

Session 3 : Monitoring and Sampling

Monitoring and sampling tools for stored product insects should reach endusers – an analysis

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DOI: xx.xxxx/xxx.2014.xxx.xxx.xxx

Abstract

Whether the food grains are stored in farm, home or warehouses, insects continue to create problems by causing qualitative and quantitative damage in storage. This warrants the use of tool/gadgets for monitoring for early detection (probe trap, pit fall trap, pheromone trap), early adult removal (Insect removal bins), or for control (Insect Egg removal device). These tools have become essential in the current scenario of “Food security”. Monitoring tools for management must be taken to the end users. Attempts were made by the author to transfer these monitoring technologies namely viz., TNAU insect probe trap, Pitfall trap, Two-in-one trap, Indicator Device, Automatic insect removal bin, Egg remover device, stack probe trap and UV – Light trap for warehouse, to end users in a systematic and scientific way following the basic principles of Agricultural Extension. The methods used were by entrepreneurs for continuous supply of the tools, feedback studies in various state of India by conducting training to end users and reaching t students of Agricultural colleges through developing a “Educational Kit” with multimedia, hosting the trapping devices on many websites and publishing details of the tools in popular magazines. The study was conducted with the support of Canadian International Development Agency (CIDA) from 2005 – 2010 and had a remarkable outreach not only in India but also in Ethiopia, Rwanda and Nigeria. For adoption of any technology inventions, development of entrepreneurship and outreach is necessary.

Keywords: stored grain insects, monitoring tools, enterpreunership, transfer of technology, adoption

1. Introduction

Wandering behavior of many stored product insects is exploited for early detection of their presence in storage facilities by way of developing insect traps to monitor the insect activity. Several developments have happened t from 1967 to the current date in developing such insect traps/ devices across the world (Loschiavo and Atkinson, 1967; Hodges et al., 1985; Cogan and

Wakefield, 1987, Pinniger, 1990; White et al., 1990; Hagstrum and Subramanyam, 2000; Mohan, 2000; Phillips et al., 2000; Mohan and Paul fields, 2002; Mohan, 2007).

These tools may be for early insect detection (probe trap, pitfall trap, pheromone trap), early adult insect removal from storage bins (insect automatic removal bin), or for control (insect egg removal device) but are very essential in the current scenario of “food security”. Grains produced by should be protected from stored products insects. There is also a need to transfer technology to end users, otherwise research results will not be utilized. Hence the author made attempts to transfer some of the monitoring technologies to end users in a systematic and scientific way following the basic principles of agricultural extension.

2. Transfer of technology

2.1. Test kit

A stored grain insect management kit was designed to accommodate prototypes of TNAU insect probe trap, TNAU Pitfall trap, TNAU Two-in-one trap for pulse beetle, Indicator Device, Automatic insect removal bin, UV – Light trap for warehouse, Egg removal device and Stack probe trap along with a multimedia CD ROM to facilitate easy demonstration/ teaching/ training to the endusers (Mohan, 2007).

2.2. Entrepreneur development

The next important step in any science is developing entrepreneur to manufacture and market the target scientific tool. Two such entrepreneurs were developed through a Memorandum of Understanding (MoU) between Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India and the entrepreneurs.

Entrepreneurs	Website
M/s. KSNM Marketing, SF No.29/1B, Ona Palayam, Siruvani Water Line Road, Dheenam Palayam Post, Coimbatore, Tamil Nadu - 641 109, India Email : ksnmmarketing@hotmail.com	<a href="http://www.agriculture-
implement.com/testimonial.html">http://www.agriculture- implement.com/testimonial.html
M/s. Melwin Engineering, 18/2, Gandhi Street, Bharathi Nagar, Podanur (PO), Coimbatore – 641 023. Tamil Nadu, India. Email : anitathomascscs10@gmail.com	www.storedgraininsecttraps.com

2.3. Training and demonstration

Demonstration projects were conducted across the target site mainly Southern India (Tamil Nadu, Andhra Pradesh, Kerala and Karnataka) and to limited areas in Northern India (Uttar Pradesh) were conducted. Around two hundred demonstrations were conducted covering thousands of farmers and several agricultural institutions.

2.4. *Written communication*

Written communication to popularize the tools was done in English and in other Indian languages (Tamil, Hindi, Telugu, Kanada etc.) as communication through written words (publication of articles in journals, write-ups in magazines and newspapers). This has proved to be an effective extension tool in the transfer of technology (Mohan and Tajuddin, 1989). Around 150 such articles were written in this exercise.

2.5. *Introduction of the tools in Africa - A case study with foreign student*

Hategekimana Athanase, a student from Rwanda recently completed his M.Sc. (Agriculture) during the year 2012 in Agricultural Entomology in Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India. He underwent a course on Stored Product Entomology (1+1) as part of his Degree programme and learned about stored grain insect management kit technology. Mr. Athanase, before leaving India after completion of the M.Sc. (Agriculture) Degree, purchased the TNAU kit for training the Agricultural officers/farmers of his country (Athanase, 2012). Similar attempts were also made through another student from Ethiopia (Amsalu Debebe *et al.*, 2008).

2.6. *Role of website in technology transfer*

The technology was hosted in several websites. Most significant websites in this regard are:

- www.agritech.tnau.ac.in/crop_production/crop_prot_crop_insect_sto_trap.html
- www.ciphnet.in/upload/file/Gadgets%5B1%5D.pdf
- www.indg.in/...production.../gadgets-for-stored-grain-insect-pest-management
- <http://postharvestinstitute.illinois.edu/>

2.7. *Through school education*

“A grain saved is a grain produced,
A seed saved is thousands produced”

This basic slogan should form an integral part of the education of students who are the future scientists of this world. The author has made attempts to introduce these simple trap concepts as part of school education and as a result these tools are being taught in the school education to Agriculture students of Tamil Nadu province, India at 11th Standard education level (In Tamil Nadu, India we have school education from 1st to 12th standard).

Sl. No.	Book title	Author
1.	Text book on Agricultural Practices I and Agricultural Practices II (for 11 th standard)	Dr. S. Mohan, T. Vasanthi, A. Anantha selvi, P. Thirumal Gandhi, R. Malarvizhi, S. Hilta. 2011. Published by Government of Tamil Nadu, School Education, Tamil Nadu, India. Pp: 218

3. Conclusion

Better methodologies always lead to better results. The tiresome effort the author spent in evolving and implementing the above methods, which are on line with the basic principles of agricultural extension, has yielded good net results. They are summarized below:

- Two hundred and fifty thousand people are using the TNAU trap across India.
- Two hundred State Agricultural Universities and Krishi Vigyan Kendras in India are using the TNAU Stored product insect management kit for teaching and training.
- Introduction of TNAU Trap in Ethiopia, Rwanda and Nigeria.
- These traps kindered the scientific temper of school children which led them to make TNAU Traps in plastic waste water bottles, which got them National and International awards.
- Making TNAU Trap technology as part of 11th standard vocational Education curriculum in Tamil Nadu Schools which is being studied by around twenty five thousand students every year.
- Five private firms which export rice, herbal tea, medicinal products etc., use this TNAU trap for monitoring the stored grain insects:
 1. M/s Madaus Pharmaceuticals PVT. Ltd. Goa, India
 2. M/s Saraf Trading Corporation PVT. LTD, Cochin, India
 3. M/s SKM Siddha and Ayurvedic, Tamil Nadu, India
 4. All Maha Foods International Pvt Ltd, Jasola, New Delhi, India
 5. M/s Cadburys India Ltd., Dharapuram, Tamil Nadu, India.

Global food security is the current slogan throughout the world. Whether a technology is developed in East or West is not the point of discussion at this juncture but it is best when they are used across the globe. The chain should be “inventions – entrepreneurship – transfer of technology – benefit to users”. The enormous quantitative/qualitative caused by insects is of serious concern in Food/Nutritional security throughout the world.

Acknowledgement

The author thanks TNAU – Mc Gill CIDA project for support.

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