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OVERVIEW

Horticulture sector has emerged enormous potential regarding the fruits as a part of healthy diet, is key to strengthen the immune system against diseases like stunted growth, blindness, dyspepsia, dermal disorders and pulmonary track infection as well as scavenge of free radicals into body to fight against aging due to its peculiar antioxidant capacity. Fruits play a major role for earning of foreign exchange through export of various fruits to the different countries of the world. Pakistan is blessed with tropical, subtropical and temperate climate to produce diversity of fruit crop around the year. Keeping in view, the vast paradigm of fruit production, a Fruit Section was established during 1926 in Punjab Agricultural College and Research Institute, Lyallpur (Faisalabad) with passionate zeal to develop specific fruit production ecological zones as well as provision of high yielding varieties of fruit plants to align a trend of commercial fruit production in the subcontinent. With the passage of time and after a long series of changes, this section was upgraded as Horticultural Research Institute, Faisalabad in 1986. The mandate of this institute was to conduct research on various aspects of quality fruit production. Currently, this institute has Horticultural Research Station, Bahawalpur, Horticultural Research Sub-Station, DG Khan and Date Palm Research Sub-Station, Jhang as its paraphernalia in the Punjab.

This pioneer research institute has prime objective to develop new fruit varieties by means of hybridization, mutation, selection, introduction and acclimatization of fruit varieties having superior quality traits to enrich the existing genepool of indigenous fruits. The planning and designing of fruit groves accommodating different planting densities to enhance the fruit production by efficient utilization of land are the part of ongoing research work. Dissemination of climate resilient production technology of different fruit crop under the changing trend of prevailing climate for the benefit of orchardist. Evolution of clonal propagation technique for the rapid multiplication of pedigree fruit nursery plants also accompanied to expedite the pace of research work. An integrated research based strategy to address the physiological disorders in the fruit crop also grab the attention of fruit growers as well. Introduction of

exotic date palm cultivars to boost the date industry on modern lines, is shifting the paradigm into a new horizon that ultimate contribute a lot regarding the employment generation, poverty alleviation and strengthening the national exchequer by fetching foreign exchange through export of premium date fruits to the different countries of the world.

1. STANDARDIZATION OF SUITABLE TIME FOR ROOTING OF GUAVA SOFT WOOD CUTTINGS

Guava is highly cross pollinated fruit crop. Mostly guava is being propagated through seeds due to non-availability of any quick reliable vegetative/asexual propagation technique. So the attempts have been made to develop a technology for production of true to type guava nursery plants. A success of 59% has been achieved by planting 9 inches long shoot tip of guava with 2-3 terminal leaves planted in polythene bag under tunnel. Cuttings are planted after treatment with IBA @ 0.4% during the month of October under 80% humidity and 25-28 C temperature.



Fig.1. Sprouted soft wood cuttings

2. STANDARDIZATION OF TIME AND METHOD OF GRAFTING/BUDDING FOR PRODUCTION OF TRUE TO TYPE GUAVA NURSERY PLANTS

The trial was carried out to find the suitable time of grafting in guava to produce true to type nursery plants. Three methods i.e. T-Budding, T-Grafting and Cleft-Grafting were tested for success. Recorded data revealed that maximum success (49%) was achieved in T-grafting

practiced during the month of October. The significance of the technology are the purity of the homogenous planting material with early juvenility.



Fig.2. Grafting of guava

3. CRACKING AND FRUIT QUALITY OF POMEGRANATE AS EFFECTED BY PRE HARVEST SPRAYS OF GROWTH REGULATORS

Fruit cracking is the physiological disorder of pomegranate that occurs due to different growth rates between skin and aril filling stage fruit impacted poor quality of fruit ultimately result in economic loss. The reasons are the genetic, environmental and physiological factors accompanied with malpractices of the farmers. The current study was conducted to find out the suitable chemicals as a possible control measures against fruit cracking of pomegranate. The cracking can be minimize by the foliar application of the 0.3% Boric acid + 1% KNO₃ during first week of June and first week of July. Better orchard management, efficient irrigation schedule, keeping field in “WATTER” condition,



Fig.3. Fruit cracking in pomegranate

4.COLLECTION AND MAINTENANCE OF GUAVA GENEPOOL

There are a few superior guava cultivars in the entire Punjab. There lies great diversity in terms of shape and quality in guava varieties in the entire Punjab due to cross pollination. There was need to explore the promising germplasm of guava with elite characteristics. The hectic efforts of the scientists enabled this institute to identify eight strains of guava (GS-1,2,3,4,5,6,7 & 8) with elite quality characteristics and planted the Progeny garden for its further characterization.

Eight strains were selected from the different districts of the Punjab that have the elite characteristics like proper fruit shape, fruit weight, TSS and productivity.



Fig.4. Guava Selection 1,3,4 & 5

5.COLLECTION AND MAINTENANCE OF POMEGRANATE GENEPOOL

The pomegranate production areas are facing the deterioration due to unhealthy plant material and infestation of diseases like bacterial blight.

Collection of superior strains may help in boosting up the pomegranate industry on strong footing. There was need to explore the promising germplasm of pomegranate with elite characteristics. The attempts are made by the scientists of this institute for the Selection and collection of Six strains of Pomegranate (PS-1,2,3,4,5&6) with elite quality characteristics and planted in Progeny Garden for its further characterization.



Fig. 5. Pomegranate Selection 1,3,6 & 7 (from Top L to R)

6.ROOT INDUCTION IN LIGHT WEIGHT DATE PALM SUCKERS

Availability of pedigree suckers of the date palm is the prerequisite for establishment of the date groves. The date palm plant produces 10-15 suckers in whole life resulting less availability of the date suckers for date orchardists. Nursery experiments were conducted on standardization of clonal propagation technique in date palm by application of different concentrations of IBA on low weighted (4-8kg) suckers of date

palm. These attempts were carried out for the production of true to type and trust worthy nursery plants of date palm in the lath house during the month of February. Significantly higher success percentage after 30 days (79.25%) was noted in the suckers treated with IBA at the rate of 4000 ppm. The low rooted and low weighted suckers initiated the roots by application of IBA. This technology will be helpful for production of pedigree suckers for inward plantation of new orchards and will fill the need of availability of the plants to some extent.



Fig. 6. Root induction in low weighted suckers

7.PERFORMANCE OF DIFFERENT STRAWBERRY VARIETIES UNDER THE CLIMATIC CONDITIONS OF FAISALABAD

The experiment was conducted at Progeny Garden of Horticultural Research Institute, Faisalabad with emphasis to find out the suitable strawberry variety under the agro-climatic conditions of Faisalabad. The runners were planted in ridges during November, 2015. Two varieties viz Henyo and Chandler were evaluated for different vegetative and physio-

chemical characteristics. The data revealed that maximum fruit weight, fruit size, success%, No. of leaves/plant and number of roots/plant were observed in variety Chandler which is fit for the cultivation in the Faisalabad region.



Fig. 7. Glimpses of field plantation of strawberry cultivation

8.STANDERIZATION OF SUITABLE TEMPERATURE FOR PROCESSING/ DEHYDRATION OF DATES

Date fruits have a very high nutritional value. In Punjab, there is a menace of onset of monsoon downpour which coincides with dates harvesting season every year. Hence, there is dire need to secure dates by processing it fast before the monsoon rains and to get it into the markets as fast as possible. So the attempt has been made to standardize suitable temperature under control conditions (Dryer) to dehydrate the dates within short duration. Different temperatures ($52\pm 10^{\circ}\text{C}$, $56\pm 10^{\circ}\text{C}$, $60\pm 10^{\circ}\text{C}$) have been set and checked the effect of temperature on nutritional value of dates as well as on Physical quality.



Fig. 8. Dehydration plant for dates

9. ESTABLISHMENT OF MULTIPLICATION BLOCK OF EXOTIC DATE VARIETIES

The local available germplasm of date is not high valued as Arabian dates. So the attempts has been made by this Institute to import the nine Arabian dates varieties (Ajwa, Amber, Khudri, Nabut Saif, Sagai, Khalas, Barhee, Shishi and Sultana) which have been planted in the form of multiplication block at Date Palm Research Sub-Station, Jhang and Horticultural Research Station, Bahawalpur. In future, these will be the excellent source of nursery plants of high value dates.



Fig. 9. Multiplication block of exotic date varieties

10. TO STUDY VARIABILITY OF DIFFERENT DATE PALM VARIETIES

A attempt was carried out to develop the chance seedling variety after sowing the seeds of exotic date cultivars. For this pupose six varieties i.e. Ajwa, Khalas, Halwaa, Sukri, and Barniwere sown after soaking in lukewarm water for a span of 12 hours in the polyethylene bags containing a soil medium (containing 25% leaf mold, 25% sewage sludge and 50% organic fertilizer) during March, 2016. The stones showed more than 75% germination and when seedling initiated frond formaton were transferred in the field.



Fig. 10. Juvenile plantlets raised from Arabian Date stone into polyethylene bags

11. INTRODUCTION AND PERFORMANCE OF SEEDLESS BER

The experiment was conducted to collect different strains of seedless Ber from various regions of Pakistan and plant under Bahawalpur conditions for performance evaluation. During fruit maturity time, the promising strains of seedless Ber were marked and tagged through

survey and selection from Mouza Asrani (KhairpurTamewali area) in District Bahawalpur. The bud wood from selected material was collected and multiplied through vegetative methods. The bud wood from selected material was grafted on Desi ber (rootstock) through T-grafting method during September- October, 2014. The scion started growth from rootstock (Desi ber) within a month. The graft success was recorded about 95%, the graft took 18-30 days for initiation of growth. Data recorded on shoot parameters indicated average graft length 70-120cm having 7-10 side branches and 21-33 fruit per branch. Average number of fruit per panicle was 18-22 fruit, each fruit weighed 12-22 g, fruit size ranged in length 3.2-3.6 cm with diameter 2.7-3.5 cm, TSS ranged 13-16 Brix and fruit yield ranged 10-30 kg per plant when fruit samples were taken from plants of 2-3 year old.



Fig.11. Tree, fruit and fruit cross section view of seedless ber

12. ESTABLISHMENT OF FIG (*Ficus carica*) PROGENY ORCHARDS AT BAHAWALPUR

The experiment was initiated To collect and maintain germplasm of Fig from various regions of Pakistan and study their performance under agro-climatic conditions of Bahawalpur. During fruit maturity time, the promising strains/varieties of fig were marked and tagged through survey and selection. The bud wood from selected material was collected and multiplied through cuttings. Cuttings of four Fig selections have been planted and growth related parameters

were recorded. Out of these four selections, the performance of the fis selection, White Ball remain the best.



Fig.12. Black Ball, White Greek and Brown Turkey fruits of Fig varieties (from L to R)

RESEARCH PAPER PUBLISHED

1. Comparative evaluation of Naphthalene Acetic Acid (NAA) and urea for preventing premature fruit drop and improving fruit yield and quality in Ber (*Zizyphus mauritiana* Lamk.) Cv. Suffan. 2016. J Agric. Res. Vol. 54(1):55-62.
2. Performance of different apricot varieties under climatic conditions of Soan Valley. 2016. JAR 54 (4).
3. Bashir, M.A., F. Altaf, K. Shabir, N. Sharif and M. Ishfaq. 2016. Effect of different levels of pruning on ber (*Zizyphus mauritiana*) cv. Dehli Suffaid at Bahawalpur. 2nd Int. Conf. Hort. Sci. Feb. 18-20, 2016. Instt. Hort. Sci. Univ. Agri. Faisalabad (ICHS 2016/AB_396, pp 64).
4. Bashir, M.A., K. Shabir, F. Altaf, N. Akhtar and M. Ahmad. 2016. Effect of low level pruning on different ber (*Zizyphus mauritiana*) varieties. 2nd Int. Conf. Hort. Sci. Feb. 18-20, 2016. Instt. Hort. Sci. Univ. Agri. Faisalabad (ICHS 2016/AB_397, pp 172).
5. Altaf, F., M.A. Bashir, K. Shabir, M.M. Abbas and M. Ishfaq. 2016. Combating fruit cracking of pomegranate (*Punicagranatum*) by spraying different chemicals. 2nd Int. Conf. Hort. Sci. Feb. 18-20, 2016. Instt. Hort. Sci. Univ. Agri. Faisalabad (ICHS 2016/AB_367, pp 164).
6. Shabir, K., M.A. Bashir, F. Altaf, N. Akhtar and M. Ishfaq. 2016. Effect of urea spray on deblossoming of summer guava (*Psidium guajava*) crop. 2nd Int. Conf. Hort. Sci. Feb. 18-20, 2016. Instt. Hort. Sci. Univ. Agri. Faisalabad (ICHS 2016/AB_366, pp 163-164).

ABSTRACTS PUBLISHED

1. Morphological and physiochemical characterization of Jamun (*Syzgium cumini*)

Skeels) germplasm existing in Punjab, Pakistan. 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 80.

2. Influence of pruning on fruit yield and quality of guava cv. Gola. 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 81
3. Effect of different doses of potassium nitrate on flowering and fruiting of mango cv. Anwar Rataul. 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 96
4. Standardization of optimum time of budding peach nursery under Soan Valley conditions. 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 109
5. Combating fruit cracking of pomegranate (*Punica granatum*) by spraying different chemicals. 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 164
6. Effect of different concentrations of IBA on air layering of litchi (*Litchi chinensis* Sonn.). 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 173
7. Standardization of a technique of walnut harvesting for quality produce. 2nd International Conference on Horticultural Sciences. 18-20 Feb. 2016. Organized by Institute of Horticultural Sciences, UAF, Faisalabad. Page. 179

BOOKLETS OF PRODUCTION TECHNOLOGY PUBLISHED IN URDU

1. Cultivation of Guava, 2016
2. Cultivation of Pomegranate, 2016
3. Cultivation of Date palm, 2016

OTHERS

Urdu articles publications	08
TV/Radio talk	50
Workshops/Conferences	08
Presentations delivered in seminars	09

No. of trainings/trainees trained	91
Nursery of true to type fruit plants	12000

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