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Message by Editor-in-Chief

Dear Horticulturists!

I am delighted to celebrate the launch of first issue of HortiMag, under the umbrella of Pakistan Society for Horticultural Science. Previously this magazine was being published by PSHS-IHS, UAF. I believe this magazine would not only be a good source of sharing major activities and achievements in the field of Horticulture at national level, but also provide useful knowledge to the growers, stakeholders, amateurs and researchers regarding horticulture related issues. I hope that it will become the primary platform for society members to share their findings and knowledge for uplifting the horticulture sector in the country. I feel highly motivated to see the positive response by the contributors exhibiting their deep interest in bringing this first issue of HortiMag to print. I would like to hear from you about its outlook and quality along with valuable suggestions for improving it in future. I sincerely extend my thanks to contributors, managing editor and associate editors and looking forward for continuous support.



Message by President PSHS

Pakistan Society for Horticultural Sciences (PSHS) is not only a community but is a family where one really feels that he or she is a part of growing Horticultural network in Pakistan. The joy of the society is that you have this large group of like-minded people with a passion to overcome the major problems of horticultural professionals in Pakistan by providing facilities & guideline through workshops, seminars, conferences, field visits and training schemes. Our main focus is to train and use talented young blood and polish them for future of horticulture in Pakistan. We also creed to develop a strong relationship between research wing of horticulture and Horticultural industry of Pakistan by developing R&D wing in society in which our country is lacking.

My wish for the future of the PSHS is that community continues to bring together all specialists working in horticulture from different countries and from different sub-specialties within horticulture. The vision I have for the PSHS is to promote sound, unbiased research and to create solidarity among Pakistani Horticulturists.

PSHS is already determined to transfer research-based knowledge to the farmers and community through platform of HortiMag.



Congratulations to the Newly Elected General Body of PSHS for 2019-20

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University of Agric., Faisalabad



Honors for the Horticulture Family

Congratulations to Prof. Dr. Nadeem Akhtar Abbasi on becoming Pro-Vice Chancellor, PMAS Arid Agriculture University, Rawalpindi

On behalf of Pakistan Society for Horticultural Science and HortiMag team, heartiest felicitations to Prof. Dr. Nadeem Akhtar Abbasi, Professor of Horticulture and Founding President of Pakistan Society for Horticultural Science, on assuming the charge of Pro-Vice Chancellor PMAS Arid Agriculture University, Rawalpindi. We are sure that he will

strive hard to improve academics and university management using his extraordinary skills and experience and will bridge the gap between academia, research and extension. Indeed it is a great honor for horticulture family and we wish him best of luck and ensure our moral support for his future endeavors.



Congratulations to Prof. Dr. Ishtiaq A. Rajwana on becoming Chairperson of NAEAC

On behalf of Pakistan Society for Horticultural Science and HortiMAG team, heartiest felicitations to Prof. Dr. Ishtiaq A. Rajwana, Pro-Vice Chancellor MNSUA, Multan and Ex-Vice President of Pakistan Society for Horticultural Science, on joining the office of The National Agriculture Education Accreditation Council (NAEAC), which was established by the Higher Education Commission, Govt. of Pakistan in 2008 to implement a comprehensive program of accreditation of agriculture education degree programs based on policies, procedures, and criteria setup by HEC to assure high quality and standards of education. The Council is responsible to publish a list of ranking of agriculture qualifications / programs and promote intellectual

development and understanding of subject areas that impact accreditation activities in the agriculture profession. Besides, the NAEAC is mandated to provide guidance for the improvement of the existing educational programs and development of future programs leading to the agriculture profession. Indeed it is a great honor for horticulture family and we wish him best of luck and ensure our moral support for his future endeavors.



Congratulations to Dr. Muhammad Azher Nawaz on Getting Chinese Govt. Outstanding Scholar Award

China Scholarship Council awarded "Chinese Government Outstanding Scholar Award-2018" to Dr. Muhammad Azher Nawaz. Dr. Nawaz got this award on publishing 8 SCI articles as a first author with a cumulative impact factor of 19; and 13 SCI articles as co-author with a cumulative impact factor of about 30 during his PhD studies at Huazhong Agricultural University, China. This is a prestigious award at national level and the amount of this award is 30,000 RMB. Dr. Nawaz is the Vice-President of Pakistan Society for Horticultural Science (PSHS); currently he is working as a Lecturer at Department of Horticulture, College of Agriculture, University of Sargodha, Pakistan. He is working to introduce Vegetable Grafting Technology in Pakistan.





International Horticulture Conference 2019

International Horticulture Conference was held from 26-28 February, 2019. Department of Horticulture, Bahauddin Zakariya University, Multan organized the conference in collaboration with Pakistan Society for Horticultural Sciences. Dr. Aamir Nawaz Khan, Chairman



Department of Horticulture, Bahauddin Zakariya University, Multan was the chief organizer whereas Prof. Dr. Tariq Mahmood Ansari, Vice Chancellor, BZU, Multan was the chief guest of the conference. The conference covered various topics related to different horticultural crops including (a) Peri-urban and urban crop production, (b) Plant protection and food safety, (c) Biodiversity and evolution, (d) Seed science and technology, (e) Genetics, breeding and biotechnology, (f) Propagation and nursery management, (g) Postharvest physiology and supply chain management, (h) Biotic and abiotic stress tolerance, (i) Storage and marketing and (j) Disease and pest management. The conference received more than 250 abstracts. The abstracts were screened based on their scientific merit. There were about 100 oral talks and over 150 abstracts were presented in the form of posters. Renowned national and international invited speakers presented

their key findings at the conference. Among the international invited speakers Prof. Dr. Jin Hu (China), Prof. Dr. Zhenhai Han (China), Prof. Dr. Hawa Ze Jafar (Malaysia) and Prof. Dr. Muhammad Aasim (Turkey) participated in the conference and shared their research findings on different aspects of various horticultural crops. The results of their work were of paramount importance because Pakistani horticulture-linked academia, extension, stakeholders, industrialists and exporters can utilize these findings to enhance research expertise and to reduce production/export related constraints in Pakistan. Various issues related to horticultural crops were also presented by the national and international participants. In the end, conference recommendations were presented. Among the different conference recommendations, an expo-center



was demanded to organize various future horticulture related activities in the region. Annual General Meeting of the society was also held during the conference. Prof. Dr. Muhammad Akbar Anjum presided Annual General Meeting of Pakistan Society for Horticultural Science. The next conference will be held at University of the Punjab, Lahore, during 2020.



Annual Spring Festival, UAF, 2019

Where Flowers Bloom, So does Hope!. In continuation of its beautiful tradition, Institute of Horticultural Sciences, University of Agriculture, Faisalabad organized "Annual



Spring Festival" on 19-21st March, 2019. As University of Agriculture, Faisalabad remained a place of attraction where people from all walks of life and flower lovers thronged at Spring Flower Festival with a huge participation of various public and private organizations. The festival was inaugurated by UAF vice chancellor Prof. Dr. Zafar Iqbal Randhawa who was flanked by Dean Faculty of Animal Husbandry, Prof. Dr. Sajjad Khan, Director Horticultural Sciences Dr. Jafar Jaskani, Controller of Examinations Prof. Dr. Abdul Wahid, Chief Hall Warden Prof. Dr. M. Amjad and Dr. Iftikhar Ahmad, Coordinator of the flower show. The



flowers of spring which are blossoming with all beautiful shades mesmerized the nature lovers. The dozens of different flower arrangements displaying colours of creative ideas as a fitting celebration of the spring season were set up by university students and other organizations. Educational and research institutions of the city and various industrial groups participated with their stalls showcasing more than 300 varieties of spring flowers.

Inspecting the stalls after inauguration, Prof. Dr. Zafar Iqbal Randhawa said that the exhibition is meant to spread the message of peace and brotherhood in the society. He said that the intolerance was showing an increasing trend that must be tackled with harmony and love. Dr Zafar Iqbal Randhawa while inspecting the stalls said that flowers are the symbol of love, peace and



beatification. He was of the view that intervention of marriage halls and marquees, demands for fresh flowers was at rise with every passing day. He told the participants that UAF was making all-out effort for the beautification of the city with plants, which are a gift of nature. Talking about UAF initiative for floriculture, he said that experts of the University in floriculture and landscape are providing consultancy to the government and private organizations for the beautification of different cities. He said we had developed a variety of *Rosa centifolia* with amazing fragrance and a large amount of essential oil contents. Further he said that beautification of personality's



blooms with education, religious values, dedication, honesty and their contribution towards the development of human beings and society. He added that there is need to explore hidden talents and use them for beautification of personalities development. Flower exhibition provides a chance to the people to enjoy the beauties of nature and such exhibitions must be arranged for the promotion of the harmony in the societies. He praised the UAF for taking the marvelous initiatives for the academia, research and outreach. Besides the University students, other organizations including Ayub Agricultural Research Institute, NIAB, NIBGE, Sitara Chemicals, and others exhibited their skills in arranging the flowers. The exhibition was based on the different themes. Different committees were made to organize such a big event like Organizing Committee, Management Committee and Evaluation Committee. The juries consist of Mr. Shuaib Raza, Mr. Ulfat Rasool, Dr. Umer Habib, Dr. M. Usman, Mr. Waheed Khaliq Raamay and Miss Kiran Khalid evaluated all 08 divisions. Multiple varieties of spring flowers were displayed that were placed in mounds and stalls and students of respective fields visited the event for identification of the displayed flora.

The prize distribution and closing ceremony of the event was held at New Senate Hall, University of Agriculture, Faisalabad in which position holders were awarded with trophies, shields and cash prizes. Vice Chancellor University of Agriculture, Faisalabad Prof. Dr. Zafar Iqbal Randhawa was the guest of honor. The odorous of intolerance, abhorrence and hatred attitude can be removed with the promotion of aroma of love, brotherhood, and patience among the different

segments of the society, said Commissioner Faisalabad Mahmood Javed Bhatti on closing ceremony of the event. He addressed the concluding session of three-day flower exhibition set up at the University of Agriculture Faisalabad. Mahmood Javed Bhatti said that flowers promote peace and beautification in our people. He lauded the holding of such festivity in which number of schools, universities and research institutes took part and spread the message of peace. Further he said that it also provided an opportunity to students to showcase their skills and give voice to their inner beauty. Prof. Dr. Zafar Iqbal said that flowers give us message of peace, prosperity, freshness, and development. He said that significance of the flower can

be gauged from the fact that at the time of pleasant moments, flowers are presented to make the moment historic. He said that hatred attitude in the society needed to be ironed out with the fragrance of love and brotherhood. Talking about economic and health benefit of flowers, he said that country can earn

heavy foreign exchange with the floriculture industry as we have a lot of potential that must be tapped. He said that bee collects essence from flowers and Nature converts it into honey from, he called, "factory" of honey bee. He said that honey is the best food and medicine. Prof. Dr Jaffer Jaskani said that there is a need to beautify the characters with brotherhood and love. He said that flower exhibition was a step towards spreading such messages. Gardener Club CEO Mr. Hamid Khan and **Dr. Iftikhar Ahmad**, Assistant Professor/Coordinator of the show also spoke. The event continued till evening of the 21st March and more than 50,000 visitors visited this Spring Flower Festival.





Vegetable Grafting Workshop at College of Agriculture, University of Sargodha

A two days Vegetable Grafting Workshop was organized by Department of Horticulture at College of Agriculture (COA), University of Sargodha (UOS) on April 16-17, 2019. In this workshop a large number of researchers, students, farmers and seedling nursery owners from different areas of the country participated to learn this innovative technology. Researchers and students from University of Agriculture Faisalabad (UAF), Pir Mehr Ali Shah Arid Agriculture University (AAUR), Rawalpindi, Muhammad Nawaz Sharif University of Agriculture (MNSUA), Multan, Lasbela University of Agriculture, Water and Marine Sciences, Uthal, Balochistan, Sindh Agriculture University (SAU), Tandojam, Department of Agriculture Extension Sargodha, Ayyub Agricultural Research Institute (AARI), Faisalabad, Nuclear Institute for Agriculture and Biology (NIAB), Bhakkar Campus, UOS, and Research Institute Mardan, Khyber Pakhtunkhwa participated in the workshop. An appreciable number of numbers of farmers from



Guests and invited speakers delivering their talks

Saleem highlighted the importance and health benefits of vegetables. Dr Muhammad Azher Nawaz talked regarding the history and commercial uses of vegetable grafting followed by Mr. Irfan Nawaz, Genral Manager M. A. Farms Faisalabad who delivered an impressive talk regarding the commercial greenhouse vegetable farming in Pakistan. Mr. Saqib Sultan and Mr. Shamshad Hussain from F. A. Traders Scientific Solutions and Engro Fertilizers, respectively, provided information regarding



Participants of the workshop during the technical sessions



Lahore, Okara, Lodhran, Bahawalpur and Bahawalnagar also attended the workshop. In the inaugural session, Dr. Zahoor Hussain, Incharge Department of Horticulture, College of Agriculture, UOS welcomed the distinguished guests and participants; key note speech regarding the overview, importance and status of vegetable grafting was delivered by Dr. Muhammad Azher Nawaz. In the 1st technical session Dr. Basharat Ali

their company products that are indispensable for successful and scientific based vegetable farming. In the 2nd technical session, Dr. Muhammad Azher Nawaz presented talks regarding the major grafting methods utilized for the production of grafted transplants and the healing requirement. Mr. Sajid Iqbal Sindhu, CEO Green Circle Pakistan delivered a talk related with input supplies for vegetable's seedlings production at a



commercial scale. Then all the participants got a hands-on training of vegetable grafting at Horticulture Laboratory, Department of Horticulture. Dr. Muhammad Azher Nawaz demonstrated the Hole Insertion Grafting Method and then all the participants practically prepared the grafted transplants of watermelon and muskmelon. Participants took keen interest in learning this innovative technology. Prof. Dr. Aman Ullah Malik, Director Institute of Horticultural Sciences, UAF was the chief guest of this workshop. Dr. Malik said the future of this technology seems bright and this technology can help boost vegetable sector of Pakistan. Prof. Dr. Ishtiaq Ahmed Rajwana, Pro-Vice Chancellor Muhammad Nawaz Sharif University of Agriculture, Multan (MNSUA) also graced the occasion. He mentioned vegetable grafting technology is the need of time, and we can harvest benefits from this innovative agro-technical approach. The ceremony

ended with the closing remarks of the chief guest Prof. Dr. Aman Ullah Malik and certificates were distributed among the 74 registered participants. According to the best of our knowledge, there was no research work or practical application of vegetable grafting in Pakistan, considering this, Department of Horticulture College of Agriculture, University of Sargodha organized this training workshop. Dr. Muhammad Azher Nawaz, the Focal Person of Vegetable Grafting Workshop earned PhD Degree during 2018 from Huazhong Agricultural University Wuhan, China. The focus of his research was improving the nutrient use efficacy and heavy metals stress tolerance of watermelon through utilizing vegetable grafting technology. He published several research articles related with vegetable grafting in the leading journals. Currently Dr. Nawaz is working on the introduction and development of vegetable grafting in Pakistan.



Participants during hands on training session of Vegetable Grafting Workshop

10-Day Training Workshops on "Nursery Management of Ornamentals" at Pattoki and Islamabad

Establishment of Model Farms Project, Linked with improved Supply Chain and Value Addition in collaboration with University of Agriculture, Faisalabad-



Mr. Anwar Bhatti and Dr. Arshad Hashmi chaired inauguration sessions and said that despite having a huge potential of producing good quality, Pakistan floriculture share at international market is far less where as in future, these sort of trainings will help us to meet the international standards. Further it was emphasized that the Agriculture and specially Floriculture is the most important sector to ensure the uplift of small land holders and to alleviate poverty. Mr. Wim Van Kester, a well known breeder and a senior expert from PUM Senior experts, Netherlands and Dr. Iftikhar Ahmad, Assistant Professor, Floriculture, University of Agriculture, Faisalabad conducted different technical sessions and trained the nurserymen regarding following aspects;

Pakistan, PUM Senior Experts Neatherlands and Directorate of Floriculture Punjab T&R (Lahore) organized two sessions of 5-day Training workshops entitled "Nursery Management of ornamentals" at Pattoki and Islamabad, respectively, from April 16-25, 2019. Horticulturists, stakeholders, Researchers, nursery owners, florists, entrepreneurs, extension agents and students participated in this training workshop. Dr. Malik Abid Mehmood, Director Floriculture T&R, Mr. Kashif Jamshed, Project Director, Model Farms Project,





Trainings Agenda

- o Basic pre-requisites for modern nursery
- o Business functions and planning of a modern nursery
- o Business planning modern nursery
- o Technical requirements and operations
- o Group discussion with participants
- o Issues and expectations
- o Structure for quality plant protection
- o Ornamental species for local and export markets
- o Planning, cost management, budgeting and IT resources for managing nursery
- o Substrates for quality nursery production and local substrates
- o Human Resources management and capacity building
- o Irrigation, fertigation for potted and plug culture and nursery plants
- o Marketing strategies and marketing Mix
- o Handling, packaging and value addition of nursery products for shipping
- o Quarantine requirements to link local nursery business with international markets
- o PGRs in nursery production
- o Insect/Pest and disease management in nursery production
- o Improvement in supply chain and profitability
- o Comments and survey about training by participants



Certificates distribution among the participants after completion of the training



Token of Love presented to Mr. Wim Van Kester by Dr. Abid Mehmood Malik (Director Floriculture (T&R) Punjab and Dr. Iftikhar Ahmad, Assistant Professor, UAF/ Training Coordinator



Group Photo at Islamabad



Group photo at Pattoki

Training Workshop on Ultra-High Density Plantation of Mango Orchards at MNSUA

MNS University of Agriculture, Multan in collaboration with Pakistan Mango Growers Group and Mango Research Institute, Multan, organized a Training Workshop on "Ultra-High Density Plantation of Mango Orchards" from 6th-10th February, 2019 at MNS-UAM. The objective of the training program was to build capacity/training of Pakistani mango stakeholders for establishing high density plantation of mango orchards and using high efficiency production systems. The participants of this training workshop included mango growers, researchers, service providers and field officers from different agro-industries from Punjab and Sindh province.

The resource person for the training course was Dr. Steven A. Oosthuysen, General Manager from HortResearch, South Africa. He has a vast experience of over 25 years in High Density Plantation of various fruit plants including mango, macadamia nuts and pistachio.

This training programme included the in-house lectures and in-field practical activities for high density plantation of mango orchards and covered following topics: 1) Essential Basics – current status; 2) Management – current status SA; 3) Sun, soil, water and atmosphere – a progression to irrigation and nutrition management; 4) Mango Tree Growth and Development; 5) Mango tree Spacing and Size Maintenance; 6) Mango Disorders, Diseases and Pests, Control Measures.



Outreach Seminar on Management of Pomegranate Tree Canopy for Better Fruit Quality at MNSUA, Multan



An outreach seminar was organized by Department of Horticulture, MNS-UAM, at Alipur, Muzaffar, Garh in collaboration of Extension Department, Alipur, on Dec. 05, 2018, under HEC funded NRPU project No 5933 entitled: 'Various supply chain issues and commercial potential of some minor fruit'. Pomegranate growers, university academia, research scientist, and representatives of Agriculture Extension department participated in the seminar.

Seminar on Innovation in Strawberry Production & Marketing at MNSUA, Multan

Department of Horticulture Muhammad Nawaz Shareef University of Agriculture Multan, organized one-day seminar on "Innovations in Strawberry Production & Marketing" in collaboration with the Strawberry Growers under PARB-CAS funded project entitled "Improving fruit quality and reducing postharvest losses in strawberry" at Mango Research Institute, Multan. The stakeholders, academia, researchers, government officials, and students together with strawberry growers and traders participated in this event. Overall, this event provided a valuable opportunity for awareness, branding and networking in strawberry production, supply and value chains.





Conference on Sustainable Urban Landscape at IHS, UAF

The conference entitled as “Sustainable Urban Landscape” was held on 24th of April, 2019. It was organized by Institute of Horticultural Sciences, University of Agriculture Faisalabad. The conference was funded by Endowment fund, UAF. The honorable Vice Chancellor UAF, Prof. Dr. Muhammad Ashraf was the chief guest. He was accompanied by Dean, Faculty of Agriculture “Prof. Dr. Muhammad Aslam” along with Prof. Dr. Aman Ullah Malik, Director, Institute of Horticultural Sciences.

The inaugural session started at 10 am by the recitation of Holy Quran by Hafiza Mehak Nadeem. Then Mr.



principles of landscape. He explained briefly the designs and their ecological value in the region of Sukkur to Multan. The next presentation was by Mr. Jawad Qadir, Manager Horticulture, Technical Associates Pakistan Pvt. Ltd. He elaborated the role of Roof Gardening towards the urban sustainability. He discussed about the material and structure of the roof gardens. It's a team of civil engineers along with a horticulturist who can complete the task of rooftop garden successfully. The perfectness of the drainage system is one of the primary importance while laying out this garden.

He further explained the difference between the micro climate of the roof and the ground level. So, plants must be selected keeping in view of the harsh climate (rain, temperature, frost) and other conditions on the roof as compared to ground. Plants that can be used at roof garden are: Foxtail palm, Topiaries, Petunia, Marigold, Bougainvillea, Roses, Fine dacca, and Korean grass etc. kitchen gardening can also be done at rooftops.

At the end certificates were distributed among all the presenters by Prof. Dr. Aslam Khan and Director ORIC.



Tauseef Sabir enchanted the premises with beautiful lines of Naat (S.A.W.). After that Dr. Adnan Younis elaborated the agenda of the conference and the importance of sustainable landscape in Pakistan, especially. He welcomed the honorable guests and all the participants and students.

After that chief guest Prof. Dr. Muhammad Ashraf gave his precious remarks and congratulated the managing team for providing such a thought-provoking platform specially for the students.

After the tea break, the first technical session started by Dr. Tariq Iqtadar Ex. Director Floriculture Punjab as the chairperson to the session. First speaker was Prof. Dr. Rana Aslam. He presented the work under process at the new M-5. The slogan to this project is “Eco-Friendly Motorway” that includes the use of different trees, shrubs, annuals and native grasses according to the



VEGETABLES SOILLESS FARMING SYSTEM IN SOUTH PUNJAB

Dr. Hafiz Nazar Faried, Dr. Muhammad Amin, Zeeshan Haider and Dr. Sami Ullah

Department of Horticulture, MNS-University of Agriculture, Multan, Pakistan

Introduction

Hydroponic cultivation is a soilless farming technique for the production of shallow rooted high value crops especially vegetables. It is an advanced form of tunnel technology fitted with high efficiency of irrigation system along with nutrient supply (fertigation), air-circulation, temperature and relative humidity control. Overall, this system ensures limited chances of external contaminants (insect/pest) and least insecticide/pesticide sprays, thereby producing high and export quality agriculture produce.



Commercial Advantages:

Hydroponic/Soilless farming has various commercial advantages as compared to conventional farming like efficient use of inputs, minimal use of chemicals, least chance of weeds, insects and diseases, suitable for small scale farming, semi-automatic operation, opportunity of vertical cultivation, export promotion, high crop density and high yield.

Crops Grown at MNS-UAM Hydroponic Unit:

In this system, one can grow high value shallow rooted crops. However, during 2017-18, two crops were grown; tomato (beefsteak & cherry) and bell/sweet pepper (Red, Orange & Yellow color) MNS-UAM hydroponic research unit. Crop seeds were sown in the greenhouse, Institutes of Hydroponic Studies, Rawat, University of

Arid Agriculture, Rawalpindi, seedling transported to Multan and transplanted at hydroponic unit, research farm MNS-UAM during mid-December, 2017.

Nutrient Recipe for the Growth of Crops Grown under Hydroponic System

The nutrient recipe provided to the hydroponically grown crops at MNS-UAM is developed by UAAR on the basis of Hoagland's solution.

Crop Nutrition Timetable with respect to Different Crop Growth Stages

In order to maximize the crop growth, nutrition is planned as per their growth stages.

Harvesting and Packaging Material

Besides, standard harvesting procedure was adopted to reduce postharvest losses and ensure quality. Additionally, two type of packaging material i.e., 04 kg export quality cardboard and open top gift pack was introduced.

Environment Control

Environment control plays a pivotal role for high quality produce. Therefore, Fan and Pad system is installed to maintain the desired temperature (25-30 °C) and relative humidity (55-65%).

Precautions

In order to produce insect-pest, disease and chemical free produce, MNS-UAM has focused on the following precautions ; kept the hydroponic unit clean during all



crop growth stages to avoid disease infestation, recipe was developed with vigilance, maintained hygiene and sanitation environment, did not visit the hydroponic unit crop after visiting the other field crops, responsibly supervised of whole hydroponic system regularly and did not employ illiterate workforce.



GUAVA WILT DISEASE (GWD) IN PUNJAB: STATUS, CAUSES AND FUTURE PROSPECTS

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Guava, *Psidium guajava* L., is named as Amrood (Pakistan), Piyara (Mexico), Guayaba (Spain), and Biyabas (Indonesia). Southern Mexico and tropical America are believed as its center of origin. It was transported to India and Philippine in the fifteenth century. It is widely cultivated in tropical and sub-tropical areas of the world and is known as "Apple of Tropics". High nutritive value, abundant availability, relatively low price compared with other fruit crops and year-round production makes it more attractive for both consumers and producers. Guava fruit contains 2.5 time more Vitamin C compared with Citrus. Guava is an excellent fruit for boosting human immunity system, lowering risk of cancer, diabetes, cardiac health maintainer, lowers stress, improves nervous system activity and reduces cholesterol.

In Pakistan, guava is the fourth most cultivated fruit crop after citrus, mango and apple. Central Punjab including Lahore, Sheikhpura, Faisalabad, Sahiwal and Bahawalpur are the main guava producing areas. In Punjab, district Sheikhpura is the main guava producing hub. Guava cultivation is rapidly rising in the progressive farming community due to its early bearing habit, long harvesting span and meadow orchard culture. Among, Asian countries, Pakistan has the lowest per hectare yield of guava i.e., 7-8 tons ha⁻¹ whereas leading guava producing countries e.g. South Africa, Taiwan and Brazil produce 23-25 tons ha⁻¹. In the last 7-8 years, despite 25% increase in the area under cultivation, production has not increased substantially and per hectare yield has decreased up to 13% mainly due to guava decline which is an alarming situation. Among many other factors, the most critical biotic stress is Guava Wilt Disease (GWD) and old productive orchards have been massively removed in Lahore and Faisalabad districts because of this emerging dilemma. GWD has not only threatened the guava industry of Pakistan but also reduced its export. Guava wilt is widely

reported in Brazil, Mexico, India, Pakistan, South Africa, and Bangladesh. Guava wilt drastically reduced fruit production in West Bengal, India where plants need replacement every few years.

Guava industry of Pakistan is seedling based and has genetic diversity due to lack of commercially successful clonal propagation systems. The scientists of Institute of Horticultural Sciences, University of Agriculture, Faisalabad has developed clonal propagation systems using stem cuttings and plant tissue culture technology, however, the commercialization of these systems may be a slow process. There has been relatively less focus on guava crop improvement programs and recently few projects have been funded by agencies including PARB and ALP-PARC. Other problems include abiotic stress (heat and drought) and high post-harvest losses. Heat stress during summer season due to removal of leaves, little or no irrigation to avoid flower and fruit bearing followed by heavy irrigation and fertilization during fall and winter seasons for bumper winter crop is also drastically affecting the plant health and long term productivity of the orchards. Farmers also grow wheat, cotton, fodder crops and vegetables etc. as intercrops and the irrigation schedules of these crops do not match with the guava irrigation requirements. Collectively these problems are also intensifying the severity of guava decline.

In GWD, the effected plant's green leaves turn yellow with mild leaf curling from margins at the terminal branches, which turns reddish at later stages and fell concomitantly. Twigs bear flowers which fail to grow and newly emerged leaves and flowers become dry and fell down. Fruit of all affected branches remain unripen/underdeveloped or mummified (hard, black and stony). The complete plant may defoliate and finally die. Medium day length, mild temperatures, high humidity and soil moisture maintenance may help in vigorous transfer of the disease. GWD is soil borne and

spreads through nursery stock grown in contaminated soil and infection is transferred from infected nurseries to clean orchards. Hence, spread of fungi and other soil borne pathogens in guava can be minimized by adopting proper phytosanitary measures in nurseries including use of sterilized potting media and ensure plant sanitation (<https://www.facebook.com/CitrusnGuava.NurseryIHSUAF>). Related information and recommendations for the growers are being updated on the given webpage. Keeping in view the above discussed situation an extensive study was initiated in potential guava growing regions of Punjab to identify disease and its pathogen, quantify its status, screen elite and wild varieties for potential tolerance and genetic characterization of the pathogenic fungal isolates.

It was found that GWD incidence was much higher in Lahore, Sheikhupura and Faisalabad regions compared with Sahiwal and Bahawalpur areas. Among cultivars, survey depicted higher incidence of GWD in cultivar Pyriform (Surahi) compared with Round (Gola). Most of the elite strains in both cultivars across different regions in central and southern Punjab were found infected with GWD. Cytological characterization of different fungal isolates recovered from infected roots collected from different areas showed frequent involvement of *Fusarium* species in GWD along with few other novel species. Fungal isolates collected from Lahore, Bahawalpur, Faisalabad and Multan regions were found more virulent compared with other regions.

Substantial tolerance was observed in a few guava strains while elite cultivars like Sadabahar Gola and Sadabahar Surahi were more susceptible varieties. Genetic characterization of fungi showed higher polymorphism. Detailed phylogenetic analysis showed that Guava pathogenic isolates were closely related to internationally reported wilt causing *Fusarium sp.* in different horticultural crops. This is the first report of any pathogenic isolate causing GWD from Pakistan and we found novel wilt causing pathogens in guava as well. These studies could be helpful to underpin the defense mechanism involved in tolerance against GWD in local varieties and for future breeding and biotechnology applications for guava crop improvement.

Preventive Measures: Growers shall always purchase plants from a well reputed nursery having containerized

plants and following proper nursery sanitation and hygiene system. It is advised that nursery plants shall not be purchased from areas having higher disease incidence. Farmers shall immediately uproot the wilting trees showing more than 50% canopy wilting and burn these to avoid disease spread. The wilting trees at initial stages shall be isolated from rest of the orchard and shall be separately irrigated to avoid inoculum spread through conventional flood irrigation system. Such trees shall be immediately and repeatedly treated with suitable copper-based fungicides as both foliar spray and by root drenching. For further information, visit <https://www.facebook.com/CitrusnGuava.NurseryIHSUAF>.

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Model Steam Sterilization Unit for Potting Media

Wilt Symptoms and Removal Guave Orchards



TOPICAL DEVELOPMENT AND PLANT LANDSCAPING IMPRESSION TOWARDS MUSHROOM INDUSTRY

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Life demands flavors and flavors arise from nature in figure of plants either vegetable or fruit. But very few people know about an additional kingdom which grips the fruit but not whole plant. Yes, I am talking about fungi (basidiomycota and agricomycota). Mushrooms exist as plumps, spore-producing fruiting bodies holding a unique mature frame and have been cultured from prehistoric commencing to ingest nutrients and flavor particularly in Eastern states.

No doubt mushrooms have much more protein value than plants but in comparison with animal, they ranks 2nd position. Except of hiding different minerals and nutrients in themselves, mushrooms also carry huge volumes of vitamin D and has most stimulating natural bases of compounds used for pharmaceutical purpose to deflect cancer, HIV-1 AIDS and several additional ailments. Although mushroom forming is attractive and almost independent to land and climate particularly suitable for lowland farmers even landless former. But the cultivation of edible fungi tracks two different periods: the first one is obtaining pure inoculum of the fungus and second is the preparation of the spawn (the vegetative mycelium used for raising mushroom). As the world demand for mushrooms is projected to grow 15% a year, so there is need for improvement through different tools (cross breeding, domestication, selection and hybridization etc.) of biotechnology to increase productivity and make it more nutritious.

Developmental Approaches;

Great inventions and noble merits are always on priority level for an agriculturist therefore he is able to turn wild fruit into edible form through hybridization process but on other hand quality traits within the gene pool of any one particular edible mushroom species are limited. So for further improvement of edible mushroom's characters need to be introgressed across the boundary of a particular specie to increase productivity in mushroom culture. It is necessary to develop and improve the control and computerized monitoring

system for growing mushroom.

Morphological Improvement;

In 2010, a cultivar of Korean button mushroom "sae-ah" was developed but it is not economical so farmer demand for improved cultivars. Although scientists introduced a cultivar "saejoeng" which also had a defect that it was difficult to cultivate in classic mushroom farms. To solve this problem, another new cultivar, 'Saedo', (heterokaryon line A175 x homokaryon line A175) was developed in 2012. The morphological traits such as the pileus (cap) and stipe of the 'Saedo' cultivar were thicker and the mycelium showed good growth on compost dextrose agar at 25°C.



High Yield Hybridizer;

Earlier work to produce the high yield producing strain of the *Pleurotus sp.* was first performed in *P. ostreatus*. Three strain of the king oyster mushroom i.e., ATCC 36047, ATCC 90212 and Holland 150, Strain ATCC 36047 had high commercial value with medium to large fruit bodies, fine texture and long shelf life but it produced many warts on caps surface during the high humidity. Holland 150 produced early large fruit bodies with a soft and fine texture and with short shelf life. Similarly when monokaryon ATCC 3647 and Holland 50 were crossed, they gave high yield and long shelf life with good texture.

Cold Resistance;

Straw mushroom holds a unique place among edible fungi due to its high nutritious value, pleasant aroma and yummiest taste. It demands high temperature for proper growth and cannot tolerate cold due to highly perishable nature in low temperature. So hybridization between *V. volvacea* and *Pleurotus eryngii* resulted two

low-temperature resistant strains, namely, VP1 and VP2.

Spore less Strain;

Since some workers develop an allergy that is identical to mushroom-workers lung and is associated with personal exposure to *Pleurotus sp.* spores. However, similar symptoms have also been observed with *L. edodes* spores. This problem has increased interest in the development of spore less mutants for breeding spore less strains.

Plant Landscaping;

A luxury home adjoining with a well-planned landscape yard is a dream of every person. Landscape stands as an

important fragment in the world and have exceptional character in the quality of our surroundings, achieving a great significance to promote financial as well as health sector. Furthermore, it is most cost effective tools for maintaining and sustaining the quality of life in the presence of trees, shrubs, flowers and grasses etc. But stop, you can forget the most important element (mushroom) that may be harmful or beneficial for other elements. Mushrooms come in many forms with suitable environmental conditions. Mostly proved harmful for trees and turf grasses as a result of decay but some of them provide benefit to plants.

Impact of Mushrooms on garden life



These are **green spored-parasol** which are mostly harmful for human beings therefore called as death cap but no thread found in plant growth by the presence of it. **Control;** clean infected area.



Tall flowers and leafy shrubs provide shade and organic matter to mushroom for growth. Although they are not harmful for flower beds but slower the growth. **Control;** dig up wood or dead roots



Ring fairy tail; circular or semi-circular rings appeared on grounds and prevent water and nutrients for turf grasses or kill turf grasses by releasing nitrogen in soil. **Control;** Pro star 70WP or core aerate the infected area.



White Rot; fungi that rapidly grown and breakdown lignin and cellulose. It turns tree wood soft, spongy and stinky. It also causes root rot that hard trees fail and fall. **Control;** Remove all injured branches or wood



Brown Rot; fungi that breakdown cellulose and eventually lignin. Tree wood become crumbles and shrinks or fail to live. It is also called dry rot. **Control;** proper pruning or avoid drought.



Ring less Honey Mushrooms; grow on grounds or near the tree trunk in cluster form usually wood decomposing and also called destroying angel. **Control;** no effective chemical control. Avoid burying dead wood or roots.



OLIVES; NATURE'S GIFT ENCASED BY POTENTIAL THREATS

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Olive (*Olea europaea*), meaning "european olive", is native to Africa and Asia. A large range of olive cultivars exist, each having different growth characteristics, color, shape, size as well as superiority of oil. Its prime use is in form of oil, also used as eating purpose in toppings of different food stuff. It is of worth prize worldwide due to its oil. From consumption point of view olive is categorized as Table olives that comprises of green, black and semi ripe olives. Olive is a nutritious package that calories, vitamin E, sodium, fat, carbohydrates and protein etc. olive industry in Pakistan is gaining attention to increase this natural gift production. Olives are rich in numerous defense shielding nutrients.

BENEFITS:

Cardiovascular

Olives are helpful not only in lowering the risk of atherosclerosis but also increase good cholesterol in body as it contains fat of healthy monounsaturated form. Black olives have the ability to counteract with the free radicals in fat by containing rich amount of vitamin E. It is proved in various studies that olives are helpful in reducing the risk of colon cancer.

Skin Health

Olives provide nourishment to skin especially black ones as they are rich in vitamin E, antioxidants and fatty acids.

Bone Health

Black olives contain monounsaturated fats, polyphenols and vitamin E, having anti-inflammatory ability which reduces the risk of osteoarthritis, rheumatoid arthritis and asthma. A chemical oleocanthal found in olive oil acts as a painkiller and anti-inflammatory medicine.

Stomach Health

Olive oil is effective for ulcer and gastritis patients. It triggers the natural secretion of pancreatic and bile hormones and compared to drugs, in that way it lowers

the formation of gallstone. Researches showed that black olives contain fiber which fulfills the 17% of daily allowance, promotes movement of food by stimulation of digestive tract health.

Iron rich

Black olives are rich source of iron. Red blood cells carry oxygen throughout the body that is due to the ability of iron in blood. Healthy immune system is also dependent on ample iron.



Improve vision

As black olives are good source of vitamin A which is crucial for eye health. Olives improve night vision by enabling the ability to distinguish between light and dark.

THREATS:

Various biotic factors play their role in reducing quality and quantity of produce. These include; "Armillaria root rot, Phytophthora crown and root rot *Verticillium* wilt, Cercospora leaf spot, Olive Knot, plant-parasitic nematodes".

Armillaria Root Rot

It also referred as oak root fungus that attacks olives infrequently but in case of severe attack can kill trees. It is a soil borne fungus, mostly prevalent after wet winters. It survives on dead matrix of roots in soil as long as the moisture is available. Infected trees become weak with thin canopies. Firstly symptoms only appear on one side then progressively attack the whole tree. Discoloration of bark and wood also occurred. White to yellow mycelia mats formed on infected roots. Brown to black rhizomorphs can also be seen on root.

Cercospora Leaf Spot

It is a fungal disease caused by *Mycocentrospora*

cladosporioides that infect foliar portion of tree. Its symptoms resembles with sooty mold apper on the underside of leaves. In severe conditions foliage become yellow and drop off.

Diplodia Canker

It is caused by *Diplodiae*. It affects indirectly as it aggravates the damage caused by olive knot disease. Little information is known about its epidemiology subsequently about its control measures. *Diplodia* canker is caused by a *Diplodiae*. It does not cause direct damage to the tree, but can aggravate damage resulting from olive knot disease.

Olive Knot Disease

This disease has a very long history, caused by *Pseudomonas syringae* pv. *Savastanoi*. It attacks on all cultivars of olive in severe form. Its symptoms appear as rough galls. Galls appear on branches, twigs, trunks and on leaves. It effects the transportation of water causing defoliation and death of branches. Its management is very difficult.

Olive Leaf Spot Disease

It is caused by *Spilocaea oleaginea*. Almost all cultivars are susceptible to this disease but degree of susceptibility varies among cultivars. This disease progress slowly and take several years to appear in epidemic form. Its symptoms appear as sooty blotches on leaves that develop into circular spots of muddy to black color, premature leaf drop occurs. It also infects stem portion and fruits. The pathogen survives in infected leaves that remain on the tree. Rainfall plays a vital role in spreading of new infections. High temperature is unfavorable for spore germination and growth.

Phytophthora Rot Disease

Phytophthora cause crown and root rot disease in olives. It's not frequent disease but becomes severe in wet and poorly drained soils. Proper aeration and drainage are required to get rid from this problem as *Phytophthora* presence in soil with excessive moisture converts this problem into severe disease. The symptoms appear on infected trees are reduced growth with thin canopies and death in severe cases. It takes 1 to 2 years for death of tree.

Wilt Disease"

Wilt in olives is caused by *Verticillium dahlia*. It's a serious problem which is difficult to cure. It prevails throughout

the world. Sudden wilting in trees occur early in growing season, leaves become sticky on dead branch. It takes several years to kill the tree. Infection increases with the age of tree. The most evident symptom of wilt is darkening of xylem tissue but its appearance is not frequent in olives.

Plant-Parasitic Nematodes

Several nematode species attack on olives; '*Meloidogyne* spp.', '*Pratylenchus* spp.', '*Rotylenchulus* spp.', '*Heterodera* spp.', '*Helicotylenchus* spp.' and '*Mesocriconema xenoplax*'. Nematode infection causes disruption in the normal processes of plant growth in turns causes water stress, nutrient deficiencies in plants due to the failure root system normal functioning.

Meloidogyne spp.

Among the most damaging plant parasitic nematodes *Meloidogyne* spp., causes severe damage in olive trees as well adaptation in subtropical and temperate areas. It occurs mostly in wild olives in a sporadic manner. Its symptoms include yellowing, growth retardation and severe galling on roots.

Pratylenchus spp.

Pratylenchus is migratory endoparasites that damage roots due to feeding of cortical parenchyma. It also causes necrosis of endodermal and cortical cells. Infection due to lesion nematode causes lesions in cortical cells and cause reduction in root size. Nematode penetrates by thrusting of stylet and by softening of plant cell walls through enzymatic degradation.

Heterodera spp.

Heterodera spp. forms cyst which is helpful for their survival in soil upto several years in the absence of host plant. Few of its species attack on woody plants. This nematode is most prevalent in sandy soils.

Rotylenchulus spp.

These nematodes are semiendoparasitic on woody and herbaceous plants. It is prevalent worldwide in tropical and subtropical regions. Different species of *Rotylenchulus* attacks on olives.

CONCLUSION

Olives, the precious gift of nature containing diversified health benefits are being invaded by various pathogens. These pathogens are destructively harming its quantity and quality. So, there is a need of protective measures to save this natural gift.



MULBERRY; A POTENTIAL MINOR FRUIT OF PAKISTAN

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Mulberries (*Morus alba*) are colorful berries that belong to family *Moraceae* and native to temperate and subtropical region of the world (Asia, Europe, and North America). The mulberry belongs to genus *Morus* comprises of 24 species and 100 varieties. Among them, *M. alba* and *M. indica* are considered its most popular species in the world. They are also known by the Persian derived names i.e. toot (mulberry) or shahtoot (King's or "superior" mulberry). Its attractive color, juicy texture and delicious taste with perfect balance of sweetness and acidity has been extremely liked all over the world. Turkey, China and India are considered as top mulberry fruit producing countries of the world. However, in Pakistan mulberry is regarded as a minor fruit and rank in 21th position, cultivated on an area of 459 hectares with production of 2100 tonnes. In Punjab, it grows in Sargodha, Bhakker, Rawalpindi, Lahore, Faisalabad, Jhang, Multan, Khanewal, Bahawalnagar and Rahim Yar Khan over an area of 422 acres with 777 tonnes fruit production.

Mulberry fruits are packed with nutrients and have numerous potential health benefits. The fruit contains abundant nutrients and bioactive compounds such as antioxidants, phenolic, flavonoids and phytochemicals. The fruit supplies vitamins A, C, E, K, B-complex group, beta-carotene, lutein, iron, potassium, calcium, manganese, niacin, riboflavin and folic acid. Among 14 identified fatty acids in mulberry fruit, predominant fatty acid is linoleic acid (C18:2); that can't be prepared by human body but necessary for health promotion and disease prevention. It possesses various pharmacological properties including fever reduction, treatment of sore throat, liver and kidney protection, eyesight improvement, and ability to lower blood pressure, indicating that it is a potential disease-fighting fruit for the prevention or treatment of chronic illness i.e.

heart and kidney diseases. These are all characteristics of a fruit that fit well into a healthy diet and a healthy fruit choice for consumers as appropriate for both sweet and savory applications. Mulberry fruits are also rich in anthocyanin (148-2725 mg/L of fruit juice), a natural pigment particularly the cyanin. As synthetic pigments are unsafe, these pigments can be used both as dietary modulators and as a natural food colorant in the food industry. A cheap and industrially feasible method to purify anthocyanin from mulberry fruit has already been established.

They are commonly consumed as dried or processed. Many value added products (fruit juice, fruit pulp, molasses, fruit juice concentrate, spirits, bread, jam, marmalade, paste, vinegar, puddings, donuts, pies,



sorbet, milk, yogurt, walnut sausage, mulberry wine, tea, leather and ice creams etc.) has been formed from mulberry fruits in most mulberry growing countries such as Turkey, China, India, Spain and are praised for its delicious taste and low calorie (43 cal per 100g). In Turkey, special mulberry products are made such as mulberry pekmez, mulberry pestil and mulberry kome (kind of dessert with nuts and paste) from mulberry fruit. A super fruit drink named "Fairjuice" is prepared from pure fresh mulberry fruits in UK which is full of antioxidants and useful against obesity.

Mulberry fruit has become popular in the world due to its fresh consumption, processed products and nutritive features, has become popular and has gained market potential gradually in the world. However, in Pakistan,

اگیتی پیاز (فصل خریف) کو خشک کرنے کا طریقہ کار

حرم ضیافہ، امان اللہ ملک، منزل جہانگیر، راجیل انوار، محمد وسیم حیدر انٹیٹیوٹ آف ہارٹیکلچرل سائنسز، زرعی یونیورسٹی فیصل آباد۔

پیاز ایک ایسی سبزی ہے جو دنیا بھر میں کاشت کی جاتی ہے اور تقریباً ہر کھانے کی ترکیب میں شامل ہوتی ہے۔ پاکستان میں یہ گنڈا، وسل اور بصل کے ناموں سے مشہور ہے۔ اسے پاکستان میں چھوٹے زمینداروں کی آمدنی بڑھانے کی وجہ سے تجارتی فصلوں میں نمایاں مقام حاصل ہے۔ پیاز کو برداشت کرنے کے فوری بعد اس کی کیورنگ کرنی چاہیے۔ اس سے پیاز کی بیرونی پرت سخت ہو جاتی ہے اور اس کی ذخیرہ اندوزی کے دوران اگاؤ نہیں ہوتا۔ یوں پیاز کی قیمت بھی اچھی لگتی ہے اور اس کو دیر تک ذخیرہ بھی کیا جاسکتا ہے۔ پاکستان میں پیاز کی پیداوار کا سب سے بڑا حصہ (40 فیصد) سندھ کا ہے اور منڈی میں اس کی ترسیل دسمبر سے اپریل تک رہتی ہے۔ جبکہ پنجاب کی فصل کا حصہ تقریباً 25 فیصد ہے اور منڈی پنجاب کے پیاز کی آمد اپریل سے جون تک جاری رہتی ہے مگر اس دوران منڈی میں پیاز کی زیادہ ترسیل کی وجہ سے اس کی قیمت کم رہتی ہے۔ اسی طرح بلوچستان کی فصل



ٹل میں پیاز کی کیورنگ:

برداشت شدہ پیاز کی فصل کو چوں سے بلیک پولیٹھین پر رکھا گیا ہے اور اوپر شفاف پولیٹھین کی ٹل بنائی گئی ہے جس کے دونوں سروں کا منہ کھلا رکھا گیا ہے۔

کا حصہ بھی تقریباً 25 فیصد ہے اور منڈی میں اس کی ترسیل ستمبر سے نومبر تک رہتی ہے۔ نومبر اور دسمبر میں پیاز کی قلت ہوتی ہے اور اسی دوران پیاز کی پیداوار کر کے زمیندار منافع کما سکتے ہیں۔ محکمہ زراعت نے موسم سرما کے مہینوں میں پیاز کی برداشت کے لیے پیاز کے سیٹ (Sets) کی ٹیکنالوجی متعارف کروائی ہے، جس کی وجہ سے دسمبر تا فروری پیاز برداشت کیا جاسکتا ہے۔ تاہم، اس پیداواری ٹیکنالوجی سے حاصل شدہ پیاز (Bulbs) مکمل طور پر خشک نہیں ہوتے جس کی وجہ سے ان کو زیادہ دن تک بوریوں میں رکھنا بھی مشکل ہوتا ہے اور باوجود بے موسم ہونے کے، کم قیمت لگتی ہے۔ زرعی یونیورسٹی فیصل آباد کے شعبہ ہنریات میں اگیتی پیاز (فصل خریف) کو خشک (کیورنگ، Curing) کرنے کا آسان اور انتہائی کم قیمت طریقہ متعارف کروایا ہے۔ اگیتی پیاز کو برداشت کرنے کے بعد چھوٹی ٹل میں (پتوں سمیت) 7 تا 10 دن رکھنے سے ان کے پتے خشک ہو جاتے ہیں۔ ٹل کے دونوں جانب منہ کھلا رکھا جائے۔ اس عمل کو زیادہ موثر بنانے کے لیے بلیک پولیٹھین شیٹ کو زمین پر بچھا کر اوپر برداشت شدہ پیاز رکھا جاسکتا ہے، جس سے پیاز جلدی خشک ہو جاتا ہے۔ مزید برآں، برداشت سے 15 دن پہلے پانی روکنے سے پیاز کو جلدی خشک کرنے میں مدد ملتی ہے۔ اچھی طرح خشک کیے گئے پیاز کو بوریوں میں ڈیڑھ تا دو ماہ بغیر پھوٹ کے ذخیرہ کیا جاسکتا ہے اور شکل و صورت اچھی ہونے کی وجہ سے اس کی قیمت بھی اچھی لگتی ہے۔ ٹل بنانے کے لیے توت کی ٹہنیاں استعمال کی جاسکتی ہیں۔ اگر پولیٹھین کو پیاز خشک ہونے کے فوراً بعد تہ لگا کر رکھ لیا جائے تو مزید استعمال کیا جاسکتا ہے۔ اس طریقہ سے اپریل میں برداشت کی گئی فصل کو خشک کرنا نامناسب ہے۔



پھوٹ شدہ پیاز (بغیر کیورنگ کے)

کیور شدہ پیاز

یہ تحقیق آسٹریلیا، فنڈ ڈیولپمنٹ ویلویویشن پراجیکٹ کے تعاون سے کی گئی ہے۔

there is lack of awareness about its nutritional importance. Farmers are growing mulberries as side crop on marginal lands. They are either growing for rearing of silkworms or seldom for fruit production in Punjab. Moreover, its production and postharvest technology is not yet standardized and improper harvesting, handling and open selling is causing serious losses at production and postharvest handling.

Since, the mulberry fruit is non-climacteric in nature, it can't ripe after harvest. So, harvest at appropriate maturity stage is very important to market good quality fruit. Immature fruits couldn't develop proper color and possess inferior quality. Good quality mulberry fruits must have developed characteristic color and taste, matured size as well as free from browning and dust particles. Poor quality fruit exhibit partially developed color, deformed shape, browning and dusty appearance. Mulberry is very perishable fruit commodity due to very thin skin and high water content (70%) that results in very short shelf life. Its harvesting season is extremely short (end Feb-April) and fruit easily lose their commercial value after harvest because of its rapid ripening and quality deterioration, posing enormous difficulties in storage, transportation, and sales to distant market. Hence, value addition is one of the best option to utilize this delicate fruit.

Mulberry is mostly consumed fresh in Pakistan during season and processing or value addition is done on limited scale (only dried mulberry). Establishment of small scale processing industry will not only reduce losses of this perishable fruit but also ensure its availability into other value added products (ice creams, jams, jellies, cakes, smoothies) throughout the year. It would be possible to earn an economic profit by improving the consumption of mulberries and by adopting value added options. So there is need to standardized the proper production technology for better fruit production and postharvest management that ultimately help farmers to get high economic return of this valuable fruit crop.



صاف پانی کی بالٹیوں یا ٹب میں رکھ دیں تاکہ پھول تروتازہ رہ سکیں۔ زیبائشی گوہمی کے پھولوں کو تیز دھار صاف قینچی کی مدد سے زمین سے 1 انچ اوپر کاٹا جاتا ہے تاہم پھولوں کو زمین سے کھینچ کر بھی نکالا جاسکتا ہے اور بعد آزاں جڑوں کو کاٹا جاسکتا ہے جس سے نہ صرف وقت کی بچت ہوتی ہے بلکہ تنوں کی لمبائی میں بھی اضافہ ہو جاتا ہے۔

بعد از برداشت نگہداشت

پھولوں کو کٹائی کے فوراً بعد ٹھنڈی اور سایہ دار جگہ پر منتقل کر دیں اور نچلے پتے اتار دیں۔ پھولوں کے تنے کو تڑھا کاٹیں اور دوبارہ دو گھنٹے کے لیے پانی کی بالٹیوں یا ٹب میں رکھ دیں۔ دو گھنٹے بعد 4 یا 5 پھولوں کے کٹھوں کی شکل میں پلاسٹک شاپر میں بیک کریں۔ اس کے پھول گلدان میں 6 تا 7 روز تک تروتازہ رہ سکتے ہیں۔

زیبائشی گوہمی کی کاشت کا فی کنال تخمینہ لاگت و منافع

زمین کا ٹھیکہ	=	5000 روپے
بیج کی لاگت (5000 بیج فی کنال) = 2 روپے/بیج	=	10,000 روپے
نرسری کی تیاری	=	10,000 روپے
زمین کی تیاری	=	5000 روپے
پودوں کی زمین میں منتقلی	=	10,000 روپے
آپاشی اور گوڈی	=	5000 روپے
کھادیں اور کیڑے مارا دویات	=	5000 روپے
دیگر اخراجات	=	5000 روپے
کل لاگت (فی کنال)	=	55,000 روپے
مارکیٹ قیمت فی پھول	=	25 روپے
ایک کنال سے حاصل شدہ پھول	=	4000 (کم از کم)
کل آمدن	=	25 × 4000 = 1,00,000 روپے
منافع (فی کنال)	=	1,00,000 - 55,000 = 45,000 روپے

اسکی کامیاب کاشت سے فی ایکڑ 3 تا ساڑھے تین لاکھ روپے کمائے جاسکتے ہیں

مزید معلومات!

فلوری کلچر ویلویو ایڈیشن لیبارٹری، انسٹی ٹیوٹ آف ہارٹیکلچرل سائنسز، زرعی یونیورسٹی فیصل آباد

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میں ہی زنی چاہیے۔ سردراتوں میں فصل کو کورے سے بچانے کے لیے شام کے اوقات میں ہلکی آب پاشی کریں۔

کھادوں کا استعمال

پھولوں کی بہتر پیداوار کے حصول کے لئے باقاعدہ کھادوں کا استعمال کیا جاتا ہے تاکہ پودے اپنی غذائی ضروریات کو بروقت پورا کر سکیں اور عمرہ کو الٹی پیداوار حاصل ہو سکے۔ زمین کی تیاری سے دو ماہ قبل گوہر کی گلی سڑی کھاد بحساب 2 ٹرا فی ایکڑ ڈال کر اچھی طرح ملا دیں۔ چونکہ نمائشی گوہمی ایک خوشنما پتے والی فصل ہے اس لیے اس میں نائٹروجن اور فاسفورس کھادوں کا زیادہ استعمال کیا جاتا ہے۔ نائٹروجن اور فاسفورس کی نصف مقدار جبکہ پوٹاش کی مکمل مقدار بروقت نسری منتقلی ڈالی جاتی ہے جبکہ بقیہ نائٹروجن اور فاسفورس ہر آپاشی کے ساتھ ڈالی جائے۔ اس کے علاوہ پھولوں کی بہتر کوالٹی کے لیے پلٹیم کا استعمال بھی کیا جاتا ہے جو کہ نسری منتقلی کے وقت ڈالی جاتی ہے۔ اس کے علاوہ پھول بننے کے عمل کے دوران اجزائے صغیرہ (Micro-nutrients) کا سپرے بھی کیا جاسکتا ہے جس سے پھولوں کی رنگت اور کوالٹی میں بے پناہ اضافہ ہو جاتا ہے۔ زیبائشی گوہمی کی فی کنال اچھی پیداوار کے لیے مندرجہ ذیل سفارش کردہ کھادیں استعمال کرنی چاہئیں۔

ڈی-اے-پی (DAP)	10 کلوگرام فی کنال
یا نائٹرو فاسفورس (NP)	15 کلوگرام فی کنال
کیلشیم سلفیٹ	5 کلوگرام فی کنال
این-پی-کے (20:20:20) (NPK)	10 کلوگرام فی کنال
اجزائے صغیرہ (Headland Crop Nutrition)	25 گرام فی کنال

جڑی بوٹیوں کا خاتمہ

فصل کو پہلا پانی لگنے کے ساتھ ہی موسمی جڑی بوٹیوں کی موشروع ہو جاتی ہے جو بڑی ہو کر فصل کے لئے بیماریوں اور مختلف کیڑے کوڑوں کا مسکن بن جاتی ہیں اور پودوں کے ساتھ خوراک اور پانی کے حصول کے لیے مقابلہ کرتی ہیں۔ جڑی بوٹیوں کے خاتمے کے لیے نسری زمین میں منتقل کرنے سے قبل جڑی بوٹی مار زہر (Pre-Emergence Weedicide) ڈوال گولڈ (Dual Gold) بحساب 5 ملی لیٹر فی لیٹر پانی میں سپرے کریں۔ اس سے ایک ماہ تک جڑی بوٹیوں پر قابو پایا جاسکتا ہے اور گوڈی پر آنے والا خرچہ بھی کم کیا جاسکتا ہے۔ جبکہ بعد میں اگنے والی جڑی بوٹیاں بذریعہ گوڈی تلف کی جاسکتی ہیں۔

ضرر سبب کیڑے اور ان کا تدارک

زیبائشی گوہمی (Ornamental Kale) میں کیڑوں اور بیماریوں کا کوئی خطرناک حملہ نہیں ہوتا تاہم سنڈی اور تیلہ کبھی کبھار حملہ آور ہوتے ہیں جس کے تدارک کے لیے بالترتیب میچ (Match) یا ایمیڈاکلوپریڈ (Imidacloprid) بحساب 5 ملی لیٹر فی لیٹر پانی سپرے کریں۔

برداشت

پھولوں کی برداشت کا انحصار منڈیوں کے فاصلہ پر کیا جاتا ہے۔ مقامی منڈیوں کے لیے جب پھول مکمل کھل جائے تو کاٹ لیں جبکہ دور دراز منڈیوں کے لیے پھول آدھا کھلا ہوا کاٹ لینا چاہئے تاکہ منڈی تک پہنچتے پہنچتے پھول مکمل کھل جائے۔ پھولوں کو صبح یا شام کے وقت کاٹنا چاہیے۔ پھول کاٹنے کے فوراً بعد انہیں تازہ

زیبائشی گوہمی (Ornamental kale) - ایک دلکش پھول

ڈاکٹر افتخار احمد، محمد زین علی..... شعبہ گلہبانی و چمن آرائی، انسٹی ٹیوٹ آف ہارٹیکلچرل سائنسز، زرعی یونیورسٹی فیصل آباد

وقت کاشت

زیبائشی گوہمی (Ornamental Kale) چونکہ موسم سرما کا پھول ہے لہذا اسے سرد موسم کے آغاز سے قبل بذریعہ بیج کاشت کیا جاتا ہے اسے میدانی علاقوں میں یکم اکتوبر تا 15 نومبر تک کاشت کیا جاسکتا ہے جبکہ 15 فروری تا 15 اپریل کے دوران پہاڑی علاقوں میں کاشت کیا جاسکتا ہے۔

نرسری کی تیاری

زیبائشی گوہمی (Ornamental Kale) کی نرسری بیج سے تیار کی جاتی ہے۔ نرسری اُگانے کے لیے 128 خانوں والی پلاسٹک ٹرے استعمال کی جاتی ہے۔ اس میں ایک حصہ بھل، ایک حصہ ناریل کا برادہ اور ایک حصہ پتوں کی گلی سڑی کھا دیا گئے کی خشک کی گئی پریس ہڈا اچھی طرح ملا کر بھر دیں۔ بعد ازاں ہر خانے کے درمیان ہلکا سا سوراخ کر لیں تاکہ بیج لگانے کے لیے جگہ بن سکے۔ اس کے بعد ایک خانے میں ایک بیج ڈال دیں۔ بیج کو دوبارہ ناریل کے برادہ سے ڈھانپ دیں تاکہ بیج کو مکمل نمی مل سکے۔ اس کے بعد ٹرے کو باریک فوارے کی مدد سے دو تین دفعہ اچھی طرح پانی لگا دیں۔ بیج کی نمو کے دوران اسے مکمل نم رکھیں تاکہ سو فیصد اگاؤ ممکن ہو سکے مناسب درجہ حرارت اور نمی کی موجودگی میں پانچ تا چھ ہفتوں کے دوران نرسری کھیت میں منتقل کرنے کے قابل ہو جاتی ہے۔ نرسری تیار ہونے کے بعد اسے جلد از جلد زمین میں منتقل کر دینا چاہیے، اگر نرسری زیادہ دیر ٹرے میں پڑی رہے تو روز ٹینگ (Rosetting) ہو جاتی ہے جس کی وجہ سے اس کا قد نہیں بڑھتا اور قابل مارکیٹ پھول حاصل نہیں ہوتے ہیں۔

زمین کا انتخاب اور تیاری

عمدہ کوالٹی کے تراشیدہ پھولوں کے حصول کے لیے زمین کا بھر بھرا، زرخیز اور اچھے نکاس والا ہونا ضروری ہے۔ تراشیدہ گوہمی کے لیے زمین کا تعامل (pH) 6 تا 7.5 ہونا چاہیے۔ کاشت سے دو ماہ قبل زمین میں گوبر کی گلی سڑی کھا دیا حساب 2 ٹری فی ایکڑ ڈال کر اچھی طرح زمین میں ملا دیں۔ پانی کے یکساں بہاؤ کے لیے زمین کا ہموار ہونا ضروری ہے۔ اس مقصد کے لیے زمین میں اچھی طرح ہل چلا کر زمین ہموار کریں۔ زمین ہموار ہونے کے بعد اس میں 10 فٹ لمبے اور 5 تا 6 فٹ چوڑے کیارے بنالیں۔

نرسری کی منتقلی

نرسری زمین میں منتقل کرنے سے پہلے کیاریوں میں جڑی بوٹی مار نہر (Pre-Emergence Weedicide) ڈوال گولڈ (Dual Gold) بحساب 5 ملی لیٹر فی لیٹر پانی میں سپرے کریں۔ اس سے ایک ماہ کے لیے جڑی بوٹیوں پر قابو پایا جاسکتا ہے۔ بعد ازاں پیہری کو پودوں اور قطاروں کے درمیان 9 انچ فاصلے پر سیدی قطاروں پر منتقل کریں۔ پیہری منتقل کرتے وقت جڑوں کا مڑا ہوا حصہ مکمل طور پر زمین کے اندر دبا دینا چاہیے تاکہ پھولوں کے تنے سیدھے رہیں اور کوالٹی متاثر نہ ہو۔ مزید برآں پودے کے تنوں کو سیدھا رکھنے کے لیے پھولوں والا جال (Netting) بچھا دیا جاتا ہے تاکہ پودے کے تنے سیدھے رہیں۔

آب پاشی

پیہری منتقل کرنے کے فوراً بعد پہلا پانی لگائیں۔ اس کے بعد جب زمین خشک ہو تب پانی دیں۔ یہ فصل زیادہ تر سرد موسم میں کاشت کی جاتی ہے لہذا پانی کا دوران کم از کم دو تین ہفتے تک بڑھا دیں تاکہ نام ٹھم و تر حالت

تعارف

پھول قدرت کی بے شمار نعمتوں میں سے ایک انمول شاہکار ہیں جو خوشی، پیار، محبت، اور پاکیزگی کا مظہر ہوتے ہیں۔ مزید برآں مختلف رنگوں کے پھول مختلف انسانی جذبات و احساسات کی ترجمانی بھی کرتے ہیں۔ پھولوں کی مہک اور دلکشی لوگوں کی روح کو سرشار کرتی اور مزاج کو فرحت بخشتی ہیں۔ دنیا میں سب سے زیادہ گلاب، گل داؤدی اور کارنیشن کے پھول استعمال ہوتے ہیں۔ تاہم وقت گزرنے کے ساتھ مختلف نئی اقسام کے ایک سالہ پھول متعارف کروائے گئے ہیں تاکہ لوگوں کی پھولوں کی ضروریات کو احسن طریقے سے پورا کیا جاسکے۔ انہی نئے پھولوں میں زیبائشی گوہمی (Ornamental Kale) بھی ایک نیا تراشیدہ پھول ہے جسے براسیکا اولیہ ریٹیا (Brassica oleracea) کے سائنسی نام سے جانا جاتا ہے۔ اس کا تعلق سرسوں کے خاندان (Brassicaceae) سے ہے۔ زیبائشی گوہمی کو مختلف مقاصد کے لیے استعمال کیا جاتا ہے جس میں اسے عام طور پر گلوں اور کیاریوں میں اگایا جاتا ہے جبکہ پچھلے چند سالوں سے اسے پاکستان میں تراشیدہ پھول کے طور پر بھی کاشت کیا جا رہا ہے جس کا زیادہ تر استعمال گل دستہ بنانے اور سٹیج ڈیکوریشن میں کیا جاتا ہے۔ اس کے پھول مختلف دلکش رنگوں میں پائے جاتے ہیں جو خوبصورت ہونے کے ساتھ ساتھ دیدہ زیب بھی ہوتے ہیں اور کافی دنوں تک تروتازگی برقرار رکھتے ہیں۔

آب و ہوا

زیبائشی گوہمی کی اچھی نشوونما کے لیے ٹھنڈی راتیں اور دھوپ والے دن چاہئیں۔ اس کے لیے مناسب درجہ حرارت 20 تا 30 ڈگری سینٹی گریڈ جبکہ ہوا میں نمی کا تناسب 60 تا 70 فیصد ہونا چاہیے۔

اقسام و رنگ

زیبائشی گوہمی کی قد کے لحاظ سے دو اقسام ہیں۔ پست قد (dwarf) اقسام گلوں اور بانچوں میں لگائی جاتی ہیں جبکہ دراز قد اقسام کو تراشیدہ پھولوں (cut flowers) کے حصول کے لیے کاشت کیا جاتا ہے۔ زیبائشی گوہمی کے پھول جامنی سبز یا گہرے سبز، گلابی اور گول یا کناری دار پتے ہونے کی وجہ سے ہر ایک کی توجہ کا مرکز بننے ہیں۔ اس کے پھولوں کے درمیان میں دلخیز اور خوشنما رنگ ہوتے ہیں جن میں کرمی سفید، جامنی سرخ اور گلابی رنگ شامل ہیں جو پھولوں کی سجاوٹ میں رنگ بھر دیتے ہیں۔ پاکستان میں اس کی کاشت کی جانے والی اقسام میں مندرجہ ذیل اقسام قابل ذکر ہیں:

نمبر شمار	قسم (variety) کا نام	سنے کی لمبائی (انچ)	بیج کی کمپنی
1	کرین (Crane)	20 تا 30	ٹاکی (Takii)
2	کرین فیدر (Crane Feather)	20 تا 36	ٹاکی (Takii)
3	کوئڈر (Conder)	25 تا 30	سکاتا (Sakata)
4	اوسا کا (Osaka)	6	سکاتا (Sakata)
5	یوکوہاما (Yokohama)	5 تا 7	سکاتا (Sakata)

ان اقسام میں پہلی تین اقسام بطور تراشیدہ پھول استعمال ہوتی ہیں جبکہ آخری دو اقسام کو بانچوں اور گلوں میں کاشت کے لیے استعمال کیا جاتا ہے



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September 19-20, 2019

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ON HORTICULTURAL CROP
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Emerging Techniques for Sustainable Crop Production




**Workshop on Indigenous Soilless Substrates for Horticultural Nursery Production
Institute of Horticultural Sciences, University of Agriculture, Faisalabad**
October 03, 2019





Pakistan Society for Horticultural Science

Registration No. _____

Membership Application Form

Prefix: Dr Mr Ms Mrs

Name (First Last): _____

CNIC no. (Pak. nationals)

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Passport no. _____

Date of birth (dd,mm,yy) _____ **Gender:** Male Female

Qualification: _____

Profession/Position: _____

Organization: _____

Mailing address: _____

Mobile: _____ **WhatsApp no:** _____

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Information you allow to make publicly available in members' directory on PSHS website
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Would you like us to add you in PSHS WhatsApp group? Yes No

Previous PSHS ID: _____
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Memb. category: (for current appl.) Lifetime Regular Student Corporate

The information provided are true and accurate to the best of my knowledge. I hereby agree to abide by the rules and regulations of Pakistan Society for Horticultural Science, failing to which my membership will be cancelled. PSHS reserves the right to cancel my membership any time without prior notice.

Signature of Applicant: _____ **Date:** _____

Signature of PSHS Authority (with stamp): _____ **Date:** _____

(Revised January 2019)