



Pir Mehr Ali Shah  
**ARID AGRICULTURE UNIVERSITY RAWALPINDI**  
*Department of Horticulture*



No. PMAS-AAUR/HORT/ 520

Date: 26/08/2022

Subject: **MINUTES OF 41<sup>st</sup> MEETING OF BOARD OF STUDIES**

The 41<sup>st</sup> meeting of the Board of Studies, Department of Horticulture was held on 15<sup>th</sup> August 2022 at 10:00 am in the Office of the Chairman, Department of Horticulture. The following were the participant in the meeting:

|                              |                  |
|------------------------------|------------------|
| Prof. Dr. Muhammad Azam Khan | Chairman         |
| Dr. Imran Hassan             | Member           |
| Dr. Touqeer Ahmad            | Member           |
| Ms. Najma Yousaf Zahid       | Member           |
| Dr. Mehwish Liaquat          | Member           |
| Dr. Muhammad Tahir Akram     | Member           |
| Dr. Usman Ali Abbasi         | Member           |
| Mr. Usman Shoukat Qureshi    | Member           |
| Dr. Umer Habib               | Member           |
| Dr. Irfan Ali                | Member           |
| Dr. Naveed Ur Rehman         | Member/Secretary |

The Chairman welcomed all the faculty members for sparing their time to attend the meeting of the Board of studies: -

The following agenda items were discussed one by one in detail.

**1. Admission Policy for Fall Semester 2022-23**

The house discussed the policy for postgraduate admission 2022-23. The following two committees were formulated to prepare the admission test for the Ph.D. and M.Phil.:

**For the Ph.D. admission test**

- |                            |          |
|----------------------------|----------|
| (1) Prof. Dr. M. Azam Khan | Convener |
| (2) Dr. Imran Hassan       | Member   |
| (3) Dr. Umer Habib         | Member   |

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**For the M.Phil. admission test**

|                              |          |
|------------------------------|----------|
| (1) Dr. Imran Hassan         | Convener |
| (2) Ms. Najma Yousaf Zahid   | Member   |
| (3) Dr. Muhammad Tahir Akram | Member   |

The Chairman expected the smooth completion of the postgraduate admission process ensuring merit in letter and spirit.

**2. Course Allocation for Fall Semester 2022-23**

Moving forward, the different courses were allocated to all faculty members:

| S. No.                                                           | Course Code | Credit Hours | Course Title                                    | Teacher Name                                                                                                 |
|------------------------------------------------------------------|-------------|--------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>B.Sc. (Hons) Agri. (Horticulture) 1<sup>st</sup> Semester</b> |             |              |                                                 |                                                                                                              |
| 1.                                                               | HORT-301    | 3(2-2)       | Introductory Horticulture                       | Dr. Imran Hassan (A)<br>Dr. Usman Ali Abbasi (B)<br>Dr. Naveed Ur Rehman (C)<br>Dr. Mehwish Liaquat (D & FT) |
| <b>B.Sc. (Hons) Agri. (Horticulture) 5<sup>th</sup> Semester</b> |             |              |                                                 |                                                                                                              |
| 1.                                                               | HORT-501    | 4(3-2)       | Principles of Fruit Production                  | Dr. Irfan Ali/ Dr. Naveed Ur Rehman                                                                          |
| 2.                                                               | HORT-503    | 3(2-2)       | Principles of Vegetable Production              | Dr. Muhammad Tahir Akram                                                                                     |
| 3.                                                               | HORT-505    | 3(2-2)       | Principles of Ornamental Crop Production        | Mr. Usman Shoukat Qureshi                                                                                    |
| 4.                                                               | HORT-507    | 3(1-4)       | Propagation and Nursery Management              | Dr. Umer Habib (Section-I Hort)<br>Mr. Usman Shoukat Qureshi (Section-II PBG)                                |
| 5.                                                               | HORT-509    | 2(1-2)       | <i>In Vitro</i> Propagation                     | Dr. Touqeer Ahmad                                                                                            |
| 6.                                                               | HORT-511    | 3(2-2)       | Vegetable and Flower Seed Production            | Ms. Najma Yousaf Zahid (Section-I Hort)/ Dr. Tanveer Hussain (Section-II PBG)                                |
| <b>B.Sc. (Hons) Agri. (Horticulture) 7<sup>th</sup> Semester</b> |             |              |                                                 |                                                                                                              |
| 1.                                                               | HORT-601    | 3(2-2)       | Physiology of Horticultural Plants              | Dr. Usman Ali Abbasi                                                                                         |
| 2.                                                               | HORT-603    | 3(2-2)       | Temperate Fruits                                | Dr. Naveed Ur Rehman/ Dr. Irfan Ali                                                                          |
| 3.                                                               | HORT-605    | 3(2-2)       | Winter Vegetables                               | Dr. Tanveer Hussain                                                                                          |
| 4.                                                               | HORT-607    | 3(2-2)       | Protected Horticulture                          | Dr. Muhammad Azam Khan/ Dr. Muhammad Tahir Akram                                                             |
| 5.                                                               | HORT-609    | 3(2-2)       | Breeding of Horticultural Crops                 | Dr. Muhammad Tahir Akram                                                                                     |
| 6.                                                               | HORT-611    | 2(1-2)       | Arid Horticulture                               | Dr. Touqeer Ahmad/ Dr. Tanveer Hussain                                                                       |
| 7.                                                               | HORT-613    | 3(2-2)       | Commercial Flower Production                    | Mr. Usman Shoukat Qureshi                                                                                    |
| <b>Ph.D. (Horticulture)/M.Sc. (Hons) Agri. (Horticulture)</b>    |             |              |                                                 |                                                                                                              |
| 1.                                                               | HORT-703    | 3(2-2)       | Environmental Horticulture                      | Dr. Umer Habib                                                                                               |
| 2.                                                               | HORT-706    | 3(2-2)       | Rootstock for Horticultural Crops               | Dr. Touqeer Ahmad                                                                                            |
| 3.                                                               | HORT-718    | 3(2-2)       | Advanced Fruit Science                          | Dr. Mehwish Liaquat                                                                                          |
| 4.                                                               | HORT-724    | 3(2-2)       | Post-Harvest Physiology                         | Dr. Usman Ali Abbasi/ Dr. Naveed Ur Rehman                                                                   |
| 5.                                                               | HORT-725    | 3(2-2)       | Horticultural Production under Abiotic Stresses | Ms. Najma Yousaf Zahid/ Dr. Umer Habib                                                                       |

**3. Any Other Point Raised by Member**

- Hosting an International Conference**

The house proposed to organize an "International Conference on Sustainable Horticulture (ICSH-2022)" in the mid of November 2022. The mega event will invite

foreign delegates, honorable speakers, and guests from other universities, institutes, and organizations. All faculty members shared their valuable input for the successful accomplishment of this scientific event. House discussed the contents of the event to make it an interesting knowledge resource for students, scientists, researchers, growers, and other stakeholders of the community. The following committee members against the discussed topic were finalized:

| Conference theme                                                                                                                                                                                                                                                                                       | Committee members                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li><b>Horticulture Crop Production</b><br/>Major and minor fruit and vegetable production, quality improvement, disease management, and innovative production techniques</li> </ul>                                                                                | Dr. Imran Hassan<br>Dr. Abdul Ahad Qureshi<br>Dr. Muhammad Tahir Akram |
| <ul style="list-style-type: none"> <li><b>Postharvest and Value Addition</b><br/>Cold storage, CA storage, MAP, value chain, pre- and post-harvest treatments, disease management, Food preservation method, and innovative method/process for Quality maintenance of fruits and vegetables</li> </ul> | Dr. Irfan Ali<br>Dr. Naveed Ur Rehman<br>Dr. Usman Ali Abbasi          |
| <ul style="list-style-type: none"> <li><b>Propagation, Breeding, and Biotechnology</b><br/>Micro &amp; macro propagation, breeding, seed production, rootstock, genetic diversity, mutation, genetic transformation, stress management, secondary metabolite</li> </ul>                                | Dr. Touqeer Ahmed<br>Dr. Usman Ali Abbasi                              |
| <ul style="list-style-type: none"> <li><b>Ornamental and Urban Horticulture</b><br/>Food gardening, nursery management, urban &amp; peri-urban horticulture, commercial floriculture, turf sciences, landscape design &amp; ecology</li> </ul>                                                         | Dr. Umer Habib<br>Mr. Usman Shoukat Qureshi                            |
| <ul style="list-style-type: none"> <li><b>Medicinal and Aromatic Plants</b><br/>Ethnobotany, genetic resources, domestication, adaptation products handling, bio-extracts, essential oils, industrial application, mushroom culture</li> </ul>                                                         | Ms. Najma Yousaf Zahid<br>Dr. Umer Habib<br>Dr. Tanveer Hussain        |
| <ul style="list-style-type: none"> <li><b>Climate-Smart Horticulture</b><br/>Precision application (AI, IoT, &amp; GIS), protected horticulture, soilless culture (hydroponics, aeroponic, aquaponics)</li> </ul>                                                                                      | Dr. Mehwish Liaquat<br>Dr. Tanveer Hussain                             |
| <ul style="list-style-type: none"> <li><b>Horticulture Business and Entrepreneurship</b><br/>Agri tourism, cottage horticulture, small and medium enterprise, business and supply chain, export certification</li> </ul>                                                                               | Dr. Umer Habib<br>Dr. Touqeer Ahmed                                    |

- Update of contents of the course**

Moreover, the contents of the course entitled "Breeding of Horticultural Crops (Hort-609)" were updated by Dr. Muhammad Tahir Akram. Similarly, the contents of the course "Postharvest of Horticultural Crops (Hort-508) were revised and updated by Dr. Naveed Ur Rehman. The Chairman encouraged respective faculty members for

introducing necessary changes in the contents of the course to meet the needs of future challenges.

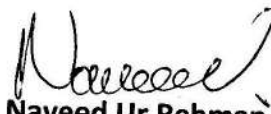
- **Revision of course title**

The house further suggested that the title of the course "Physiology of Horticultural Plants (Hort-723)" offered for postgraduate should be revised as "Advances in Physiology of Horticultural Plants (Hort-723)".

The meeting was ended with a vote of thanks by the Chairman, the Department of Horticulture.

Confirmed by

  
**Prof. Dr. Muhammad Azam Khan**  
Chairman

  
**Dr. Naveed Ur Rehman**  
Assistant Professor/Secretary Board

**Prerequisites**

Principles of Fruit Production, Principles of Vegetable Production and Principles of Ornamental Crop Production

**Specific Objectives**

To teach breeding methods for improvement of horticultural crops for specific objectives such as quality and yields.

**Theory**

Principles of plant breeding, Reproductive systems in horticultural crops, Self-incompatibility and male sterility; centres of origin, sources of genetic variability, Cytological basis of breeding, Heterosis, Theories of heterosis, Inbreeding depression, Apomixes, Role of mutation and polyploidy in breeding, Somatic selection and chimeras, Breeding objective, Methods of breeding of self and cross pollinated crops, Crop improvement and cultivars development, Somaclonal variations, Germplasm conservation, Concept of genetic manipulation and transgenic plants, traditional methods of developing improved cultivars of cross-pollinated, self-pollinated, and asexually-propagated horticultural crops, Traditional and modern breeding methods

**Practical**

Description of flowers of important fruits, vegetables and ornamentals. Emasculation, selfing and crossing techniques, Polyembryony tests. Pollen viability tests, Inducing polyploidy by chemicals, Emasculation and Crossing

**Learning Outcomes**

Students must be able to conduct breeding procedures independently.

**Books recommended**

- Fageria, M.S., P.S. Arya and Choudhary, A.K. 2000. Vegetable Crops (Vol. 1): Breeding and Seed Production. Kalyani Publisher, Ludhiana, New Delhi, India.
- Bassett, M.J. 1986. Breeding Vegetable Crops. Avi Publishing Co. Inc., Westport, Connecticut.
- Shukla, A.K., A.K. Shukla and B.B. Vashishtha. 2004. Fruit Breeding: Approaches and Achievements. International Book Distributing Company (Publishing Division), Lucknow, India.
- Singh, A.P. 2003. Vegetable Breeding and Seed Production (1<sup>st</sup> Ed.). Kalyani Publisher, Ludhiana, New Delhi, India.
- Ram, H.H. 2005. Vegetable Breeding, Principles and Practices. Kalyani Publisher, Ludhiana, New Delhi, India.

**Journals/Periodicals****Worldwide Web**

**Prerequisites**

Principles of Fruit Production, Principles of Vegetable Production and Principles of Ornamental Crop Production

**Specific Objectives**

To train students about breeding methods for the improvement of horticultural crops

To revolutionize students the mechanism of seedless fruit and vegetable production

To familiar students about innovative molecular techniques used for crop improvement

**Theory**

Introduction of Plant Breeding, Principles and types of plant breeding, Taxonomy of Horticulture crops, Reproductive systems in horticultural crops, Pollination types and mode of pollination, Factors affect crop fertilization, Self-incompatibility, Classification of Incompatibility Mechanisms, Heterosis, Inbreeding depression, Apomixes, Types of Genetic Variations, Mechanics of Polyploidy, Aneuploidy and its classification, Causes, advantages and disadvantages of Aneuploidy, Mutagenesis and types of mutagenesis, Floral biology and classification of horticultural crops, Parthenocarpy in horticultural crops, Flower biology, breeding methods and problems of major vegetables (Onion, Garlic, Bitter gourd, Cucumber), fruits (Grapes, Peaches, Apples) and ornamental crops (Jasmine, Petunia), Concept of genetic manipulation and transgenic plants., Role of genetic engineering in crop improvements

**Practical**

Description of flowers of important fruits, vegetables and ornamentals. Emasculation, Selfing and crossing techniques of Horticultural crops, Polyembryony tests, Seeds viability tests, Characterization of fruit and vegetable crops on the basis of morphological, biochemical, and molecular attributes, Polymerase Chain Reaction and Molecular markers.

**Learning Outcomes**

Students must be able to conduct breeding independently.

**Books recommended**

- Al-Khayri, J. M., Jain, S. M., & Johnson, D. V. (Eds.). (2018). *Advances in plant breeding strategies: fruits* (pp. 727-771). Cham: Springer.
- Gaur, R. K., Verma, R. K., & Khurana, S. M. (2018). Genetic engineering of horticultural crops: present and future. In *Genetic engineering of horticultural crops* (pp. 23-46). Academic Press.
- Badenes, M. L., & Byrne, D. H. (Eds.). (2012). *Fruit breeding* (Vol. 8). Springer Science & Business Media.
- Kalloo, G., & Bergh, B. O. (Eds.). (2012). *Genetic improvement of vegetable crops*. Newnes.
- Rahemi, A., Dodson Peterson, J. C., & Lund, K. T. (2022). Grape Rootstocks Breeding. In *Grape Rootstocks and Related Species* (pp. 23-30). Springer, Cham.
- Singh, P. K., Singh, P., Singh, R. P., & Singh, R. L. (2022). Transgenesis in Plants: Principle and Methods. In *Plant Genomics for Sustainable Agriculture* (pp. 41-70). Springer, Singapore.

**Journals/Periodicals**

- Journal of Plant Breeding And Crop Science
- Journal of Plant Breeding and Genetics
- Czech Journal of Genetics and Plant Breeding

**Worldwide Web**

**Hort. 508 POST-HARVEST HORTICULTURE**  
**Prerequisites**

**3(2-2)**

Introductory Horticulture

**Specific Objectives**

To equip students with the techniques to prolong shelf-life of perishable horticultural produce.

**Theory**

Introduction and importance, Pre- and post-harvest factors affecting quality, Climacteric and non-climacteric commodities, Indices of crop maturity / ripening, harvesting and pre-cooling, Curing and artificial ripening of horticultural commodities, Packing house operations; culling, grading, washing, cleaning, colouring, waxing and packaging of important horticultural commodities, Packing materials and containers, Storage; principles and types, storage life and factors determining it, International standards and quality assurance, sanitary and phyto-sanitary measures, Shipment for local and foreign markets.

**Practical**

Machinery and equipment used for various operations, Demonstration of harvest indices, Practices in harvesting, curing, packing and preparation of different fruits, vegetables and cut flowers for marketing, Determination of total soluble solids; Determination of fruit firmness, starch-iodine test, color determination, Visits to the fruit, vegetable and floral markets, packing houses and cold storages etc.

**Learning Outcomes**

Students must have the knowledge of produce physiology and its application to ensure quality and shelf life.

**Books Recommended**

- Bautista-Banos, S. 2014. Postharvest Decay ISBN: 978-0-12-411552-1.
- Bhattacharjee S. K and L.C. De. 2005. Post-Harvest Technology of Flowers and Ornamental Plants. Pointer Publishers jaipur India.
- Burg. P. S. 2004. Post harvest Physiology and Hypobaric Storage of Fresh Produce. CABI Publishing.
- Choudhry, M. L and K. V. Parsad. 2003. Value Addition in Horticulture. Delhi Agri-Horticultural Society. Division of Floriculture and Landscaping Indian Agricultural Research Institute Pusa, New Delhi-110 012.
- Kader, A.A. 2002. Postharvest Technology of Horticultural Crops. University of California Press, California, USA.
- Mohammed Wasim Siddiqui, M. W., Ali, A. 2016. Postharvest management of horticultural Crops: practices for quality preservation ISBN: 9781771883344; E-Book ISBN: 9781771883351.
- Pareek, S. 2016. Postharvest Ripening and Physiology of crops ISBN 9781498703802.
- Sadiq M., J. Ahmed, M.G. Lobo and F. Ozadali. 2012. Tropical and Subtropical Fruits: Postharvest Physiology, Processing and Packaging. Wiley-Balckwell Publisher.
- Simson, P.S. and Straus, M.C. 2010. Post-Harvest Technology of Horticultural Crops. Oxford Book Company, New Delhi.
- Singh, S.I. 2009. Post-Harvest Handling and Processing of Fruits and Vegetables. Westville Publishing House.
- Thompson, A.K. 1996. Post-Harvest Technology of Fruits and Vegetables. Blackwell Science Ltd., Oxford.
- Wojciech J. F., Robert L., Bernhard B., Stanley E. P. Postharvest Handling, Third Edition: A System Approach (Food Science and Technology. ISBN-13:978-0124081376; ISBN 10:0124081371.

**Journals/Periodicals**

**Worldwide Web**

**Prerequisites**

Introductory Horticulture

**Specific Objectives**

To equip students with the techniques to prolong the shelf-life of perishable horticultural produce.

**Theory**

Introduction and importance, Pre-harvest (genetic factors, environmental, cultural) factors affecting quality, Climacteric and non-climacteric commodities, Indices of crop maturity/ripening, harvesting and removal of the field heat, Curing (crops), artificial ripening of horticultural commodities, Packing house operations; curing, culling, grading, washing, cleaning, waxing, and packaging of important horticultural commodities, Packing materials, and containers, Storage; principles and types, Handling of fruits, vegetables, and flowers, International standards, and quality assurance, sanitary and phytosanitary measures, Shipment for local and foreign markets.

**Practical**

Introduction to lab equipment and functions; Practical demonstration of harvest indices; Harvesting operation; Quantification of weight loss, curing, packing, Determination of total soluble solids; fruit firmness, titratable acidity, starch-iodine test; Quality assessment; Color determination, Visit the fruit, vegetable, and flower markets, packing houses and cold storages, etc.

**Learning Outcomes**

Students must have the knowledge of produce physiology and its application to ensure quality and shelf life.

**Books Recommended**

- Ahmad, M. S., & Siddiqui, M. W. (2015). Postharvest quality assurance of fruits. Cham: Springer.
- Ali, A., Yeoh, W. K., Forney, C., & Siddiqui, M. W. (2018). Advances in postharvest technologies to extend the storage life of minimally processed fruits and vegetables. *Critical Reviews in Food Science and Nutrition*, 58(15), 2632-2649.
- Bhattacharjee S. K and L.C. De. 2005. Post-Harvest Technology of Flowers and Ornamental Plants. Pointer Publishers jaipur India.
- Kader, A.A. 2002. Postharvest Technology of Horticultural Crops. University of California Press, California, USA.
- Mohammed Wasim Siddiqui, M. W., Ali, A. 2016. Postharvest management of horticultural Crops: practices for quality preservation ISBN: 9781771883344; E-Book ISBN: 9781771883351.
- Ranganna, S. (2007). Handbook of analysis and quality control for fruits and vegetable products. Tata Mcgrawhill.
- Sadiq M., J. Ahmed, M.G. Lobo and F. Ozadali. 2012. Tropical and Subtropical Fruits: Postharvest Physiology, Processing and Packaging. Wiley-Balckwell Publisher.
- Shewfelt, R. L. (2000). Fruit and vegetable quality. In *Fruit and Vegetable Quality* (pp. 160-173). CRC Press.
- Simson, P.S. and Straus, M.C. 2010. Post-Harvest Technology of Horticultural Crops. Oxford Book Company, New Delhi.
- Singh, S.I. 2009. Post-Harvest Handling and Processing of Fruits and Vegetables. Westville Publishing House.
- Taylor, S. (2012). Postharvest handling: a systems approach. Academic Press.

**Journals/Periodicals****Worldwide Web**