Training Workshop on

"Non-Chemical Approaches to Preserve Post Harvest Quality of Stored Grains"

Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi is organizing the above mentioned two days training workshop under Research Endowment Fund Program (REFP) of the University.

Venue for Day 1 & 2: Main Agriculture Seminar Room & Department of Entomology & Plant Pathology, PMAS-Arid Agriculture University, Rawalpindi

Focal Person: Dr. Farid Asif Shaheen (Assistant Professor, Department of Entomology)

Date and Time	Activity
Day 1 Monday (23-05-2022)	
9:30-10:30 am	**Registration/Reception of Guests**
	INAUGURAL SESSION
10:31-10:35 am	Recitation from the Holy Quran & Naat Sharif
10:36-10:40 am	Welcome Note by **Prof. Dr. Muhammad Naeem**, Chairman Department of Entomology
10:41-10:50 am	Technical Talk by **Dr. Farid Asif Shaheen**, (Assistant Professor, Department of Entomology)
10:51 -11:10 am	**"Grain Storage Management and The Food Security"** Presentation by **Mr. Nazar Iqbal, Director**, Federal Seed Certification & Registration Department, Ministry of National Food Security & Research, Islamabad
11:11-11:15 am	Address by the Dean, FC & FS, **Prof. Dr. Fayyaz-ul-Hassan**
11:16-11:25 am	Address by the Worthy Vice-Chancellor, **Prof. Dr. Qamar-uz-Zaman**
11:26-11:30 am	Vote of Thanks
11:31-11:59 am	**Tea Break**
Technical Session-1	
12:00 pm-12:15 pm	**The Identification of Important Stored Grain Insect Pests** **Prof. Dr. Muhammad Naeem**, Chairman, Department of Entomology, PMAS-AAUR.

12:16-12:59 pm	**Sequence Analysis and Its Application in Stored Product Entomology** **Dr. Abdul Rauf Siddique,** Associate Professor of Bioinformatics, COMSATS University, Islamabad.
1:00-1:59 pm	**PRAYER & LUNCH BREAK**
	Technical Session-2
2:00-2:30 pm	**Management of Stored Product Insect Pests Using Organic Systems** **Prof. Dr. Muhammad Aslam** (PhD, USA), Ex-Chairman, Department of Entomology, PMAS-AAUR.
2:31-2:45 pm	**Modeling Technique in Population Dynamics of Stored Product Insects** **Dr. Mukhtar Ahmed** (Assistant Professor of Agronomy), PMAS-AAUR
2:46-3:15 pm	**Environmentally Benign Integrated Strategies to Manage Stored Product Insects (online via Zoom)** **Dr. Mureed Husain,** Economic Entomology research Unit, Department of Plant Protection, College of Food and Agriculture Sciences, King Saud University, Riyadh
3:16-3:30 pm	**TEA BREAK**
	Technical Session-3
3:31-3:45 pm	**Non-chemical Control Methods in Stored Product Entomology** **Dr. Munir Ahmad** (Associate Professor, Department of Entomology) PMAS-AAUR
3:46-4:15 pm	**Application of Plant Extracts and Entomopathogenic Fungi for Management of Stored Grain Insects** **Dr. Farid Asif Shaheen**, (Assistant Professor, Department of Entomology) / **Ms. Mahwish Raza**, (PhD Scholar, Department of Entomology)
4:16-4:59 pm	**Practical Demonstration on Optimization and Application of Entomopathogenic Bacteria Against Stored Grains Insects** Mr. **Muhammad Usman Raja** (Assistant Professor, Department of Plant Pathology) PMAS-AAUR.
Day 2 Tuesday (24-05-2022)	
8:15-8:59 am	**Visit of Stored Product Entomology Laboratory**
9:00-1130 am	**Departure to Godowns of the Punjab Food Department, Rawalpindi (Government of Punjab)** *for* **Hands on Training & Field Visit of Godowns** *by* **Mr. Muhammad Zaman,** Deputy Food Controller **Mr. Shams Abbas,** Assistant Food Controller
11:31-11:59 am	**Field Visit of Godowns of Gilgit Baltistan, Rawalpindi**
12:00 pm	**Back to PMAS-AAUR**
1:00-2:15 pm	**PRAYER & LUNCH BREAK**

CLOSING CEREMONY	
2:15-2:20 pm	**Recitation from the Holy Quran**
2:21-2:30 pm	**Concluding Remarks by Dr. Farid Asif Shaheen**, (Assistant Professor, Department of Entomology)
2:31-2:45 pm	**Distribution of Shields/Certificates among Guests/Presenters/Organizers and Participants**
2:46-2:55 pm	**Address by the Worthy Vice-Chancellor** (the Chief Guest)
2:56-2:59 pm	**Vote of Thanks**
3:00 pm	**Tea Break**

"Non-Chemical Approaches to Preserve Post Harvest Quality of Stored Grains"

Scope of the Event	The training workshop will address the "Sustainable Development Goal of Poverty Alleviation" through farmers' income generation by reduction in their post-harvest losses caused by insect pests. To fulfill the food demand of an increasing population remains a major global concern; more than one-third of food is lost or wasted in post-harvest operations. Reducing the post-harvest losses, especially in developing countries like Pakistan, could be a sustainable solution to increase food availability, reduce pressure on natural resources, eliminate hunger and improve farmers' livelihoods. Cereal grains and pulses are the basis of staple food in most of the developing nations, and account for the maximum post-harvest losses on a calorific basis among all agricultural commodities. As much as 50%–60% grains can be lost during the storage stage due only to the lack of technical inefficiency. The basics of hermetic storage, various technology options, and their effectiveness on stored commodities in different localities are important to be addressed for food security. Technology interventions and environment friendly management practices against these insect pests can play a critical role in reducing post-harvest losses and strengthening food security, and poverty alleviation, increasing returns of smallholder farmers. There is dire need to curb the catholic usage of synthetic fumigants and insecticides, which is consistent threat to life and environment. This threat is increased many folds if pesticide is used on agriculture commodities which are directly consumable such as stored grains, fruits and vegetables. In addition, continuous use of chemicals resulted selection pressure in insect population and only those individuals survive, which developed resistance against

	chemical through mutation and genetic recombination. Management of these new chemical resistant insects is an uphill task. In addition, cost of production is also increased due to chemical spray which is unbearable for a farmer as well whole seller. Under WTO scenario, scientists all over the world are encouraged to exploit safe alternatives of pesticides such as plants and pathogens based bio-pesticides, which are environment friendly, economical, less laborious and above all targeted ones. In this milieu, plant based products and insect pathogens such as insect killing viruses, fungi, protozoa, bacteria have been evaluated as hopeful substitutes to chemicals. The training workshop will enable the participants to understand the current issues and challenges in stored product entomology and how to manage economic insect pests in stored grains effectively by using latest non-chemical approaches, which will help farmers and stakeholders to be able to save their stored grains and products from the deadly infestations of insects and hence their stored products will be of higher quality and quantity resulting in their high income for their better socio-economic conditions.
Objectives	To train participants in milieu of: • comprehending the current issues and challenges in stored product entomology and • identification and the management of economic insect pests in stored grains by using latest non-chemical and eco-friendly approaches including plant-based products and entomopathogenic fungi and bacteria • computational modeling in stored product entomology
Expected outcomes of the event	Indiscriminate use of synthetic insecticides and fumigants in storages has led to a number of problems including insect resistance, toxic residues in food grains, environmental pollution and increasing costs of application. In view of these problems together with the WTO regulations, there is a need to restrict their use globally and implement safe alternatives of conventional insecticides and fumigants to protect stored grains from insect infestations. In this milieu, plant-based products and insect pathogens such as entomopathogenic fungi, viruses, bacteria and protozoa have been evaluated as promising alternatives to chemical-based insect control methods. The outcomes will encompass: • Participants will be able to understand the current issues and challenges in stored product entomology in Pakistan and worldwide. • Participants will learn about identification and the management of economic insect pests in stored grains by using latest non-chemical and eco-friendly approaches

	including plant-based products and entomopathogenic fungi and bacteria. These non-chemical strategies will have significant contribution towards development of commercial formulations of bio-pesticides to be used against the economic insect pests of stored grains and other stored products. • Participants will learn about computational modeling in stored product entomology

Background

On-farm grain storage has become a significant component of many cropping operations and growers who manage their storage facilities and operations well are being rewarded through preferred-supplier partnerships with key grain traders. Grain traders and buyers are increasingly pursuing growers who can maintain grain quality through best practice storage management allowing savvy growers to become 'price makers' rather than 'price takers'. On-farm storage systems are a significant investment to set up and manage. Any potential return on investment in on-farm storage should be compared to other investment options, such as buying more land or upgrading machinery, to determine the best use of capital. The interesting thing about on-farm storage is the return on investment varies for every grower depending on their scale, crops grown, access to bulk handlers and distance from domestic markets. In the same way growers ensure they take a strategic approach to managing the production of their crops, a strategic approach to grain storage is also required for optimal end-product performance. It's no longer acceptable to empty grain into a silo at the back of the shed and forget about it for months on end.

Successful on-farm storage starts with a planned, strategic mindset. This enables us to set up a flexible system that will suit our plans across variable years and crops, and enable us to manage quality and avoid disasters. A key component to storing grain on farm successfully is having the knowledge of best-practice management to avoid costly quality issues and disasters. To fulfill the food demand of an increasing population remains a major global concern; more than one-third of food is lost or wasted in post-harvest operations. Reducing the post-harvest losses, especially in developing countries like Pakistan, could be a sustainable solution to increase food availability, reduce pressure on natural resources, eliminate hunger and improve farmers' livelihoods. Cereal grains and pulses are the basis of staple food in most of the developing nations, and account for the maximum post-harvest losses on a calorific basis among all agricultural commodities. As much as 50%–60% grains can be lost during the storage stage due only to the lack of technical inefficiency. The basics of hermetic storage, various technology options, and their effectiveness on stored commodities in different localities are important to be addressed for food security. Technology interventions and environment friendly management practices against these insect pests can play a critical role in reducing post-harvest losses and strengthening food security, and poverty alleviation, increasing returns of smallholder farmers.

The threat is increased many folds if pesticide is used on agriculture commodities which are directly consumable such as stored grains, fruits and vegetables. There is dire need to curb the catholic usage of synthetic fumigants and insecticides, which is consistent threat to life and environment. In addition, continuous use of chemicals resulted selection

pressure in insect population and only those individuals survive, which developed resistance against chemical through mutation and genetic recombination. Management of these new chemical resistant insects is an uphill task. In addition, cost of production is also increased due to chemical spray which is unbearable for a farmer as well whole seller. Under WTO scenario, scientists all over the world are encouraged to exploit safe alternatives of pesticides such as plants and pathogens based bio-pesticides, which are environment friendly, economical, less laborious and above all targeted ones. In this milieu, plant based products and insect pathogens such as insect killing viruses, fungi, protozoa, bacteria have been evaluated as hopeful substitutes to chemicals.

The maintenance of cereal grains quality is a complex problem due to the interaction between biotic and abiotic factors in stored grain ecosystem. The biotic factors (germination, insects, moulds and mites) give information on the quality of grain. The abiotic factors (time, temperature, moisture content, impurities and insecticides) influence the biotic factors dynamics and give information on grain storage condition. The planning problem is to control the abiotic factors in view to hold them in a safe storage condition. One of the latest the *QualiGrain* preventive approach includes four steps: assessment of grain initial quality and condition, planning of optimal storage technical routes, monitoring of grain condition during storage and re-planning the storage technical route if the grain condition drifts out of safe storage conditions. A prototype of expert system *QualiS©* has been developed on Windows® personal computer. The advice afforded by decision support system have been validated by the human experts first and after in pilot scale experiments in UK.

The training workshop is aimed at providing a continuing forum for the dissemination and discussion of current research and deve lopment needs and priorities in the field of Stored Product Entomology. In addition, this will provide relevant information, links to other resources and contacts to enable a base understanding of how to manage on-farm and warehouse storage successfully. Through an integrated pest management (IPM) approach and proactive attitude to quality control we can avoid adding to the increasing challenge and scale of phosphine-resistant insect pests. Ultimately our aim is to save growers and industry a significant amount of money by prolonging the life of the most cost-effective pest disinfectants available.

WHO SHOULD ATTEND

Entomologists, Plant Pathologists, Modelers, and Officials from Government of Punjab Food and Agriculture Extension departments, Farmers, Bio-Pesticide Manufacturers, Policy Makers, Planners and other Agricultural Professionals motivated for cost effective and eco-friendly management of stored grains.

*Participants have to bring their laptop with windows operating system for practice of computational modeling.

No TA/DA will be paid to participants.

ORGANIZERS

Patron in-Chief

Prof. Dr. Qamar Uz Zaman (Vice Chancellor, PMAS-AAUR)

Patron:

Prof Dr. Fayyaz Ul Hassan (Dean, FC&FS)

Focal Person/Chief Organizer)

Dr. Farid Asif Shaheen (Assistant Professor, Department of Entomology)
Cell: 0332-5174250
Email: shaheen@uaar.edu.pk

Organizing Committee

Prof Dr. Muhammad Naeem (Chairman, Department of Entomology)
Dr. Ghulam Qadir (Director, URF)
Dr. Munir Ahmad (Associate Professor of Entomology)
Dr. M. Farooq Nasir (Assistant Professor of Entomology)
Dr. Muhammad Tariq (Associate Professor of Entomology)
Dr. M. Asif Aziz (Associate Professor of Entomology)
Dr. Asim Gulzar (Associate Professor of Entomology)
Dr. Mukhtar Ahmed (Assistant Professor of Agronomy)
Dr. Imran Bodlah (Assistant Professor of Entomology)