

# ANNUAL PROGRAM

OF

# RESEARCH WORK

*RABI 2018-19*



## VEGETABLE RESEARCH INSTITUTE

## FAISALABAD

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## 1. TOMATO (*Solanum lycopersicum* L.)

<b>1. TITLE</b>	<b>COLLECTION AND MAINTENANCE OF DETERMINATE TOMATO GERMPLASM</b>												
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) = 144 (local and exotic).												
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 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 and selected 15 entries will be used in breeding program. <table border="1" data-bbox="766 1192 1377 1402"> <thead> <tr> <th>Characteristics</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Fruit length (mm)</td> <td>19.4 – 77.3</td> </tr> <tr> <td>Fruit width (mm)</td> <td>15.8 – 61.9</td> </tr> <tr> <td>Fruit shape index (L/W)</td> <td>0.76 – 1.45</td> </tr> <tr> <td>Fruit firmness (kg/cm<sup>2</sup>)</td> <td>1.7 – 4.6</td> </tr> <tr> <td>Fruit weight (g)</td> <td>8.3 – 128</td> </tr> </tbody> </table>	Characteristics	Range	Fruit length (mm)	19.4 – 77.3	Fruit width (mm)	15.8 – 61.9	Fruit shape index (L/W)	0.76 – 1.45	Fruit firmness (kg/cm <sup>2</sup> )	1.7 – 4.6	Fruit weight (g)	8.3 – 128
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Fruit weight (g)	8.3 – 128												
<b>2. TITLE</b>	<b>STUDY OF FILIAL GENERATIONS IN DETERMINATE TOMATO</b>												
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 <sub>2</sub> = 26 cross combinations												

	ii) F <sub>3</sub> = 98 single plant progenies of 17 crosses iii) F <sub>4</sub> = 124 single plant progenies of 18 crosses iv) F <sub>5</sub> = 70 single plant progenies of 10 crosses v) F <sub>6</sub> = 14 single plant progenies of 5 crosses vi) F <sub>7</sub> = 16 single plant progenies of 3 crosses																																		
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Plant to plant distance = 50 cm Experimental design = Non-replicated  F <sub>2</sub> – F <sub>6</sub> 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>F<sub>1</sub></td> <td>30</td> <td>26</td> </tr> <tr> <td>2</td> <td>F<sub>2</sub></td> <td>18</td> <td>17/98</td> </tr> <tr> <td>3</td> <td>F<sub>3</sub></td> <td>22/39</td> <td>18/124</td> </tr> <tr> <td>4</td> <td>F<sub>4</sub></td> <td>21/70</td> <td>10/70</td> </tr> <tr> <td>5</td> <td>F<sub>5</sub></td> <td>11/76</td> <td>5/14</td> </tr> <tr> <td>6</td> <td>F<sub>6</sub></td> <td>7/23</td> <td>3/16</td> </tr> <tr> <td>7</td> <td>F<sub>7</sub></td> <td>1/25</td> <td>1/20</td> </tr> </tbody> </table>	S. No.	Generation	No. of Crosses / Progeny		Studied	Selected	1	F <sub>1</sub>	30	26	2	F <sub>2</sub>	18	17/98	3	F <sub>3</sub>	22/39	18/124	4	F <sub>4</sub>	21/70	10/70	5	F <sub>5</sub>	11/76	5/14	6	F <sub>6</sub>	7/23	3/16	7	F <sub>7</sub>	1/25	1/20
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<b>3. TITLE</b>	<b>PRELIMINARY EVALUATION OF DETERMINATE TOMATO PURELINES</b>																																		
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	2018-19																																		
TREATMENTS	Entries = 20 (including 3 checks) viz; 18273, 18274, 18275, 18276, 18277, 18278, 18279, 18280, 18281, 18282, 18283, 18284, 18285, 18286, 18287, 18288, 18289, Nadir (Check), Naqeeb (Check) & Rio Grande (Check).																																		
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit length, fruit width, fruit shape index, fruit																																		

	firmness, fruit weight and fruit yield will be recorded.																																																																																
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OBJECTIVE	To evaluate the selected determinate tomato purelines for open field cultivation.																																																																																
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LOCATION	Faisalabad																																																																																
DURATION	2018-19																																																																																
TREATMENTS	Entries = 10 (including 3 checks) viz; 13234, 17256, 17257, 17260, 17261, 17264, 17265, Nadir (Check), Naqeeb (Check) & Rio Grande (Check).																																																																																
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Exp. Design = RCBD Plot size = 8.0 × 1.25 m Repeats = 3 Plant spacing = 50 cm Data regarding fruit length, fruit width, fruit shape index, 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 shape index, fruit																																																																																

firmness, fruit weight and fruit yield is given below.

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	13234	57.7	50.0	1.15	3.70	82.6	51.11
2	13240	44.7	44.5	1.00	3.66	64.8	50.92
3	10139	61.4	48.5	1.27	3.82	87.4	50.47
<b>4</b>	<b>Nadir (Check)</b>	<b>57.2</b>	<b>50.5</b>	<b>1.13</b>	<b>3.80</b>	<b>86.2</b>	<b>49.28</b>
5	16249	51.7	49.0	1.06	4.12	75.2	48.15
<b>6</b>	<b>Nageeb (Check)</b>	<b>57.6</b>	<b>48.6</b>	<b>1.19</b>	<b>3.82</b>	<b>83.8</b>	<b>45.96</b>
<b>10</b>	<b>Rio Grande (Check)</b>	<b>59.3</b>	<b>50.4</b>	<b>1.18</b>	<b>3.92</b>	<b>85.4</b>	<b>41.06</b>
11	16252	53.7	51.8	1.04	4.04	94.4	39.22
<b>LSD (0.05)</b>							<b>3.71</b>

<b>5. TITLE</b>	<b>MULTI-LOCATIONAL / ZONAL EVALUATION OF DETERMINATE TOMATO PURELINES</b>
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 Mr. Amir Latif Mr. Ijaz Khan
LOCATION	Faisalabad, Sheikhpura, Raiwind & Bahawalpur
DURATION	2018-19
TREATMENTS	Entries = 08 (including 3 checks) viz; 10139, 10142, 10173, 13234, 13239, Nadir (Check), Nageeb (Check) & Rio Grande (Check).
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit length, fruit width, fruit shape index, 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 8 entries including 3 checks were studied at four different locations. Fruit yield data is presented below.

Rank	Entry	Fruit yield (T/ha)				
		FSD	S. Pura	Multan	B. Pur	Average
1	10173	53.38	37.87	30.27	17.18	34.68
2	10142	48.82	36.65	29.01	15.98	32.62
3	10139	46.40	34.59	29.43	18.42	32.21
4	<b>Nadir (Check)</b>	<b>50.15</b>	<b>33.73</b>	<b>26.61</b>	<b>14.63</b>	<b>31.28</b>
5	<b>Naqeeb (Check)</b>	<b>44.11</b>	<b>30.76</b>	<b>27.22</b>	<b>15.03</b>	<b>29.28</b>
7	<b>Rio Grande (Check)</b>	<b>42.08</b>	<b>29.43</b>	<b>24.23</b>	<b>12.34</b>	<b>27.02</b>
8	13198	28.33	23.83	22.38	10.80	21.34
<b>LSD (0.05)</b>		<b>3.03</b>	<b>2.08</b>	<b>2.19</b>	<b>2.36</b>	<b>-</b>

<b>6. TITLE</b>	<b>MULTILOCAUTIONAL EVALUATION OF TOMATO ADVANCED LINES/ HYBRIDS FOR AUTUMN PLANTING</b>
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 Mrs. Naveeda Anjum
LOCATION(S)	Faisalabad & Chakwal
DURATION	2018-19
TREATMENTS	7 entries including 1 check = AUT-302, AUT-305, AUT-309, AUT-312, AUT-315, AUT-324 & TO-1057 F <sub>1</sub> (Check).
METHODOLOGY	Nursery sowing = 2 <sup>nd</sup> week of August, 2018 Transplanting = 2 <sup>nd</sup> week of September, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit yield and disease incidence will be recorded at VRI Faisalabad whereas; only fruit yield data will be recorded at BARI Chakwal.
PREVIOUS YEAR'S RESULTS	10 selected lines along with 1 check 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
<b>1</b>	<b>RS-1312 F<sub>1</sub> (Check)</b>	<b>17.87</b>	<b>12.19</b>	<b>15.03</b>
2	AUT-315	14.96	10.55	<b>12.76</b>
3	AUT-312	13.10	11.01	<b>12.06</b>
4	AUT-318	13.93	10.10	<b>12.02</b>
5	AUT-305	13.50	9.33	<b>11.42</b>
10	AUT-330	6.73	5.94	<b>6.34</b>
	<b>LSD (0.05)</b>	<b>2.27</b>	<b>1.28</b>	<b>-</b>

<b>7. TITLE</b>	<b>INTERCROPPING STUDIES IN DETERMINATE TOMATO</b>
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	2018-19
TREATMENTS	Tomato variety = Saandal F <sub>1</sub> & Naqeeb Vegetables to be intercropped = Peas, Strawberry, Onion & Turnips T <sub>1</sub> = Sole crop (Saandal F <sub>1</sub> ) T <sub>2</sub> = Saandal F <sub>1</sub> + Peas T <sub>3</sub> = Saandal F <sub>1</sub> + Strawberry T <sub>4</sub> = Saandal F <sub>1</sub> + Onion T <sub>5</sub> = Saandal F <sub>1</sub> + Turnips T <sub>6</sub> = Sole crop (Naqeeb) T <sub>7</sub> = Naqeeb + Peas T <sub>8</sub> = Naqeeb + Strawberry T <sub>9</sub> = Naqeeb + Onion T <sub>10</sub> = Naqeeb + Turnips
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 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	<p>5 different intercropping combinations were tested and data regarding fruit yield is presented below:</p> <table border="1" data-bbox="657 306 1312 1308"> <thead> <tr> <th>Rank</th> <th>Combination</th> <th>Gross Income (Rs.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Saandal F<sub>1</sub> Turnip</td> <td>468924/-</td> </tr> <tr> <td>2</td> <td>Naqeeb Turnip</td> <td>347801/-</td> </tr> <tr> <td>3</td> <td>Saandal F<sub>1</sub> Peas</td> <td>276654/-</td> </tr> <tr> <td>4</td> <td>Saandal F<sub>1</sub> Strawberry</td> <td>262262/-</td> </tr> <tr> <td>5</td> <td>Naqeeb Strawberry</td> <td>219292/-</td> </tr> <tr> <td>6</td> <td>Saandal F<sub>1</sub></td> <td>207870/-</td> </tr> <tr> <td>7</td> <td>Saandal F<sub>1</sub> Onion (D.S)</td> <td>179356/-</td> </tr> <tr> <td>8</td> <td>Saandal F<sub>1</sub> Onion</td> <td>175238/-</td> </tr> <tr> <td>9</td> <td>Naqeeb Peas</td> <td>152857/-</td> </tr> <tr> <td>10</td> <td>Naqeeb Onion</td> <td>82404/-</td> </tr> <tr> <td>11</td> <td>Naqeeb Naqeeb</td> <td>62836/-</td> </tr> <tr> <td>12</td> <td>Naqeeb</td> <td>58244/-</td> </tr> </tbody> </table>	Rank	Combination	Gross Income (Rs.)	1	Saandal F <sub>1</sub> Turnip	468924/-	2	Naqeeb Turnip	347801/-	3	Saandal F <sub>1</sub> Peas	276654/-	4	Saandal F <sub>1</sub> Strawberry	262262/-	5	Naqeeb Strawberry	219292/-	6	Saandal F <sub>1</sub>	207870/-	7	Saandal F <sub>1</sub> Onion (D.S)	179356/-	8	Saandal F <sub>1</sub> Onion	175238/-	9	Naqeeb Peas	152857/-	10	Naqeeb Onion	82404/-	11	Naqeeb Naqeeb	62836/-	12	Naqeeb	58244/-
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7	Saandal F <sub>1</sub> Onion (D.S)	179356/-																																						
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11	Naqeeb Naqeeb	62836/-																																						
12	Naqeeb	58244/-																																						
<b>8. TITLE</b>	<b>SEED PRODUCTION OF APPROVED DETERMINATE TOMATO VARIETIES FOR GENERAL CULTIVATION</b>																																							
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	2018-19																																							
TREATMENTS	Determinate variety(s) = 02 (Nadir & Naqeeb)																																							
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018																																							

	Area = 04 Kanals Spacing = 50 cm 4.0 kg pre-basic 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.
<b>9. TITLE</b>	<b>ADAPTABILITY TRIAL OF EXOTIC TOMATO VARIETIES / HYBRIDS</b>
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	2018-19
TREATMENTS	Varieties / hybrids will be supplied by the Seed Companies and commercial cultivars will be used as standard checks.
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	38 determinate tomato hybrids / varieties were studied in open field along with checks (19 entries + 3 checks in set-1 and set-2) and (2 entries + 2 checks in set-3) whereas; 1 indeterminate tomato F <sub>1</sub> hybrids along with two checks was studied under high tunnel in a separate trial. Data recorded for fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield is given below:

**Set-1 (Det.)**

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Ave. fruit weight (g)	Fruit yield (T/ha)
1	14T-1184 F <sub>1</sub>	50.1	49.0	1.02	3.58	72.4	52.35
2	Randah F <sub>1</sub>	53.4	49.0	1.09	3.64	80.8	52.18
3	TAI-14-6242	52.7	45.1	1.17	3.72	73.6	50.11
4	TO-2048	51.0	47.6	1.07	3.82	65.2	48.34

7	T-1359 F <sub>1</sub> (Check)	52.2	45.9	1.14	3.42	68.8	43.24
11	Ahmar Hybrid (Check)	51.6	48.5	1.06	3.46	76.0	41.15
13	Nadir (Check)	60.0	52.0	1.15	3.60	91.2	38.88
21	TTM-503	59.2	52.3	1.13	3.48	80.6	33.28
<b>LSD (0.05)</b>							<b>4.06</b>

**Set-2 (Det.)**

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Ave. fruit weight (g)	Fruit yield (T/ha)
1	Avenue F <sub>1</sub>	55.4	47.4	1.17	3.50	68.8	46.61
2	Rover F <sub>1</sub>	55.1	46.9	1.17	3.60	74.2	44.56
3	<b>T-1359 F<sub>1</sub> (Check)</b>	<b>52.1</b>	<b>47.4</b>	<b>1.10</b>	<b>3.48</b>	<b>69.6</b>	<b>44.47</b>
4	Qasba F <sub>1</sub>	60.7	55.7	1.09	3.60	110.0	43.45
5	Miracle F <sub>1</sub>	57.5	51.4	1.12	3.46	79.2	42.23
6	<b>Ahmar Hybrid (Check)</b>	<b>56.5</b>	<b>50.2</b>	<b>1.13</b>	<b>3.52</b>	<b>78.6</b>	<b>41.11</b>
10	<b>Nadir (Check)</b>	<b>58.1</b>	<b>51.1</b>	<b>1.14</b>	<b>3.62</b>	<b>88.4</b>	<b>37.05</b>
21	US-3383 F <sub>1</sub>	57.3	49.8	1.15	3.44	85.0	27.85
<b>LSD (0.05)</b>							<b>3.43</b>

**Set-3 (Det.)**

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Ave. fruit weight (g)	Fruit yield (T/ha)
1	<b>Ahmar Hybrid (Check)</b>	<b>55.1</b>	<b>48.0</b>	<b>1.15</b>	<b>3.56</b>	<b>74.6</b>	<b>19.85</b>
2	Bull's Eye F <sub>1</sub>	67.0	51.5	1.30	3.62	100.2	18.07
3	SV-3543 TE	71.1	52.2	1.36	3.42	108.8	16.72
4	<b>T-1359 F<sub>1</sub> (Check)</b>	<b>55.1</b>	<b>46.6</b>	<b>1.18</b>	<b>3.38</b>	<b>69.0</b>	<b>16.04</b>
<b>LSD (0.05)</b>							<b>3.15</b>

**Indeterminate**

Rank	Variety/ Hybrid	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Ave. fruit weight (g)	Fruit yield (T/ha)
1	<b>Salar F<sub>1</sub> (Check)</b>	<b>59.8</b>	<b>49.4</b>	<b>1.21</b>	<b>4.02</b>	<b>85.6</b>	<b>125.04</b>
2	<b>Sahel F<sub>1</sub> (Check)</b>	<b>63.4</b>	<b>54.4</b>	<b>1.16</b>	<b>3.94</b>	<b>112.8</b>	<b>121.13</b>
3	Cosmic F <sub>1</sub>	57.5	51.5	1.12	3.98	92.4	101.52
<b>LSD (0.05)</b>							<b>5.48</b>

<b>10. TITLE</b>	<b>SYNTHESIS OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION</b>
<b>OBJECTIVES</b>	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	2018-19
TREATMENTS	Parental lines = 15
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 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 <sub>1</sub> hybrids.
PREVIOUS YEAR'S RESULTS	A total of 49 F <sub>1</sub> crosses seed (40 fresh & 9 under evaluation hybrids) was produced.
<b>11. TITLE</b>	<b>PRELIMINARY EVALUATION OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION</b>
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	2018-19
TREATMENTS	F <sub>1</sub> hybrids = 32 (including 2 checks) viz; LTH-491, LTH-492, LTH-493, LTH-494, LTH-495, LTH-496, LTH-497, LTH-498, LTH-499, LTH-500, LTH-501, LTH-502, LTH-503, LTH-504, LTH-505, LTH-506, LTH-507, LTH-508, LTH-509, LTH-510, LTH-511, LTH-512, LTH-513, LTH-514, LTH-515, LTH-516, LTH-517, LTH-518, LTH-519, LTH-520, TO-1057 F <sub>1</sub> (Check) and Ahmar Hybrid (Check).
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S	40 locally developed determinate F <sub>1</sub> hybrids along with three checks

RESULTS	were evaluated in two different sets (20 F <sub>1</sub> hybrids & 3 checks in each set). Data recorded for fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield is given below.
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**Set-1**

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LTH-459	54.8	47.5	1.16	3.92	78.0	50.35
2	<b>TO-1057 F<sub>1</sub> (Check)</b>	<b>53.4</b>	<b>48.7</b>	<b>1.10</b>	<b>4.04</b>	<b>75.4</b>	<b>49.78</b>
3	LTH-457	51.9	47.6	1.09	3.66	76.0	46.93
4	LTH-465	43.3	46.6	0.93	3.50	80.4	45.91
5	<b>T-1359 F<sub>1</sub> (Check)</b>	<b>53.3</b>	<b>47.0</b>	<b>1.13</b>	<b>3.84</b>	<b>71.0</b>	<b>45.72</b>
6	LTH-458	52.3	49.0	1.07	3.72	78.8	45.18
9	<b>Ahmar Hybrid (Check)</b>	<b>51.3</b>	<b>45.9</b>	<b>1.12</b>	<b>3.90</b>	<b>73.2</b>	<b>43.56</b>
23	LTH-460	47.6	47.3	1.01	3.46	63.2	32.38
<b>LSD (0.05)</b>							<b>4.83</b>

**Set-2**

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LTH-482	48.8	49.0	1.00	3.80	73.0	50.13
2	LTH-478	49.0	50.8	0.96	3.70	72.2	47.28
3	<b>TO-1057 F<sub>1</sub> (Check)</b>	<b>55.8</b>	<b>47.8</b>	<b>1.17</b>	<b>3.94</b>	<b>79.2</b>	<b>46.81</b>
4	<b>T-1359 F<sub>1</sub> (Check)</b>	<b>53.8</b>	<b>47.5</b>	<b>1.13</b>	<b>3.82</b>	<b>72.4</b>	<b>44.35</b>
5	LTH-471	53.2	48.5	1.10	3.52	62.6	44.25
6	<b>Ahmar Hybrid (Check)</b>	<b>52.5</b>	<b>46.9</b>	<b>1.12</b>	<b>3.88</b>	<b>74.0</b>	<b>43.23</b>
7	LTH-476	45.9	46.5	0.99	3.56	57.8	41.85
23	LTH-489	49.9	46.8	1.07	3.46	66.8	27.17
<b>LSD (0.05)</b>							<b>4.60</b>

<b>12. TITLE</b>	<b>SECONDARY / STATION YIELD EVALUATION OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION</b>
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	2018-19

TREATMENTS	F <sub>1</sub> hybrids = 9 (including 2 checks) viz; LTH-421, LTH-436, LTH-457, LTH-459, LTH-466, LTH-469, LTH-471, TO-1057 F <sub>1</sub> (Check) and Ahmar Hybrid (Check).
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	10 determinate F <sub>1</sub> hybrids along with three checks were evaluated. Data recorded for fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield is given below.

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LTH-421	54.4	47.0	1.16	3.80	70.4	47.52
2	<b>TO-1057 F<sub>1</sub> (Check)</b>	<b>53.3</b>	<b>45.6</b>	<b>1.17</b>	<b>3.78</b>	<b>72.6</b>	<b>46.57</b>
3	LTH-420	54.7	47.7	1.15	3.60	72.6	45.47
4	LTH-405	48.5	47.4	1.02	3.64	69.4	44.15
6	<b>T-1359 F<sub>1</sub> (Check)</b>	<b>52.9</b>	<b>45.9</b>	<b>1.15</b>	<b>3.74</b>	<b>69.2</b>	<b>43.74</b>
7	<b>Ahmar Hybrid (Check)</b>	<b>53.8</b>	<b>46.1</b>	<b>1.17</b>	<b>3.82</b>	<b>69.6</b>	<b>43.32</b>
10	LTH-444	52.6	45.2	1.16	3.66	71.6	33.88
<b>LSD (0.05)</b>							<b>3.04</b>

<b>13. TITLE</b>	<b>MULTI-LOCATIONAL / ZONAL EVALUATION OF DETERMINATE TOMATO HYBRIDS SUITABLE FOR LOW TUNNELS AND OPEN FIELD CULTIVATION</b>
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 Mr. Ijaz Khan
LOCATION	Faisalabad, Shekhupura, Raiwind & Bahawalpur
DURATION	2018-19
TREATMENTS	Entries = 7 (including 2 checks) viz; LTH-324, LTH-421, LTH-422, LTH-436, LTH-440, TO-1057 F <sub>1</sub> (Check) and Ahmar Hybrid (Check).

METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 8.0 × 1.25 m Plant Spacing = 50 cm Repeats = 3  Data regarding fruit length, fruit width, fruit shape index, 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	10 F <sub>1</sub> hybrids along with three checks were studied at four different locations. Data recorded for fruit yield is presented below.																																																																											
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <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>LTH-324</td> <td>48.30</td> <td>39.75</td> <td>35.20</td> <td>22.08</td> <td>36.33</td> </tr> <tr> <td>2</td> <td>NBH-5</td> <td>45.34</td> <td>40.67</td> <td>33.94</td> <td>21.75</td> <td>35.43</td> </tr> <tr> <td>3</td> <td><b>T-1359 F<sub>1</sub> (Check)</b></td> <td><b>48.04</b></td> <td><b>37.96</b></td> <td><b>32.15</b></td> <td><b>19.14</b></td> <td><b>34.32</b></td> </tr> <tr> <td>4</td> <td><b>Ahmar Hybrid (Check)</b></td> <td><b>44.21</b></td> <td><b>35.79</b></td> <td><b>30.34</b></td> <td><b>17.89</b></td> <td><b>32.06</b></td> </tr> <tr> <td>5</td> <td>NBH-149</td> <td>38.29</td> <td>36.29</td> <td>30.72</td> <td>19.39</td> <td>31.17</td> </tr> <tr> <td>6</td> <td><b>TO-1057 F<sub>1</sub> (Check)</b></td> <td><b>42.16</b></td> <td><b>34.65</b></td> <td><b>27.01</b></td> <td><b>16.08</b></td> <td><b>29.98</b></td> </tr> <tr> <td>7</td> <td>LTH-350</td> <td>37.06</td> <td>32.61</td> <td>24.97</td> <td>16.90</td> <td>27.89</td> </tr> <tr> <td>10</td> <td>LTH-379</td> <td>37.63</td> <td>28.19</td> <td>23.85</td> <td>13.50</td> <td>25.79</td> </tr> <tr> <td colspan="2"><b>LSD (0.05)</b></td> <td><b>3.72</b></td> <td><b>2.41</b></td> <td><b>2.15</b></td> <td><b>2.03</b></td> <td><b>-</b></td> </tr> </tbody> </table>		Rank	Entry	Fruit yield (T/ha)					FSD	S. Pura	Multan	B. Pur	Average	1	LTH-324	48.30	39.75	35.20	22.08	36.33	2	NBH-5	45.34	40.67	33.94	21.75	35.43	3	<b>T-1359 F<sub>1</sub> (Check)</b>	<b>48.04</b>	<b>37.96</b>	<b>32.15</b>	<b>19.14</b>	<b>34.32</b>	4	<b>Ahmar Hybrid (Check)</b>	<b>44.21</b>	<b>35.79</b>	<b>30.34</b>	<b>17.89</b>	<b>32.06</b>	5	NBH-149	38.29	36.29	30.72	19.39	31.17	6	<b>TO-1057 F<sub>1</sub> (Check)</b>	<b>42.16</b>	<b>34.65</b>	<b>27.01</b>	<b>16.08</b>	<b>29.98</b>	7	LTH-350	37.06	32.61	24.97	16.90	27.89	10	LTH-379	37.63	28.19	23.85	13.50	25.79	<b>LSD (0.05)</b>		<b>3.72</b>	<b>2.41</b>	<b>2.15</b>	<b>2.03</b>	<b>-</b>
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14. TITLE	<b>COLLECTION AND MAINTENANCE OF INDETERMINATE TOMATO GERMPLASM</b>																																																																											
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) = 148 (local and exotic).																																																																											

METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 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	148 entries of indeterminate tomato were maintained and selected 15 entries will be used in breeding program. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Characteristics</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>Fruit length (mm)</td> <td>20.4 – 81.2</td> </tr> <tr> <td>Fruit width (mm)</td> <td>18.9 – 73.3</td> </tr> <tr> <td>Fruit shape index (L/W)</td> <td>0.48 – 1.75</td> </tr> <tr> <td>Fruit firmness (kg/cm<sup>2</sup>)</td> <td>1.5 – 4.5</td> </tr> <tr> <td>Fruit weight (g)</td> <td>13.1 – 156</td> </tr> </tbody> </table>	Characteristics	Range	Fruit length (mm)	20.4 – 81.2	Fruit width (mm)	18.9 – 73.3	Fruit shape index (L/W)	0.48 – 1.75	Fruit firmness (kg/cm <sup>2</sup> )	1.5 – 4.5	Fruit weight (g)	13.1 – 156
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Fruit firmness (kg/cm <sup>2</sup> )	1.5 – 4.5												
Fruit weight (g)	13.1 – 156												
<b>15. TITLE</b>	<b>STUDY OF FILIAL GENERATIONS IN INDETERMINATE TOMATO</b>												
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 <sub>2</sub> = 21 cross combinations ii) F <sub>3</sub> = 49 single plant progenies of 15 crosses iii) F <sub>4</sub> = 11 single plant progenies of 7 crosses iv) F <sub>5</sub> = 22 single plant progenies of 9 crosses v) F <sub>6</sub> = 21 single plant progenies of 4 crosses vi) F <sub>7</sub> = 18 single plant progenies of 6 crosses												
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Plant to plant distance = 50 cm Experimental design = Non-replicated Plant spacing = 40 cm Bed width = 1.50 m (on both sides) F <sub>2</sub> – F <sub>6</sub> will be advanced by using Pedigree method. Desirable plant progenies will be selected for further studies.												
PREVIOUS YEAR'S RESULTS	<table border="1" style="margin-left: auto; margin-right: auto;"> <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>F<sub>1</sub></td> <td>30</td> <td>21</td> </tr> </tbody> </table>	S. No.	Generation	No. of Crosses / Progeny		Studied	Selected	1	F <sub>1</sub>	30	21		
S. No.	Generation			No. of Crosses / Progeny									
		Studied	Selected										
1	F <sub>1</sub>	30	21										



		2	F <sub>2</sub>	21	15/49
		3	F <sub>3</sub>	18/25	7/11
		4	F <sub>4</sub>	10/17	9/22
		5	F <sub>5</sub>	10/30	4/21
		6	F <sub>6</sub>	5/42	6/18
		7	F <sub>7</sub>	3/5	2/4
<b>16. TITLE</b>	<b>SYNTHESIS OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION</b>				
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	2018-19				
TREATMENTS	Parents =15				
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Plot size = 4.5 × 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 <sub>1</sub> hybrids.				
PREVIOUS YEAR'S RESULTS	A total of 60 F <sub>1</sub> crosses seed (38 fresh & 22 under evaluation hybrids) was produced.				
<b>17. TITLE</b>	<b>PRELIMINARY EVALUATION OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION</b>				
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	2018-19				
TREATMENTS	32 F <sub>1</sub> hybrids (including two checks) in two sets viz: LITTH-917, LITTH-918, LITTH-919, LITTH-920, LITTH-921, LITTH-922, LITTH-923, LITTH-924, LITTH-925, LITTH-926, LITTH-927, LITTH-928, LITTH-929, LITTH-930, LITTH-931, LITTH-932, LITTH-933, LITTH-934, LITTH-935, LITTH-936, LITTH-937, LITTH-938, LITTH-939, LITTH-940, LITTH-941,				

	LITTH-942, LITTH-943, LITTH-944, LITTH-945, LITTH-946, Saandal F <sub>1</sub> (Local check) & Sahel F <sub>1</sub> (Exotic check).
METHODOLOGY	<p>Nursery sowing = Mid October, 2018  Transplanting = 3<sup>rd</sup> week of November, 2018  Experimental design = RCBD  Plot size = 4.5 × 0.75 m  Plant Spacing = 40 cm</p> <p>Data regarding fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield will be recorded.</p>
PREVIOUS YEAR'S RESULTS	42 locally developed indeterminate F <sub>1</sub> hybrids along with two checks were evaluated in three different sets (14 F <sub>1</sub> hybrids & 2 checks in each set). Data recorded for fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield is given below.

**Set-1**

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LITTH-879	55.2	52.4	1.05	4.02	95.2	129.81
2	LITTH-872	57.6	43.4	1.33	3.68	65.2	120.72
3	LITTH-877	65.0	50.2	1.29	3.72	106.0	118.86
4	LITTH-874	67.8	44.9	1.51	3.80	84.0	118.26
<b>5</b>	<b>Saandal F<sub>1</sub> (Check)</b>	<b>60.0</b>	<b>54.2</b>	<b>1.11</b>	<b>3.84</b>	<b>108.4</b>	<b>118.25</b>
<b>6</b>	<b>Sahel F<sub>1</sub> (Check)</b>	<b>64.2</b>	<b>54.9</b>	<b>1.17</b>	<b>3.80</b>	<b>110.0</b>	<b>116.18</b>
16	LITTH-885	38.6	42.4	0.91	3.70	51.6	62.93
<b>LSD (0.05)</b>							<b>6.04</b>

**Set-2**

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LITTH-901	62.9	45.0	1.40	3.66	88.4	128.24
2	LITTH-900	71.6	45.5	1.57	3.76	82.0	124.08
3	LITTH-895	44.5	49.9	0.89	3.54	72.8	122.88
4	LITTH-899	79.7	45.2	1.76	3.60	95.2	121.50
<b>6</b>	<b>Sahel F<sub>1</sub> (Check)</b>	<b>63.1</b>	<b>53.0</b>	<b>1.19</b>	<b>3.70</b>	<b>105.6</b>	<b>115.75</b>
<b>7</b>	<b>Saandal F<sub>1</sub> (Check)</b>	<b>60.9</b>	<b>54.3</b>	<b>1.12</b>	<b>3.72</b>	<b>109.2</b>	<b>114.91</b>
16	LITTH-890	41.8	45.6	0.92	3.66	58.6	70.58
<b>LSD (0.05)</b>							<b>5.88</b>

**Set-3**

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LITTH-908	67.5	53.5	1.26	3.70	112.4	136.60
2	LITTH-907	67.3	53.5	1.26	3.78	116.0	128.18
3	LITTH-903	66.3	52.2	1.27	3.68	113.2	124.46
4	LITTH-914	56.5	49.7	1.14	3.56	89.6	123.09
<b>7</b>	<b>Sahel F<sub>1</sub> (Check)</b>	<b>64.1</b>	<b>54.3</b>	<b>1.18</b>	<b>3.70</b>	<b>111.6</b>	<b>119.01</b>
<b>8</b>	<b>Saandal F<sub>1</sub> (Check)</b>	<b>60.9</b>	<b>55.2</b>	<b>1.10</b>	<b>3.76</b>	<b>115.4</b>	<b>117.47</b>
16	LITTH-905	64.4	49.3	1.31	3.58	98.4	90.27
<b>LSD (0.05)</b>							<b>5.75</b>

**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	2018-19
TREATMENTS	9 F <sub>1</sub> Hybrids (including two checks) viz: LITTH-879, LITTH-900, LITTH-901, LITTH-903, LITTH-904, LITTH-907, LITTH-908, Sahel F <sub>1</sub> (Exotic check) & Saandal F <sub>1</sub> (Local check).
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3 <sup>rd</sup> week of November, 2018 Experimental design = RCBD Plot size = 4.5 × 1.5 m Plant Spacing = 40 cm  Data regarding fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield will be recorded.
PREVIOUS YEAR'S RESULTS	7 locally developed indeterminate F <sub>1</sub> hybrids along with two checks (one exotic & one local) were evaluated. Data recorded for fruit length, fruit width, fruit shape index, fruit firmness, fruit weight and fruit yield is given below.

Rank	Entry	Fruit length (mm)	Fruit width (mm)	Fruit shape index (L/W)	Fruit firmness (kg/cm <sup>2</sup> )	Fruit weight (g)	Fruit yield (T/ha)
1	LITTH-835	62.7	53.1	1.18	3.58	103.8	120.24
2	LITTH-861	65.3	51.1	1.28	3.72	106.0	118.11
<b>3</b>	<b>Sahel F<sub>1</sub> (Check)</b>	<b>66.7</b>	<b>56.4</b>	<b>1.18</b>	<b>3.84</b>	<b>118.6</b>	<b>117.42</b>
4	LITTH-869	57.3	49.5	1.16	3.84	94.4	115.88
<b>5</b>	<b>Saandal F<sub>1</sub> (Check)</b>	<b>61.2</b>	<b>55.3</b>	<b>1.11</b>	<b>3.80</b>	<b>116.2</b>	<b>115.56</b>
6	LITTH-844	68.3	50.6	1.35	3.68	109.2	113.61
9	LITTH-852	61.6	48.1	1.28	3.82	88.8	101.00
<b>LSD (0.05)</b>							<b>4.73</b>

<b>19. TITLE</b>	<b>MULTI-LOCATIONAL / ZONAL EVALUATION OF INDETERMINATE TOMATO HYBRIDS SUITABLE FOR TUNNEL CULTIVATION</b>
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 Mr. Ijaz Khan

	Mrs. Naveeda Anjum Mr. Bashir Hussain
LOCATION	Faisalabad, Sheikhpura, Bahawalpur and Chakwal
DURATION	2018-19
TREATMENTS	8 F <sub>1</sub> Hybrids (including three checks) viz: LITTH-682, LITTH-765, LITTH-835, LITTH-861, LITTH-869, Sahel F <sub>1</sub> (Exotic check), Salar F <sub>1</sub> & Saandal F <sub>1</sub> (Local checks).
METHODOLOGY	Nursery sowing = Mid October, 2018 Transplanting = 3rd week of November, 2018 Experimental design = RCBD Plot size = 4.5 × 1.50 m Plant Spacing = 40 cm  Data regarding fruit length, fruit width, fruit shape index, 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	5 F <sub>1</sub> 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	Chakwal	Average
<b>1</b>	<b>Salar F<sub>1</sub> (Check)</b>	<b>115.15</b>	<b>110.22</b>	<b>104.55</b>	<b>-</b>	<b>109.97</b>
2	LITTH-682	116.46	109.38	101.54	83.47	102.71
<b>3</b>	<b>Sahel F<sub>1</sub> (Check)</b>	<b>113.79</b>	<b>107.49</b>	<b>101.05</b>	<b>84.62</b>	<b>101.74</b>
<b>4</b>	<b>Saandal F<sub>1</sub> (Check)</b>	<b>111.57</b>	<b>108.75</b>	<b>100.14</b>	<b>86.22</b>	<b>101.67</b>
5	LITTH-710	112.48	105.88	95.94	80.84	98.79
6	LITTH-765	104.29	98.39	98.39	81.51	95.65
8	LITTH-818	101.39	93.49	90.62	74.09	89.90
	<b>LSD (0.05)</b>	<b>4.12</b>	<b>6.18</b>	<b>5.65</b>	<b>4.35</b>	<b>-</b>

<b>20. TITLE</b>	<b>EARLY PRODUCTION OF TOMATO HYBRID(S)</b>
OBJECTIVE	To select high yielding tomato genotypes suitable for early planting.
RESEARCH WORKERS	Dr. Saeed Ahmad Shah Chishti Mr. Kashif Nadeem Mr. Muhammad Najeebullah
LOCATION(S)	Faisalabad
DURATION	2018-19
TREATMENTS	3 Entries = Saandal F <sub>1</sub> , Salar F <sub>1</sub> & Sahel F <sub>1</sub> .
METHODOLOGY	Nursery sowing = Last week of August, 2018 Transplanting = Last week of September, 2018 Experimental design = RCBD

	Plot size = 9.0 × 1.50 m Plant Spacing = 40 cm Data regarding fruit yield will be recorded.															
PREVIOUS YEAR'S RESULTS	<p>3 indeterminate tomato hybrids (2 local + 1 exotic) were studied for earlier fruit production pattern. Pickings were started from 21.12.2017 and lasted upto 06.06.2018 with total number of 19 pickings. The fruit yield data is presented below;</p> <table border="1" data-bbox="812 495 1334 714"> <thead> <tr> <th>Rank</th> <th>Entry</th> <th>Fruit yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Salar F<sub>1</sub></td> <td>144.86</td> </tr> <tr> <td>2</td> <td>Saandal F<sub>1</sub></td> <td>140.77</td> </tr> <tr> <td>3</td> <td>Sahel F<sub>1</sub></td> <td>140.25</td> </tr> <tr> <td colspan="2"><b>LSD (0.05)</b></td> <td><b>3.92</b></td> </tr> </tbody> </table>	Rank	Entry	Fruit yield (T/ha)	1	Salar F <sub>1</sub>	144.86	2	Saandal F <sub>1</sub>	140.77	3	Sahel F <sub>1</sub>	140.25	<b>LSD (0.05)</b>		<b>3.92</b>
Rank	Entry	Fruit yield (T/ha)														
1	Salar F <sub>1</sub>	144.86														
2	Saandal F <sub>1</sub>	140.77														
3	Sahel F <sub>1</sub>	140.25														
<b>LSD (0.05)</b>		<b>3.92</b>														

## 2. ONION (*Allium cepa* L.)

<b>1. TITLE</b>	<b>COLLECTION AND MAINTAINCE OF GERMPLASM</b>		
<b>OBJECTIVES:</b>	Collection and maintenance of local and exotic germplasm for future use in breeding programme.		
<b>RESEARCH WORKER (S)</b>	Mrs. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti		
<b>LOCATION</b>	VRI, Faisalabad		
<b>DURATION</b>	Continuous		
<b>TREATMENTS</b>	Varieties for sets production = 23 Varieties for seed production = 30		
<b>METHODOLOGY</b>	<p><b>For sets production</b> Nursery sowing = 2<sup>nd</sup> fortnight of November, 2018 Harvesting of nursery sets = 2<sup>nd</sup> fortnight of April, 2019</p> <p><b>For seed production</b> Transplanting of bulbs (In isolations) = Nov-Dec, 2018 Plot size = up to 5 Marla Sets and seeds will be harvested at maturity</p>		
	<b>Sr. No</b>	<b>Characters</b>	<b>Range</b>
	1	<b>Bulb diameter(cm)</b>	<b>5.6-11.6</b>
	2	<b>Neck diameter</b>	<b>0.62-1.4</b>
	3	<b>Bulb weight(g)</b>	<b>76-130</b>
	4	<b>Bulb color</b>	<b>White, piazzi, purple, red</b>
	5	<b>Bulb shape</b>	<b>Spherical, Tall, Flat</b>
	6	<b>Ring/bulb</b>	<b>6-11</b>
	7	<b>Centres/bulb</b>	<b>1-9</b>
<b>2. TITLE</b>	<b>DEVELOPMENT OF ONION INBRED LINE</b>		
<b>OBJECTIVES:</b>	<b>For the development of hybrids/synthetic varieties</b>		
<b>RESEARCH WORKER (S)</b>	Mrs. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti		
<b>LOCATION</b>	VRI, Faisalabad		
<b>DURATION</b>	Continuos		
<b>TREATMENTS</b>	<p>S<sub>0</sub> Sets = 10 varieties S<sub>1</sub> Sets = 6 varieties S<sub>1</sub> Seed = 4 varieties S<sub>2</sub> Sets = 2 varieties S<sub>2</sub> Seed = 2 varieties S<sub>3</sub> Sets = 5 varieties</p>		

	<p>S<sub>3</sub> Seed = 6 varieties  S<sub>4</sub> Sets = 6 varieties  S<sub>4</sub> Seed = 4 varieties  S<sub>5</sub> Sets = 2 varieties  S<sub>5</sub> Seed = 1 varieties</p>																																																																																	
<b>METHODOLOGY</b>	<p>The nursery sets (harvested during May 2018) has been planted in August for bulb formation. The bulb of S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub> and S<sub>4</sub> generation will be planted during Nov-Dec 2018 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.</p> <p>S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub> and S<sub>4</sub> seed will be planted during 2nd fortnight of October 2018 to produce bulbs which will be stored for next year seed production.</p>																																																																																	
<b>PREVIOUS YEAR'S RESULTS</b>	<table border="1"> <thead> <tr> <th></th> <th>Sr. No.</th> <th>S<sub>1</sub></th> <th>S<sub>2</sub></th> <th>S<sub>3</sub></th> <th>S<sub>4</sub></th> <th>S<sub>5</sub></th> </tr> </thead> <tbody> <tr> <td rowspan="6"><b>Sets</b></td> <td>1</td> <td>Red King</td> <td>VRIO-4</td> <td>VRIO-3</td> <td>Desi Large</td> <td>Faisal red</td> </tr> <tr> <td>2</td> <td>Robina</td> <td>Red Imposta</td> <td>VRIO-6</td> <td>VRIO-9-75</td> <td>Mirpurkhas</td> </tr> <tr> <td>3</td> <td>Desi Red</td> <td></td> <td>Red Imposta</td> <td>Early Red</td> <td></td> </tr> <tr> <td>4</td> <td>T1-172</td> <td></td> <td>Early red</td> <td>Faisal Red</td> <td></td> </tr> <tr> <td>5</td> <td>Prema</td> <td></td> <td>Robina</td> <td>PK-10321</td> <td></td> </tr> <tr> <td>6</td> <td>Kareem</td> <td></td> <td></td> <td>VRIO-9-79</td> <td></td> </tr> <tr> <td rowspan="6"><b>Seed</b></td> <td>1</td> <td>Yellow Granex</td> <td>Desi Red</td> <td>Mirpurkhas,</td> <td>Nasarpuri</td> <td>4466</td> </tr> <tr> <td>2</td> <td>Golden ORB</td> <td>Red Moon</td> <td>Red Imposta</td> <td>Desi Red</td> <td></td> </tr> <tr> <td>3</td> <td>Pink Panther</td> <td>Ceylon</td> <td>Faisal Red</td> <td>HON-1069</td> <td></td> </tr> <tr> <td>4</td> <td>White Pearl</td> <td></td> <td>Selection I yellow</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td>Selection I</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td>Selection IV</td> <td></td> <td></td> </tr> </tbody> </table>		Sr. No.	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	<b>Sets</b>	1	Red King	VRIO-4	VRIO-3	Desi Large	Faisal red	2	Robina	Red Imposta	VRIO-6	VRIO-9-75	Mirpurkhas	3	Desi Red		Red Imposta	Early Red		4	T1-172		Early red	Faisal Red		5	Prema		Robina	PK-10321		6	Kareem			VRIO-9-79		<b>Seed</b>	1	Yellow Granex	Desi Red	Mirpurkhas,	Nasarpuri	4466	2	Golden ORB	Red Moon	Red Imposta	Desi Red		3	Pink Panther	Ceylon	Faisal Red	HON-1069		4	White Pearl		Selection I yellow			5			Selection I			6			Selection IV		
	Sr. No.	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>																																																																												
<b>Sets</b>	1	Red King	VRIO-4	VRIO-3	Desi Large	Faisal red																																																																												
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<b>3. TITLE</b>	<b>DEVELOPMENT OF OPEN POLLINATED ONION VARIETIES</b>																																																																																	
<b>OBJECTIVES</b>	To develop high yielding, disease resistant/tolerant and better adapted open pollinated onion varieties.																																																																																	
<b>RESEARCH WORKER (S)</b>	Mrs. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti																																																																																	
<b>LOCATION</b>	VRI, Faisalabad.																																																																																	
<b>DURATION</b>	Continuous																																																																																	
<b>TREATMENTS</b>	<b>A.</b> Seed of source population <b>B.</b> Bulbs of 30 varieties																																																																																	
<b>METHODOLOGY</b>	<b>A.</b> Seed of one source population will be planted during 2 <sup>nd</sup> fortnight of October and transplanted during December. At maturity desirable bulbs will be selected. <b>B.</b> Selected bulbs will be planted during December to facilitate random mating in isolation.																																																																																	



	Seed will be harvested at maturity.																																																																																																																																					
<b>PREVIOUS YEAR'S RESULTS</b>	A. One source population was developed. B. Bulbs of genotypes were produced and stored.																																																																																																																																					
<b>4. TITLE</b>	<b>EVALUATION OF EXOTIC VARIETIES/HYBRIDS IN ADAPTABILITY TRIAL</b>																																																																																																																																					
<b>OBJECTIVES:</b>	To test adaptability of imported varieties.																																																																																																																																					
<b>RESEARCH WORKER (S)</b>	Mrs. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti																																																																																																																																					
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<b>TREATMENTS</b>	Varieties provided by importers																																																																																																																																					
<b>METHODOLOGY</b>	Nursery sowing = 2 <sup>nd</sup> fortnight of October , 2018 Transplanting = December, 2018 Design = RCBD Replication = 3 Plot size = 7 × 1.5 m Data on diameter of the bulb, neck diameter, average bulb weight, number of rings per bulb and yield will be recorded.																																																																																																																																					
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	<b>Marvi</b>	96.67	5.48	0.78	8.93	3.53	13.06
	<b>LSD (0.05)</b>	<b>55.47</b>	<b>0.65</b>	<b>0.18</b>	<b>1.28</b>	<b>0.76</b>	<b>4.606</b>
<b>5. TITLE</b>	<b>MULTILOCATIONAL/ ZONAL EVALUATION OF HIGH YIELDING ONION VARIETIES FOR SPRING SEASON</b>						
<b>OBJECTIVES:</b>	To screen out high yielding onion varieties for spring season in different location.						
<b>RESEARCH WORKER (S)</b>	Mrs. Mehvish Tahir Dr. Akhter Saeed Dr. Saeed Ahmad Shah Chishti						
<b>LOCATION</b>	VRI-Faisalabad, Jhang and Raiwind						
<b>DURATION</b>	2018-19						
<b>TREATMENTS</b>	Varieties = 10 viz. Vrio-1, Vrio-2, Vrio-3, Vrio-4, Vrio-6, Local, Dark red, Phulkara, Mirpur Khas and Early Red.						
<b>METHODOLOGY</b>	Nursery sowing = 2 <sup>nd</sup> fortnight of October, 2018 Transplanting = December, 2018 Design = RCBD Replication = 3 P x P = 10 cm R x R = 30 cm Plot size = 7 × 1.5 m Data on diameter of the bulb and neck, no.of rings/bulb, bulb weight and yield will be recorded.						
<b>PREVIOUS YEAR'S RESULTS</b>	During previous year six entries were evaluated at two locations (Multan and Bahawalpur). and Data is presented below.						
<b>Bahawalpur</b>	<b>Entries</b>	<b>Bulb Weight (g)</b>	<b>Bulb Diameter (cm)</b>	<b>Neck Diameter (cm)</b>	<b>Yield (t/ha)</b>		
	<b>Dark red</b>	125.67	6.29	1.28	24.73		
	<b>VRIO-1</b>	115.00	6.07	1.44	23.33		
	<b>Phulkara Check)</b>	<b>104.33</b>	<b>6.29</b>	<b>1.31</b>	<b>22.13</b>		
	<b>Mirpurkhas</b>	94.33	5.59	1.81	22.58		
	<b>Early red</b>	87.00	5.44	1.85	21.60		
	<b>Desi red</b>	87.67	5.57	1.56	20.98		
	<b>LSD (0.05)</b>	2.90	0.50	0.45	1.01		
<b>Multan</b>	<b>Dark red</b>	120.17	6.39	1.08	22.22		
	<b>Mirpurkhas</b>	98.33	5.69	1.91	22.18		
	<b>VRIO-1</b>	111.08	6.27	1.14	20.33		
	<b>Phulkara(Check)</b>	<b>101.03</b>	<b>6.21</b>	<b>1.21</b>	<b>20.03</b>		
	<b>Early red</b>	97.00	5.64	1.75	19.60		
	<b>Desi red</b>	77.67	6.07	1.67	18.98		
	<b>LSD (0.05)</b>	2.80	0.45	0.41	0.98		

### 3. PEAS

(*Pisum sativum* L.)

<b>1. TITLE</b>	<b>COLLECTION AND MAINTENANCE OF PEAS GERMPLASM</b>																															
OBJECTIVE	To maintain and evaluate lines/varieties of pea to be used in future breeding program.																															
RESEARCH WORKERS	Mudassar Iqbal Ghazanfar Hammad Dr. Muhammad Iqbal																															
LOCATION	Faisalabad																															
DURATION	Continuous																															
TREATMENTS	Varieties/lines = 77																															
METHODOLOGY	Sowing date = 1 <sup>st</sup> week of November, 2018 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	75 lines/varieties were evaluated and maintained by selecting desirable plants and roughing off-type plants.																															
	<table border="1"> <thead> <tr> <th>S. No</th> <th>Traits</th> <th>Minimum</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Days to 50 % Flowering</td> <td>29</td> <td>81</td> </tr> <tr> <td>2.</td> <td>No. of Seeds/pod</td> <td>5</td> <td>9</td> </tr> <tr> <td>3.</td> <td>Pod Length (cm)</td> <td>6</td> <td>11</td> </tr> <tr> <td>4.</td> <td>Pod Width (cm)</td> <td>1.4</td> <td>2.1</td> </tr> <tr> <td>5.</td> <td>Plant Height (cm)</td> <td>32</td> <td>110</td> </tr> <tr> <td>6.</td> <td>Fresh 100- Seed Weight (g)</td> <td>14</td> <td>65</td> </tr> </tbody> </table>				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
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<b>2. TITLE</b>	<b>HYBRIDIZATION AND STUDY OF FILIAL GENERATIONS IN PEAS</b>																															
OBJECTIVE	To combine desirable traits for the development of high yielding, early maturing and diseases resistant/tolerant varieties.																															
RESEARCH WORKERS	Mudassar Iqbal GhazanfarHammad Dr. Muhammad Iqbal Muhammad Najeebullah																															
LOCATION	Faisalabad																															
DURATION	Continuous																															
TREATMENTS/ METHODOLOGY	<p><b>Hybridization:</b> Four crosses will be made to induce powdery mildew tolerance in desirable parents.</p> <p><b>1) High yielding</b> = Peas-2009, 9374&amp; Meteor</p>																															

2) **Powdery mildew tolerant line** = PTL 1.

**b) Study of Filial Generations**

The segregating populations will be advanced by selecting desirable plants for further studies.

<b>Generation</b>	<b>Cross</b>	<b>No. of selected plants in each generation/cross</b>
<b>F<sub>1</sub></b>	Pea-2009 × 9374	Bulk seed
	PTL-1 × 9374	Bulk seed
<b>F<sub>2</sub></b>	9200-1 × 9374	Bulk seed
	Safeer × 9374	Bulk seed
	9800-5 × 9374	Bulk seed
<b>F<sub>3</sub></b>	Meteor × 9374	5
	Linapak × 9374	10
	1300-8 × 9374	11
<b>F<sub>4</sub></b>	Meteor × 2001-40	19
	9374 × 2001-40	12
<b>F<sub>5</sub></b>	9800-10 × 2001-40	5
	2001-20 × 2001-40	20
	Lina Pak × 2001-40	18
<b>F<sub>6</sub></b>	9375 × 2001-40	12
	Pea-2009 × 2001-40	9
	9200-1 × 2001-40	9
	9375 × 9374	13
<b>F<sub>7</sub></b>	9200-1 × 2001-60	11

Sowing date = November, 2018

Seeds of F<sub>0</sub> crosses will be planted along with their parents and selfed plants will be rouged out. Seed of each F<sub>1</sub> cross will be harvested separately as bulk. Seeds of crosses and single selected plants of different segregating generations from F<sub>2</sub> to F<sub>6</sub> 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 F<sub>7</sub> will be planted as individual plant to row progeny and superior progenies will be selected.

PREVIOUS YEAR'S RESULTS

Seed of following generations were harvested

Generation	Cross	No. of selected plants in each generation
F <sub>1</sub>	9200-1 × 9374	Bulk seed
	Safeer × 9374	Bulk seed
	9800-5 × 9374	Bulk seed
F <sub>2</sub>	Meteor × 9374	Bulk seed
	Linapak × 9374	Bulk seed
	1300-8 × 9374	Bulk seed
F <sub>3</sub>	Meteor × 2001-40	19
	9374 × 2001-40	12
F <sub>4</sub>	9800-10 × 2001-40	5
	2001-20 × 2001-40	20
	Lina Pak × 2001-40	18
F <sub>5</sub>	9375 × 2001-40	12
	Pea-2009 × 2001-40	9
	9200-1 × 2001-40	9
	9375 × 9374	13
F <sub>6</sub>	9200-1 × 2001-60	11
F <sub>7</sub>	Pea-09 × 2001-60	4
	9800-10 × 2001-60	3
	Meteor Fsd × 2001-60	4
F <sub>8</sub>	a) 2001-20 × It-96	5 lines
	b) 9200-1 × No. 267	5 lines

<b>3. TITLE</b>	<b>SECONDARY EVALUATION OF PEAS FOR EARLY PLANTING</b>		
OBJECTIVE	To find out high yielding pea varieties/lines suitable for early peas planting		
RESEARCH WORKERS	Mudassar Iqbal GhazanfarHammad Dr. Muhammad Iqbal		
LOCATION	Faisalabad		
DURATION	2018-19		
TREATMENTS/ METHODOLOGY	Varieties/ lines	=	10Including 2 checks (Meteor Fsd, Pea-2009)
	Replications	=	3
	Design	=	RCB
	Sowing Dates	=	2 <sup>nd</sup> week of October, 2018
	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	<p>Performance of varieties/strains in early pea varietal trial</p> <table border="1" data-bbox="532 258 1471 674"> <thead> <tr> <th>R. No.</th> <th>Variety/ Line</th> <th>Days to 50 % flower</th> <th>No. of pods/ plant</th> <th>Seeds/ pod</th> <th>100-Seed Weight (g) Fresh</th> <th>Green Pod Yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1300-8</td> <td>32.67</td> <td>8.0</td> <td>7.2</td> <td>37.33</td> <td>8.90</td> </tr> <tr> <td>2</td> <td>Pea-2009</td> <td>33.00</td> <td>7.6</td> <td>7.0</td> <td>61.67</td> <td>8.46</td> </tr> <tr> <td>3</td> <td>Sarsabz</td> <td>39.00</td> <td>7.6</td> <td>6.6</td> <td>62.33</td> <td>8.26</td> </tr> <tr> <td>4</td> <td>Linapak</td> <td>32.67</td> <td>4.2</td> <td>5.8</td> <td>36.67</td> <td>8.11</td> </tr> <tr> <td>5</td> <td>Meteor</td> <td>30.67</td> <td>6.2</td> <td>5.2</td> <td>43.33</td> <td>8.07</td> </tr> <tr> <td>9</td> <td>9374</td> <td>32.00</td> <td>4.0</td> <td>5.8</td> <td>42.67</td> <td>6.20</td> </tr> <tr> <td colspan="2"><b>LSD (0.05)</b></td> <td><b>0.92</b></td> <td><b>1.71</b></td> <td><b>0.89</b></td> <td><b>4.61</b></td> <td><b>1.31</b></td> </tr> </tbody> </table>	R. No.	Variety/ Line	Days to 50 % flower	No. of pods/ plant	Seeds/ pod	100-Seed Weight (g) Fresh	Green Pod Yield (T/ha)	1	1300-8	32.67	8.0	7.2	37.33	8.90	2	Pea-2009	33.00	7.6	7.0	61.67	8.46	3	Sarsabz	39.00	7.6	6.6	62.33	8.26	4	Linapak	32.67	4.2	5.8	36.67	8.11	5	Meteor	30.67	6.2	5.2	43.33	8.07	9	9374	32.00	4.0	5.8	42.67	6.20	<b>LSD (0.05)</b>		<b>0.92</b>	<b>1.71</b>	<b>0.89</b>	<b>4.61</b>	<b>1.31</b>
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DURATION	2018-19																																																								
TREATMENTS/METHODOLOGY	Varieties/ lines = 10 Including checks (Pea-2009, Green cross) Replication = 3 Design = RCB Sowing Date = 1st fortnight of November, 2018 Plot Size = 5.0 m × 2.5 m Spacing = 10 cm plant to plant distance on both sides of 125 cm beds Data regarding days to flowering (50%), 100-seed weight and green pod yield will be recorded.																																																								
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<b>5. TITLE</b>	<b>NATIONAL UNIFORM YIELD TRIALS IN PEAS</b>
OBJECTIVE	To find out high yielding and well adapted variety in different ecological zones of country
RESEARCH WORKERS	Mudassar Iqbal GhazanfarHammad
LOCATION	Faisalabad selected by coordinatr
DURATION	2018-19
TREATMENTS/METHODOLOGY	Varieties/Entries = Entries received from coordinator Replications = 3 Design = RCB Sowing Dates = Third week of October, 2018 Plot Size = 5.0 × 1.50 m Spacing = 5 cm (Plant to plant) = 75 cm (Row to row) Data regarding days to flowering (50%), green pod yield and yield parameters will be recorded.
PREVIOUS YEAR'S RESULTS	New experiment
<b>6. TITLE</b>	<b>ADAPTABILITY TRIAL OF PEA EXOTIC VARIETIES</b>
OBJECTIVE	To check the adaptability of exotic pea varieties.
RESEARCH WORKERS	Mudassar Iqbal GhazanfarHammad Dr. Muhammad Iqbal
LOCATION	Faisalabad
DURATION	2018-19
TREATMENTS/METHODOLOGY	Varieties will be provided by different seed companies Replication = 3 Design = RCB Sowing Date = 1st week of November, 2018 Plot Size = 5.0 m × 1.5m P × P = 5 cm R × R = 75 cm Data regarding yield its components and disease incidents will be recorded.

PREVIOUS YEAR'S RESULTS	<p>Performance of strains/varieties in peas adaptability trail at Vegetable Research Institute Faisalabad during 2017-18.</p> <table border="1" data-bbox="532 296 1474 678"> <thead> <tr> <th>Rank</th> <th>Varieties/ Line</th> <th>Days to 50% flowering</th> <th>Fresh 100 seed weight (g)</th> <th>Green pod yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Pea-2009 (Check)</td> <td>36.00</td> <td>70.67</td> <td>9.54</td> </tr> <tr> <td>2</td> <td>Meteor (Check)</td> <td>32.00</td> <td>47.33</td> <td>9.37</td> </tr> <tr> <td>3</td> <td>Super Polo</td> <td>32.00</td> <td>45.33</td> <td>7.76</td> </tr> <tr> <td>4</td> <td>Prince</td> <td>59.00</td> <td>44.67</td> <td>7.62</td> </tr> <tr> <td>8</td> <td>Super Aleena</td> <td>35.00</td> <td>40.33</td> <td>6.56</td> </tr> <tr> <td>9</td> <td>Mission</td> <td>37.00</td> <td>50.67</td> <td>6.31</td> </tr> <tr> <td>10</td> <td>Peas Summer Plus</td> <td>58.67</td> <td>43.33</td> <td>5.73</td> </tr> <tr> <td colspan="2"><b>LSD (0.05)</b></td> <td><b>0.41</b></td> <td><b>4.81</b></td> <td><b>2.47</b></td> </tr> </tbody> </table>	Rank	Varieties/ Line	Days to 50% flowering	Fresh 100 seed weight (g)	Green pod yield (T/ha)	1	Pea-2009 (Check)	36.00	70.67	9.54	2	Meteor (Check)	32.00	47.33	9.37	3	Super Polo	32.00	45.33	7.76	4	Prince	59.00	44.67	7.62	8	Super Aleena	35.00	40.33	6.56	9	Mission	37.00	50.67	6.31	10	Peas Summer Plus	58.67	43.33	5.73	<b>LSD (0.05)</b>		<b>0.41</b>	<b>4.81</b>	<b>2.47</b>
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<b>7. TITLE</b>	<b>PRELIMINARY YIELD TRIAL FOR EARLY PEA PLANTING</b>																																													
OBJECTIVE	To find out high yielding, disease tolerant pea varieties/lines suitable for early peas planting																																													
RESEARCH WORKERS	Mudassar Iqbal GhazanfarHammad Dr. Muhammad Iqbal																																													
LOCATION	Faisalabad																																													
DURATION	2018-19																																													
TREATMENTS/ METHODOLOGY	<p>Varieties/ lines = 13 Including checks (Meteor, Linapak)  Replications = 3  Design = RCB  Sowing Dates = 2<sup>nd</sup> week of October, 2018  Plot Size = 4.0 × 1.50 m  Spacing = 5 cm (Plant to plant)  = 75 cm (Row to row)</p> <p>Data regarding days to flowering (50%), 100-seed weight and green pod yield will be recorded.</p>																																													
PREVIOUS YEAR'S RESULTS	<p>Performance of varieties/strains in preliminary yield trial in early planting.</p> <table border="1" data-bbox="667 1709 1336 1879"> <thead> <tr> <th>R. No.</th> <th>Variety/ Line</th> <th>100- Seed Weight (g) Fresh</th> <th>Green Pod Yield (T/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Meteor (c)</td> <td>43.67</td> <td>8.80</td> </tr> </tbody> </table>	R. No.	Variety/ Line	100- Seed Weight (g) Fresh	Green Pod Yield (T/ha)	1	Meteor (c)	43.67	8.80																																					
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		2	Sarsabz (c)	57.33	7.93
		3	1700-1	45.67	6.86
		4	1700-2	41.33	6.48
		5	1700-3	43.67	6.22
		6	9374	42.67	5.40
		<b>LSD (0.05)</b>		<b>3.28</b>	<b>1.06</b>
<b>8. TITLE</b>	<b>PRELIMINARY YIELD TRIAL FOR NORMAL SEASON PEA PLANTING</b>				
OBJECTIVE	To find out the high yielding varieties suitable for normal season planting				
RESEARCH WORKERS	Mudassar Iqbal GhazanfarHammad Dr. Muhammad Iqbal				
LOCATION	Faisalabad				
DURATION	2018-19				
TREATMENTS/ METHODOLOGY	Varieties/ lines = 12 Including checks (Pea-09&Sarsabz) Replication = 3 Design = RCB Sowing Date = 1st week of November, 2018 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 normal season will be selected and data regarding yield and yield components will be recorded.				
PREVIOUS YEAR'S RESULTS	Performance of varieties/strains in preliminary yield trial in normal planting season.				
		<b>R. No.</b>	<b>Variety/ Line</b>	<b>100- Seed Weight (g) Fresh</b>	<b>Green Pod Yield (T/ha)</b>
		1	<b>Pea-2009 (Check)</b>	58.33	9.89
		2	1700-9	33.67	8.00
		3	<b>Climax (Check)</b>	40.67	7.69
		4	1700-4	41.40	7.17
		5	1700-10	31.33	6.94
		9	1700-8	43.67	4.61
		<b>LSD (0.05)</b>		<b>2.18</b>	<b>0.84</b>

#### 4. CARROT (*Daucus carota* L.)

<b>1. TITLE</b>	<b>COLLECTION AND MAINTENANCE OF CARROT GERMPLASM</b>
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	Genotypes = 12 1. Red Genotype = 10 viz; DC-3, DC-4, DC-90, DC-W,T-29, Red Rose, Red lady,Red long,Rudhira, AS-725 2. Orange genotype = 01 viz; Orange 2007 3. Purple genotype = 01 viz; DC-B (Kanji)
METHODOLOGY	Sowing Time = 17.10.2018 Transplantation of stacklings = 2nd week of January,2019 Roots will be selected on the basis of root and 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.
<b>2. TITLE</b>	<b>DEVELOPMENT OF CARROT VARIETIES FOR EARLY SOWING</b>
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	Genotypes = 4 viz; DC-3, DC-90, Population 1 (DC-90 × DCPRC) and Pop-2 (DC-3 and DCPRC).
METHODOLOGY	Sowing date = 17.10.2018 Plot Size = 60 m <sup>2</sup> DC-90 and Population-1 will be harvested after 90 days of sowing. DC-3 and population-2 will be harvested after 110 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	Selection were made in above mentioned breeding material.
<b>3. TITLE</b>	<b>DEVELOPMENT OF CARROT VARIETIES SUITABLE FOR LATE PLANTING</b>
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	Genotypes = 2 viz ; DC-4 and Orange-2007
METHODOLOGY	Sowing date = 2nd week of November, 2018 Plot size = 60 m <sup>2</sup> Transplanting = 2nd week of March, 2019 Selection will be based on resistance to cold/frost, marketable carrots and non bolting behavior till 2nd week 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 2018. The plants having resistance against frost with good roots were selected and transplanted in isolation which produced sufficient seed to continue the selection cycle.
<b>4. TITLE</b>	<b>DEVELOPMENT OF CMS LINES</b>
OBJECTIVE	To develop CMS lines (both Maintainer and Restorer lines)
RESEARCH WORKERS	Abdul Sattar Muneeb Munawar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah

LOCATION	Faisalabad												
DURATION	Continuous												
TREATMENTS	260 genotypes viz; BC <sub>5</sub> female lines = 130 F <sub>6</sub> Male lines =130												
METHODOLOGY	Sowing time = 22.10.2018 Design = Plant to row 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 160 genotypes, 122 genotypes comprising BC <sub>4</sub> and F <sub>5</sub> were harvested successfully to advance the generations to develop new cycle of three line breeding system.												
<b>5. TITLE</b>	<b>ADAPTABILITY TRIAL OF CARROT EXOTIC VARIETIES</b>												
OBJECTIVE	To evaluate exotic varieties/hybrids under Faisalabad condition.												
RESEARCH WORKERS	Abdul Sattar Muneeb Munawar Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah												
LOCATION	Faisalabad												
DURATION	2018-19												
TREATMENTS/ METHODOLOGY	Genotype = 13 Genotypes viz; Red Rose, Red lady, Red Long, Rudhira, HCR-1131A, HCR-1133B, Maverick F1, Carrot F1 Hybrid, HCR-341A, KQS-HCR-1, Carrot F1 Hybrid (Royal check), DC-3 and T-29 (check) Date of sowing = 25-10-2018 Design = RCBD Plot size = 16 m <sup>2</sup> Replications = 03 Data on root yield will and disease sesistance be recorded after 100 days of sowing.												
PREVIOUS YEAR'S RESULTS	<b>SET-I</b> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Rank</th> <th>Entry</th> <th>Yield (T/Ha)</th> <th>Root Length</th> <th>Root Widh</th> <th>Root Flesh</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Rank	Entry	Yield (T/Ha)	Root Length	Root Widh	Root Flesh						
Rank	Entry	Yield (T/Ha)	Root Length	Root Widh	Root Flesh								

			(cm)	(mm)	Color
1	AS-725	52.9	25.8	39.4	Red
2	DC-90	48.9	24.8	39.8	Red
3	T-29 (Check)	43.6	26.4	43	Red
4	DC-W	41.6	22.4	34.3	Red
5	DC-4	38.6	24.6	36.6	Red
6	Maverick	34.6	27.6	32.9	Orange
	LSD (0.05)	2.33			

**SET-11**

Rank	Entry	Yield (T/Ha)	Root Length (cm)	Root Width (mm)	Root Flesh Color
1	DC-4	32.1	23.4	40.43	Red
2	Appache	28.6	21.5	28.53	Orange
3	Maverick	27.3	21.3	22.83	Orange
4	DC-3	23.8	22.7	39.95	Red
5	T-29 (Check)	19.0	25.5	34.83	Red
6	DC-W	13.6	24.6	32.68	Red
	LSD (0.05)	3.2			

**5. CAULIFLOWER** (*Brassica oleracea var. botrytis*)

<b>1. TITLE</b>	<b>ADAPTABILITY TRIAL FOR 2<sup>nd</sup> EARLY SEASON CAULIFLOWER.</b>																																																		
OBJECTIVE	To evaluate cauliflower varieties suitable for production during high temperature.																																																		
RESEARCH WORKER (S)	Saba Aleem Kaiser Latif Cheema Dr. Muhammad Tasdiq Hussain Shahid																																																		
LOCATION	Faisalabad																																																		
DURATION	2018-19																																																		
TREATMENTS	Varieties = 4																																																		
METHODOLOGY	Nursery sowing date = 13-07-2018 Nursery Transplanting date = 20-08-2018 Plot size = 5 x 0.75 m. Design = RCBD Replications = 5 Row to row distance = 75 cm Plant to plant distance = 45 cm Data regarding plant weight curd weight, curd yield, disease resistance and maturity days will be recorded.																																																		
PREVIOUS YEAR'S RESULTS	<p><b>Table I: Yield performance of hybrid/varieties (2<sup>nd</sup> EARLY season) during 2017-18</b></p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Varieties</th> <th>Average Plant Weight (kg)</th> <th>Average Curd Weight (kg)</th> <th>Yield (t/ha)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Snow Muffin</td> <td>1.28</td> <td>0.67</td> <td>14.23</td> </tr> <tr> <td>2</td> <td>Snow Waltry</td> <td>1.23</td> <td>0.59</td> <td>12.67</td> </tr> <tr> <td>3</td> <td>CFH-1522</td> <td>0.89</td> <td>0.44</td> <td>11.24</td> </tr> <tr> <td><b>4</b></td> <td><b>FDII (Check)</b></td> <td><b>0.79</b></td> <td><b>0.45</b></td> <td><b>10.39</b></td> </tr> <tr> <td>5</td> <td>Dawn 175</td> <td>0.70</td> <td>0.37</td> <td>9.37</td> </tr> <tr> <td>6</td> <td>SV 4051AC</td> <td>0.70</td> <td>0.41</td> <td>9.03</td> </tr> <tr> <td>7</td> <td>Esk.002 F<sub>1</sub></td> <td>0.72</td> <td>0.37</td> <td>8.83</td> </tr> <tr> <td>8</td> <td>MEIGETSU-55</td> <td>0.88</td> <td>0.32</td> <td>6.71</td> </tr> <tr> <td colspan="4"><b>LSD (0.05)</b></td> <td><b>1.53</b></td> </tr> </tbody> </table>	Sr. No.	Varieties	Average Plant Weight (kg)	Average Curd Weight (kg)	Yield (t/ha)	1	Snow Muffin	1.28	0.67	14.23	2	Snow Waltry	1.23	0.59	12.67	3	CFH-1522	0.89	0.44	11.24	<b>4</b>	<b>FDII (Check)</b>	<b>0.79</b>	<b>0.45</b>	<b>10.39</b>	5	Dawn 175	0.70	0.37	9.37	6	SV 4051AC	0.70	0.41	9.03	7	Esk.002 F <sub>1</sub>	0.72	0.37	8.83	8	MEIGETSU-55	0.88	0.32	6.71	<b>LSD (0.05)</b>				<b>1.53</b>
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<b>2. TITLE</b>	<b>ADAPTABILITY TRIAL OF MID SEASON CAULIFLOWER</b>																																																							
OBJECTIVE	To evaluate cauliflower varieties suitable for mid season.																																																							
RESEARCH WORKER (S)	Saba Aleem Kaiser Latif Cheema Dr. Muhammad Tasdiq Hussain Shahid																																																							
LOCATION	Faisalabad																																																							
DURATION	2018-19																																																							
TREATMENTS	Varieties= 27																																																							
METHODOLOGY	Nursery sowing date = August-September 2018 Nursery transplanting date = September-October 2018 Plot size = 7 x 1.5m Design = RCBD Replications = 3 Row to row distance = 75 cm Plant to plant distance = 45 cm Data regarding plant weight, curd weight, curd yield maturity days and disease incidence will be recorded.																																																							
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METHODOLOGY	Nursery sowing date = October, 2018 Nursery Transplanting date = November, 2018 Plot size = 7 x 1.5 m Design = RCBD Replications = 03 Row to row distance = 75 cm Plant to plant distance = 30 cm Data regarding plant weight curd weight, curd yield maturity days and disease incidence will be recorded.																																																							
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<b>OBJECTIVE</b>	To develop high yielding and heat tolerant cauliflower varieties.																																																							
<b>RESEARCH WORKERS</b>	Saba Aleem Kaiser Latif Cheema																																																							



	Dr. Muhammad Tasdiq Hussain Shahid
<b>LOCATION</b>	Faisalabad
<b>DURATION</b>	Continuous
<b>TREATMENTS</b>	Seed obtained from open pollinated population.
<b>METHODOLOGY</b>	Nursery sowing date = 6-06-2018 Nursery Transplanting date = 18-07-2018 The seed obtained from random matted population has been sown in the field keeping plant to plant and row to row distance of 30 and 75 cm, respectively. Healthy plants on the basis of head size, color, shape and compactness will be selected and their duck will be shifted in isolation for open pollination. At maturity seeds of individual plants will be harvested for further studies.
<b>PREVIOUS YEAR'S RESULTS</b>	New experiment
<b>5. TITLE</b>	<b>DEVELOPMENT OF OPEN POLLINATED VARIETIES FOR 2nd EARLY SEASON</b>
<b>OBJECTIVE</b>	To develop high yielding and heat resistant cauliflower varieties.
<b>RESEARCH WORKERS</b>	Saba Aleem Kaiser Latif Cheema Dr. Muhammad Tasdiq Hussain Shahid
<b>LOCATION</b>	Faisalabad
<b>DURATION</b>	Continuous
<b>TREATMENTS</b>	Seed obtained from open pollinated population.
<b>METHODOLOGY</b>	Nursery sowing date = 13-07-2018 Nursery Transplanting date = 20-08-2018 The seed obtained from random matted population has been 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 next selection cycle. At maturity individual plant seeds will be harvested for further studies.
<b>PREVIOUS YEAR'S RESULTS</b>	New experiment
<b>6. TITLE</b>	<b>DEVELOPMENT OF OPEN POLLINATED VARIETIES FOR MID SEASON</b>
<b>OBJECTIVE</b>	To develop high yielding disease and insect resistant cauliflower varieties.

<b>RESEARCH WORKERS</b>	Saba Aleem Kaiser Latif Cheema Dr. Muhammad Tasdiq Hussain Shahid											
<b>LOCATION</b>	Faisalabad											
<b>DURATION</b>	Continuous											
<b>TREATMENTS</b>	Seed obtained from open pollinated population.											
<b>METHODOLOGY</b>	Nursery sowing date = 09-08-2018 Nursery Transplanting date = 27-09-2018 The seed obtained from random mated population has been 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 size, color, shape and compactness will be selected to get high yielding genotypes to start Second selection cycle. At maturity seeds of individual plants will be harvested for further studies.											
<b>PREVIOUS YEAR'S RESULTS</b>	500 gm seed of random mated population was produced.											
<b>7. TITLE</b>	<b>DEVELOPMENT OF INBRED LINES IN 2<sup>nd</sup> EARLY AND MID GROUPS.</b>											
<b>OBJECTIVE</b>	To develop inbred lines for hybrid production.											
<b>RESEARCH WORKER (S)</b>	Saba Aleem Kaiser Latif Cheema Dr. Muhammad Tasdiq Hussain Shahid											
<b>LOCATION</b>	Faisalabad											
<b>DURATION</b>	Continuous											
<b>TREATMENTS</b>	Varieties = Local and Exotic varieties											
<b>METHODOLOGY</b>	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Group</th> <th colspan="2">Sowing Date 2018</th> </tr> <tr> <th>Nursery</th> <th>Transplanting</th> </tr> </thead> <tbody> <tr> <td>2<sup>nd</sup> Early</td> <td>2<sup>nd</sup> fortnight July</td> <td>2<sup>nd</sup> fortnight of August</td> </tr> <tr> <td>Mid</td> <td>2<sup>nd</sup> fortnight August</td> <td>2<sup>nd</sup> fortnight of Sept</td> </tr> </tbody> </table> <p>The nursery of the varieties has been planted according to standard practice and area availability. Desirable plants will be selected in 2<sup>nd</sup> Early and Mid season cauliflower. 4-5 branches of all the selected plants will be selfed normally and through bud pollination. At maturity, seeds of individual plant will be harvested for further studies.</p>	Group	Sowing Date 2018		Nursery	Transplanting	2 <sup>nd</sup> Early	2 <sup>nd</sup> fortnight July	2 <sup>nd</sup> fortnight of August	Mid	2 <sup>nd</sup> fortnight August	2 <sup>nd</sup> fortnight of Sept
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<b>PREVIOUS YEAR'S RESULTS</b>	New Experiment											

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

<b>1. TITLE</b>	<b>ADAPTABILITY TRIAL ON CABBAGE VARIETIES/HYBRIDS</b>																																																										
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<b>OBJECTIVE</b>	To evaluate exotic cabbage varieties/hybrids for yield performance																																																										
<b>RESEARCH WORKERS</b>	Saba Aleem Dr. Muhammad Tasdiq Hussain Shahid Muhammad Najeebullah																																																										
<b>LOCATION</b>	Faisalabad																																																										
<b>DURATION</b>	2018-19																																																										
<b>TREATMENTS</b>	Varieties/Hybrids = Varieties that will be received from the private seed companies																																																										
<b>METHODOLOGY</b>	Nursery sowing date = September, 2018 Nursery Transplanting date = October, 2018 Plot size = 7 x 1.5 m Design = RCBD Replications = 3 Row to row distance = 75 cm Plant to plant distance = 30 cm Data regarding plant weight, head weight, maturity days, field holding capacity, disease reaction and head yield will be recorded.																																																										
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**7. RADISH (*Raphanus sativus* L.)**

<b>1. TITLE</b>	<b>MAINTENANCE OF GERMPLASM</b>
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
<b>2. TITLE</b>	<b>DEVELOPMENT OF BETTER VARIETIES OF RADISH</b>
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 from 3rd selection cycle
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 3rd selection cycle.
PREVIOUS YEAR'S RESULTS	Non pithy roots after 60 days were harvested.
<b>3. TITLE</b>	<b>DEVELOPMENT OF INBREAD LINE IN RADISH</b>
OBJECTIVE	To develop homozygous lines
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS/	Population of different varieties viz: 40 Days, Mino selection ,Green Neck and Gang Seong
METHODOLOGY	Desirable roots will be selected from different population of varieties to get stecklings. .These steckling will be planted during end of November. Selfing will be manually made at flowering stage of plant to get selfed seed for 1 <sup>st</sup> generation..
PREVIOUS YEAR'S	New experiment

RESULTS	
<b>4. TITL</b>	<b>DEVELOPMENT OF RED FLESH WITH LONG ROOT RADISH VARIETY</b>
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 (4 <sup>th</sup> 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 5th selection cycle.
PREVIOUS YEAR'S RESULTS	300 gram seed of desirable root and flesh color alongwith long root was obtained
<b>5. TITLE</b>	<b>DEVELOPMENT OF VARIETY FOR KITCHEN GARDENING</b>
OBJECTIVE	To develop short duration and fascinating variety
RESEARCH WORKERS	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabd
DURATION	2018-2019
TREATMENTS	One group from random population.
METHODOLOGY	The sowing was done during 2nd fortnight of October. The selection of desirable root will be planted made at maturity .The steckling of selected root will be plant at maturity to develop random population.
PREVIOUS YEAR'S RESULTS	600 gram seed of random population.
<b>6. TITLE</b>	<b>EVALUATION OF RADISH VARIETIES FOR LATE SEASON</b>
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	2018-19
TREATMENTS	Varieties = 9 viz; White long,HRR-1120A,White Sturdy,NO.45,HRR-1121B,HRD-225B,HRD-224C,HRD-222B and Mino(check)
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	<b>S. No.</b>	<b>Variety</b>	<b>Root +Leaf yield(T/ha)</b>
	1	<b>Mino selection (Check)</b>	75.83
	2	Purple neck	67.77
	3	Small leave	67.22
	4	Desi white	65.67
	5	Gang seong	62.22
	6	Green neck	57.22
	7	Lal pari	48.33
	8	Mino local	47.77
	9	No.025	32.22
	10	RED PRINCE	28.33
	<b>LSD (<math>\alpha= 0.05</math>)</b>		6.29
<b>7. TITLE</b>	<b>PRE -BASIC SEED PRODUCTION IN RADISH</b>		
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		
	<b>S. No.</b>	<b>Varieties</b>	<b>Quantity (g)</b>
	1	Mino Local	200
	2	40 Days	5000
	3	Desi White	200
	4	Lal Pari	2000
	5	Mino Selection	2000

<b>8. TITLE</b>	<b>IDENTIFICATION OF MALE STERILITY AND MAINTENER LINE IN RADISH.</b>
RESEARCH WORKER	Dr. Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2018-19
TREATMENTS	Radish varieties; 40 days and Mino selection
METHODOLOGY	Male sterile plant will be identified and maintained through crossing / selfing manually.
PREVIOUS YEAR'S RESULTS	New Experiment

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

<b>1. TITLE</b>	<b>MAINTENANCE OF GERMPASM</b>
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 transplanted 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.
<b>2. TITLE</b>	<b>EVALUATION OF HEAT TOLERANT VARIETY</b>
OBJECTIVE	To develop high yielding, early and better tasted variety.
RESEARCH WORKERS	Kaiser Latif Cheema Dr. Tasdiq Hussain Shahid Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	2018-19
TREATMENTS/	Five Genotypes: Golden, Green Top, Purple Top Local, Purple Top (Agita) and Purple (exotic).
METHODOLOGY	Date of sowing = 15 July - 15 August Plot size = 8 x 0.75 m Replications = 3 Design = RCB Data on root yield will be recorded.
PREVIOUS YEAR'S RESULTS	New experiment
<b>3. TITLE</b>	<b>DEVELOPMENT OF LATE BOLTING AND SHORT DURATION VARIETIES</b>



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 <sup>th</sup> cycle)
METHODOLOGY	Seed from Random mated population (7 <sup>th</sup> 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 <sup>th</sup> 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.
<b>4. TITLE</b>	<b>EVALUATION OF TURNIP VARIETIES</b>
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	2018-19
TREATMENTS	Varieties = 9 viz; Golden(Check), Purple Top, Desi Red, Green Top, P100,GT-200,HTP-232A,ETP-230A,Super Sultan. .
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

S. NO.	VARIETY	Root +leave YIELD (T/HA)
1	GOLDEN	58.33
2	Purple TOP (LOT. NO.M-17-6358)	52.22
3	DESI RED	52.77
4	Purple TOP (LOT. NO.M-17-6299358)	52.22
5	PURPLE	50.55
6	PURPLE TOP	50.55
7	PURPLE GOLDEN	45.00
8	GREEN TOP	44.44
9	KUNSAR	31.11
10	WHITE LOCAL	27.77
<b>LSD (<math>\alpha= 0.05</math>)</b>		<b>8.17</b>

<b>5. TITLE</b>	<b>PRE- BASIC SEED PRODUCTION IN TURNIP</b>
OBJECTIVE	To produce genetically pure and good quality seed of turnip varieties.
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 <sup>nd</sup> week of September on both sides of ridges made 75 cm apart in row length of 7 meters. True to type steckling will be selected and planted in November 2018. Progenies with off-type plants will be rogued out at different stages of crop growth. True to type will be selected and bulked for the production of pre-basic seed. seeds from single plant will also be retained.
PREVIOUS YEAR'S RESULTS	Seed of Purple Top (500 g) and Golden (400g) was obtained.

**9. GARLIC** (*Allium sativum* L.)

<b>1. TITLE</b>	<b>GERMPLASM COLLECTION EVALUATION AND MAINTANAINENCE IN GARLIC</b>																														
<b>OBJECTIVE</b>	To find out high yielding and having better shelf life																														
<b>RESEARCH WORKERS</b>	Tahir Iqbal Shah Muhammad Najeebullah																														
<b>DURATION</b>	2017-18																														
<b>TREATMENTS</b>	Variety = G-1801, G-1802, G-1803, G-1804																														
<b>METHODOLOGY</b>	<p>Date of Sowing = 1st Week of October            Design = RCB            Replication = 4            Plot Size = 5 x 2 m            PxP Distance = 10cm            RxR Distance = 20cm</p> <p>The crop will be observed for disease plants that will be rouged out to produce pure seed. The data regarding bulb weight, clove weight, no of cloves / bulb and bulb size will be recorded.</p>																														
<b>PREVIOUS YEAR'S RESULTS</b>	<p><b>Performance of Garlic Genotypes during 2017-18</b></p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Clones</th> <th>Bulb Weight (gm)</th> <th>Clove weight (gm)</th> <th>No. of Cloves/ Bulb</th> <th>Yield (t/ha).</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>G-1701 (thin clove)</td> <td>20-25</td> <td>1.0-1.5</td> <td>20-25</td> <td>3.7-5.0</td> </tr> <tr> <td>2</td> <td>G-1702 (Thin clove)</td> <td>30-35</td> <td>1.5-2.0</td> <td>30-35</td> <td>5.0-7.5</td> </tr> <tr> <td>3</td> <td>G-1703 (Bold clove)</td> <td>40-45</td> <td>5.0-6.0</td> <td>5-9</td> <td>10.0-15.0</td> </tr> <tr> <td>4</td> <td>G-1704 (Bold clove)</td> <td>55-60</td> <td>10.0-12.0</td> <td>5-6</td> <td>20.0-25.0</td> </tr> </tbody> </table>	Sr. No.	Clones	Bulb Weight (gm)	Clove weight (gm)	No. of Cloves/ Bulb	Yield (t/ha).	1	G-1701 (thin clove)	20-25	1.0-1.5	20-25	3.7-5.0	2	G-1702 (Thin clove)	30-35	1.5-2.0	30-35	5.0-7.5	3	G-1703 (Bold clove)	40-45	5.0-6.0	5-9	10.0-15.0	4	G-1704 (Bold clove)	55-60	10.0-12.0	5-6	20.0-25.0
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4	G-1704 (Bold clove)	55-60	10.0-12.0	5-6	20.0-25.0																										

## 10. SPINACH (*Spinacia oleracea* L.)

<b>1. TITLE</b>	<b>MAINTENANCE OF GENEPOOL IN SPINACH</b>						
<b>OBJECTIVE</b>	To maintain genetic purity of existing varieties of Desi and Lahori palak						
<b>RESEARCH WORKERS</b>	Tahir Iqbal Shah Muhammad Najeebullah						
<b>LOCATION</b>	Faisalabad						
<b>DURATION</b>	2018-19						
<b>TREATMENTS</b>	Desi and Lahori Palak						
<b>METHODOLOGY</b>	About 01 Kanal each of “Desi and Lahori Palak” will be sown during 2 <sup>nd</sup> fortnight of October in rows 75 cm apart in isolation. After germination, crop will be thinned keeping plant to plant distance of 10 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 rouged out. Remaining full green and late bolting plants will be kept to produce BNS seed.						
<b>PREVIOUS YEAR’S RESULTS</b>	Desi and Lahori Palak in isolations were maintained.						
<b>2. TITLE</b>	<b>ADAPTABILITY TRIAL OF SPINACH VARIETIES</b>						
<b>OBJECTIVE</b>	To study the adaptability of spinach varieties under Faisalabad conditons.						
<b>RESEARCH WORKERS</b>	Tahir Iqbal Shah Muhammad Najeebullah						
<b>LOCATION</b>	Faisalabad						
<b>DURATION</b>	2018-19						
<b>TREATMENTS</b>	Varieties/Hybrids provided by the Private Seed companies.						
<b>METHODOLOGY</b>	Sowing Date                      Second fortnight of October, 2018 Plot Size                            5 x 1.5m Reps                                    3 Row to Row spacing            75 cm Design                                RCBD Data on leaf yield and its parameters will be recorded. Disease data will also be recorded.						
<b>PREVIOUS YEAR’S RESULTS</b>		<b>Sr. No.</b>	<b>Varieties</b>	<b>No. of Leaf / Plant</b>	<b>Leaf Length (without petiole)</b>	<b>Leaf width</b>	<b>Leaf Yield (t/ha)</b>
		1	Desi Palak	10-15	20-25 cm	10-15 cm	73.3
		2	Green Star	7-10	15-20 cm	8-10 cm	61.8

	3	Lahori Palak	5-10	10-15 cm	8-10 cm	50.1
		(LSD 0.05)				1.9
	<p>The above table reveals that check variety (Desi Palak) gave the highest leaf yield (73.3 T/ha) followed by green star with yield value of 61.8 (t/ha) and Lahori Palak with yield of 50.1(T/ha). The difference among the varieties is highly significant.</p>					
<b>3. TITLE</b>	<b>SCREENING OF SPINACH GERMPLASM SUITABLE FOR LATE BOLTING</b>					
OBJECTIVE	To select genotypes suitable for late bolting and prolong supply of spinach					
RESEARCH WORKERS	Tahir Iqbal Shah Muhammad Najeebullah					
LOCATION	Faisalabad					
DURATION	2018-19					
TREATMENTS	Local/ Exotic germplams = 300 Genotypes					
METHODOLOGY	Sowing Date		Second fortnight of October, 2018			
	Plot Size		5 x 1.5m			
	Design		Augmented			
	Selection will be made on the basis of non bolting behavior of the genotypes till the middle of March.					
PREVIOUS YEAR'S RESULTS	New experiment.					

**11. CORIANDER**      (*Coriandrum sativum* L.)

<b>1. TITLE</b>	<b>DEVELOPMENT OF CORIANDER VARIETIES FOR LATE BOLTING</b>
OBJECTIVE	To select genotypes suitable for late bolting and prolonged supply of coraidner.
RESEARCH WORKERS	Tahir Iqbal Shah Muhammad Najeebullah
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Kandhari, Dilpazeer, T-I-17
METHODOLOGY	The seed will be mixed and planted in the field. The plants will be allowed to random mate at flowering. The seed will be harvested. Then this seed will be planted and selection will be made for the plants having late bolting character. The seed will be harvested and bulked. This selection procedure will be adopted till the late bolting character will be fixed.
PREVIOUS YEAR'S RESULTS	New experiment

## 12. LETTUCE (*Lactuca sativa* L.)

<b>1. TITLE</b>	<b>ADAPTABILITY TRIAL IN LETTUCE</b>
OBJECTIVE	To study the adaptability of exotic varieties, their maintenance and bulk seed multiplication for future use.
RESEARCH WORKERS	Ghazanfar Hammad Raja Javed-ur-Rehman Dr. Muhammad Tasdiq HussainShahid
LOCATION	Faisalabad
DURATION	2018-19
TREATMENTS	Number of varieties = 5
METHODOLOGY	Sowing Date for nursery = 2nd fortnight of October, 2018. Transplanting date = 2nd fortnight of November, 2018. Plot Size = 7.5× 0.75 m No. of Replication = 4 P×P = 40 cm The data will be recorded for yield and disease incidence.
PREVIOUS YEAR'S RESULTS	New Experiment
<b>2. TITLE</b>	<b>COLLECTION AND MAINTENANCE OF LETTUCE GERMPLASM</b>
OBJECTIVE	Collection and maintenance of local and exotic germplasm for future use in breeding programme.
RESEARCH WORKERS	Ghazanfar Hammad Raja Javed-ur-Rehman Dr. Muhammad Tasdiq HussainShahid
LOCATION	Faisalabad
DURATION	Continuous
TREATMENTS	Entries (Existing) = 2 (ICE-BERG-Red and ICE-BERG-Green)
METHODOLOGY	Sowing Date for nursery = 2nd fortnight of October, 2018. Transplanting date = 2nd fortnight of November, 2018. Plot Size = 7.5× 0.75 m P×P = 40 cm
PREVIOUS YEAR'S RESULTS	The seed of the existing entries was harvested and maintained.

**13. FENUGREEK***(Trigonella foenum-graecum)*

<b>1. TITLE</b>	<b>ADAPTABILITY TRIAL IN FENUGREEK</b>
OBJECTIVE	To study the adaptability of exotic varieties, their maintenance and bulk seed multiplication for future use.
RESEARCH WORKERS	Ghazanfar Hammad Raja Javed-Ur-Rehman Dr. Muhammad Tasdiq HussainShahid
LOCATION	Faisalabad
DURATION	2018-19
TREATMENTS	Seed provided by seed companies.
METHODOLOGY	Sowing Date = 2nd fortnight of October, 2018. P×P = 40 cm R×R = 2.5 feet Data wil be recoreded on yield and disease resistance.
PREVIOUS YEAR'S RESULTS	New Experiment



## 14. SEED PRODUCTION

<b>1. TITLE</b>	<b>BREEDER, PRE BASIC AND BASIC SEED PRODUCTION OF RABI VEGETABLES</b>																																																																						
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 <b>Cauiflower FD-I</b> Radish              Tomato <b>Cauiflower FD-II</b> Carrot              Fenugreek <b>Cauiflower FD-III</b> 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 2017-18.																																																																						
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1.	<b>TITLE</b>	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN GARLIC</b>																																																				
	<b>Objectives</b>	To investigate the most practicable package of weed management in Garlic																																																				
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																																																				
	<b>DURATION</b>	Two years																																																				
	<b>LOCATION</b>	Vegetable Research Area																																																				
	<b>TREATMENTS/ PLAN OF WORK</b>	<table border="1"> <thead> <tr> <th><b>Sr No.</b></th> <th><b>Treatment</b></th> <th><b>Time of application</b></th> </tr> </thead> <tbody> <tr> <td>T<sub>1</sub></td> <td>Dual gold @ 8ml/Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>2</sub></td> <td>Dual gold @ 6 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>3</sub></td> <td>Dual gold @ 4 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>4</sub></td> <td>Stomp @ 10 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>5</sub></td> <td>Stomp @ 8 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>6</sub></td> <td>Stomp @ 6 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>7</sub></td> <td>Pre act @ 9 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>8</sub></td> <td>Pre act @ 7 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>9</sub></td> <td>Top Max @ 9 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>10</sub></td> <td>Top Max @ 7 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>11</sub></td> <td>Relax @ 3 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>12</sub></td> <td>Relax @ 5 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>13</sub></td> <td>Oxyfen @ 3ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>14</sub></td> <td>Recall @ 8 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>15</sub></td> <td>Recall @ 10 ml/ Lit</td> <td>24 hours after sowing</td> </tr> <tr> <td>T<sub>16</sub></td> <td>Pert Plus @ 3 ml/ Lit</td> <td>24 hours after sowing</td> </tr> </tbody> </table>		<b>Sr No.</b>	<b>Treatment</b>	<b>Time of application</b>	T <sub>1</sub>	Dual gold @ 8ml/Lit	24 hours after sowing	T <sub>2</sub>	Dual gold @ 6 ml/ Lit	24 hours after sowing	T <sub>3</sub>	Dual gold @ 4 ml/ Lit	24 hours after sowing	T <sub>4</sub>	Stomp @ 10 ml/ Lit	24 hours after sowing	T <sub>5</sub>	Stomp @ 8 ml/ Lit	24 hours after sowing	T <sub>6</sub>	Stomp @ 6 ml/ Lit	24 hours after sowing	T <sub>7</sub>	Pre act @ 9 ml/ Lit	24 hours after sowing	T <sub>8</sub>	Pre act @ 7 ml/ Lit	24 hours after sowing	T <sub>9</sub>	Top Max @ 9 ml/ Lit	24 hours after sowing	T <sub>10</sub>	Top Max @ 7 ml/ Lit	24 hours after sowing	T <sub>11</sub>	Relax @ 3 ml/ Lit	24 hours after sowing	T <sub>12</sub>	Relax @ 5 ml/ Lit	24 hours after sowing	T <sub>13</sub>	Oxyfen @ 3ml/ Lit	24 hours after sowing	T <sub>14</sub>	Recall @ 8 ml/ Lit	24 hours after sowing	T <sub>15</sub>	Recall @ 10 ml/ Lit	24 hours after sowing	T <sub>16</sub>	Pert Plus @ 3 ml/ Lit	24 hours after sowing
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	<b>Objectives</b>	To investigate the most practicable package of weed management in peas																																																	
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																																																	
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3.	TITLE	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN TURNIP AND SPINACH CROPS</b>
	Objectives	To investigate the most practicable package of weed management in turnips and

	spinach crops																																																							
RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																																																							
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	<b>PREVIOUS YEAR'S RESULTS</b>	Among 20 different weedicides no one is found to be effective all weedicides treatments found to be injurious.		

4.	<b>TITLE</b>	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN RADISH</b>							
	<b>Objectives</b>	To investigate the most practicable package of weed management in radish							
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)							
	<b>DURATION</b>	Two years							
	<b>LOCATION</b>	Vegetable Research Area							
	<b>TREATMENTS/ PLAN OF WORK</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Sr No.</th> <th style="width: 60%;">Treatment</th> <th style="width: 30%;">Time of application</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			Sr No.	Treatment	Time of application		
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5.	TITLE	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN CARROTS</b>
	Objectives	To investigate the most practicable package of weed management in carrots
	RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)
	DURATION	Two years
	LOCATION	Vegetable Research Area
	TREATMENTS/ PLAN OF WORK	

Sr No.	Treatment	Time of application
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T <sub>16</sub>	Pert Plus @ 3 ml/ Lit	24 hours after sowing
T <sub>17</sub>	Pert Plus @ 4 ml/ Lit	24 hours after sowing
T <sub>18</sub>	Pert Plus @ 5 ml/ Lit	24 hours after sowing
T <sub>19</sub>	Manual Hoeing	24 hours after sowing
T <sub>20</sub>	Water only (Control)	24 hours after sowing
<b>METHODOLOGY</b>	<ul style="list-style-type: none"> <li>➤ Design = RCB</li> <li>➤ Replication = 3</li> <li>➤ Plot Size = 2 × 5 m</li> </ul>	

	<ul style="list-style-type: none"> <li>➤ Application of all weedicides treatments will sprayed 24 hour after sowing</li> <li>➤ Weedicide effect on germination, weed control along with crop safety will be recorded.</li> <li>➤ Weed counts after 30 and 45 days after spray of weedicides will be recorded</li> <li>➤ Trial will be ploughed after 50 days</li> </ul>
PREVIOUS YEAR'S RESULTS	Among 20 different weedicides only stomp @ 10 ml found to be highly safe and most effective.

6.	<b>TITLE</b>	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN ONION NURSERY AND SEED CROPS</b>																									
	Objectives	To investigate the most practicable package of weed management in onion nursery as well as in onion seed crop																									
	RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																									
	DURATION	Two years																									
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		T <sub>9</sub>	Top Max @ 9 ml/ Lit	24 hours after sowing
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		T <sub>11</sub>	Relax @ 3 ml/ Lit	24 hours after sowing
		T <sub>12</sub>	Relax @ 5 ml/ Lit	24 hours after sowing
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		T <sub>14</sub>	Recall @ 8 ml/ Lit	24 hours after sowing
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		T <sub>19</sub>	Manual Hoeing	24 hours after sowing
		T <sub>20</sub>	Water only (Control)	24 hours after sowing
	<b>METHODOLOGY</b>	<ul style="list-style-type: none"> <li>➤ Design = RCB</li> <li>➤ Replication = 3</li> <li>➤ Plot Size = 2 × 5 m</li> <li>➤ Application of all weedicides treatments will sprayed 24 hour after sowing</li> <li>➤ Weedicide effect on germination, weed control along with crop safety will be recorded.</li> <li>➤ Weed counts after 30 and 45 days after spray of weedicides will be recorded</li> <li>➤ Trial will be ploughed after 50 days</li> </ul>		
	<b>PREVIOUS YEAR'S RESULTS</b>	<ul style="list-style-type: none"> <li>➤ Among 20 different weedicides no one is found to be effective all weedicides treatments found to be injurious in case of onion nursery crop.</li> <li>➤ In onion seed crop Dual Gold @ 6ml Lit found to be very effective followed by Stomp @ 8ml/Lit of water</li> </ul>		

7.	TITLE	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR</b>
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		<b>THE CONTROL OF WEEDS IN FENUGREEK</b>																																																					
Objectives	To investigate the most practicable package of weed management in fenugreek																																																						
RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																																																						
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	<b>PREVIOUS YEAR'S RESULTS</b>	Among 20 different weedicides no one is found to be effective all weedicides treatments found to be injurious.		

8.	<b>TITLE</b>	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN CORIANDER</b>								
	<b>Objectives</b>	To investigate the most practicable package of weed management in coriander								
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)								
	<b>DURATION</b>	Two years								
	<b>LOCATION</b>	Vegetable Research Area								
	<b>TREATMENTS/ PLAN OF WORK</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"><b>Sr No.</b></th> <th style="width: 60%;"><b>Treatment</b></th> <th style="width: 30%;"><b>Time of application</b></th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			<b>Sr No.</b>	<b>Treatment</b>	<b>Time of application</b>			
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	<ul style="list-style-type: none"> <li>➤ be recorded.</li> <li>➤ Weed counts after 30 and 45 days after spray of weedicides will be recorded</li> <li>➤ Trial will be ploughed after 50 days</li> </ul>
PREVIOUS YEAR'S RESULTS	Among 20 different weedicides only stomp @ 10 ml found to be highly safe and most effective.

9.	<b>TITLE</b>	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN CAULIFLOWER</b>																															
	<b>Objectives</b>	To investigate the most practicable package of weed management in Garlic																															
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																															
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		T9= Top Max @ 7ml/ Lit	90	10	85
		T10= Top Max @ 9ml/ Lit	90	15	90

10.	<b>TITLE</b>	<b>EVALUATION OF DIFFERENT POST-EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN FENUGREEK</b>																								
	<b>Objectives</b>	To investigate the most practicable package of weed management in fenugreek																								
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																								
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	T <sub>7</sub>	Skype @ 1 ml/ Lit	30 days after sowing
	T <sub>8</sub>	Topik 15 wp @ 1.2 gm/ Lit	30 days after sowing
	T <sub>9</sub>	Broxtra @ 2 ml/ Lit	30 days after sowing
	T <sub>10</sub>	Sonak @ 1.5 gm/ Lit	30 days after sowing
	T <sub>11</sub>	Water only	30 days after sowing
	T <sub>12</sub>	Manual Hoeing	30 days after sowing
	<b>METHODOLOGY</b>	<ul style="list-style-type: none"> <li>➤ Design = RCB</li> <li>➤ Replication = 3</li> <li>➤ Plot Size = 2 × 5 m</li> <li>➤ Application of all weedicides treatments will sprayed 30 days after sowing</li> <li>➤ Weedicide effect on weed control along with crop safety will be recorded.</li> <li>➤ Weed counts after 30 and 45 days after spray of weedicides will be recorded</li> </ul>	
	<b>PREVIOUS YEAR'S RESULTS</b>	Among 12 different weedicides treatments Axial @ 3ml/Lit found to be most effective followed by Topik @1.2 gm/Lit and Skype @ 1ml/Lit respectively.	

11.	<b>TITLE</b>	<b>Evaluation of different fungicides against stem phylum leaf blight garlic under field condition</b>
	<b>Objectives</b>	To find out the most effective fungicide against the disease.
	<b>RESEARCH WORKER (S)</b>	Waseem Abbas (Assistant Plant Pathologist)

DURATION	Two year			
LOCATION	Vegetable Research Area			
TREATMENTS/ PLAN OF WORK	Lay Out	RCBD		
	Plot Size	1 x3m (Each Treatments)		
	Replications	3		
	Rating Scale	karthik, 1980		
<b>Treatments:</b>				
	<b>Treatments</b>	<b>Common name</b>	<b>Active ingredients</b>	<b>Doses</b>
	T1	Thrill	Bismethiazole	3g/lit
	T2	Antracol	Propineb	5g/lit
	T3	Curzate M8	cymoxanil Mencozeb	6g/ lit
	T4	Alliette	Fosetyl Aluminium	3g/ lit
	T5	Cabrio Top	Pyraclostrobin Metiram	5g/lit
	T6	Success	Chlorothalonil Metalaxyl	3g/lit
	T7	Ridomil Gold MZ	Metalaxyl-m, Mencozeb	3g/lit
	T8	Cytrol	Thiophanate Methyl Chlorothaloni	5g/lit
	T9	Co prides	Copper Oxychloride	10g/lit
	T10	Melody Duo	Propineb, Iprovalicarb	3g/lit
	T11	Rally	Myclobutanil	1g/ lit
	T12	Chlorostrabin	Azoxystrobin Chlorothalonil	5ml/lit
	T13	Score	Difenoconazole	2 ml/lit
	T14	Nanok	Azoxystrobim Flutrifol	3ml/lit
	T15	Evito	Fluoxastrobin	1ml/lit
	T16	Shincar	Carbendazim	3ml/lit
	T17	Jalwa	Azoxystrobin Difenoconazole	2ml/lit
	T18	Flumax	Fluazinam Metalaxal-M	2 ml/lit

		T19	Tilt	Propiconazol	2ml/ lit
		T20	Topas	Penconazole	1ml/ lit
		T21	Nativo 75 EG	Trifloxystrobin + tebuconazole)	1gm/Lit
		T22	Emistar Top	Azoxystrobin + difenoconazole	2ml/Lit
	<b>METHODOLOGY</b>	<ul style="list-style-type: none"> <li>➤ Highly susceptible variety lahsan gulabi will be sown during the month of October , 2018</li> <li>➤ Design= RCBD</li> <li>➤ <b>P × P</b> = 4 Inches</li> <li>➤ <b>R × R</b> = 9 Inches</li> <li>➤ Disease will be created artificially by applying fresh spore suspension</li> <li>➤ Water will be sprayed to create humidity, conducive for the disease development.</li> <li>➤ Application of fungicides will be repeated twice at 7 days interval after initiation of the disease.</li> <li>➤ Data of incidence/ severity will be recorded one day before spraying and seven days after spraying</li> </ul>			
	PREVIOUS YEAR'S RESULTS	<p><b>Among 20 different fungicides thrill found to be most effective followed by rally and flumax respectively. Similarly nanok ,shincar,chlorostrobin give control over diseases but their performance are similar with the above mentioned fungicides. Thirteen other fungicides cabriotop, antracol, curzate M, success, Ridomil gold, cytrol, melody due, evito , jalwa , tilt ,topas, alliete and cabrio top found to be non effective.</b></p>			

12.	TITLE	<b>CHEMICAL CONTROL OF LATE BLIGHT OF TOMATO CAUSED BY <i>PHYTOPHTHORA INFESTANS</i>.</b>	
	Objectives	To find out the most effective fungicide against late blight of tomato.	
	RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist)	
	DURATION	one year	
	LOCATION	Vegetable Research Institute, Faisalabad	
	TREATMENTS/	Lay Out	RCBD

PLAN OF WORK	Replication	3		
	Treatments	5		
	Rating Scale	Shutong et al. (2007).		
<b>Treatments:</b>				
	<b>Treatments</b>	<b>Common name</b>	<b>Active ingredients</b>	<b>Doses</b>
	T1	Thrill	Bismerthiazole	3g/lit
	T2	Antracol	Propineb	5g/lit
	T3	Curzate M8	cymoxanil Mencozeb	6g/ lit
	T4	Alliette	Fosetyl Aluminium	3g/ lit
	T5	Cabrio Top	Pyraclostrobin Metiram	5g/lit
	T6	Success	Chlorothalonil Metalaxyl	3g/lit
	T7	Ridomil Gold MZ	Metalaxyl-m, Mencozeb	3g/lit
	T8	Cytrol	Thiophanate Methyl Chlorothaloni	5g/lit
	T9	Co prides	Copper Oxychloride	10g/lit
	T10	Melody Duo	Propineb, Iprovalicarb	3g/lit
	T11	Rally	Myclobutanil	1g/ lit
	T12	Chlorostrabin	Azoxystrobin Chlorothalonil	5ml/lit
	T13	Score	Difenoconazole	2 ml/lit
	T14	Nanok	Azoxystrobim Flutrifol	3ml/lit
	T15	Evito	Fluoxastrobin	1ml/lit
	T16	Shincar	Carbendazim	3ml/lit
	T17	Jalwa	Azoxystrobin Difenoconazole	2ml/lit
	T18	Flumax	Fluazinam Metalaxal-M	2 ml/lit
	T19	Tilt	Propiconazol	2ml/ lit
	T20	Topas	Penconazole	1ml/ lit

		T21	Nativo 75 EG	Trifloxystrobin + tebuconazole)	1gm/Lit
		T22	Emistar Top	Azoxystrobin + difenoconazole	2ml/Lit
		<ul style="list-style-type: none"> <li>➤ Application of fungicides will be repeated twice at 10-15 days interval after initiation of the disease.</li> <li>➤ Disease severity data will be recorded and analyzed according to the Scale of Shutong et al. (2007).</li> </ul>			
	PREVIOUS YEAR'S RESULTS	Fungicides showed different response in regards to minimizing the effect of pathogen against late blight of tomato. Minimum disease incidence was recorded by spraying Chlorostrobin (100%), Cabrio top (90%), followed by Curzate M (80%), Ridomil Gold (80%), Jalva (80%) and Nanok (80%) respectively. Often treatment i.e Antracol (70%) and Co-pride (70%) are also effective but not compareable with the treatments mentioned above. Rest of all the fungicides Flumax (50%), Alliette (50%), Score (40%), Success 40 WSP (0%), Melody due (0%), Rally (0%), Cytrol (0%), Thrill (0%), Evito (0%), Shincar (0%), Topas (0%) and Tilt (0%) found to be non-effective.			

13.	TITLE	<b>Evaluation of different fungicides against downy mildew and stem phylum leaf blight of onion under field condition</b>	
	Objectives	To find out the most effective fungicide against the disease.	
	RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist)	
	DURATION	Two year	
	LOCATION	Vegetable Research Area	
	TREATMENTS/ PLAN OF WORK	Check Variety	Phulkara Punjab
		Lay Out	RCBD
		Plot Size	1.5 x3m (Each Treatments)
		Replications	3
		Treatments	20

Rating Scale

Irzhansky &amp; cohen 2006

**Treatments:**

<b>Treatments</b>	<b>Common name</b>	<b>Active ingredients</b>	<b>Doses</b>
T1	Thrill	Bismethiazole	3g/lit
T2	Antracol	Propineb	5g/lit
T3	Curzate M8	cymoxanil Mencozeb	6g/ lit
T4	Alliette	Fosetyl Aluminium	3g/ lit
T5	Cabrio Top	Pyraclostrobin Metiram	5g/lit
T6	Success	Chlorothalonil Metalaxyl	3g/lit
T7	Ridomil Gold MZ	Metalaxyl-m, Mencozeb	3g/lit
T8	Cytrol	Thiophanate Methyl Chlorothaloni	5g/lit
T9	Co prides	Copper Oxychloride	10g/lit
T10	Melody Duo	Propineb, Iprovalicarb	3g/lit
T11	Rally	Myclobutanil	1g/ lit
T12	Chlorostrabin	Azoxystrobin Chlorothalonil	5ml/lit
T13	Score	Difenoconazole	2 ml/lit
T14	Nanok	Azoxystrobim Flutrifol	3ml/lit
T15	Evito	Fluoxastrobin	1ml/lit
T16	Shincar	Carbendazim	3ml/lit
T17	Jalwa	Azoxystrobin Difenoconazole	2ml/lit
T18	Flumax	Fluazinam Metalaxal-M	2 ml/lit
T19	Tilt	Propiconazol	2ml/ lit
T20	Topas	Penconazole	1ml/ lit
T21	Nativo 75 EG	Trifloxystrobin + tebuconazole)	1gm/Lit
T22	Emistar Top	Azoxystrobin + difenoconazole	2ml/Lit



<b>METHODOLOGY</b>	<ul style="list-style-type: none"> <li>➤ Disease will be created artificially by applying fresh spore suspension</li> <li>➤ Water will be sprayed to create humidity, conducive for the disease development.</li> <li>➤ Application of fungicides will be repeated twice at 7 days interval after initiation of the disease.</li> <li>➤ Data of incidence/ severity will be recorded one day before spraying and seven days after spraying</li> </ul>
PREVIOUS YEAR'S RESULTS	New Experiment

14.	<b>TITLE</b>	<b>EFFICACY OF FUNGICIDES FOR THE CONTROL OF POWDERY MILDEW OF PEAS UNDER FIELD CONDITIONS (<i>Erysiphe polygoni</i>).</b>																																		
	Objectives	To find out the most effective fungicide against the disease.																																		
	RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist)																																		
	DURATION	Two years																																		
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PREVIOUS YEAR'S RESULTS	1 <sup>st</sup> year experiment			

<b>TITLE</b>	<b>EVALUATION OF DIFFERENT PRE- EMERGENCE WEEDICIDES FOR THE CONTROL OF WEEDS IN GARLIC</b>																																																				
Objectives	To investigate the most practicable package of weed management in Garlic																																																				
RESEARCH WORKER (S)	Waseem Abbas (Assistant Plant Pathologist) Muhammad Ashiq Hussain (Assistant Agronomist)																																																				
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T1= Dual gold @ 8 ml/ Lit	90	10	80																																				
T2= Dual gold @ 6 ml/ Lit	92	15	90																																				
T3= Dual gold @ 4 ml/ Lit	92	25	95																																				
T4= Stomp @ 10 ml/ Lit	95	10	90																																				
T5= Stomp @ 8 ml/ Lit	95	15	95																																				
T6= Stomp @ 6 ml/ Lit	95	30	95																																				
T9= Top Max @ 7ml/ Lit	90	10	85																																				
T10= Top Max @ 9ml/ Lit	90	15	90																																				

