplanting of sets (In isolations) = December, 2017 Plot size = up to 5 Marla Sets and seeds will be harvested at maturity		
	Sr. No	Characters	Range
	1	Bulb diameter(cm)	5.6-11.6
	2	Neck diameter	0.62-1.4
	3	Bulb weight(g)	76-107
	4	Bulb color	White, piazzi, purple, red
	5	Bulb shape	Spherical, Tall, Flat
	6	Ring/bulb	6-11
	7	Centres/bulb	1-7
2. TITLE	DEVELOPMENT OF ONION INBRED LINE		
OBJECTIVE	For the development of hybrids/synthetic varieties		
RESEARCH WORKERS	Ms. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti		
LOCATION	VRI, Faisalabad		
DURATION	Continuos		
TREATMENTS			

	<p>S₀ Sets = 10 varieties S₁ Sets = 3 varieties S₁ Seed = 6 varieties S₂ Sets = 5 varieties S₂ Seed = 2 varieties S₃ Sets = 3 varieties S₃ Seed = 6 varieties S₄ Sets = 2 varieties S₄ Seed = 6 varieties</p>
METHODOLOGY	<p>The nursery sets (harvested during May 2017) has been planted in August for bulb formation. The bulb of S₁, S₂, S₃ and S₄ generation will be planted during December 2017 for seed production. At flowering (March-April) 25 single umbels will be bagged with butter paper bag in each variety. At maturity seed will be collected for further selfing to develop inbred lines. S₁, S₂ and S₃ Seed will be planted during 2nd fortnight of November 2017 to produce bulblets during spring 2017-18 for bulb production in next season.</p>
PREVIOUS YEAR'S RESULTS	<p>Following selfed material was harvested. S₁ Sets = 3 varieties S₁ Seed = 6 varieties S₂ Sets = 5 varieties S₂ Seed = 2 varieties S₃ Sets = 3 varieties S₃ Seed = 6 varieties S₄ Sets = 2 varieties S₄ Seed = 6 varieties</p>
3. TITLE	DEVELOPMENT OF OPEN POLLINATED ONION VARIETIES
OBJECTIVE	To develop high yielding, disease resistant/tolerant and better adapted open pollinated onion varieties.
RESEARCH WORKERS	Ms. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti
LOCATION	VRI, Faisalabad.
DURATION	Continuous
TREATMENTS	A. Seed of two source population B. Sets of 20 varieties
METHODOLOGY	A. Seed of one source population will be planted during 2nd fortnight of October and transplanted during December. At maturity desirable bulbs will be selected. B. Sets will be harvested and replanted during December to facilitate random mating. Seed will be harvested at maturity.
PREVIOUS YEAR'S RESULTS	A. One source population was developed. B. Sets exotic varieties were produced.

4. TITLE	EVALUATION OF EXOTIC VARIETIES/HYBRIDS IN ADAPTABILITY TRIAL							
OBJECTIVE	To test adaptability of imported varieties.							
RESEARCH WORKERS	Ms. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti							
LOCATION	VRI, Faisalabad							
DURATION	Continuous							
TREATMENTS	Varieties provided by importers							
METHODOLOGY	Nursery sowing = 2nd fortnight of October, 2017 Transplanting = December, 2017 Design = RCBD Replication = 3 Plot size = 7 × 1.5 m Data on Bulb diameter, neck diameter, average bulb weight, number of rings per bulb and yield will be recorded.							
PREVIOUS YEAR'S RESULTS	Performance of Varieties/strains is as follows							
	Sr. No	Entries	PH(cm)	BD (cm)	ND (cm)	NOR	BW(g)	Y (t/ha)
	1	Hybrid Yellow Granex	63.1	8.3	0.93	9.4	234.6	40
	2	Red King F1	61.37	8.29	1.09	9.33	234.8	36
	3	Pink Panther	57.97	7.89	0.93	8.15	236.5	35
	4	Texas Early Grano	60.73	8.05	1.02	8.05	230.3	34
	10	White Pearl	49.33	7.79	0.92	7.88	233.9	32
	11	Golden ORB	56.33	7.91	0.94	8.63	241.3	31
	15	1122 F1 Hybrid	62.47	8.18	0.92	8.33	243.3	30
	17	Onion Red Crystal	57.07	7.63	0.93	7.5	200.3	28
	18	Barkeel	62.6	7.95	1.08	8.83	224.6	26
	20	Anoki	64.23	7.86	1.16	9.09	182.0	23
	27	Phulkara	63.43	7.14	1.49	9.1	137.3	18

	32	Super Sarhad F1	72.7	6.31	1.82	9.37	115.8	14
		LSD	4.82	0.64	0.3	0.89	44	6
BW =bulb weight, PH =plant height, NOR =number of rings per bulb, BD =bulb diameter, ND =neck diameter, Y =yield								
5. TITLE	EVALUATION OF HIGH YIELDING ONION VARIETIES FOR SPRING SEASON							
OBJECTIVE	To screen out high yielding onion varieties for spring seasons.							
RESEARCH WORKERS	Ms. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti							
LOCATION	VRI-Faisalabad.							
DURATION	Continuous							
TREATMENTS	Varieties = 10 viz; Vrio-1, Vrio-2, Vrio-6, S-C_16, Dark red, Phulkara, Robina, Mirpur Khas, Early Red, and Red Nasik.							
METHODOLOGY	Nursery sowing = 2nd fortnight of October, 2017 Transplanting = December, 2017 Design = RCBD Replication = 3 Plot size = 7 × 1.5 m Data on bolting %, diameter of the bulb and neck, plant height, no.of rings/bulb, bulb weigh and yield will be recorded.							
PREVIOUS YEAR'S RESULTS	Performance of Varieties/strains is as follows							
	Entries	PH(cm)	NOL	BW(g)	BD(cm)	ND(cm)	NOR	YIELD(t/ha)
	Dark Red	60.47	17.87	119.33	6.85	1.50	9.40	21.82
	Phulkara	59.20	19.93	71.93	6.96	1.30	9.87	21.01
	VRIO-1	57.47	15.13	116.67	6.69	1.17	9.07	20.33
	Mirpur Khas	64.20	15.80	123.33	6.90	1.34	8.67	20.23
	Husri	60.40	14.33	123.33	6.61	1.42	9.73	20.09
	VRIO-2	57.07	15.13	111.00	6.61	1.28	8.67	19.71
	S-C-16	66.67	14.20	121.33	6.86	1.25	8.93	19.67
	Early Red	60.47	14.93	125.00	7.17	1.42	8.93	19.18

VRIO-6	56.20	18.27	123.92	6.66	1.21	8.47	18.43
Red Nasic	64.00	16.13	133.00	6.49	1.34	8.33	18.23
LSD	5.00	3.90	40.00	0.89	0.20	1.30	3.57

PH=plant height, **NOL**=number of leaved/plant, **BW**=bulb weight, **BD**=bulb diameter, **ND**=neck diameter, **NOR**=number of rings/bulb

6. TITLE	IDENTIFICATION OF BEST SOWING TECHNIQUE								
OBJECTIVE	To identify best combination of sowing techniques for getting high yield								
RESEARCH WORKERS	Ms. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti								
LOCATION	VRI, Faisalabad.								
DURATION	2017-2018								
TREATMENTS	A. Flat verses ridge B. Broad casting, line sowing of seed and transplanting of nursery								
METHODOLOGY	Replication: 3 Design: Factorial RCB Design Treatments: A and B Plot size: 7 × 3 m A. Sowing of seed will be done both on ridges and flat experimental units in 2nd fortnight of October. B. Seed sowing will be done through broadcasting and line sowing in all the replications and nursery will be planted on the same date and will be transplanted after 45 days both on ridges and flat experimental units. Data will be taken after harvesting of the following parameters 1. Yield 2. Bulb diameter 3. Bulb weight 4. No.of bulbs/Kg 5. No. of plants per plot 6. Bolting % age								
PREVIOUS YEAR'S RESULTS	A	B	BW (G)	PH (cm)	NOL	Bolt (%)	BD (cm)	NOB /kg	Y(t/ha)
	Flat	Broadcast	94.50	65.77	16.60	28.33	5.67	16.11	22.14
		Lines	70.50	64.67	18.67	11.67	5.03	13.56	15.26
		Transplanting	93.00	59.57	11.53	0.37	5.83	12.67	16.85
	Ridge	Broadcast	100.00	63.50	21.00	17.67	6.03	12.33	13.18
		Lines	58.70	63.33	12.83	38.33	4.69	22.22	26.83

	Transplanting	107.00	67.10	12.33	2.13	6.21	9.44	23.84	23
LSD	A	11.33	3.96	1.60	2.17	0.57	3.26	3.09	3.0
	B	13.00	4.85	2.04	2.66	0.69	4.00	3.70	3.7
	A*B	19.61	6.80	2.89	3.76	0.98	5.65	5.35	5.3
BW=bulb weight, PH=plant height, NOL=number of leaves per plant, Bol=bolting percentage, BD=bulb diameter, NOB=no.of bulbs per kg. Y=yield									

3. PEAS (*Pisum sativum* L.)

1. TITLE	COLLECTION AND MAINTENANCE OF PEAS GERMPLASM			
OBJECTIVE	To maintain and evaluate lines/varieties of pea to be used in future breeding program.			
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal Muhammad Najeebullah			
LOCATION	Faisalabad			
DURATION	Continuous			
TREATMENTS	Varieties/lines = 75			
METHODOLOGY	Sowing date = First week of November, 2017 Plot size = 5.0 × 1.25 m Design = Observational plot Off-type plants will be roughed out from each line/variety to maintain purity.			
PREVIOUS YEAR'S RESULTS	74 lines/varieties were evaluated and maintained by selecting desirable plants and roughing off-type plants.			
	S. No	Traits	Minimum	Maximum
	1.	Days to 50 % Flowering	29	81
	2.	No. of Seeds/pod	5	9
	3.	Pod Length (cm)	6	11
	4.	Pod Width (cm)	1.4	2.1
	5.	Plant Height (cm)	32	110
	6.	Fresh 100- Seed Weight (g)	14	65
2. TITLE	HYBRIDIZATION AND STUDY OF FILIAL GENERATIONS IN PEAS			

OBJECTIVE	To combine desirable traits for the development of high yielding, early maturing and diseases resistant/tolerant varieties.																																	
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal Muhammad Najeebullah																																	
LOCATION	Faisalabad																																	
DURATION	Continuous																																	
TREATMENTS/ METHODOLOGY	<p>Hybridization: Four crosses will be made to induce powdery mildew tolerance in desirable parents.</p> <p>1) High yielding = Peas 2009, 9374, Sarsabz & Meteor Fsd</p> <p>2) Powdery mildew tolerant line = PTL 1,3,6 & 7.</p> <p>b) Study of Filial Generations</p> <p>The segregating populations will be advanced by selecting desirable plants for further studies.</p> <table border="1" data-bbox="500 892 1409 1894"> <thead> <tr> <th>Generation</th> <th>Cross</th> <th>No. of selected plants in each generation/cross</th> </tr> </thead> <tbody> <tr> <td rowspan="3">F₁</td> <td>9800-5 × 9374</td> <td>Bulk seed</td> </tr> <tr> <td>9200-1 × 9374</td> <td>Bulk seed</td> </tr> <tr> <td>Safeer × 9374</td> <td>Bulk seed</td> </tr> <tr> <td rowspan="3">F₂</td> <td>Meteor × 9374</td> <td>Bulk seed</td> </tr> <tr> <td>Lina pak × 9374</td> <td>Bulk seed</td> </tr> <tr> <td>1300-8 × 9374</td> <td>Bulk seed</td> </tr> <tr> <td rowspan="2">F₃</td> <td>Meteor × 2001-40</td> <td>Bulk seed</td> </tr> <tr> <td>9374 × 2001-40</td> <td>Bulk seed</td> </tr> <tr> <td rowspan="3">F₄</td> <td>9800-10 × 2001-40</td> <td>14</td> </tr> <tr> <td>2001-20 × 2001-40</td> <td>29</td> </tr> <tr> <td>Lina Pak × 2001-40</td> <td>18</td> </tr> <tr> <td>F₅</td> <td>9375 × 2001-40</td> <td>12</td> </tr> </tbody> </table>		Generation	Cross	No. of selected plants in each generation/cross	F ₁	9800-5 × 9374	Bulk seed	9200-1 × 9374	Bulk seed	Safeer × 9374	Bulk seed	F ₂	Meteor × 9374	Bulk seed	Lina pak × 9374	Bulk seed	1300-8 × 9374	Bulk seed	F ₃	Meteor × 2001-40	Bulk seed	9374 × 2001-40	Bulk seed	F ₄	9800-10 × 2001-40	14	2001-20 × 2001-40	29	Lina Pak × 2001-40	18	F ₅	9375 × 2001-40	12
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	F₇	Pea-09 × 2001-60	13
		9800-10 × 2001-60	19
		Meteor Fsd × 2001-60	11
	F₈	a) 2001-20 × It-96	52
		b) 9200-1 × No. 267	11
		c) 2001-35 × No. 267	19
	<p>Sowing date = November, 2017</p> <p>Seeds of F₀ crosses will be planted along with their parents and selfed plants will be rouged out. Seed of each F₁ cross will be harvested separately as bulk. Seeds of crosses and single selected plants of different segregating generations from F₂ to F₆ will be sown on both sides of the raised beds made 1.25 m apart with plant to plant distance of 10 cm to raise next generation by using modified bulk method and desirable plants will be selected and bulked for each cross from each generation. Seed of selected plants of F₇ and F₈ generation will be planted as individual plant to row progeny and superior progenies will be selected.</p>		
PREVIOUS YEAR'S RESULTS	Seed of following generations were harvested		

Generation	Cross	No. of selected plants in each generation
F₁	Meteor × 9374	Bulk seed
	Lina pak × 9374	Bulk seed
	1300-8 × 9374	Bulk seed
F₂	Meteor × 2001-40	Bulk seed
	9374 × 2001-40	Bulk seed
F₃	9800-10 × 2001-40	14
	2001-20 × 2001-40	29
	Lina Pak × 2001-40	18
F₄	9375 × 2001-40	12
	Pea-2009 × 2001-40	8
	9200-1 × 2001-40	10
	9375 × 9374	10
F₅	9200-1 × 2001-60	14
F₆	Pea-09 × 2001-60	13
	9800-10 × 2001-60	19
	Meteor Fsd × 2001-60	11
F₇	a) 2001-20 × It-96	52
	b) 9200-1 × No. 267	11
	c) 2001-35 × No. 267	19
F₈	a) GRW-45 × It-96	19
	b) 9800-5 × No. 267	14
	c) PF-400 × No. 267	5

3. TITLE	SECONDARY EVALUATION OF FOR EARLY PEAS PLANTING																																																														
OBJECTIVE	To find out high yielding pea varieties/lines suitable for early peas planting																																																														
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal Muhammad Najeebullah																																																														
LOCATION	Faisalabad																																																														
DURATION	2017-18																																																														
TREATMENTS/ METHODOLOGY	Varieties/ lines = 9 Including 2 checks (Meteor Fsd, Pea-2009) Replications = 3 Design = RCB Sowing Dates = 1st week of October, 2017 Plot Size = 5.0 × 1.50 m Spacing = 5 cm (plant to plant) = 75 cm (row to row) Data regarding days to flowering (50%), 100-seed weight and green pod yield will be recorded.																																																														
PREVIOUS YEAR'S RESULTS	Performance of varieties/strains in early pea varietal trial <table border="1" style="margin: 10px auto; width: 80%;"> <thead> <tr> <th>R. No.</th> <th>Variety</th> <th>Days to 50 % flower</th> <th>No. of pods/plant</th> <th>Seeds/pod</th> <th>100-Seed Weight Fresh (g)</th> <th>Green Pod Yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Pea-2009 (check)</td> <td>44.33</td> <td>54.0</td> <td>4.6</td> <td>66.7</td> <td>8.0</td> </tr> <tr> <td>2</td> <td>1300-8</td> <td>44.00</td> <td>52.0</td> <td>5.7</td> <td>49.0</td> <td>7.4</td> </tr> <tr> <td>3</td> <td>Sarsabz (check)</td> <td>44.00</td> <td>61.1</td> <td>8.8</td> <td>70.1</td> <td>7.0</td> </tr> <tr> <td>4</td> <td>Lina pak</td> <td>42.00</td> <td>30.3</td> <td>3</td> <td>39.4</td> <td>6.7</td> </tr> <tr> <td>5</td> <td>Strike</td> <td>37.00</td> <td>37.5</td> <td>2.9</td> <td>41.1</td> <td>5.6</td> </tr> <tr> <td>11</td> <td>Meteor</td> <td>41.00</td> <td>41.3</td> <td>4.1</td> <td>41.0</td> <td>5.5</td> </tr> <tr> <td colspan="2">LSD (0.05)</td> <td>0.76</td> <td>5.67</td> <td>1.08</td> <td>1.06</td> <td>4.68</td> </tr> </tbody> </table>							R. No.	Variety	Days to 50 % flower	No. of pods/plant	Seeds/pod	100-Seed Weight Fresh (g)	Green Pod Yield (T/ha)	1	Pea-2009 (check)	44.33	54.0	4.6	66.7	8.0	2	1300-8	44.00	52.0	5.7	49.0	7.4	3	Sarsabz (check)	44.00	61.1	8.8	70.1	7.0	4	Lina pak	42.00	30.3	3	39.4	6.7	5	Strike	37.00	37.5	2.9	41.1	5.6	11	Meteor	41.00	41.3	4.1	41.0	5.5	LSD (0.05)		0.76	5.67	1.08	1.06	4.68
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4. TITLE	SECONDARY EVALUATION OF PEA FOR NORMAL SEASON																																																														
OBJECTIVE	To find out the high yielding varieties suitable for normal planting																																																														
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal																																																														

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LOCATION	Faisalabad																																																								
DURATION	2017-18																																																								
TREATMENTS/ METHODOLOGY	Varieties/ lines = 13 Including checks (Climax, Pea-2009) Replication = 3 Design = RCB Sowing Date = 1st fortnight of November, 2017 Plot Size = 5.0 m × 2.5 m Spacing = 10 cm plant to plant distance on both sides of 125 cm beds																																																								
PREVIOUS YEAR'S RESULTS	Performance of varieties/strains in peas varietal trial in normal planting. <table border="1" data-bbox="506 676 1458 1276"> <thead> <tr> <th>R. No.</th> <th>Variety</th> <th>Days to 50% flowering</th> <th>No. of pods/plant</th> <th>Seeds/pod</th> <th>100-Seed Weight Fresh (g)</th> <th>Green Pod Yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1300-8</td> <td>50.0</td> <td>12.0</td> <td>7.5</td> <td>45.93</td> <td>10.88</td> </tr> <tr> <td>2</td> <td>Pea-2009</td> <td>54.0</td> <td>11.8</td> <td>7.4</td> <td>60.20</td> <td>10.67</td> </tr> <tr> <td>3</td> <td>Lina pak</td> <td>43.0</td> <td>10.7</td> <td>7.4</td> <td>44.67</td> <td>10.64</td> </tr> <tr> <td>4</td> <td>Super lina</td> <td>43.0</td> <td>6.8</td> <td>6.4</td> <td>48.53</td> <td>9.13</td> </tr> <tr> <td>5</td> <td>2001-40</td> <td>55.3</td> <td>15.0</td> <td>6.4</td> <td>48.33</td> <td>9.04</td> </tr> <tr> <td>12</td> <td>PTL-7</td> <td>59.0</td> <td>13.8</td> <td>7.8</td> <td>39.67</td> <td>4.27</td> </tr> <tr> <td colspan="2">LSD (0.05)</td> <td>0.68</td> <td>5.08</td> <td>0.82</td> <td>5.3</td> <td>1.37</td> </tr> </tbody> </table>	R. No.	Variety	Days to 50% flowering	No. of pods/plant	Seeds/pod	100-Seed Weight Fresh (g)	Green Pod Yield (T/ha)	1	1300-8	50.0	12.0	7.5	45.93	10.88	2	Pea-2009	54.0	11.8	7.4	60.20	10.67	3	Lina pak	43.0	10.7	7.4	44.67	10.64	4	Super lina	43.0	6.8	6.4	48.53	9.13	5	2001-40	55.3	15.0	6.4	48.33	9.04	12	PTL-7	59.0	13.8	7.8	39.67	4.27	LSD (0.05)		0.68	5.08	0.82	5.3	1.37
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5. TITLE	MULTI-LOCATIONAL PEAS YIELD TRIALS																																																								
OBJECTIVE	To find out high yielding and well adapted variety/line of Pea																																																								
RESEARCH WORKERS	Mr. Ghazanfar Hammad Dr. Ghulam Nabi Mr. Abrar Ahmad Dr. Umbreen Shahzad																																																								
LOCATION	Faisalabad, Sheikhupura, Multan and Layyah																																																								
DURATION	2017-18																																																								
TREATMENTS/ METHODOLOGY	Varieties/Entries = 6 including one checks Replications = 3 Design = RCB Sowing Dates = Second week of October, 2017 Plot Size = 6.0 × 1.50 m Spacing = 5 cm (Plant to plant) = 75 cm (Row to row) Data regarding days to flowering (50%), 100-seed weight and green pod yield																																																								

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PREVIOUS YEAR'S RESULTS	New Experiment																																													
6. TITLE	ADAPTABILITY TRIAL OF PEA EXOTIC VARIETIES																																													
OBJECTIVE	To see the adaptability of exotic pea varieties for yield.																																													
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal Muhammad Najeebullah																																													
LOCATION	Faisalabad																																													
DURATION	2017-18																																													
TREATMENTS/METHODOLOGY	Varieties will be provided by different seed companies Replication = 3 Design = RCB Sowing Date = 1st week of November, 2017 Plot Size = 6.0 m × 1.5m P × P = 5 cm R × R = 75 cm Data regarding yield and its parameters will be recorded.																																													
PREVIOUS YEAR'S RESULTS	Performance of strains/varieties in peas adaptability trail at Vegetable Research Institute, Faisalabad during 2016-17. <table border="1"> <thead> <tr> <th>Rank</th> <th>Varieties/ Line</th> <th>Days to 50% flowering</th> <th>100 seed weight Fresh (g)</th> <th>Green pod yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Super polo</td> <td>37.67</td> <td>37.83</td> <td>7.92</td> </tr> <tr> <td>2</td> <td>summer plus</td> <td>64.00</td> <td>26.13</td> <td>7.89</td> </tr> <tr> <td>3</td> <td>Anmol</td> <td>60.00</td> <td>37.00</td> <td>7.63</td> </tr> <tr> <td>4</td> <td>Pea-2009 (Check)</td> <td>46.00</td> <td>69.37</td> <td>7.04</td> </tr> <tr> <td>5</td> <td>Polo pak</td> <td>48.00</td> <td>34.83</td> <td>6.97</td> </tr> <tr> <td>6</td> <td>Meteor (Check)</td> <td>44.00</td> <td>38.33</td> <td>6.94</td> </tr> <tr> <td>7</td> <td>Mission</td> <td>44.00</td> <td>47.27</td> <td>5.17</td> </tr> <tr> <td>8</td> <td>Polo pak</td> <td>45.00</td> <td>49.43</td> <td>5.05</td> </tr> </tbody> </table>	Rank	Varieties/ Line	Days to 50% flowering	100 seed weight Fresh (g)	Green pod yield (T/ha)	1	Super polo	37.67	37.83	7.92	2	summer plus	64.00	26.13	7.89	3	Anmol	60.00	37.00	7.63	4	Pea-2009 (Check)	46.00	69.37	7.04	5	Polo pak	48.00	34.83	6.97	6	Meteor (Check)	44.00	38.33	6.94	7	Mission	44.00	47.27	5.17	8	Polo pak	45.00	49.43	5.05
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	9	Summer Plus	60.00	36.60	4.36
	LSD (0.05)		0.45	4.84	1.20
7. TITLE	PRELIMINARY YIELD TRIAL FOR EARLY PEA PLANTING				
OBJECTIVE	To find out high yielding pea varieties/lines suitable for early peas planting				
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal Muhammad Najeebullah				
LOCATION	Faisalabad				
DURATION	2017-18				
TREATMENTS/ METHODOLOGY	Varieties/ lines = 6 Including 3checks (Meteor Fsd, Pea-2009 & Sarsabz) Replications = 3 Design = RCB Sowing Dates = 1st week of October, 2017 Plot Size = 5.0 × 1.50 m Spacing = 5 cm (Plant to plant) = 75 cm (Row to row) Data regarding days to flowering (50%), 100-seed weight and green pod yield will be recorded.				
PREVIOUS YEAR'S RESULTS	New Experiment				
8. TITLE	PRELIMINARY YIELD TRIAL FOR NORMAL PEA PLANTING				
OBJECTIVE	To find out the high yielding varieties suitable for normal planting				
RESEARCH WORKERS	Ghazanfar Hammad Dr. Muhammad Iqbal Muhammad Najeebullah				
LOCATION	Faisalabad				
DURATION	2017-18				

TREATMENTS/ METHODOLOGY	Varieties/ lines = 9 Including checks (Climax & Pea-09) Replication = 3 Design = RCB Sowing Date = 1st week of November, 2017 Plot Size = 5.0 m × 2.5 m Spacing = 10 cm plant to plant distance on both sides of 125 cm beds The line suitable for mid-season will be selected and data regarding yield and yield components will be recorded.
PREVIOUS YEAR'S RESULTS	New Experiment

4. CARROT (*Daucus carota* L.)

1. TITLE	COLLECTION AND MAINTENANCE OF CARROT GERmplasm
OBJECTIVE	Collection and Maintenance of exotic and local germplasm for use in breeding program
RESEARCH WORKERS	Abdul Sattar Muneeb Munawar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Genotype = 7 1. Red Genotype = 5 viz; DC-3, DC-4, DC-90, DC-W, T-29 2. Purple genotype = 1 viz; DC-B (Kanji) 3. Orange genotype = Orange 2007
METHODOLOGY	Sowing Date = 07.09.2017 Transplantation of stacklings = December, 2017 Roots will be selected on the basis of root flesh color, core color and their shape. The selected roots will be transplanted and maintained in isolation.
PREVIOUS YEAR'S RESULTS	Genotypes (DC-3, DC-4, DC-90, DC-W, DC-B, Orange 2007 and T-29) were selected and maintained in isolation. Small quantity seed of each genotype is available for future use.

2. TITLE	DEVELOPMENT OF CARROT VARIETIES FOR EARLY SOWING
OBJECTIVE	To select lines suitable for early planting and early availability of better marketable roots.
RESEARCH WORKERS	Abdul Sattar Dr. Muhammad Tasdiq Hussain Shahid Muneeb Munawar Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Populations = 5 viz; DC-3, DC-4, DC-90, Population 1 (DC-90 × DCPRC) and Pop-2 (DC-3 and DCPRC).
METHODOLOGY	Sowing date = 07.09.2017 Plot Size = 60 m ² DC-90 and Population-1 will be harvested after 90 days of sowing. DC-3 and population-2 will be harvested after 100 days of sowing. Selection will be done on the basis of marketable roots, roots shape and color.. Selected roots of each genotype will be transplanted in isolation to produce seed for next selection cycle.
PREVIOUS YEAR'S RESULTS	DC-90 is early bulking with variable root flesh and core color. DC-3 is slightly early genotypes with good taste but light flesh color. Therefore, these genotypes were crossed with DCPRC to improve their quality, plant structure, root color and shape.
3. TITLE	DEVELOPMENT OF CARROT VARIETIES SUITABLE FOR LATE PLANTING
OBJECTIVE	To select lines suitable for late planting and prolonged supply of marketable carrot.
RESEARCH WORKERS	Abdul Sattar Muneeb Munawar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Population = 3 viz ; DC-4 and Orange-2007
METHODOLOGY	Sowing date = November, 2017 Plot size = 60 m ² Transplanting = March, 2018 Selection will be based on resistance to cold/frost, marketable root development and non bolting behavior till the end of March particularly for DC-4.

PREVIOUS YEAR'S RESULTS :	To develop a frost tolerant and late bolting variety for longer supply, selection against bolting remained in progress till March 2017. The plants having resistance against frost cum good root were selected and transplanted in isolation which gave 1.5kg of seed to continue the selection cycl.
4. TITLE	DEVELOPMENT OF CMS LINES
OBJECTIVE	To develop CMS, Maintainer and Restorer lines
RESEARCH WORKERS	Abdul Sattar Muneeb Munawar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	160 genotypes viz; BC ₄ female lines = 80 F ₅ Male lines =80 (Both maintainer and restorer)
METHODOLOGY	Sowing date = 07.09.2017 Design = Plant to progeny Male sterile plants will be identified and classified as Brown anther type and Petaloid type (pt). Crosses will be made to study inheritance of male sterility.
PREVIOUS YEAR'S RESULTS	Out of 199 genotypes, 160 genotypes comprising BC ₃ and F ₄ were harvested to advance the generations to develop new cycle of three line breeding system.
5. TITLE	ADAPTABILITY TRIAL OF CARROT EXOTIC VARIETIES
OBJECTIVE	To evaluate exotic varieties/hybrids under Faisalabad condition.
RESEARCH WORKERS	Dr. Muhammad Ikram Muneeb Munawar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18

TREATMENTS/ METHODOLOGY	Genotype = Maverick, AS-725, DC-4, DC-W, DC-90 and T-2 (check) Date of sowing = 21.09.2017 Design = RCBD Plot size = 7 x 1.5 m ² Replications = 03 Data on root yield will be recorded after 100 days of sowing																																				
PREVIOUS YEAR'S RESULTS	<table border="1"> <thead> <tr> <th>Rank</th> <th>Entry</th> <th>Yield (T/Ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>AS 725</td> <td>59</td> </tr> <tr> <td>2</td> <td>Nayab</td> <td>57</td> </tr> <tr> <td>3</td> <td>Sweety F₁</td> <td>57</td> </tr> <tr> <td>4</td> <td>T-29 (Check)</td> <td>54</td> </tr> <tr> <td>5</td> <td>Pukhraj</td> <td>47</td> </tr> <tr> <td>6</td> <td>Hermoso F₁</td> <td>47</td> </tr> <tr> <td>7</td> <td>Kirti Rose</td> <td>46</td> </tr> <tr> <td>8</td> <td>Lakshmi F₁</td> <td>43</td> </tr> <tr> <td>9</td> <td>Red Pearl</td> <td>38</td> </tr> <tr> <td>10</td> <td>Best Choice F₁</td> <td>13</td> </tr> <tr> <td></td> <td>LSD ($\alpha= 0.05$)</td> <td>3.4</td> </tr> </tbody> </table>	Rank	Entry	Yield (T/Ha)	1	AS 725	59	2	Nayab	57	3	Sweety F ₁	57	4	T-29 (Check)	54	5	Pukhraj	47	6	Hermoso F ₁	47	7	Kirti Rose	46	8	Lakshmi F ₁	43	9	Red Pearl	38	10	Best Choice F ₁	13		LSD ($\alpha= 0.05$)	3.4
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5. CAULIFLOWER (*Brassica oleracea var. botrytis*)

1. TITLE	ADAPTABILITY TRIAL FOR 2nd EARLY SEASON CAULIFLOWER
OBJECTIVE	To evaluate cauliflower varieties suitable for production during high temperature.
RESEARCH WORKERS	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18

TREATMENTS	Varieties = 10																																																																														
METHODOLOGY	Nursery sowing date = 22-07-2017 Nursery transplanting date = 31-08-2017 Plot size = 7 × 3 m Design = RCBD Replications = 3 Row to row distance = 75 cm Plant to plant distance = 30 cm Data regarding curd weight, plant weight and curd yield will be recorded.																																																																														
PREVIOUS YEAR'S RESULTS	<p>Table I: Yield performance of hybrid/varieties (2nd EARLY season) during 2016-17</p> <table border="1"> <thead> <tr> <th>Sr. No</th> <th>Varieties/hybrid</th> <th>Average Curd weight (kg)</th> <th>Average Plant Weight (kg)</th> <th>Biomass (t/ha)</th> <th>Curd Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CFH-1522</td> <td>0.94</td> <td>1.88</td> <td>62.07</td> <td>31</td> </tr> <tr> <td>2</td> <td>HCF-12</td> <td>0.93</td> <td>1.79</td> <td>59.71</td> <td>30</td> </tr> <tr> <td>3</td> <td>CKD-1924</td> <td>0.81</td> <td>1.60</td> <td>53.40</td> <td>27</td> </tr> <tr> <td>4</td> <td>CKD-2014</td> <td>0.82</td> <td>1.68</td> <td>56.91</td> <td>27</td> </tr> <tr> <td>5</td> <td>HCF-13</td> <td>0.78</td> <td>1.67</td> <td>55.91</td> <td>26</td> </tr> <tr> <td>6</td> <td>C-6099</td> <td>0.84</td> <td>1.69</td> <td>50.97</td> <td>25</td> </tr> <tr> <td>7</td> <td>CKD-1425</td> <td>0.75</td> <td>1.53</td> <td>51.16</td> <td>25</td> </tr> <tr> <td>8</td> <td>White Glow</td> <td>0.84</td> <td>1.16</td> <td>35.20</td> <td>24</td> </tr> <tr> <td>9</td> <td>C-6015</td> <td>0.71</td> <td>1.61</td> <td>53.81</td> <td>24</td> </tr> <tr> <td>10</td> <td>FD-II</td> <td>0.70</td> <td>1.47</td> <td>49.13</td> <td>23</td> </tr> <tr> <td>11</td> <td>HCF-11</td> <td>0.77</td> <td>1.75</td> <td>52.35</td> <td>23</td> </tr> <tr> <td colspan="2">LSD 5%</td> <td></td> <td></td> <td>2.70</td> <td>3.67</td> </tr> </tbody> </table>	Sr. No	Varieties/hybrid	Average Curd weight (kg)	Average Plant Weight (kg)	Biomass (t/ha)	Curd Yield (t/ha)	1	CFH-1522	0.94	1.88	62.07	31	2	HCF-12	0.93	1.79	59.71	30	3	CKD-1924	0.81	1.60	53.40	27	4	CKD-2014	0.82	1.68	56.91	27	5	HCF-13	0.78	1.67	55.91	26	6	C-6099	0.84	1.69	50.97	25	7	CKD-1425	0.75	1.53	51.16	25	8	White Glow	0.84	1.16	35.20	24	9	C-6015	0.71	1.61	53.81	24	10	FD-II	0.70	1.47	49.13	23	11	HCF-11	0.77	1.75	52.35	23	LSD 5%				2.70	3.67
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OBJECTIVE	To evaluate cauliflower varieties suitable for mid season.																																																																														

RESEARCH WORKERS	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah																																																																							
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TREATMENTS	Varieties will be received from seed companies.																																																																							
METHODOLOGY	Nursery sowing date = August, 2017 Nursery transplanting date = Mid September Plot size = 7 x 3 m Design = RCBD Replications = 3 Row to row distance = 75 cm Plant to plant distance = 45 cm Data regarding curd weight, plant weight and yield will be recorded.																																																																							
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4	Whistler	1.28	2.76	84.05	39																																																																			
5	White Mountain	1.35	2.72	77.60	38																																																																			
6	RS-5340	0.87	1.94	64.81	29																																																																			
7	Remi-F ₁	0.86	1.60	48.84	26																																																																			
8	HCF-22	0.79	1.58	52.77	26																																																																			
9	White-270	0.75	1.77	59.19	25																																																																			
10	FD-III	0.79	2.60	79.26	24																																																																			

	11	HCF-21	0,87	1.70	51.81	24
	12	SV4051AC	0.45	0.92	30.81	15
	LSD 5%				8.31	4.58
Table II: Yield performance of hybrid/varieties (Mid season) during 2016-17 (Set-II)						
	Sr. No	Varieties/hybrid	Average Curd weight (kg)	Average Plant Weight (kg)	Biomass (t/ha)	Curd Yield (t/ha)
	1	CF-38-42	1.88	3.69	98.48	50
	2	Meigetsu 55-F ₁	0.95	1.13	37.83	32
	3	G-CF-1	0.95	1.88	62.72	32
	4	Snow Mountain	0.82	1.78	59.62	28
	5	FD-III	0.86	2.28	69.71	26
	6	Snow Muffin	0.65	1.52	50.76	22
	LSD 5%				7.03	4.8
3. TITLE	ADAPTABILITY TRIAL OF LATE SEASON CAULIFLOWER					
OBJECTIVE	To evaluate cauliflower varieties suitable for late season.					
RESEARCH WORKERS	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah					
LOCATION	Faisalabad					
DURATION	2017-18					
TREATMENTS	Varieties received from the private seed companies.					
METHODOLOGY	Nursery sowing date = October, 2017 Nursery transplanting date = November, 2017 Plot size = 7 × 3 m Design = RCBD Replications = 03					

	<p>Row to row distance = 75 cm Plant to plant distance = 30 cm Data regarding curd weight, plant weight and curd yield will be recorded.</p>																																																																																				
PREVIOUS YEAR'S RESULTS	<p>Table I :Yield performance of hybrid/varieties (Late season) during 2016-17 (Set-I)</p> <table border="1"> <thead> <tr> <th>Sr. No</th> <th>Varieties/hybrid</th> <th>Average Curd weight (kg)</th> <th>Average Plant Weight (kg)</th> <th>Biomass (t/ha)</th> <th>Curd Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Giewont</td> <td>1.18</td> <td>1.74</td> <td>62.1</td> <td>39</td> </tr> <tr> <td>2</td> <td>Whistler</td> <td>1.03</td> <td>1.52</td> <td>54.7</td> <td>37</td> </tr> <tr> <td>3</td> <td>White Queen</td> <td>1.05</td> <td>1.61</td> <td>51.7</td> <td>33</td> </tr> <tr> <td>4</td> <td>SARA-F₁</td> <td>1.10</td> <td>1.78</td> <td>54.3</td> <td>33</td> </tr> <tr> <td>5</td> <td>Hansa</td> <td>0.79</td> <td>1.38</td> <td>50.6</td> <td>27</td> </tr> <tr> <td>6</td> <td>FD-IV</td> <td>0.67</td> <td>1.52</td> <td>54.3</td> <td>23</td> </tr> <tr> <td colspan="2">LSD 5%</td> <td></td> <td></td> <td>5.80</td> <td>4.2</td> </tr> </tbody> </table> <p>Table II : Yield performance of cauliflower hybrid/varieties (Late season) during 2016-17 (Set-II)</p> <table border="1"> <thead> <tr> <th>Sr. No</th> <th>Varieties/hybrid</th> <th>Average Curd weight (kg)</th> <th>Average Plant Weight (kg)</th> <th>Biomass (t/ha)</th> <th>Curd Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Carona-F₁</td> <td>0.76</td> <td>1.33</td> <td>38.0</td> <td>22</td> </tr> <tr> <td>2</td> <td>Vanesa-F₁</td> <td>0.75</td> <td>1.29</td> <td>37.0</td> <td>22</td> </tr> <tr> <td>3</td> <td>Capton-F₁</td> <td>0.67</td> <td>1.29</td> <td>36.9</td> <td>19</td> </tr> <tr> <td>4</td> <td>FD-IV</td> <td>0.46</td> <td>1.27</td> <td>36.3</td> <td>13</td> </tr> <tr> <td colspan="2">LSD 5%</td> <td></td> <td></td> <td>N.S</td> <td>3.19</td> </tr> </tbody> </table>	Sr. No	Varieties/hybrid	Average Curd weight (kg)	Average Plant Weight (kg)	Biomass (t/ha)	Curd Yield (t/ha)	1	Giewont	1.18	1.74	62.1	39	2	Whistler	1.03	1.52	54.7	37	3	White Queen	1.05	1.61	51.7	33	4	SARA-F ₁	1.10	1.78	54.3	33	5	Hansa	0.79	1.38	50.6	27	6	FD-IV	0.67	1.52	54.3	23	LSD 5%				5.80	4.2	Sr. No	Varieties/hybrid	Average Curd weight (kg)	Average Plant Weight (kg)	Biomass (t/ha)	Curd Yield (t/ha)	1	Carona-F ₁	0.76	1.33	38.0	22	2	Vanesa-F ₁	0.75	1.29	37.0	22	3	Capton-F ₁	0.67	1.29	36.9	19	4	FD-IV	0.46	1.27	36.3	13	LSD 5%				N.S	3.19
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Table III : Yield performance of cauliflower hybrid/varieties (Late season) during 2016-17 (Set-III)					
Sr. No	Varieties/hybrid	Average Curd weight (kg)	Average Plant Weight (kg)	Biomass (t/ha)	Curd Yield (t/ha)
1	TCF-601	0.59	1.47	42.0	17
2	Star Cauliflower-02	0.58	1.43	40.7	17
3	Classic-F ₁	0.57	1.24	35.6	16
4	Bushra ACS	0.57	1.36	39.1	16
5	Kipper ACS	0.54	1.31	37.4	15
6	FD-IV(Check)	0.49	1.18	33.7	14
7	Leo-F ₁	0.48	1.03	29.5	13
8	Star Cauliflower-01	0.46	1.07	30.7	13
LSD 5%				3.80	1.61
4. TITLE	DEVELOPMENT OF OPEN POLLINATED VARIETIES				
OBJECTIVE	To develop high yielding and disease resistant cauliflower varieties.				
RESEARCH WORKERS	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah				
LOCATION	Faisalabad				
DURATION	Continuous				
TREATMENTS	Seed obtained from open pollinated population.				
METHODOLOGY	Nursery sowing date = August, 2017 Nursery Transplanting date = September, 2017 The seed obtained from random matted population will be sown in				

	the field keeping plant to plant and row to row distance of 45 and 75 cm, respectively. Morphologically similar and healthy plants with desirable heads on the basis of color, shape and compactness will be selected to get high yielding genotypes to start second selection cycle. At maturity seed will be harvested and bulked for further studies.											
PREVIOUS YEAR'S RESULTS	500 gm seed of random mated population was produced.											
5. TITLE	IDENTIFICATION OF SELF-INCOMPATIBLE PLANTS IN 2nd EARLY AND MID GROUPS.											
OBJECTIVE	To develop self-incompatible inbred lines for hybrid production.											
RESEARCH WORKER (S)	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah											
LOCATION	Faisalabad											
DURATION	2017-18											
TREATMENTS	Varieties = 02 viz; FD-II and FD-III											
METHODOLOGY	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Group</th> <th colspan="2">Sowing Date 2017</th> </tr> <tr> <th>Nursery</th> <th>Transplanting</th> </tr> </thead> <tbody> <tr> <td>2nd Early</td> <td>2nd fortnight July</td> <td>2nd fortnight of August</td> </tr> <tr> <td>Mid</td> <td>2nd fortnight August</td> <td>2nd fortnight of Sept</td> </tr> </tbody> </table> <p>The nursery of the varieties will be planted according to standard practice and area availability. 30 desirable plants will be selected in 2nd Early and Mid season cauliflower. Four to five branches of all the selected plants will be selfed normally and through bud pollination. At maturity, seeds obtained from normal pollinated pods and bud pollinated pods will be counted and self-incompatibility will be calculated in case of each plant.</p>	Group	Sowing Date 2017		Nursery	Transplanting	2nd Early	2nd fortnight July	2nd fortnight of August	Mid	2nd fortnight August	2nd fortnight of Sept
Group	Sowing Date 2017											
	Nursery	Transplanting										
2nd Early	2nd fortnight July	2nd fortnight of August										
Mid	2nd fortnight August	2nd fortnight of Sept										
PREVIOUS YEAR'S RESULTS	There was not any plant found self-incompatible in FD-II and FD-III.											

6. CABBAGE (*Brassica oleracea* L. var. *capitata*)

1. TITLE	ADAPTABILITY TRIAL ON CABBAGE VARIETIES/HYBRIDS
OBJECTIVE	To evaluate exotic cabbage varieties/hybrids for yield performance
RESEARCH WORKERS	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid

	Muhammad Najeebullah																																																						
LOCATION	Faisalabad																																																						
DURATION	2017-18																																																						
TREATMENTS	Varieties/Hybrids = Varieties that will be received from the private seed companies																																																						
METHODOLOGY	Nursery sowing date = September, 2017 Nursery transplanting date = October, 2017 Plot size = 7 × 3 m Design = RCBD Replications = 3 Row to row distance = 75 cm Plant to plant distance = 30 cm Data regarding head weight, plant weight and head yield will be recorded.																																																						
PREVIOUS YEAR'S RESULTS	<p>Yield performance of cabbage hybrid/varieties during 2016-17 (Set-I)</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Varieties/hybrid</th> <th>Biomass (t/ha)</th> <th>Average Head weight (kg)</th> <th>Average Plant Weight (kg)</th> <th>Head Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Veneeza F₁</td> <td>60.3</td> <td>1.81</td> <td>1.35</td> <td>45</td> </tr> <tr> <td>2</td> <td>Green Stone F₁</td> <td>65.4</td> <td>1.96</td> <td>1.35</td> <td>45</td> </tr> <tr> <td>3</td> <td>G-CB-1</td> <td>62.7</td> <td>1.78</td> <td>1.27</td> <td>45</td> </tr> <tr> <td>4</td> <td>Ever Green F₁</td> <td>61.8</td> <td>1.85</td> <td>1.24</td> <td>41</td> </tr> <tr> <td>5</td> <td>Cabbage No. 1 F₁</td> <td>55.1</td> <td>1.65</td> <td>1.09</td> <td>36</td> </tr> <tr> <td colspan="2">LSD 5%</td> <td>5.71</td> <td></td> <td></td> <td>3.84</td> </tr> </tbody> </table> <p>Yield performance of cabbage hybrid/varieties during 2016-17 (Set-II)</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Varieties/hybrid</th> <th>Biomass (t/ha)</th> <th>Average Plant Weight (kg)</th> <th>Average Head weight (kg)</th> <th>Head Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Summer Highland</td> <td>69.89</td> <td>2.29</td> <td>1.50</td> <td>46</td> </tr> </tbody> </table>	Sr. No.	Varieties/hybrid	Biomass (t/ha)	Average Head weight (kg)	Average Plant Weight (kg)	Head Yield (t/ha)	1	Veneeza F ₁	60.3	1.81	1.35	45	2	Green Stone F ₁	65.4	1.96	1.35	45	3	G-CB-1	62.7	1.78	1.27	45	4	Ever Green F ₁	61.8	1.85	1.24	41	5	Cabbage No. 1 F ₁	55.1	1.65	1.09	36	LSD 5%		5.71			3.84	Sr. No.	Varieties/hybrid	Biomass (t/ha)	Average Plant Weight (kg)	Average Head weight (kg)	Head Yield (t/ha)	1	Summer Highland	69.89	2.29	1.50	46
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1	Veneeza F ₁	60.3	1.81	1.35	45																																																		
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Sr. No.	Varieties/hybrid	Biomass (t/ha)	Average Plant Weight (kg)	Average Head weight (kg)	Head Yield (t/ha)																																																		
1	Summer Highland	69.89	2.29	1.50	46																																																		

2	Tropicana	66.20	1.97	1.23	41
3	Saint	57.30	1.71	1.11	37
4	Red Flama	53.00	1.85	1.18	34
LSD 5%		7.9			3.39
Yield performance of cabbage hybrid/varieties during 2016-17 (Set-III)					
Sr. No.	Varieties/hybrid	Biomass (t/ha)	Average Plant Weight (kg)	Average Head weight (kg)	Head Yield (t/ha)
1	Marco-F ₁	52.1	1.71	1.13	34
2	Roca-F ₁	49.0	1.61	1.12	34
3	Austin-F ₁	43.9	1.44	0.99	30
4	Red Ball-F ₁	58.2	1.92	0.91	28
LSD 5%		6.67			3.4

7. BROCCOLI (*Brassica oleracea var. italica*)

1. TITLE	ADAPTABILITY TRIAL ON BROCCOLI VARIETIES/ HYBRIDS
OBJECTIVE	To evaluate exotic broccoli varieties/hybrids for yield performance
RESEARCH WORKERS	Dr. Muhammad Sarwar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Varieties/Hybrids = Varieties received from the private seed companies
METHODOLOGY	Nursery sowing date = Mid September, 2017 Nursery Transplanting date = October, 2017 Plot size = 7 × 3 m Design = RCBD Replications = 3 Row to row distance = 75 cm Plant to plant distance = 30 cm

	Data regarding head yield will be recorded.															
PREVIOUS YEAR'S RESULTS	Yield performance of Broccoli hybrid/varieties during 2016-17 (Set-I) <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Varieties/hybrid</th> <th>Head Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Paraiso</td> <td>18.6</td> </tr> <tr> <td>2</td> <td>Green Pia</td> <td>15.6</td> </tr> <tr> <td>3</td> <td>Baro Star</td> <td>13.9</td> </tr> <tr> <td colspan="2">LSD 5%</td> <td>2.97</td> </tr> </tbody> </table>	Sr. No.	Varieties/hybrid	Head Yield (t/ha)	1	Paraiso	18.6	2	Green Pia	15.6	3	Baro Star	13.9	LSD 5%		2.97
Sr. No.	Varieties/hybrid	Head Yield (t/ha)														
1	Paraiso	18.6														
2	Green Pia	15.6														
3	Baro Star	13.9														
LSD 5%		2.97														

8. RADISH (*Raphanus sativus* L.)

1. TITLE	MAINTENANCE OF GERMPLASM
OBJECTIVE	To maintain the genotypes/lines for their subsequent inclusion in the breeding programme
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Varieties/lines = 8
METHODOLOGY	Sowing date = Second fortnight of October Plot size = 7 × 1.5 m Row to row spacing = 75 cm Plant to plant spacing = 5 cm
PREVIOUS YEAR'S RESULTS	Green Neck, Mino Local, Mino Selection, Purple Neck, Desi White, Lalpari, 40Days and Gang Seong
2. TITLE	DEVELOPMENT OF BETTER VARIETIES OF RADISH
OBJECTIVE	To develop early and non-pithy variety.
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS/	Seed of Selected group
METHODOLOGY	Seed of selected plant will be sown in observational plots, containing about 1000 -1500 plants, during the month of July with row to row spacing of 75 cm. Morphologically similar and healthy plants with desirable roots

	will be selected to get high yield and non-pithy genotypes suitable for earliness to start 1st selection cycle.
PREVIOUS YEAR'S RESULTS	Non pithy roots after 30 days were harvested.
3. TITL	DEVELOPMENTOF RED FLESH WITH LONG ROOT RADISH VARIETY
OBJECTIVE	To develop longer rooted Lal Pari
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Random mated population (6 th cycle) Red root (flesh color) and long rooted.
METHODOLOGY	A population of 100-200 plants will be developed after sowing during 2nd fortnight of October. The selection of desirable root will be made at maturity. The steckling of selected root will be plant at maturity to start 4th selection cycle.
PREVIOUS YEAR'S RESULTS	500 gram seed desirable root flesh color and long root were selected
4. TITLE	DEVELOPMENT OF VARIETY FOR KITCHEN GARDENING
OBJECTIVE	To develop short duration and fascinating variety
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabd
DURATION	2017-2018
TREATMENTS	One group from Random population. Out of two one group was selected.
METHODOLOGY	The sowing was done during 2nd fortnight of October. The selection of desirable root will be made at maturity .The steckling of selected root will be plant at maturity to develop random population.
PREVIOUS YEAR'S RESULTS	20 gram of two group random population.
5. TITLE	EVALUATION OF RADISH VARIETIES FOR LATE SEASON
OBJECTIVE	To select varieties possessing high yield potential and better root quality suitable for late planting.
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Varieties = 10 viz; Green Neck, Lal Pari, Purple Neck , Gang Seong, Mino local, Mino (selection), Desi White, Lal Pari, Red Prince F ₁ and

	No.025.		
METHODOLOGY	Date of sowing. = Second fortnight of September Plot size = 8 x 0.75 m Replications = 3 Design = RCB Data on root yield and root shape will be recorded.		
PREVIOUS YEAR'S RESULTS		Sr. No.	Variety
			Root + Leave yield (t/ha)
			Purple Neck
	2	Mino Local	70
	3	Green Neck	66
	4	Desi White	66
	5	Mino Selection	65
	6	Gang Seong	58
	7	Lal Pari	57
		L.S.D	48
		CV	5.25
6. TITLE	PRE -BASIC SEED PRODUCTION IN RADISH		
OBJECTIVE	To supply the pure seed to public / private seed companies and interested growers.		
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah		
LOCATION	Faisalabad		
DURATION	Continuous		
TREATMENTS	Varieties = Mino Selection, 40-Days, and Lal Pari		
METHODOLOGY	Seed of each variety will be sown according to the recommended practices during second fortnight of September. At the time of steckling preparation, true to type roots will be selected on the basis of root shape, root length, root girth and leaf shape. Stecklings of 40-Days will be transplanted during the month of November while other varieties will be transplanted during December in isolated plots. Rouging of off-type plants will be done at different stages. Early and late bolter plants will be rogued out .At maturity seed of healthy and true to type plants will be harvested separately.		
PREVIOUS YEAR'S RESULTS	The following quantity of pre-basic seed was produced.		

	S. No.	Varieties	Quantity (g)
	1	Mino Local	100
	2	40 Days	4000
	3	Desi White	150
	4	Lal Pari	2000
	5	Mino Selection	2000
7. TITLE	FLOWER INDUCTION IN RADISH LATE VARIETY		
OBJECTIVE	To get seed development in late radish variety		
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah		
LOCATION	Faisalabad		
DURATION	2017-18		
TREATMENTS	Radish variety : No.6 and All season. GA3 ; 1000 ppm, 1500 ppm , 2000 ppm, No spray (Control)		
METHODOLOGY	The steckling of radish will be planted in 2 nd fortnight of November 2017. Three treatment will be applied on 15 th , 21 th and 28 th January, 2018, having sufficient vegetative growth. The treatment will repeated thrice with span of 7 days.		
PREVIOUS YEAR'S RESULTS	New experiment		

9. TURNIP (*Brassica campestris* L. var. *rapa*)

1. TITLE	MAINTENANCE OF GERMPLASM
OBJECTIVE	To maintain the genotypes/lines for their subsequent inclusion in the breeding programme.
RESEARCH WORKERS	Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Strains = 6 viz; Golden, Purple Top, Green Top,

	White, Whit (Late) and White Apple.
METHODOLOGY	Sowing date = Second fortnight of September Row to row spacing = 75 cm Plant to plant spacing = 5 cm These varieties will be transplant in Isolation additionally these varieties will be maintained through bud pollination.
PREVIOUS YEAR'S RESULTS	Turnip Purple (20 g) and Turnip Green top (200 g) was harvested and all varieties were maintained.
2. TITLE	EVALUATION OF HEAT TOLERANT VARIETY
OBJECTIVE	To develop high yielding, early and better tasted variety.
RESEARCH WORKERS	Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS/	Five Genotypes: Golden, Green Top, Purple Top Local, Purple Top (Agita) and Purple (exotic).
METHODOLOGY	Date of sowing = 15July - 15August Plot size = 8 x 0.75 m Replications = 3 Design = RCB Data on root yield will be recorded.
PREVIOUS YEAR'S RESULTS	100 grams seed of 5 selected plants having tolerance against heat were harvested.
3. TITLE	DEVELOPMENT OF LATE BOLTING AND SHORT DURATION VARIETIES
OBJECTIVE	To develop high yielding, late bolting and better tasted variety.
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Random mated population (8 th cycle)

METHODOLOGY	Seed from Random mated population (7 th cycle) will be sown in plant to progeny row method during second fortnight of September. Plants within the progeny will be selected on the basis of late bolting, root shape, single root weight, taste and single plant weight. Harvesting will be done at maturity for marketable roots and selected roots will be transplanted for seed production under random mating system for 5 th cycle selection. The seed of only those plants will be retained which bolted late. Selection will continue until to fix the gene for late bolting																					
PREVIOUS YEAR'S RESULTS	100 grams seed of 5 selected plants was harvested.																					
4. TITLE	EVALUATION OF TURNIP VARIETIES																					
OBJECTIVE	To select variety with high yield potential and better root quality.																					
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah																					
LOCATION	Faisalabad																					
DURATION	2017-18																					
TREATMENTS	Varieties = 7 viz; Golden, Purple Top, Desi Red, Green Top, Golden World F ₁ , Kansas F ₁ and Stylo.																					
METHODOLOGY	Date of sowing = Last week of September Plot size = 8 × 0.75 m Replications = 3 Design = RCB Data on root yield will be recorded.																					
PREVIOUS YEAR'S RESULTS	Performance of turnip varieties																					
<table border="1"> <thead> <tr> <th>S.NO.</th> <th>VARIETY</th> <th>Root +leave YIELD (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Desi Red</td> <td>61.68a</td> </tr> <tr> <td>2</td> <td>Green Top</td> <td>60.49a</td> </tr> <tr> <td>3</td> <td>Kansar</td> <td>56.25ab</td> </tr> <tr> <td>4</td> <td>Purple Top</td> <td>52.70ab</td> </tr> <tr> <td>5</td> <td>Golden</td> <td>50.32b</td> </tr> <tr> <td>6</td> <td>Stylo</td> <td>49.60b</td> </tr> </tbody> </table>		S.NO.	VARIETY	Root +leave YIELD (T/ha)	1	Desi Red	61.68a	2	Green Top	60.49a	3	Kansar	56.25ab	4	Purple Top	52.70ab	5	Golden	50.32b	6	Stylo	49.60b
S.NO.	VARIETY	Root +leave YIELD (T/ha)																				
1	Desi Red	61.68a																				
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3	Kansar	56.25ab																				
4	Purple Top	52.70ab																				
5	Golden	50.32b																				
6	Stylo	49.60b																				

	7	Golden World F1	37.27c
	LSD		13.53
5. TITLE	PRE- BASIC SEED PRODUCTION IN TURNIP		
OBJECTIVE	To produce genetically pure and good quality turnip variety seed.		
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah		
LOCATION	Faisalabad		
DURATION	Continuous		
TREATMENTS	Varieties = 2 viz; Purple top and Golden		
METHODOLOGY	Single plant progenies of Purple top and Golden varieties will be sown during 2 nd week of September on both sides of ridges made 75 cm apart in row length of 7 meters. Progenies with off-type plants will be rogued out at different stages of crop growth. True to type and sweet tasted progenies will be selected and bulked for the production of pre-basic seed.		
PREVIOUS YEAR'S RESULTS	Seed of Purple Top (500 g) and Golden (400g) was obtained.		

10. GARLIC (*Allium sativum* L.)

1. TITLE	GERMPLASM COLLECTION EVALUATION AND MAINTANAINENCE IN GARLIC
OBJECTIVE	To find out high yielding and having better shelf life
RESEARCH WORKERS	Tahir Iqbal Shah Muhammad Najeebullah
DURATION	2017-18
TREATMENTS	Variety = G-1701, G-1702, G-1703, G-1704
METHODOLOGY	Date of Sowing = 1st Week of October Design = RCB Replication = 4 Plot Size = 5 x 2 m PxP Distance = 10cm RxR Distance = 20cm The crop will be observed for disease plants that will be rogued out to produce pure seed. The data regarding bulb weight, clove weight, no of cloves / bulb and bulb size will be recorded.

PREVIOUS YEAR'S RESULTS	Performance of Garlic Genotypes during 2016-17		
	Sr. NO	Genotypes	Clove formation
	1	G-16014	100%
	2	Wi-16	100%
	3	G3-16	100%
	4	Lehssan Gulabi (Check)	100%
	5	G2-16	50%
	6	G-16005	40%
	7	W2-16	40%
	8	G-16020	30%
	LSD 0.05		1.04
<p>Above data shows that three clones surpassed the check Lehssan Gulabi in yield Comparison but the clones G-16014, G-16005, G-16020, G2-16 and W2-16 took 33 days more to mature. These aforesaid clones also respond differently as regards to clove formation. The genotype G-16014 only Showed bolting behavior.</p>			

11. SPINACH (*Spinacia oleracea* L.)

1. TITLE	MAINTENANCE OF GENEPOOL IN SPINACH
OBJECTIVE	To maintain genetic purity of existing varieties of Desi and Lahori palak
RESEARCH WORKERS	Tahir Iqbal Shah Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Desi and Lahori Palak
METHODOLOGY	About 10 Marla's each of "Desi and Lahori Palak" will be sown during 2 nd fortnight of October in rows 75 cm apart in isolation. After germination, crop will be thinned keeping plant to plant distance of 15 cm. At 20-25 cm plants height, the plants will be keenly observed regarding leaf & stem color and plants having minute ting of redness and red color midrib will be roughed out. At bolting stage all early bolters will also be rough out. Remaining full green and late bolting plants will be kept to produce BNS seed.
PREVIOUS YEAR'S RESULTS	Desi and Lahori Palak in isolations were maintained.

12. CORIANDER (*Coriandrum sativum* L.)

1. TITLE	MAINTENANCE OF GENEPOOL IN CORIANDER
OBJECTIVE	To maintain genetic purity of existing varieties of coriander.
RESEARCH WORKERS	Tahir Iqbal Shah Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Kandhari And Desi
METHODOLOGY	About 10 Marla's each of "Qandhari and Desi" will be sown during last week of October in rows 75 cm apart in isolation on well prepare soil in watter condition. After germination, crop will be thinned keeping plant to plant distance of 15 cm. At 20-25 cm plants height, the plants will keenly be observed regarding leaf & stem color and plants having purple color will be roughed out. At bolting stage all early bolters will also be rough out. Remaining full green and late bolting plants will be kept to produce BNS seed.
PREVIOUS YEAR'S RESULTS	Desi & Qandhari coriander were maintained.

13. LETTUCE (*Lactuca sativa* L.)

1. TITLE	ADAPTABILITY TRIAL IN LETTUCE
OBJECTIVE	Maintenance for future use and bulk seed multiplication. To study the adaptability of exotic varieties.
RESEARCH WORKERS	Ghazanfar Hammad Raja Javed ur Rehman Dr.M. Tasdiq Hussain Shahid
LOCATION	Faisalabad
DURATION	2017-18
TREATMENTS	Seed provided by private seed companies.
METHODOLOGY	Sowing date for nursery = 2nd fortnight of October, 2017 Transplanting date = 2nd fortnight of November, 2017 Plot Size = 5 Marla's each
PREVIOUS YEAR'S RESULTS	New Experiment
2. TITLE	COLLECTION AND MAINTENANCE OF LETTUCE GERMPLASM
OBJECTIVE	Collection and maintenance of local and exotic germplasm for future use in breeding programme.

RESEARCH WORKERS	Ghazanfar Hammad Raja Javed ur Rehman Dr. M. Tasdiq Hussain Shahid
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Entries (Existing) = 2 (ICE-BERG-Red and ICE-BERG-Green)
METHODOLOGY	Sowing date for nursery = 2nd fortnight of October, 2017 Transplanting date = 2nd fortnight of October, 2017 Plot Size = 5 Marla's each.
PREVIOUS YEAR'S RESULTS	The seeds of the existing entries were harvested and maintained.

14. SEED PRODUCTION

1. TITLE	BREEDER, PRE BASIC AND BASIC SEED PRODUCTION OF RABI VEGETABLES
OBJECTIVE	To fulfill the seed requirements of Pre-basic and basic types of seed for Foundation Seed Cell
RESEARCH WORKERS	Respective Scientists of each crop
LOCATION	Faisalabad and Sub-stations
DURATION	Continuous
TREATMENTS	Crop varieties of the following winter vegetables Cauiflower FD-I Radish Tomato Cauiflower FD-II Carrot Fenugreek Cauiflower FD-III Onion Coriander Turnip Spinach Peas
METHODOLOGY	All the crop varieties/plants will be sown/ planted in suitable seasons for seed production of specific variety according to standards of BNS and Pre-basic seed. Rouging of all off type plants will be carried out at specified stages of the crop and selection of the plants will be conducted keeping in view the traits of the variety. At ripening of the crops harvesting and seed collection will be carried out accordingly.
PREVIOUS YEAR'S RESULTS	The following seeds of winter vegetables were produced during the year 2016-17.

Sr. No.	Crop	Pre-Basic Seed (Kg)	Basic Seed (Kg)	
1	Cauiflower FD-I	-	3	
2	Cauliflower FD-II	-	40	
3	Cauliflower FD-III	-	39	
4	Coriander	100	312	
5	Spinach	600	3221	
6	Radish (40 Days)	120	557	
7	Radish (Mino)	100	533	
8	Radish (Lal Pari)	175	657	
9	Turnip (Golden)	100	574	
10	Turnip (Purple Top)	140	831	
11	Carrot	2250	941	
12	Peas	1484	-	
13	Onion	120	79	
14	Fenugreek	-	455	
15	Tomato (OPV)	8	4.9	

15. Weeds Trials

1.	TITLE	Weed Management in Cauliflower			
	OBJECTIVE	To investigate the most practicable package of weed management in cauliflower			
	RESEARCH WORKERS	Waseem Abbas Muhammad Ashiq M. Najeebullah			
	DURATION	2017-18			
	LOCATION	Faisalabad			
	TREATMENTS				
	Sr. No.	Treatment	Active ingredient	Dose/ha	Time of application
	1	<i>Stomp 455 g/l CS</i>	Pendimethalin	2000 ml	Pre emergence plus one hand weeding
	2	<i>Stomp 455 g/l CS</i>	Pendimethalin	2500 ml	Pre emergence plus one hand weeding
	3	<i>Dual gold 960 EC</i>	S metolachlor	1500 ml	Pre emergence plus one hand weeding
	4	<i>Dual gold 960 EC</i>	S metolachlor	2000 ml	Pre emergence plus one hand weeding
	5	<i>Pert</i>	Metazachlor	750 ml	Post emergence for BL weeds plus one hand weeding
	6	<i>Pert</i>	Metazachlor	1000 ml	Post emergence for BL weeds plus one hand weeding
	7	<i>G Max lite 15 EC</i>	Quizalofop	650 ml	Post emergence for grassy weeds plus one hand weeding
	8	<i>Axial 050 EC</i>	<i>Penoxaden</i>	825 ml	Post emergence for grassy weeds plus one hand
	9	3-4 Hand weeding			
	10	Control			
	METHODOLOGY	Design = RCB Replication = 3 Plot Size = 3 × 5 m N:P:K = 160:115:63 kg/ha Weed counts & weed biomass before and 30 days after spray of weedicides, fresh yield and dry yield data will be collected			
2.	TITLE	Weed Management in Cabbage			

OBJECTIVE	To investigate the most practicable package of weed management in cabbage			
RESEARCH WORKERS	Waseem Abbas Muhammad Ashiq M. Najeebullah			
DURATION	2017-18			
LOCATION	Faisalabad			
TREATMENTS				
Sr. No.	Treatment	Active ingredient	Dose/ha	Time of application
1	<i>Stomp 455 g/l CS</i>	Pendimethalin	2000 ml	Pre emergence plus one hand weeding
2	<i>Stomp 455 g/l CS</i>	Pendimethalin	2500 ml	Pre emergence plus one hand weeding
3	<i>Dual gold 960 EC</i>	S metolachlor	1500 ml	Pre emergence plus one hand weeding
4	<i>Dual gold 960 EC</i>	S metolachlor	2000 ml	Pre emergence plus one hand weeding
5	<i>Pert</i>	Metazachlor	750 ml	Post emergence for BL weeds plus one hand weeding
6	<i>Pert</i>	Metazachlor	1000 ml	Post emergence for BL weeds plus one hand weeding
7	<i>G Max lite 15 EC</i>	Quizalofop	650 ml	Post emergence for grassy weeds plus one hand weeding
8	<i>Axial 050 EC</i>	<i>Penoxaden</i>	825 ml	Post emergence for grassy weeds plus one hand
9	3-4 Hand weeding			
10	Control			
METHODOLOGY	Design = RCB Replication = 3 Plot Size = 3 × 5 m N:P:K = 160:115:63 kg/ha Weed counts & weed biomass before and 30 days after spray of weedicides, fresh yield and dry yield data will be collected			

3.	TITLE	Weed Management in Onion
	OBJECTIVE	To investigate the most practicable package of weed management in onion
	RESEARCH	Waseem Abbas

	WORKERS	Muhammad Ashiq M. Najeebullah			
	DURATION	2017-18			
	LOCATION	Faisalabad			
	TREATMENTS				
	Sr. No.	Treatment	Active ingredient	Dose/ha	Time of application
	1	<i>Stomp 455 g/l CS</i>	Pendimethalin	2.5 lit	Pre emergence + one hand weeding 45 days after sowing
	2	<i>Dual gold 960 EC</i>	S- metolachlor	2.0 lit	Pre emergence + one hand weeding 45 days after sowing
	3	<i>Axifin 24 EW</i>	Oxyfluorfen	750 ml	Pre emergence + one hand weeding 45 days after sowing
	4	<i>Axifin 24 EW</i>	Oxyfluorfen	750 ml	Post emergence (30 DAS + one hand weeding 60 days after sowing)
	5	<i>G Max Lite 15 EC</i>	Quizalofop	625 ml	Post emergence (30 DAS + one hand weeding 60 days after sowing)
	6	<i>Axial 050 EC</i>	<i>Penoxaden</i>	825 ml	Post emergence for grassy weeds plus one hand weeding
	7	<i>Axifin 24 EW+ G Max Lite 15 EC</i>	Oxyfluorfen+ Quizalofop	750 ml+ 625 ml	Post emergence for all weeds plus one hand weeding
	8	Hand weeding Thrice or more			
	9	Control			
	METHODOLOGY	Design = RCB Replication = 3 Plot Size = 1 × 5 m N:P:K = 160:115:63 kg/ha Weed counts & weed biomass before and 30 days after spray of weedicides, fresh yield and dry yield data will be collected			
4.	TITLE	Weed Management in Garlic			
	OBJECTIVE	To investigate the most practicable package of weed management in garlic.			
	RESEARCH WORKERS	Waseem Abbas Muhammad Ashiq M. Najeebullah			
	DURATION	2017-18			
	LOCATION	Faisalabad			

TREATMENTS				
Sr.No.	Treatment	Active ingredient	Dose/ha	Time of application
1	<i>Stomp 455 g/l CS</i>	Pendimethalin	2.5 lit	Pre emergence+ one hand weeding 45 days after sowing
2	<i>Dual gold 960 EC</i>	S- metolachlor	2.0 lit	Pre emergence+ one hand weeding 45 days after sowing
3	<i>Axifin 24 EW</i>	Oxyfluorfen	750 ml	Pre emergence+ one hand weeding 45 days after sowing
4	<i>Axifin 24 EW</i>	Oxyfluorfen	750 ml	Post emergence (30 DAS + one hand weeding 60 days after sowing)
5	<i>G Max Lite 15 EC</i>	Quizalofop	625 ml	Post emergence (30 DAS + one hand weeding 60 days after sowing)
6	<i>Axial 050 EC</i>	<i>Penoxaden</i>	825 ml	Post emergence for grassy weeds plus one hand weeding
7	<i>Axifin 24 EW+ G Max Lite 15 EC</i>	Oxyfluorfen+ Quizalofop	750 ml+ 625 ml	Post emergence for all weeds plus one hand weeding
8	Hand weeding Thrice or more			
9	Control			
METHODOLOGY	Design = RCB Replication = 3 Plot Size = 1 × 5 m N:P:K = 160:115:63 kg/ha Weed counts & weed biomass before and 30 days after spray of weedicides and yield data will be collected			

5.	TITLE	Weed Management in Carrot
	OBJECTIVE	To investigate the most practicable package of weed management in carrot
	RESEARCH WORKERS	Waseem Abbas Muhammad Ashiq M. Najeebullah
	DURATION	2017-18
	LOCATION	Faisalabad

TREATMENTS				
Sr. No.	Treatment	Active ingredient	Dose/ha	Time of application
1	<i>Stomp 455 g/l CS</i>	Pendimethalin	2000 ml	Pre emergence plus one hand weeding
2	<i>Dual gold 960 EC</i>	S metolachlor	2000 ml	Pre emergence plus one hand weeding
3	<i>Topmax 96 EC</i>	Pendimethalin+ metolachlor	2250 ml	Pre emergence plus one hand weeding
4	Linex 75 WDG	Linuron	750 g	Pre emergence for all weeds plus one hand weeding
5	Linex 75 WDG	Linuron	750 g	Post emergence for all weeds plus one hand weeding
6	<i>G Max lite 15 EC</i>	Quizalofop	650 ml	Post emergence for grassy weeds plus one hand weeding
7	<i>Axial 050 EC</i>	<i>Penoxaden</i>	825 ml	Post emergence for grassy weeds plus one hand
8	3-4 Hand weeding			
9	Control			
METHODOLOGY	Design = RCB Replication = 3 Plot Size = 3 × 5 m N:P:K = 160:115:63 kg/ha Weed counts & weed biomass before and 30 days after spray of weedicides and yield data will be collected.			