ANNUAL PROGRAMME

OF

RESEARCH WORK

FOR

2018-19

HORTICULTURAL RESEARCH INSTITUTE,

FAISALABAD

CONTENTS

DATE PALM (Phoenix dactylefera L.)

Experiment No. 1	**STANDERIZATION OF SUITABLE TEMPERATURE FOR PROCESSING/DEHYDRATION OF DATES.**
Objective	To find out the suitable temperature for making soft dates.
Research worker	Amina, Sahar Rashid and Malik Mohsin Abbas
Duration	2016-2019
Location	Horticultural Research Institute, Faisalabad
Treatments	T_1 (control)= Sun drying T_2= 52±2°C T_3= 56±2°C T_4= 60±2°C
Plan of work /	Layout Design = CRD Treatments = 4 Replication = 3 Kg / treatment = 5 Total = 60 The fruits of 4 varieties at Khalal stage will be picked and cleaned. The cleaned fruits will be placed in Electric Hot Air Dryer for heat treatment.
Data to be collected	• Fruit Length(mm) • Fruit width (mm) • Fruit Size mm2 • Fruit weight (g) • Moisture contents (%) • Brix (%) • Firmness(Kg) • Total Sugars
Previous year's results	**Table: Effect of different temperatures on Length of fruit, width of fruit, size of fruit, fruit weight, moisture%, firmness and TSS. (2017-18).**

Treatments	Variety	Control (Sun Drying)	52°C	56°C	60°C
Fruit Length (mm)	Dhakki	42.39a	53.57a	45.39a	43.26a
	Barhee	29.43c	32.34c	31.32b	29.48c
	Khudrawi	29.54b	34.59b	30.29c	30.56b
Fruit Diameter (mm)	Dhakki	19.5a	21.34a	20.9a	18.67a
	Barhee	18.32c	18.19c	17.92c	17.21c
	Khudrawi	19.36b	19.41b	18.24b	18.1b
Fruit size (mm2)	Dhakki	826.60a	1143.18a	948.65a	807.66a
	Barhee	539.15c	588.26c	813.38b	744.50b
	Khudrawi	571.89b	671.39b	552.48c	553.13c
Fruit Wt. (g)	Dhakki	107a	109a	105a	102a
	Barhee	95b	72c	70c	70c
	Khudrawi	82c	87b	83b	84b
Moisture %	Dhakki	21.45c	15c	13.69c	11.21c

		Barhee	27.12a	16.9a	15.33a	12.51a
		Khudrawi	25.21b	15.56b	15.23b	12.36b
	Firmness(Kg)	Dhakki	0.26c	0.5b	1.53a	1.9a
		Barhee	0.6b	0.47c	0.69b	1.2c
		Khudrawi	0.94a	0.62a	0.69b	1.3b
	TSS (%)	Dhakki	12.78a	13.27b	15.2a	15.97a
		Barhee	10.1c	14.89a	14.2b	15.58b
		Khudrawi	11.47b	12.29c	13.74c	13.8c

Experiment No. 2	**ROOT INDUCTION IN LIGHT WEIGHT DATE PALM SUCKERS**
Objective	To find the optimum concentration of root promoting hormones for rooting of low weight suckers
Research worker	Ghulam Mustafa, Malik Mohsin Abbas and Sitwat Riaz
Project duration	2018-20
Location	Horticultural Research Institute, Faisalabad.
Treatments/ Methodology	T_0 = Control T_1 = 2000ppm IBA T_2 = 4000ppm IBA T_3 = 2000ppm NAA T_4 = 3000ppm NAA T_5 = T1+T3
Plan of work	Layout = RCBD Treatments = 6 Plants/treatment = 2 Replications = 3 Total plants = 36
Data to be collected	1. Success % age 2. Survival % age 3. No. of Leaves 4. length of leaves (cm) 5. Number of roots

PREVIOUS YEARS RESULTS

Treatments	Success %age	Survival % after 90 days	No. of leaves	Leaf length (cm) after 3 months	No. of roots / plant
T0 (Control)	**45.5**	**13.8**	**1.8**	**9.0**	**11.0**
T1 (2000ppm IBA)	**69.5**	**31.0**	**3.5**	**18.5**	**18.1**
T2(4000ppm IBA)	**76.3**	**43.8**	**4.5**	**20.6**	**24.8**
T3(2000ppm NAA)	**53.8**	**25.5**	**3.3**	**15.0**	**14.8**
T4(3000 ppm NAA)	**59.3**	**19.5**	**2.8**	**17.1**	**13.9**
T5(T1+T3)	**66.5**	**31.0**	**3.4**	**14.3**	**20.3**

Experiment No. 3	STANDARDIZATION OF BLANCHING TIME ON DIFFERENT VARIETIES OF DATES FOR MAKING DRY DATES.
Objective	To find out the suitable blanching duration for making dry dates
Research worker	Sahar Rashid, Amina and Malik Mohsin Abbas
Duration	2016-2019
Location	Horticultural Research Institute, Faisalabad.
Treatments	T1= 10min T2= 15min T3= 20min T4= 30min
Plan of work /	Layout Design = CRD Treatments = 4 Replication = 3 Total Varieties = 2 Kg/treatment = 1 Total = 9 The fruits at Khalal stage will be picked and cleaned. The cleaned fruits will be blanched in boiling water and placed in Electric Hot Air Dryer for heat treatment.
Data to be collected	1. Fruit Length(mm) 2. Fruit Diameter (mm) 3. Fruit Size (mm) 4. Fruit weight (g) 5. TSS (%) 6. Firmness(Kg) 7. Moisture contents (%) 8. Ascorbic acid (mg/100mg) 9. Total Sugar
Previous year's result	**Physiochemical Characteristics of Dehydrated Dates (Chohara)**

Treatment (Blanching time)	Fruit weight (gm)	Fruit length (mm)	Fruit width (mm)	Fruit size (mm^2)	Fruit firmness
T_1 = 10 min	10.92a	42.52b	20.30a	863.16b	5.00d
T_2= 15 min	11.55c	42.23d	19.36c	817.57d	5.38c
T_3 = 20 min	11.39b	42.65a	19.57b	834.66c	5.73b
T_4= 30 min	11.97d	42.48c	19.21d	882.73a	5.90a

Treatment (Blanching time)	TSS Brix	pH	Ascorbic acid (mg/100ml)	Total phenols	Antioxidants
T_1 = 10 min	12.21d	6.12c	2.56d	10.70a	77.29d
T_2= 15 min	13.79b	6.35b	3.41b	5.89d	79.12c
T_3 = 20 min	13.69c	6.87a	3.62a	6.45b	83.56a
T_4= 30 min	14.23a	6.10d	3.20c	6.38c	83.26b

Experiment No. 4	**DEVELOPMENT OF CHANCE SEEDLING VARIETIES OF DATE PALM FROM SEEDLINGS OF EXOTIC CULTIVARS**
Objective	To develop chance seedling variety from seeds of exotic date palm cultivar
Research worker	Muhammad Zahid Rashid, Sitwat Riaz, Malik Mohsin Abbas
Project duration	2016- long term
Location	Horticultural Research Institute, Faisalabad.
Treatments/ Mathodology	T_1 = Ajwa T_2 = Rabai T_3 = Mabroon T_4 = Amber T_5 = Kalma T_6 = Tamur-ul-Wahdi T_7 = Khudri T_8 = Karbla T_9 = Piarom T_{10} = Pamazo T_{11} = Sharifa T_{12} = Ringro T_{13} = Deglet Noor T_{14} = Baiza T_{15} = Sauggi
Plan of work	Layout = RCBD Treatments = 15 Seeds/treatment = 20 Replications = 3 Total plants = 900
Data to be collected	1. Success % age 2. Survival % age 3. No. of Leaves 4. Length of leaves 5. Plant height

Previous year results

Sr. No.	Name of variety	No. of seeds sown	No. of seeds germinated	No. of seeds survived	Success %age
1.	Ajwa	200	182	152	**91**
2.	Rubai	102	75	66	75
3.	Mabroom	46	39	24	52
4.	Amber	48	32	25	32
5.	Kalma	56	35	31	35
6.	Tamur-ul-	98	13	10	13

	Wahdi				
7.	Khudhri	112	85	82	85
8.	Karbla	203	126	106	63
9.	Biarum	115	76	75	76
10.	Pamazo	119	35	29	**35**
11.	Sharifa	104	75	70	75
12.	Ringro	94	53	42	53
13.	DegletNour	69	42	38	42
14.	Baiza	112	92	75	68
15.	Saugi	103	82	79	73

Sr. No.	Name of variety	Height of Plant	No of Leaves	Length of Leaves
1.	Ajwa	68.25	7	124.75
2.	Rubai	64.75	6	102.35
3.	Mabroom	61.15	8	100.7
4.	Amber	63.25	6	99.5
5.	Kalma	60.5	6	92.25
6.	Tamur-ul-Wahdi	58.5	7	107.25
7.	Khudrawi	**72.24**	**9**	110.25
8.	Karbla	62.25	**5**	107
9.	Biarum	62.5	6	124.5
10.	Pamazo	58	6	**125.25**
11.	Sharifa	63	5	119.5
12.	Ringro	36.25	6	56.25
13.	DegletNour	55.25	6	59.5
14.	Baiza	32.75	5	**40.5**
15.	Saugi	**26.5**	7	44.25

JAMUN (*Syzygium cumini*)

Experiment No. 5 — **COLLECTION AND MAINTENANCE OF JAMUN GERMPLASM**

Objective

To collect and preserve different strains of Jamun for selection of variety / strain having better yield and quality.

Research worker

Nida Mahreen, Muhammad Maaz Aziz,Malik Mohsin Abbas

Project duration

2016- long term

Location

Horticultural Research Institute, Faisalabad

/ Treatments

T_1 = Jamun Selection 1 (2014-15)
T_2 = Jamun Selection 2 (2015-16)
T_3 = Jamun Selection 3 (2017-18)
T_4 = Jamun Selection 4 (2017-18)

Plan of work

Layout = RCBD
Treatments = 4
Plants/treatment = 1
Replications = 5
Total plants = 20

Five plants of each strain will be transplanted in progeny garden.

Data to be collected

a) Vegetative Characteristics

1) Survival % age
2) Plant height (cm)
3) Number of shoots
4) Size of leave

b)Reproductive Characteristics

1) Maturity time
2) Fruit weight (g)
3) Fruit Size (cm^2)
4) TSS (%)
5) Fruit yield/plant

Previous Years Results

SELECTION SITE:

Selection 1: Mian Naveed, Chak No. 184 R. B. KotNizam Din, Shah Kot.
Selection 2: Muhammad AttharChak No. 248J. B. BismillahPurKanthian.
Selection 3: Muhammad Abdullah S/O Nawab Din, Chak No. 385 G.B.
Selection 4: Irfan S/O Aurangzaib, Chak No. 385 G.B

MORPHOLOGICALCHARACTERISTICS:

Treatments	Survival %age	Plant height (cm)	No. of shoots	Leaf length (cm)	Leaf width (cm)	Leaf Area (cm2)
T1	100.00	57.2	**4.6**	**13.1**	4.94	**64.71**
T2	100.00	29.83	3.33	12.28	4.90	60.19
T3	100.00	63.17	4.17	11.48	4.37	50.14
T4	100.00	**67.4**	3.4	11.46	**5.08**	58.22

Experiment No. 6 — **STANDARDIZATION OF ASEXUAL PROPAGATIONAL TECHNIQUE IN JAMUN**

Objective

To find out the suitable method of grafting in Jamun to produce true to type nursery plants

Research worker

Nida Mahreen, Komal Aslam, and Ghulam Mustafa

Project duration

2016- 2019

Location

Horticultural Research Institute, Faisalabad

<table>
<tr><td>Methodology / Treatments</td><td>Treatments
T_1 = T-Budding
T_2 = T-Grafting
T_3 = Cleft Grafting

Time of propagation
Spring (Feb-March)
Autumn (Sept- Oct.)

Jamun seedlings having pencil thickness at the height of 25-30 cm above the ground level will be budded/ grafted.</td></tr>
<tr><td>Plan of work</td><td>Layout = RCBD (Pooled analysis)
Treatments = 3
Replications = 4
Plants/replications = 10
Total number of plants = 120</td></tr>
<tr><td>Data to be collected</td><td>1. Success % age
2. Days taken to sprout
3. Length of shoot after 60 days (cm)
4. No. of Leaves
5. Leaf size (cm^2)</td></tr>
<tr><td>Previous year results</td><td>
<table>
<tr><th>Treatments</th><th>Success %</th><th>Days taken to sprout</th><th>Shoot length after 30 days (cm)</th><th>Av. No. of leaves</th><th>Leaf size (cm^2)</th></tr>
<tr><td>T_1 (T-budding)</td><td>20</td><td>25</td><td>2.8</td><td>3</td><td>34.50</td></tr>
<tr><td>T_2 (T- grafting)</td><td>83.00</td><td>20</td><td>4.8</td><td>4.2</td><td>35.98</td></tr>
<tr><td>T_3 (Cleft Grafting)</td><td>10.00</td><td>30</td><td>1.4</td><td>2</td><td>32.34</td></tr>
</table>
</td></tr>
<tr><td>Experiment No. 7</td><td>STANDARDIZATION OF SUITABLE TIME FOR ROOTING OF JAMUN SEMI-HARD WOOD CUTTINGS</td></tr>
<tr><td>Objective</td><td>To find out the suitable concentration of chemical in different season</td></tr>
<tr><td>Research worker</td><td>Nida Mahreen, Ghulam Mustafa , Muhammad Maaz Aziz andSitwat Riaz,</td></tr>
<tr><td>Project duration</td><td>2016-2018</td></tr>
<tr><td>Location</td><td>Horticultural Research Institute, Faisalabad</td></tr>
<tr><td>Methodology/ Treatments</td><td>Treatments
T_1 = Control
T_2 = IBA @ 2000 ppm
T_3 = IBA @ 5000 ppm
T_4 = IBA @ 10000 ppm
Time of application
1 = August
2 = September
3 = February</td></tr>
</table>

<table>
<tr><td></td><td>4 = March
Cuttings dipped with above mentioned doses of IBA will be planted in tunnels during above said months.</td></tr>
<tr><td>Plan of work</td><td>Layout = RCBD
Treatments = 4
Cuttings / treatment = 20
Replications = 4
Total Cuttings = 320 (in each month under trial)</td></tr>
<tr><td>Data to be collected</td><td>1. Success % age
2. Stem height after 3 months
3. No. of leaves/Plant
4. Number of roots/Plant
5. The data will be collected after 3 months of planting of cuttings in tunnels.</td></tr>
<tr><td>Previous Years Results</td><td>Success %age
<table>
<tr><th>Treatments</th><th>August</th><th>March</th></tr>
<tr><td>Control</td><td>13.5</td><td>6</td></tr>
<tr><td>IBA @2000 ppm</td><td>26.5</td><td>12.5</td></tr>
<tr><td>IBA @4000 ppm</td><td>40</td><td>27</td></tr>
<tr><td>IBA @6000 ppm</td><td>35.5</td><td>17</td></tr>
</table>
Branch length (cm)
<table>
<tr><th>Treatments</th><th>August</th><th>March</th></tr>
<tr><td>Control</td><td>6.075</td><td>2.47</td></tr>
<tr><td>IBA @2000 ppm</td><td>8.5</td><td>2.8</td></tr>
<tr><td>IBA @4000 ppm</td><td>11</td><td>4.5</td></tr>
<tr><td>IBA @6000 ppm</td><td>13</td><td>5.4</td></tr>
</table>
No. of leaves
<table>
<tr><th>Treatments</th><th>August</th><th>March</th></tr>
<tr><td>Control</td><td>4</td><td>3</td></tr>
<tr><td>IBA @2000 ppm</td><td>5.5</td><td>4.75</td></tr>
<tr><td>IBA @4000 ppm</td><td>5.5</td><td>6.25</td></tr>
<tr><td>IBA @6000 ppm</td><td>6</td><td>5.5</td></tr>
</table>
No. of roots
<table>
<tr><th>Treatments</th><th>August</th><th>March</th></tr>
<tr><td>Control</td><td>9.5</td><td>7.5</td></tr>
<tr><td>IBA @2000 ppm</td><td>11.75</td><td>12.5</td></tr>
<tr><td>IBA @4000 ppm</td><td>18</td><td>17.5</td></tr>
<tr><td>IBA @6000 ppm</td><td>16</td><td>15</td></tr>
</table></td></tr>
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POMEGRANATE (*Punica granatum*)

Experiment No. 8	**HYBRIDIZATION OF GERMPLASM FOR DEVELOPMENT OF NEW VARIETIES OF POMEGRANATE**
Objective	Crossing of different varieties of pomegranate to develop new varieties of the pomegranate
Project duration	2016-20
Research worker	Hira Faiz, Amna Jamil, Malik Mohsin Abbas
Location.	Horticultural Research Institute, Faisalabad.
Treatments/ Methodology	T_1 = PS-1 X Sandhura T_2 = Sandhura X PS-1 T_3 = PS-2 X Sandhura T_4 = Sandhura X PS-2
	Layout = RCBD Treatments/Crosses = 4 Flowers/ treatment = 20 Replications = 4 Total crosses = 320
Data to becollected	1. No. of flowers crossed 2. Fruit set percentage 3. Survival %age of fruits 4. Germination %age 5. Plant height (cm) 6. Number of shoots 7. Number of leaves / 10 cm shoot 8. Size of leaf

Previous year result.

Treatment	**Cross**	**Crossed flower (No.)**	**Fruit set %**	**Fruit survival %**	**Fruit survival %**
T1	**$PS_1 \times PS_4$**	40	15	6	40ab
T2	**$PS_4 \times PS_1$**	40	16	5	31.25cd
T3	**$S \times PS_1$**	40	10	6	60 a
T4	**$PS_1 \times S$**	40	12	4	33.33 c
T5	**$S \times PS_4$**	40	10	3	30 cd
T6	**$PS_4 \times S$**	40	19	4	21e

Experiment No. 9	**EFFECT OF COMMERCIALLY AVAILABLE CHEMICALS ON BACTERIAL BLIGHT TO CONTROL POMGRANATE (*PUNICA GRANATUM*) CRACKING**
OBJECTIVE	Evaluate the best growth regulator for the vegetative and reproductive growth of Strawberry.
RESEARCH WORKER	Amina, Sahar Rashid, Muhammad Maaz Aziz
PROJECT DURATION	2018-2021
LOCATION	Horticultural Research Institute, AARI, Faisalabad.
TREATMENTS/ **METHDOLOGY**	Treatments T_1= Control T_2= Bordeaux mixture@ 4:4:50 T_3= Kocide @2.5g/L T_4 = Flare @1g/L T_5= Thrill @ 2g/L
PLAN OF WORK	Layout = RCBD Treatments = 5 Plants/treatment = 3 Replications = 3 Total number of plants =45 Times of applications First spray applied on April with interval of 15 days.
DATA TO BE COLLECTED	• Fruit cracking% • No. of flowers/plant • No. of fruit/plant • Fruit weight (gm) • Fruit size (mm) • Peel Thickness (mm) • Fruit yield (kg/plant) • Physiochemical analysis
RESULTS	**New experiment**

GUAVA (*Psidium guajava*)	
Experiment No. 10	**STANDARDIZATION OF SUITABLE TIME FOR ROOTING OF GUAVA SOFT WOOD CUTTINGS**
Objective	To find out the suitable IBA concentration and best time for successful rooting of guava soft wood cuttings
Research worker	Malik Mohsin Abbas, Qamer Shahzad Anjum, Muhamad Maaz Aziz and Muhammad Ishfaq
Project duration	2016-2017
Location	Horticultural Research Institute, Faisalabad
Treatment/ Methodology	**Treatments** T_1 = Control T_2 = IBA @ 0.2 % T_3 = IBA @ 0.4 % T_4 = IBA @ 0.6 % **Time of application** 1 = August 2 = September 3 = February 4 = March Cuttings dipped with above mentioned doses of IBA will be planted in tunnels during above mentioned months.
Plan of work	Layout = RCBD Treatments = 4 Cuttings / treatment = 20 Replications = 4 Total Cuttings = 320 (in each month under trial)
Data to be collected	1. Success % age 2. Branch length after 3 months 3. No. of leaves/Plant 4. Number of roots/Plant The data will be collected after 3 months of planting of cuttings in tunnels.

PREVIOUS YEAR'S RESULTS

Survival/ Success Percentage						
Treat.	**Conc.**	**Aug.**	**Sep.**	**Feb.**	**Mar.**	**Mean**
T^0	Control	18.750 ef	17.500 ef	8.750 g	6.250 g	12.813 d
T^1	IBA @ 0.2 %	35.000 cd	30.000 d	12.500 efg	11.20 fg	22.188 c
T^2	IBA @ 0.4 %	50.00 b	62.50 a	32.50 d	31.25 d	44.063 a
T_3	IBA @ 0.6 %	42.5 bc	45.00 b	20.000 e	17.50 ef	31.250 b
Main branch length (cm)						
T^0	Control	5.500 ef	4.950 efg	3.000 h	2.850 h	4.075 d
T^1	IBA @ 0.2 %	7.600 d	8.050 cd	3.350 gh	3.350 gh	5.587 c
T^2	IBA @ 0.4 %	13.350 a	14.050 a	11.150 b	6.400 de	11.238 a
T_3	IBA @ 0.6 %	9.600 bc	10.250 b	5.500 ef	3.850 fgh	7.300 b
Number of leaves per plant						
T^0	Control	11.100 fgh	11.950 fg	5.650 i	11.5fgh	10.050 d
T^1	IBA @ 0.2 %	14.250 ef	13.900 efg	5.800 i	24.6 bc	14.637 c
T^2	IBA @ 0.4 %	24.800 abc	28.300 ab	8.950 ghi	29.7 a	22.950 a
T_3	IBA @ 0.6 %	17.700 de	21.600 cd	6.550 hi	26.7ab	18.138 b
Number of roots per plant						
T^0	Control	15.200 f	13.550 fg	11.000 g	11.450 g	12.800 d
T^1	IBA @ 0.2 %	15.400 f	20.550 d	13.750 fg	19.2 de	17.225 c
T^2	IBA @ 0.4 %	25.550 bc	30.150 a	22.700 cd	28.1 ab	26.625 a
T_3	IBA @ 0.6 %	22.650 cd	26.650 ab	16.750 ef	22.75 cd	22.200 b

Experiment No. 11	**STANDERIDIZATION OF TIME OF GRAFTING FOR PRODUCTION OF TRUE TO TYPE GUAVA NURSERY PLANTS**
Objective	To find out the suitable grafting method and suitable time for grafting in guava to produce true to type nursery plants
Research worker	Amna Jamil, Malik Mohsin Abbas and Muhammad Ishfaq
Project duration	2016-2017
Location	Horticultural Research Institute, AARI, Faisalabad.
Treatments/	**Treatments** T_1 = T-Budding T_2 = T-Grafting T_3 = Cleft Grafting **Time of grafting** September October. February. March. Guava seedlings having pencil thickness at the height of 25-30 cm above the ground level will be budded/ grafted.

Plan of work	Layout = RCBD Treatments = 3 Plants/treatment = 15 Replications = 4 Total number of plants = 180 (in each week under trial)
Data to be collected	• Success % age • Days taken to sprout • Length of shoot after 60 days • No. of Leaves These data will be collected after 3 months of planting of grafting in tunnels.

Previous year's result

Survival/ success percentage						
Treat.	**Method**	**September**	**October**	**February**	**March**	**Mean**
T_1	T-Budding	26.625 e	28.275 de	44.950 bc	36.65cde	34.125 b
T_2	T-Grafting	53.300 ab	**56.650 a**	43.300 bc	38.325 cd	47.894 a
T_3	Cleft-Grafting	13.325 f	13.325 f	11.650 f	14.975 f	13.319 c
Days taken to sprout						
T_1	T-Budding	27.550 d	34.400 c	22.650 ef	**20.650 f**	26.312 b
T_2	T-Grafting	26.400 de	25.550 de	25.100 def	24.250 def	25.325 b
T_3	Cleft-Grafting	38.400 bc	46.550 a	26.850 de	42.850 ab	38.663 a
Shoot length (cm)						
T_1	T-Budding	18.050 de	16.100 ef	19.650 d	18.200 d	18.000 b
T_2	T-Grafting	27.100 b	27.700 b	25.100 c	**30.400 a**	27.575 a
T_3	Cleft-Grafting	13.900 g	13.300 g	14.550 fg	13.800 g	13.888 c
Number of leaves						
T_1	T-Budding	16.150 e	16.600 e	19.350 cd	13.600 f	16.425 b
T_2	T-Grafting	21.15bc	**25.050 a**	23.050 ab	18.075 de	21.831 a
T_3	Cleft-Grafting	12.250 f	11.600 f	13.250 f	13.300 f	12.600 c

Experiment No. 12	**COLLECTION AND MAINTENANCE OF GUAVA GENEPOOL**
Objective	To collect and maintain different strains/varieties of guava for selection of variety having better yield and quality.
Research worker	Malik Mohsin Abbas, Muhammad Maaz Aziz, Qamar Shahzad Anjum and Zahid Rashid
Project duration	2013 - Long term
Location	Horticultural Research Institute, Faisalabad
Treatments/ Methodology	T_1 = Selection 1 (Round to obviate) T_2 = Selection 2 (Pear form) T_3 = Selection 3 (Surahi) T_4 = Selection 4 (Obviate) T_5 = Selection 5 (Obviate) T_6 = Selection 6 (Pear shaped with prominent neck) T_7 = Selection 7 (pyriform)

	T_8 = Selection 8 (Obviate) T_9 = Selection 9 (Oblong) T_{10} = Selection 10 (Oblong to Obviate) T_{11} =Selection 11 (Round to obviate)
Plan of work	Layout design = RCBD Treatments = 11 Replications = 3 Plants/treatment = 2 Total Plants = 66 Survey will be carried out to select the promising strains of guava during the winter crop and during the survey the promising strains will be marked and tagged. 1. During grafting /budding seasons, the bud wood will be collected and propagated on guava seedlings. 2. Six plants of each strain/variety will be transplanted in the progeny garden of HRI, Faisalabad.
Data to be collected	**a. Vegetative Characteristics** 1. Survival % age 2. Plant height (cm) 3. Number of shoots 4. Number of leaves per shoot 5. Size of leaf **b. Fruit Characteristics** 1. Maturity time 2. Fruit weight (g) 3. Size of Fruit (mm^2) 4. TSS (%) 5. Acidity (% 6. Number of seeds/ fruit 7. Fruit yield/plant (Kg)

PREVIOUS YEAR'S RESULTS

	Plants height (CM)	No. of Branches	No. of Leaves/12cm
GS-1	150.4	11	17.6
GS-2	122	5.8	15.6
GS-3	126	4.4	13.6
GS-4	51	4.4	15.6
GS-5	121	5.6	16
GS-6	80	5.2	16.8
GS-7	99	4.4	14.6
GS-8	57.6	1.6	14.8
GS-9	84.6	2.6	18.8

Note: The strain GS-10 has been selected at the plants produced by cutting are present in the

Nursery which will be planted during October, 2017).
GS-11 is selected recently whose cuttings has be planted in the tunnel

Fruit characteristics at the time of selection

	Selection-1	Selection-2	Selection-3	Selection-4	Selection-5
Length of fruit (mm)	60.14	94.38	90.95	70.16	60.79
Width of fruit (mm)	57.41	60.35	83.67	57.05	54.73
Size of Fruit (mm2)	3452.25	5690.19	7606.67	4003.62	3324.82
Weight of fruit (g)	112.75	170.00	258.75	109.25	114.75
TSS (%)	12.49	11.70	11.62	12.11	15.85
Length of core (mm)	30.79	29.41	47.14	43.28	33.71
Width of Core (mm)	27.89	20.02	34.02	28.12	29.84
Size of core (mm2)	859.1	587.216	1605.17	1215.38	1005.62
Selection Site	Nalka Stop, Bharwana, Chiniot	HujraQiam Ali Shah, Bharwana, Chiniot	Mahji Sultan, MaluMorh, Jhang	Chak No. 245 R.B. Abbaspur, Faisalabad	Chak No. 113, R.B. Sangla Hill

	Selection-6	Selection-7	Selection-8	Selection-9	Selection-10	Selection-11
Length of fruit (mm)	89.02	95.37	61.34	83.48	53.78	54.97
Width of fruit (mm)	59.93	67.19	64.20	58.03	57.38	58.98
Size of Fruit (mm^2)	5334.45	6408.08	3939.64	4844.03	3094.94	3189.13
Weight of fruit (g)	152.25	134.75	146.50	151.65	101.00	110.75
TSS (%)	12.73	12.91	14.54	11.91	14.09	12.65
Length of core (mm)	46.16	43.43	33.49	34.95	26.52	26.15
Width of Core (mm)	33.48	46.27	39.95	15.25	23.11	26.04
Size of core (mm^2)	1546.02	2009.17	1336.82	532.89	612.31	697.22
Selection Site	Chak No. 245, R.B Abbas pur Faisalabad	Chak No. 463. G.B., Samundari, Toba Tek Singh	Sham Kot, Kangan pur Kasoor	Haveeli Bahadur Shah, Mulwana Mor Jhang	Malik Zubair, MirzaPur, Nankana Sahib	Ch. Shahzad Bashir Cheema Chak No. 268 R. B. Saloni Jhal, Sumandry

Experiment No. 13	INFLUENCE OF DIFFERENT PRUNING INTENSITIES ON GROWTH, YIELD AND QUALITY OF GUAVA (GOLA)
Objective	To evaluate out the effect of intensity of pruning on growth, yield and quality of guava
Research worker	Sitwat Riaz, Qamer Shahzad Anjum, Muhammad Maaz Aziz and Komal Aslam
Project duration	2018-2020
Treatments/ Methodology	T_1 = Control T_2 = Light pruning (20%) T_3 = Medium pruning (40%) T_4 = Severe pruning (60%)
Plan of work	Layout = RCBD Treatments = 4 Replications = 3 Plants/ treatment = 3 Total of plants = 36
Data to be collected	**Vegetative characters** 1. Plant height (cm) 2. Plant spread (cm) **Flowring and fruiting characters** 1. Yield per plant 2. Physiochemical analysys
Previous year results	New experiment
Experiment No. 14	**DETERMINATION OF POST HARVEST LOSSES IN GUAVA**
Objective	To determine the postharvest quantity and quality deterioration during transportation
Research worker	Qamar Shahzad Anjum, Muhammad Maaz Aziz and Malik Mohsin Abbas
Project duration	2016-17 and 2017-18
Location	Horticultural Research Institute, Faisalabad
Treatment/ Methdology	1. Farmer's selection for fruit harvesting from where fruit to be marketed 2. Collection of fruit from distinct market (one crate from bottom/one from middle and one from top of loading) 3. Bringing of fruit to Lab. of HRI Faisalabad 4. Determination of fruit quality loss by weight and number Activity will be carried out once during November-December, January-February
Data to be collected	The data will be collected on the following parameters. 1) Fruit weight per box (kg) 2) Total number of fruits per box 3) Number of fruits cracked per box 4) Average fruit size (mm2) 5) Skin browsing percentage

	6) TSS 7) Vitamin C contents (mg/ 100g)

PREVIOUS YEAR'S RESULTS

Treatment-1:Conventional harvesting & packing:

Stage of chain	Percentage	Nature of damage
Farmer filed	4.1%	Bird damage, diseased fruit, insects infestation, fruits injury due to poor harvesting tools, improper harvesting method, delay in packing and transportation
Transportation	17.9%	Compression & browsing
Retail level	4.8%	Over ripening, moisture loss, physical injury, compression, microbial growth, accelerated respiration etc.
Total	***26.8%***	

Transportation losses:

Box placement		Top		Middle		Bottom		Mean	
Particulars	Nature of damage	Kg	%age	Kg	%age	Kg	%age	Kg	%age
Fruit weight	-	10.5	-	12.3	-	11.4	-	11.4	-
Minor damage	Compression	0.17	1.6	0.28	2.3	0.54	4.7	0.33	2.9
	Browsing	0.12	1.1	0.21	1.7	0.18	1.6	0.17	1.5
	Sum	0.29	2.7	0.49	4.0	0.72	6.3	0.50	4.4
Medium damage	Compression	0.56	5.3	0.40	3.3	0.52	4.6	0.49	4.4
	Browsing	0.31	3.0	0.27	2.2	0.34	3.0	0.31	2.7
	Sum	0.87	8.3	0.67	5.5	0.86	7.6	0.80	7.1
Major damage	Compression	0.58	5.5	0.68	5.5	0.72	0.7	0.66	3.9
	Browsing	0.25	2.4	0.59	4.8	0.48	0.4	0.44	2.5
	Sum	0.83	7.9	1.27	10.3	1.20	1.1	1.10	6.4
Total damage (minor+medium+major)		***1.99***	***18.9***	***2.43***	***19.8***	***2.78***	***15.0***	***2.40***	***17.9***

Price increase from farm to end-consumer:

Channel stage	March, 2018 (consumer market, Islamabad)	
	Rs./ kg	Percentage increase
Farm level	30	-
Main-middle man	36	20 %
Sub-middleman	52	44 %
Vendor/ Retailer	107	106 %
Total increase (1-4)	***77***	***257 %***

Treatment-2: Improved harvesting & packing:

Stage of chain	Percentage	Nature of damage
Farmer filed	2.8%	Bird damage, diseased fruit, insects infestation, fruits injury due to poor harvesting tools, improper harvesting method, delay in packing and transportation

Transportation	11.7%	Compression & browsing
Retail level	2.7%	Over ripening, moisture loss, physical injury, compression, microbial growth, accelerated respiration etc.
Total	**17.2%**	

Experiment No. 15	**EFFECT OF DIFFERENT PLANTING DENSITIES ON GROWTH, YIELD AND FRUIT QUALITY OF GUAVA**
Objective	To evaluate out the effect of plating densities on growth, yield and quality of guava
Research worker	Malik Mohsin Abbas, Komal Aslam, Muhammad Mazz Aziz and Qamar Shahzad Anjum
Project duration	2016 - Long term
Location	Horticultural Research Institute, Faisalabad
Treatments	T1 = 22ft× 15 ft T2 = 11ft × 7.5ft T3 = 11ft × 3.75 ft T4 = 5.5ft × 3.75 ft
Plan of work	Layout design = RCBD Treatments = 4 Replications = 6 Plants/treatment = 12 Total Plants = 288 A block of guava was established at four different planting densities in the month of October at Progeny Garden of Horticultural Research Institute (31°23' 47.9876"N, 73°3' 34.1597"E)
Data to be collected	**Vegetative Characteristics** • Plant height (cm) • Stem girth (inch) • Leaf area (cm2) **Fruit Physical and Biochemical parameters**
Previous year's results	**Table: Plant height, stem girth and leaf area of guava plants grown under three planting densities**

Treatments	Plant height (inch)	Stem girth (inch)	Leaf area (cm^2)
T_1	124.32 a	3.75 a	80.828 b
T_2	63.92 c	3.2 a	72.916 c
T_3	60.75 c	3.58 a	90.005 a
T_4	85.00 b	3.75 a	69.817 c

Experiment No. 16	**NUTRITION STANDARDIZATION OF YOUNG GUAVA PLANTS, PLANTED UNDER VARIOUS DENSITIES**
Objective	Objective of study is to find out most suitbable NPK dose for guava planted under various densities
Research worker	Komal Aslam, Muhammad Maaz Aziz, Dr. Maryam Nasir Sitwat Riaz
Project duration	2018-

Treatments methodology	T1 = Control T2 = N:P:K=300:200:150 (g) per plant T3 = N:P:K=400:300:200 (g) per plant T4 = N:P:K=500:400:250 (g) per plant 50Kg farm yard manure will be applied to all plants during the month of December
Plan of work	Layout = RCBD Treatments = 4 Replications =
Data to be collected	• **Vegetative characters** 1. Plant height (cm) 2. Tree spread (cm) • **Flowering and fruiting characters** 1. Fruit set %age (%) 2. Fruit maturity time (date) 3. Total yield (Kg) 4. Physico-chemical analysis
Previous year results	New Experiment
Experiment No. 17	**ASSESSMENT OF SALINITY EFFECTS IN GUAVA AND ROLE OF TRIACONTANOL IN ITS MITIGATION**
Objective	To investigate the drastic effects of salt stress on guava plant growth and development as well as on its yielding capacity. Further, to find the role of triacontanol in its amelioration
Project duration	2018-2019
Research worker	Hira Faiz, Sahar Rashid ,Muhammad Maaz Aziz
Location.	Horticultural Research Institute, Faisalabad.
Treatments/ Methodology	**Guava variety: Gola** **Layout : factorial under CRD** **Replications : 4** **Triacontanol levels** T_o = No application T_1 = 10 µM **Salinity levels** To = 0 dS m^{-1} (NaCl) T1 = 2 dS m^{-1} (NaCl) T2 = 4 dS m^{-1} (NaCl) T3 = 6 dS m^{-1} (NaCl) T4 = 8 dS m^{-1} (NaCl)
Data collection	1. Plant height (cm) 2. Number of leaves

	3. Leaf fresh weight (g) 4. Leaf dry weight (g) 5. Leaf Area (cm2) 6. Stem dry weight (g) 7. Fruit dry weight (g) 8. Root dry weight (g)
Previous year result.	New Trial
Experiment No. 18	**CHARACTERIZATION OF INDUCED MUTANTS IN GUAVA CULTIVARS**
Objective	Mutation induction in guava in order to get desirable traits i.e seedlessnes
Project duration	2018-2020
Research worker	Hira Faiz,
Location.	Horticultural Research Institute, Faisalabad.
Treatments/ Methodology	Guava varieties : Gola and Surahi Layout : CRD To = 0 Gy T1 = 50 Gy T2 = 70 Gy T3 = 90 Gy T4 = 110 Gy T5 = 130 Gy
Data collection	1. Plant height (cm) 2. Number of leaves 3. Leaf width (cm) 4. Leaf length (cm) 5. Leaf Area (cm2) 6. Root length (cm) 7. Fruit size (cm) 8. No. of seeds 9. Total soluble solids ^{O}Brix
Previous year result.	New Experiment

GRAPES *(Vitis vinifera)*	
Experiment No. 19	**PERFORMANCE OF DIFFERENT GRAPE VARIETIES UNDER THE CLIMATIC CONDITIONS OF FAISALABAD**
Objective	To select the most suitable varieties of Grapes under the Agro-climatic conditions of Faisalabad
Research worker	Sitwat Riaz, Komal Aslam and Hira Faiz
Location	Horticultural Research Institute, Faisalabad
Project duration	2012-2017

Treatments/ Mythology

Treatments	Variety
T_1	Flame Seedless
T_2	Italia
T_3	White seedless
T_4	Preast
T_5	Haitha
T_6	Perlette
T_7	Munaka
T_8	Cardinal

Plan of work

Layout = RCBD
Treatments/varieties = 8
Plants/ treatment = 1
Replications = 4
Total plants = 32
Season for collection of cuttings : January
Transplantation time : February
Plant to Plant distance : 7 feet
Row to Row distance : 12 feet
Four plants of each variety will be planted in vine yard.

Data to be collected

a) Vegetative Characteristics

1. Survival % age
2. Plant height (cm)
3. Number of shoots /plant
4. Number of leaves/shoot
5. Size of leaves

b) Reproductive Characteristics

1. Maturity time
2. Clusters/plants
3. Fruit weight (g)
4. Clusters weight (g)
5. Size of fruit (cm2)
6. TSS (%)
7. Acidity (%)
8. Juice (%)
9. Number of seeds/ fruit
10. Fruit yield/plant

Previous year results

Results are presented in the following table

Variety	Bunch Length (cm)	Bunch Weight (gm)	Berry Size (mm2)	# of Berries/ Bunch	TSS (^{0}brix)
White Seedless	22.68	339.00	26.41	293	14.32
Perlette	20.40	371.50	26.79	300	14.10
Haita	18.15	189.250	24.50	207	19.45
Flame Seedless	17.88	177.00	21.00	270	17.48
Cardinal	19.25	370.75	25.73	370	14.68

	STRAWBERRY
Experiment No. 20	**RESPONSE OF STRAWBERRY TO PLANT GROWTH REGULATORS AND THEIR EFFECT ON VEGETATIVE AND REPRODUCTIVE GROWTH**
Objective	Evaluate the best growth regulator for the vegetative and reproductive growth of Strawberry.
Research worker	M.Maaz Aziz,Amina,Sahar Rashid
Project duration	2018-2021
Location	Horticultural Research Institute, AARI, Faisalabad.
Treatments/ Methodology	**Treatments** T_1= Control T_2= GA_3@25ppm T_3= GA_3@50ppm T_4 = GA_3@75ppm T_5= NAA@20ppm T_6=NAA@30ppm T_7=NAA@60ppm
Plan of work	Layout = RCBD Treatments = 7 Plants/treatment = 50 Replications = 3 Total number of plants = 1050
Data to be collected	• Plant height • No. of Leaves • Leaf Area (cm2) • No. of flowers/plant • No. of fruit/plant • Fruit weight (gm) • Fruit size (mm) • Fruit yield (kg/plant) • Physiochemical analysis
Results	New experiment

OLIVE

Experiment No. 21	**INTRODUCTION OF VARIOUS OLIVE CULTIVARS UNDER PREVAILING CONDITIONS OF FAISALABAD**
Objective	To evaluate the suitability of different cultivars of olive to prevailing conditions at Faisalabad conditions.
Project duration	2016- 2020
Location	Horticultural Research Institute, Faisalabad
Research worker	Hira Faiz, Sahar Rashid and Zahid Rashid
Treatments/ Methodology	T_1 = Arbequene T_2 = Arbosana T_3 = Coraniki T_4 = Kalamata T_5 = Gamblic
Plan of work	Layout = RCBD Treatments = 5 Replications = 4 Plants/ treatment = 1 Total of plants = 20
Attributes to be studied	Data will be collected and analyzed of the following aspects: **Vegetative characters:** 1. Plant height 2. Leaf blade area 3. Growth habit 4. Flowering and fruiting characters: 5. Flowering time 6. Fruit set percentage 7. Yield per plant (kgsPhysio-chemical analysis

Previous year results

Sr. No.	Variety	Plant height(cm)	Stem diameter (mm)	No. of leaves
1.	Arbequina	73a	13.58a	54.2a
2.	Coranikie	68b	12.79ab	24.6c
3.	Gamblic	62.7c	11.28c	36.8b
Two varieties i.e. Kalamata and Gamblic will be planted this year				

FIG *(Ficus carica)*

Experiment No. 22	**ADOPTABILITY OF VARIOUS FIG STRAINS UNDER FAISALABAD CONDITIONS**
Objective	To collect, select and preserve different strains / varieties of fig and identify commercially viable ones
Research worker	Sahar Rashid, Zahid Rashid, Malik Mohsin Abbas and Amna Jamil
Location	Horticultural Research Institute, Faisalabad
Project duration	2018-2020
Treatments/	**Treatments** / **Variety** T_1 Green Fig T_2 Fig Selection 1 (LY) T_3 Fig Selection 2 (AARI) T_4 Fig Selection 3 (black) T_5 Fig Selection 4 (brown) T_6 Fig selection 5 (RYK)
Plan of work	Layout = RCBD Treatments/varieties = 5 Plants/ treatment = 1 Replications = 4 Total plants = 20 Survey was carried out to collect the promising germplasm during fruiting season, the promising strains were marked and tagged for raising the nursery. Four plants of each strain have been transplanted in the progeny garden during January 2018.
Data to be collected	**a) Vegetative Characteristics** 1) Survival % age 2) Plant height (cm) 3) Number of shoots 4) Number of leaves /shoot 5) Size of leaf (cm^2) 6) Number of fruits/ shoot **b) Fruit Characteristics** 1) Fruit weight (g) 2) Length of fruit (cm) 3) Width of fruit (cm) 4) Fruit Size (cm^2) 5) TSS (Brix) 6) Fruit yield/plant

PREVIOUS RESULT

Vegetative characteristics of different Fig strains

Name of variety	Survival percentage	Plant height cm	No of branches	No. of leaves/ branch	Leaf length	Leaf width	Leaf size	Stem diameter
Green Fig	100	55	2.5	4.8	105.5	89.5	9495	7.8
Layyah Selection	100	67	2.75	5.8	101.5	90.3	9160.6	11.9
AARI Selection	100	87.5	2.75	5	112.8	96.8	10908.6	8.3
RYK Selection	100	90	3	4.5	111.5	98.8	11405.6	7.3
Fig Black	100	125	4.8	7.3	98	73.8	7227.5	11.1
Fig Brown	100	75	3.5	8	91.8	85.3	7821.7	11.2

BANANA *(Musa sapientum)*

Experiment No. 23	**PERFORMANCE OF DIFFERENT VARIETIES OF BANANA UNDER THE CLIMATIC CONDITIONS OF FAISALABAD**
Objective	To evaluate the suitability of different cultivars of Banana under Faisalabad conditions
Research worker	Komal Aslam, Sahar Rashid and Hira Faiz
Location	Horticultural Research Institute, Faisalabad
Project duration 2012- 2014	2016-2018
Treatments/	T1 = William Hybid T2 = Basarai T3 = Hari Chal T4 = Sindh Selection T5 = Kanathi Selection
Plan of work	Layout = RCBD Treatments = 5 Replications = 4 Plants/ treatment = 1 Total of plants = 20
Data to be collected	**Vegetative characters** 1. No. of leaves 2. No. of suckers produced **Flowring and fruiting characters** 1. Flowering time 2. Fruit wt. (kg) 3. Fruit Size (mm2) 4. No. of hands 5. No. of fingers/ hand 6. Yield/plant (kg) 7. TSS (%) 8. Starch contents

Previous Year Results	Suckers were brought on 12.04.2018 and planted in nursery. They were shifted in the field on 03.09.2018 as inter-plantation in date palm. Initial data was recorded.

Papaya (*Carica papaya)*

Experiment No. 24	**ADAPTABILITY STUDIES OF INDIGENOUS AND EXOTIC STRAINS OF PAPAYA UNDER AGRO-CLIMATOLOGY OF FAISALABAD CONDITIONS**
Objective	To evaluate the performance of different varieties of papaya with better yield and quality.
Research worker	Muhammad Maaz Aziz, Nida Mehreen, Malik Mohsin Abbas
Project duration	2018-2020
Location	Horticultural Research Institute, Faisalabad
Methology / Treatments	T1 = Red lady T2 = California T3 = Local Papaya
Plan of work	Layout = RCBD Treatments = 3 Plants/treatment = 12 Replications = 3 Total plants = 108 Thirty-Six plants of each strain will be transplanted in progeny garden during the month of October.
Data to be collected	**a) Vegetative Characteristics** 1) Survival % age 2) Plant height (cm) 3) Number of shoots 4) Size of leave **b) Reproductive Characteristics** 1) Maturity time 2) Fruit weight (g) 3) Fruit Size (cm^2) 4) TSS (%) 5) Fruit yield/plant

Previous year results

Treatments	Plant height (cm)	Stem girth (cm)	Leaf length (cm)	Leaf width (cm)	Leaf area (cm2)	Canopy (cm)
Calena	78.74	18.62	48.04	56.43	2710.52	130.16
Red Lady	36.83	16.44	38.73	52.45	2031.38	109.68

Experiment No. 24	**OPTIMIZATION OF NUTRIENTS NP AND K FOR EXOTIC STRAINS OF PAPAYA UNDER AGRO-CLIMATOLOGY OF FAISALABAD CONDITIONS**
Objective	To optimize the dose of N, P and K for different varieties of papaya with better yield and quality.
Research worker	Nida Mahreen, Muhammad Maaz Aziz
Project duration	2019- 2021
Location	Horticultural Research Institute, Faisalabad
Methodology / Treatments	T1 = Control T2 = N1P1K1 (160:160:160) g/plant/year

	T3= N1P2K1 (160:200:160) g/plant/year T4= N1P3K1 (160:240:160) g/plant/year T5= N2P1K2 (200:160:200) g/plant/year T6= N2P2K2 (200:200:200) g/plant/year T7= N2P3K2 (200:240:200) g/plant/year T8= N3P1K3 (240:160:240) g/plant/year T9= N3P2K3 (240:200:240) g/plant/year T10=N3P3K3 (240:240:240) g/plant/year
Plan of work	Layout = RCBD Treatments = 10 Plants/treatment =1 Replications = 3 Total plants = 30
Data to be collected	**b) Vegetative Characteristics** 1) Survival % age 2) Plant height (cm) 3) Stem girth (cm) 4) Size of leave 5) Canopy size **c) Reproductive Characteristics** 6) Maturity time 7) Fruit weight (g) 8) Fruit Size (cm^2) 9) TSS (%) 10) Fruit yield/plant
Previous year results	**New Experiment**

SEEDLESS KINNOW(*Citrus reticulate balanco*)	
Experiment No. 26	**EVALUATION OF DIFFERENT STRAIN OF SEEDLESS KINNOW (*CITRUS RETICULATE BALANCO*) UNDER FAISALABAD CLIMATIC CONDITIONS**
Objective	To find out the suitable seedless Kinnow strains better adapted to prevailing climatic conditions
Research workers	Javaid Iqbal Gill, Muhammad Maaz Aziz, Ghulam Mustafa, Muhammad Zahid Rashid
Project duration	2016-long term
Location	Horticultural Research Institute, AARI Faisalabad
Treatments	18-Entries
Plan of work	Layout = RCBD Replication = 3 Treatment unit = 1 Total Plants = 54 Bud wood of different strains of seed less Kinnow was collected from the progeny block planted at Dr. Shujaat Chak No. 8-NB, Sargodha; Sultan Farm, Vehari and AsadTiwana Farms, Sargodha. Budwood was grafted at HRI Faisalabad and transplanted in progeny garden risala No. 12 on 10-09-2015 with plant to plant and row to row distance (18x18feet) at plot No. 24, 25, 30, 31/36 sq.The evaluation of different strains of seedless kinnow in terms of their growth, yield and quality parameters will be integral part of this study.

Data to be collected	1. Height of plant (m) 2. Plant spread (m) 3. Canopy volume (m^3) 4. Leaf area (cm^2) 5. Time taken for 1st flowering 6. Number of seeds/fruit 7. Yield/plant (Kg) 8. Fruit size (cm^2) 9. Single fruit weight (gm) 10. Peel thickness (mm) 11. TSS% 12. Acidity% 13. TSS/Acid ratio
Previous Years Result	

Strains	Plant Height (ft)	Plant Canopy (ft2)	Stem Girth (Inch)	Leaf Area (cm^2)
1	6.4	4.58	6.5	24.44
2	6.27	4.17	6.17	23.46
3	5.97	4.77	6	26.63
4	6.5	4.8	7.5	26.82
5	6.97	5.97	7.83	24.51
6	7.97	5.67	7.83	26.00
7	7.27	5.33	7	22.72
8	7.27	5.47	7	25.87
9	6.73	4.97	6.83	26.90
10	6.93	5.07	7.83	23.68
11	6.8	5.07	7	24.66
12	6.3	3.77	5.17	29.88
13	6	4.13	5.67	21.23
14	6.23	3.9	6	22.75
15	5.9	3.87	5.67	28.65
16	6.23	3.33	6.33	27.85
17	5.53	3.93	5.67	25.84
18	5.57	4.8	7.5	23.84

Experiment No. 27	**EFFECT OF DIFFERENT INTERSTOCKS ON GROWTH AND FRUIT QUALITY OF 'KINNOW' UNDER FAISALABAD CONDITION**
Objective	To find out the effects of various interstocks on growth, yield and chemical quality of Kinnow
Research worker	Komal Aslam, Amna Jamil Kanwal, Ghulam Mustafa
Project duration	2018-longterm project
Treatments/ methodology	T1 = Control (Kinnow) T2 = Sweet Lime T3 = Succri

	T4 = Grapefruit T5 = Feuterl's early
Plan of work	Layout = RCBD Treatments = 5 Replications = 3 Plants/ treatment = 4 Total of plants = 60
Data to be collected	• Success %age of interstock/grafting • Girth of scion • Girth Root:stock • Girth Scion:stock • **Vegetative characters** 1. Plant height (cm) 2. Plant spread (cm) • **Fruiting characters** 3. Flowering time 4. Flowering period (days) 5. Yield (Kg) 6. Physico-chemical analysis
Previous year results	New Experiment

DATE PALM RESEARCH SUB-STATION, JHANG

Experiment No. 28	**INTRODUCTION OF EXOTIC GERMPLASM OF DATE PALM THROUGH CHANCE SEEDLING**
Objective	To develop new varieties of Date Palm through seeds under Punjab Conditions.
Research worker	Muti Ullah and Fayyaz Ahmad
Project duration	Long term (?)
Treatments/ methodology	Date Palm Research Sub Station, Jhang.
Plan of work	T1 = Ajwa T2 = Amber T3 = Barhee
Data to be collected	Layout = RCBD Treatments = 5 Seeds/treatment = 50 Replications = 3 Total plants = 750
Previous year's results	New experiment
Experiment No. 29	**EFFECTS OF THINNING ON FRUIT QUALITY AND YIELD OF DATE PALM STRAIN HILLAWI**
Objective	To improve the quality and yield of Date palm strains Hillawi.

Research worker	Fayyaz Ahmad and Muti Ullah
Project duration	2019-2020
Location	Date Palm Research Sub Station, Jhang.
Treatments/ methodology	T1 = control (No thinning) T2 = thinning 1/4 of total number of bunches
Plan of work	Layout = RCBD Treatments = 3 Plants/treatment = 2 Replications = 3 Total plants = 18
Data to be collected	1. Fruit Weight 4. Bunch Weight 2. Fruit Flesh 5. Reducing and non reducing sugar 3. Fruit yield
Previous year's results	New Experiment
Experiment No. 30	**VARIETAL PERFORMANCE OF DIFFERENT EXOTIC DATE PALM CULTIVARS UNDER CENTRAL PUNJAB CONDITION.**
Objective	To evaluate the most suitable cultivars under central Punjab condition.
Research worker	Muti Ullah and Fayyaz Ahmad
Project duration	Long term (?)
Location	Date Palm Research Sub Station Jhang.
Treatments/ methodology	Nine varieties of date palms will be studied for their growth yield and quality character and their adaptability under central Punjab. 1. Ajwa 6. Nabut e Saig 2. Amber 7. Saagi . 3. Brahee 8. Shishi 4. Khalas 9. Sultana 5. Khudri
Data to be collected	1. Plant Height 2. Fruit Weight 3. Number of Fronds 4. Stone Weight 5. Frond Length 6. TSS 7. Leaflets per fronds 8. Yield
Previous year's results	

Sr. No	Cultivar	Plant Height (cm)	No of Fronds	Frond Height (cm)
01	AJWA	169.77	29.14	121.92
02	AMBER	208.78	28	174.04
03	BARHEE	170.88	19.28	108.81
04	KHALAS	165.20	17	117.34
05	KHUDRI	174.04	20.85	134.72
06	NABUT E SAIF	230.73	16.14	139.29

	07	SAAGAI	191.41	23.85	130.45
	08	SHISHI	178.30	23.28	143.56
	09	SULTANA	172.83	19.42	154.4

It is concluded that maximum plant height 230.73 was observed in nabut e saif fallowed by Amber (208.78). Maximum numbers of fronds (29.14) and minimum (16.14) were noted in Ajwa and nabut e saif. Amber attained maximum frond length (174.04) fallowed by shishi (143.56).

Experiment No. 31	**TO STUDY THE NUTRITIONAL RESPONSE IN DATE PALM (MAKRAN cv.) UNDER CENTRAL PUNJAB CONDITIONS.**
Objective	To find out most appropriate set of nutritional doses.
Research worker	Fayyaz Ahmad and Muti Ullah
Project duration	2015-2018
Location	Date Palm Research Sub Station Jhang.
Treatments/ methodology	To = control T1 = 1 Kg N T2 = 1.5 Kg N T3 = 1 Kg N+1 Kg P T4= 1.5 Kg N+ 1.5 Kg P T5= 1 Kg N+1 Kg P+ 1Kg K T6= 1.5 Kg N+ 1.5 Kg P+ 1.5 Kg K
Plan of work	Layout = RCBD Treatments = 7 Replications = 3 Plants/Treatment = 2 Total Plants = 42
Data to be collected	1 = No. of Spathes/Plant 2 = Fruit weight (gm) 3 = Bunch Weight (gm) 4 = Yield/plant(kg) 5 = TSS(Brix)

Previous year's results

Treatments	Spathes / plant	Bunch Weight (Kg)	weight of Fruit (g)	Yield/Plant (Kg)	TSS
To	7	7.2	8.1	48	32
T_1	9	7.6	8.7	66	33
T_2	10	7.9	8.8	78.2	30
T_3	10	8.2	9.0	98	34.0
T_4	11	8.7	9.3	112	34.0
T_5	13	7.9	9.8	109	34.2
T_6	9	7.1	9.7	80	31

Above data revealed that maximum no of spath per plant (13) was noted in T5 and minimum (07) was noted in To. Maximum bunch weight (8.7 kg) and (8.2 kg) was observed in T4 and T3 respectively. (9.8) g fruit weight was observed in T5 and minimum 8.1 g was noted in To. Maximum yield per plant 112 kg was observed in T4 fallowed by T5. Maximum TSS (34.2) and minimum (32)

	were observed in T5 and T0 respectively.

HORTICULTURAL RESEARCH STATION, BAHAWALPUR

Experiment No. 32	**IMPACT OF CLIMATE REGIMES ON PRODUCTION AND QUALITY OF DATEPALM GERMPLASM**
Objective	To evaluate the impact of climate regimes especially monsoon rains and high temperature on the production and quality of Date palm germplasm.
Research worker	Muhammad Ikhlaq Khan, Dr. Muhammad Azhar Bashir, Kashif Shabeer & Ammara Noreen
Duration	2016-2020
Location	Horticultural Research Station, Bahawalpur 03 Different sites in Southern Punjab

Treatment	**Variety**	**Treatment**	**Variety**
T_1	Hallawi	T_{11}	Zahidi
T_2	Makran	T_{12}	Aseel
T_3	Dhaidi	T_{13}	Kupra
T_4	Shakri	T_{14}	Fasli
T_5	Gajar wali	T_{15}	Pathri
T_6	Sanduri	T_{16}	Halwain
T_7	Sufaida	T_{17}	Khurma
T_8	Khudrawi	T_{18}	Dhaki
T_9	Shamran	T_{19}	Bagum jangi
T_{10}	Zirin	T_{20}	Haleeni

Plan of work

Design = RCBD
Treatments = 20
Replications = 03
No. of plants / Treatment = 03
Total No. of plants under trial = 180

The recommended dose of nutrition will be given just after harvesting of fruit. The necessary plant protection measures will be carried out at proper time to ensure good crop.

Data to be collected

1. Rainfall rate (mm/year).
2. Av. Length of frond (cm).
3. Av. %age of fermented fruit.
4. Av. Yield of fruit (Doka) / plant (Kg).
5. Av. Weight recovered after drying (Tamar) / Kg
6. Av. Weight recovered after curing (Chohara) / Kg

Previous year results

S. #	**Datepalm strains**	**Length of frond (cm)**	**Ferment fruit (%)**	**Doka / plant (kg)**	**Tamar / plant (kg)**	**Chohara / plant (kg)**
1	Halawi	375	30	100.0	75.3	67.0
2	Makran	380	40	84.6	62.6	57.0

	3	Dhaidi	395	40	86.6	65.6	58.0
	4	Shakri	390	30	77.6	56.6	52.3
	5	Gajjar wali	385	35	79.0	59.0	53.0
	6	Sanduri	310	35	73.3	54.6	49.3
	7	Sufaida	360	35	76.6	59.6	51.3
	8	Khudrawi	385	45	84.6	61.3	56.7
	9	Shamran	330	35	75.0	57.3	50.7
	10	Zirin	350	25	69.7	53.3	46.3
	11	Zahidi	377	35	123.3	94.3	82.3
	12	Aseel	380	35	110.0	83.3	74.0
	13	Kupra	410	45	80.6	62.6	54.0
	14	Fasli	325	40	69.0	49.6	43.7
	15	Pathri	345	35	71.6	52.6	45.7
	16	Halwain	365	30	84.0	63.3	56.3
	17	Khurma	425	35	106.6	81.6	72.3
	18	Dhaki	385	30	100.0	74.6	66.3
	19	Bagum jang	370	25	82.3	62.6	54.7
	20	Haleeni	360	30	80.0	60.6	54.3

Meteorological Data 2017-18

Month	Temperature (^{o}C)				Humidity %	Rain (mm)
	Maximum		Minimum			
	Avg.	Range	Avg.	Range	Range	
June,17	42	36-47	29	25-33	54-92	102
July, 17	43	38-47	29	25-34	46-88	39
August,17	39	34-44	30	27-32	74-89	11
Sept.,17	40	38-43	28	22-33	72-90	-
Octob.,17	38	32-42	21	16-27	56-88	-
Nov.,17	30	24-35	21	11-28	58-92	5
Dec.,17	26	20-31	10	06-14	67-89	15
Jan., 18	21	16-26	08	05-12	75-89	-
Feb., 18	28	22-33	10	05-16	56-91	03
March,18	35	27-43	20	15-25	56-92	01
April,18	39	34-47	22	16-27	52-91	07
May,18	42	33-50	25	16-34	48-93	10
June,18	44	39-49	27	22-33	56-93	17
July,18	42	36-47	28	25-31	64-93	128
August,18	41	38-44	29	26-32	74-93	84

Now June is receiving more precipitation than that of the past which may be injurious to early date varieties i.e. Gajjar wali, Shakri, Halawi and Makran. Mid-season strains remained always vulnerable to monsoon rainfalls and usually have more fermented fruit compared to early and late varieties.

Experiment No. 33	**PERFORMANCE EVALUATION OF EXOTIC GERMPLASM OF DATE PALM AT BAHAWALPUR**
Objective	To evaluate the performance of exotic germplasm of Datepalm with respect to

	local climatic conditions and its economic value for the region.				
Research worker	Dr. Muhammad Azhar Bashir & Kashif Shabir				
Duration	2016-2020				
Location	Horticultural Research Station, Bahawalpur				
	Treatment	**Variety**	**Number of plants planted during March, 2016**	**Number of plants planted during Sept-Oct, 2017**	**Total No. of Plants**
	T1	Ajwa	8	11	19
	T2	Amber	8	-	8
	T3	Barhee	8	12	20
	T4	Khalas	8	11	19
	T5	Khudri	8	-	8
	T6	Nabt-ul-Saif	8	-	8
	T7	Sugai	8	-	8
	T8	Shishi	8	11	19
	T9	Sultana	8	-	8
	T10	Medjoul	-	14	14
	T11	Lulu	-	12	12
	T12	Nemeishi	-	12	12
	T13	Raziz	-	11	11
	T14	Zamli	-	11	11
	Total				**177**
Plan of work	Design = RCBD Treatments = 14 Replications = 03 No. of plants / Treatment = 02 Total No. of plants under trial = 84 Date of plantation = 04.03.2016, 25.09.17 & 17.10.17 The optimum dose of nutrition and irrigation will be applied for the early completion of juvenile phase.				
Data to be collected	1. Survival %age. 2. Av. Plant height (m). 3. Av. No. of fronds produced. 4. Av. Length of frond (cm). 5. Av. No. of pinnae / frond. 6. Av. No. of suckers produced per plant. 7. Av. Weight / Fruit (g). 8. Av. Weight / stone (g). 9. Av. Length of fruit (cm). 10. Av. Diameter of fruit (cm). 11. Av. Total Soluble Solids of fruit (%). 12. Av. Yield of fresh fruit / plant (Kg).				
Previous year	**Variety**	**Survival**	**Av. Plant**	**Av. No. of**	**Av. Frond**	**Av. No.**

results		(%)	Height (m)	fronds	Length (m)	of suckers / plant
	Ajwa	95	1.77	18.5	1.52	4.00
	Amber	100	2.00	23.3	1.71	3.33
	Barhee	95	1.93	22.7	1.66	4.00
	Khalas	95	1.78	21.5	1.64	8.00
	Khudri	100	1.84	30.3	1.72	7.33
	Nabt-ul-Saif	100	2.24	23.5	2.08	4.33
	Sugai	100	1.90	26.8	1.70	7.67
	Shishi	100	1.87	26.1	1.75	13.00
	Sultana	100	1.86	23.7	1.68	6.00
	Medjoul	95	0.60	12.0	0.45	0.00
	Lulu	100	0.87	13.67	0.83	0.00
	Nemeishi	100	0.77	10.33	1.03	0.00
	Raziz	100	0.93	13.3	0.85	0.00
	Zamli	100	0.88	13.0	0.85	0.00

Experiment No. 34	**TO STUDY VARIABILITY OF EXOTIC DATEPALM SEEDLINGS UNDER CLIMATIC CONDITIONS OF BAHAWALPUR**		
Objective	To find out promising chance seedling of Date palm with elite characteristics.		
Research worker	Dr. Muhammad Azhar Bashir & Kashif Shabir		
Duration	2015-2025		
Location	Horticultural Research Station, Bahawalpur		
Treatments	**Treatment**	**Variety**	**Origin**
	T1	Ajwa	Saudi Arabia
	T2	Amber	Saudi Arabia
	T3	Mubroom	Saudi Arabia
	T4	Sugai	Saudi Arabia
	T5	Safawi	Saudi Arabia
	T6	Khudri	Saudi Arabia
	T7	Sukri	Saudi Arabia
	T8	Barni	Saudi Arabia
	T9	Khalas	Saudi Arabia
	T10	Halwa	Saudi Arabia
	T11	Kalma	Saudi Arabia
	T12	Dhakki	Pakistan
Plan of work	Design = CRD Treatments = 12 Replications = 05 No. of plants / Treatment = 10 Total No. of plants under trial = 600 Date of plantation = 10.03.2016 The optimum dose of nutrition and irrigation will be applied for the early completion of juvenile phase. Stones of above said varieties will be soaked in		

	warm water for 12 hours and then will be sown in polythene bags.
Data to be collected	1. Av. Germination percentage. 2. No. of days taken to germinate. 3. Av. Plant height (cm) 4. Av. Stem girth (cm) 5. Av. No. of fronds per plant. 6. Av. Frond length (cm). 7. Av. No. of pinnae / frond.

Previous year results

Variety	Av. Plant height (cm)	Av. No. of fronds	Av. Frond Length (cm)	Av. No. of pinnae / frond
Ajwa	66.2	6	64.4	9.8
Amber	76.8	9	70.4	12.0
Mubroom	60.0	9	60.0	14.8
Sugai	70.0	7	56.0	12.8
Safawi	80.0	7	59.0	19.0
Khudri	72.8	10	70.2	10.4
Sukri	49.0	7	47.0	8.2
Barni	60.6	9	52.0	7.2
Khalas	54.6	6	51.4	6.4
Halwa	61.6	8	59.2	7.4

Experiment No. 35	**INTEGRATED APPROACH TO COMBAT THE ATTACK OF RED PALM WEEVIL IN DATE PALM**
Objective	Red Palm Weevil is a devastating insect for the Datepalm orchards causing mortality of productive plants. So, integrated approach is in need to control this insect.
Research worker	Muhammad Ikhlaq Khan, Dr. Muhammad Azhar Bashir, Kashif Shabeer & Ammara Noreen
Duration	2018-2022
Location	Horticultural Research Station, Bahawalpur

T1	Micro infusion injection of Lesenta WG (Fipronil + Imidachloprid) @ 1g/Liter of water (3 Liter solution / plant at monthly interval).
T2	Clay + Insecticide paste (Chloropyriphos @ 200 ml / 5 Kg clay) after detachment of suckers.
T3	Insertion of Phosphotoxin Tablets in attacked plants @ 05 Tablets / hole at fortnightly interval.
T4	Micro infusion injection + Paste
T5	Micro infusion injection + Phosphotoxin tablets.
T6	Phosphotoxin tablets + Paste.
T7	Control

Plan of work		
	Design	= RCBD
	Treatments	= 07
	Replications	= 03
	No. of plants / Treatment / Replication	= 03

	No. of plants / Treatment = 09 Total No. of plants under trial = 63	
Data to be collected	1. Infestation %age before start of experiment. 2. Infestation %age on quarterly basis. 3. Mortality % age of plants.	
Previous year results	New experiment	
Experiment No. 36	**CHARACTERIZATION AND DOCUMENTATION OF GERMPLASM (DATEPALM, BER & POMEGRANATE)**	
Objective	Characterization and documentation of different traits of Datepalm, Ber & Pomegranate germplasm will be conducted for the purpose of their approval and registration with the Government.	
Research worker	Muhammad Ikhlaq Khan, Dr. Muhammad Azhar Bashir, Kashif Shabeer & Ammara Noreen	
Duration	2016-2020	
Location	Horticultural Research Station, Bahawalpur	
	Crop	**Variety / Strain**
	Datepalm	Khurma, Shakri, Shamran, Zahidi, Aseel, Kupra, Haleeni, Hilawi, Khudrawi
	Ber	Pak White, Umran, Anokhi, Sufan, Bahawal-SL, Yazman
	Pomegranate	Pearl, Golden
Plan of work	The different traits will be documented at the following phenological stages: Stage 1: Post harvest vegetative growth. Stage 2: Flowering. Stage 3: Fruiting.	
Data to be collected	A total of 90 different characteristics will be documented at the following phenological stages of Datepalm, Ber and Pomegranate: 1. Vegetative stage (35-Traits) 2. Flower stage (15-Traits). 3. Fruit development and maturity stage (28-Traits) 4. Others (12-Traits)	
Previous year results	**Datepalm (7), Pomegranate (2), Ber (6)** • Two year DUS-Test i.e. 1st year (2016-17) & 2nd year (2017-18) have been completed. • Case has been submitted to PSC-Lahore to convene Experts Sub-Committee meeting.	
Experiment No. 37	**INTEGRATED APPROACH TO CONTROL CRACKING OF FRUIT IN POMEGRANATE**	
Objective	The cracking of Pomegranate fruit is a major issue in southern Punjab causing heavy loss to its growers.	
Research worker	Muhammad Ikhlaq Khan, Dr. Muhammad Azhar Bashir, Kashif Shabeer & Ammara Noreen	
Duration	2018-2022	
Location	Horticultural Research Station, Bahawalpur	
	T1	Spray of Streptomycin (1g/lliter) at monthly interval from May-July.

	T2	Spray of Isabion (1ml/liter) at monthly interval from May-July.
	T3	Spray of Nativo (1g/liter) at monthly interval from May-July.
	T4	Spray of Streptomycin (1g/lliter) + Isabion (1ml/liter) at monthly interval from May-July.
	T5	Spray of Streptomycin (1g/lliter) + Nativo (1g/liter) at monthly interval from May-July.
	T6	Spray of Isabion (1ml/liter) + Nativo (1g/liter) at monthly interval from May-July.
	T7	Control.
Plan of work	Design = RCBD Treatments = 07 Replications = 03 No. of plants / Treatment / Replication = 03 No. of plants / Treatment = 09 Total No. of plants under trial = 63 Uniform plants will be selected. The basic dose of fertilizer (N=500g, P=250g & K=250g) will be applied after harvest. Irrigation will be applied at fortnightly interval during summer and monthly interval during winter.	
Data to be collected	1. Total number of fruits / plant. 2. Av. No. of cracked fruits / plant. 3. Av. %age of cracked fruit / plant. 4. Av. Volume / fruit (cm3). 5. Av. Yield / plant (Kg). 6. Maximum residue level in fruit.	
Previous year results	New experiment.	
Experiment No. 38	**TO STANDARDIZE SOIL MOISTURE REQUIREMENTS OF DATEPALM THROUGH RESTRICTED IRRIGATION SYSTEM**	
Objective	Optimum soil moisture availability throughout the year is essential to get potential yield in Datepalm. So, it is paramount to standardize irrigation requirement for economy production of Datepalm.	
Research worker	Muhammad Ikhlaq Khan, Dr. Muhammad Azhar Bashir, Kashif Shabeer & Ammara Noreen	
Duration	2018-22	
Location	Horticultural Research Station, Bahawalpur	
	Treatment	
	T1	Maintaining 20% soil moisture in upper 100 cm of root zone
	T2	Maintaining 30% soil moisture in upper 100 cm of root zone
	T3	Maintaining 40% soil moisture in upper 100 cm of root zone
	T4	Maintaining 50% soil moisture in upper 100 cm of root zone
	T5	Control (conventional irrigations)
Plan of work	Design = RCBD Treatments = 05 Replications = 03 No. of plants / Treatment = 05	

	Total No. of plants under trial = 75 Variety = Zahidi The soil moisture in the effective root zone will be monitored through soil moisture probe (Delta T-Devices). The successive irrigation will be made after achieving the requisite average value of the soil moisture in 100 cm of the root zone. 02 access tubes will be installed at different locations under each treatment to measure soil moisture level at different depths throughout the year. The recommended dose of nutrition will be given just after harvesting of crop. The plant protection measures will be carried out at proper time to ensure good crop.
Data to be collected	1. Total No. of irrigations made / year. 2. Total rainfall received / year (mm) 3. Av. Length of frond (cm) 4. Av. Length of flowering panicle (cm) 5. Av. Weight / fruit (g) 6. Av. Yield of fresh fruit / plant (Kg) 7. Av. Weight of fruit / plant recovered after curing (Tamar) (Kg)
Previous year results	New experiment
Experiment No. 39	**STANDARDIZATION OF PRUNING INTENSITY OF POMEGRANATE BUSH FOR ITS QUALITY PRODUCTION**
Objective	To find out the best pruning intensity for better growth, quality and yield of Pomegranate fruit.
Research worker	Ammara Noreen, Kashif Shabir & Dr. Muhammad Azhar Bashir
Duration	2017-2020
Location	Horticultural Research Station, Bahawalpur
Treatments	T1 = Control (un-prunned) T2 = 20 cm pruning of branches T3 = 40 cm pruning of branches T4 = 60 cm pruning of branches
Plan of work	Design = RCBD Treatments = 04 Replications = 03 No. of plants / Treatment / Replication = 05 No. of plants / Treatment = 15 Total No. of plants under trial = 60 Uniform plants will be selected. Pruning will be carried out during the 2nd fortnight pf November.
Data to be collected	Av. No. of fruits / plant Av. Yield / plant (Kg) Av. Volume / fruit (cm3) Av. No. of arils / 100 g. Total Soluble Solids of fruit (%).

Previous year results	**Treatment**	**Av. No. of fruits / plant**	**Av. Volume / fruit (cm3)**	**Av. No. of arils / 100g**	**TSS of fruit (%)**	**Av. Yield / plant**

						(Kg)
	T1	178	185	265	13.1	35.80
	T2	225	192	277	13.2	42.70
	T3	285	214	295	14.0	60.90
	T4	335	253	315	14.0	82.75

Experiment No. 40	**STANDARDIZATION OF POTTING MIX FOR BETTER GERMINATION AND RAPID GROWTH OF BER ROOTSTOCK**
Objective	To attain the better germination and growth of Ber rootstock in pots for rapid its multiplication and extended storage of nursery plants under lath house.
Research worker	Ammara Noreen, Mrs. Naheed Akhtar & Faheem Altaf
Duration	2018-2021
Location	Horticultural Research Station, Bhawalpur Horticultural Research Sub-Station, Dera Ghazi Khan

Treatment/ Methodology

Treatment	Silt	Peat Moss
T1	100 %	0
T2	80 %	20 %
T3	60 %	40 %
T4	40 %	60 %
T5	20 %	80 %

Seeds will be soaked in water for 03 days prior to sowing in media filled pots. The polythene bags will be filled with required concentration of media by volume. The seeds of Desi Ber will be sown to raise seedling stock.

Plan of work

Layout = CRD
Treatments = 5
No. of seeds / treatment = 50
Replications = 3
Total No. of plants = 750

Data to be collected

1. Germination % age.
2. No. of days taken to achieve budable thickness.
3. Av. Stem thickness (mm).
4. Grafting success (%)
5. No. of days taken by scion to sprout.
6. Av. Length of scion (cm).
7. No. of days taken by grafted plant to ready for transplanting.

Previous year results	New experiment
Experiment No. 41	**STANDARDIZATION OF TECHNIQUE TO ENHANCE POST HARVEST SHELF LIFE OF BER FRUIT FOR ITS DISTANT MARKETING**
Objective	The fruit of Ber is very perishable which cannot be distant marketed. Therefore, it is direly in need to standardize any technique to enhance its shelf life to achieve distant marketing.
Research worker	Ammara Noreen, Mrs. Naheed Akhtar & Faheem Altaf
Duration	2018-2022
Location	Horticultural Research Sub-Station, Dera Ghazi Khan

	Horticultural Research Station, Bahawalpur	
Treatment/ Methodology	**Treatment**	
	T1	Rinse in 1% Sun flower oil + Packed in plastic boxes.
	T2	Rinse in 1% Sun flower oil + Packed in corrugated boxes.
	T3	Rinse in 1% Sun flower oil + Packed in plastic net bags.
	T4	Rinse in 2% Sun flower oil + Packed in plastic boxes.
	T5	Rinse in 2% Sun flower oil + Packed in corrugated boxes.
	T6	Rinse in 2% Sun flower oil + Packed in plastic net bags.
	T7	Control (un-treated).
	The fruit will be harvested at full maturity. After harvesting the fruit will be graded for equal size to get uniformity during experimentation. The oil for making rinse / dip solution will be used of cooking grade. The fruit will be kept at room temperature.	
Plan of work	Layout = CRD Treatments = 07 Replications = 03 No. of fruits / treatment / replication = 100 Total No. of fruits = 2100 Variety = Pak-White	
Data to be collected	1. Av. Weight of fruit / treatment at the time of start of experiment (Kg). 2. Av. Loss of fruit weight on daily basis (g). 3. Av. Shriveling of fruit on daily basis (%). 4. Av. Senescence of fruit on daily basis (%). 5. Total Soluble Solids of fruit on daily basis (oBrix).	
Previous year's results	New experiment	