

ROLE OF NEEM TO CONTROL INSECTS AND PESTS IN STORED FOOD GRAINS

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Neem - "nature's gift to mankind" - is a god gifted resource which has got various uses. The most important use for neem products is to fight against crop pests and diseases. Farmers all over the world used simple plant preparations to protect their stored products against pest damage. The insecticidal properties of the neem tree have been known for many years. People in India placed neem twigs and leaves in their beds, in cupboards and stored grains to reduce infestation by moths and used oil as a protectant for stored pulses. These traditional methods were pushed to the background or even forgotten with the introduction and wide distribution of synthetic pesticides during the last decades. The modern agriculture is based on judicious use of chemicals particularly complex synthetic pesticides. Although these chemical pesticides are highly effective at the initial stage, but later create some major disadvantages such as high toxicity to non - targeted organisms, environmental pollution and residual hazards which pose a serious threat to human livelihood.

For ecologically sound, equitable and ethical pest management, there is a need for control agents that are pest - specific, nontoxic to humans and other biodegradable, less prone to pest resistance and relatively less expensive. Among various options, neem has been identified a source of environmentally "soft" natural pesticides. Neem extracts contain a natural chemical called azadirachtin. The substance is found in all parts of the tree. The leaves are used effectively, though the chemical is much more concentrated in the fruit, especially in the seeds.

Neem has much to offer in solving global agricultural and environmental pollution problems. It cannot be achieved without building awareness of its potential and dissemination of neem based technology for pest management. An awareness generation programme was conducted in selected villages of Anamalai block in Coimbatore district on practical applications of neem for pest management of stored food grains.

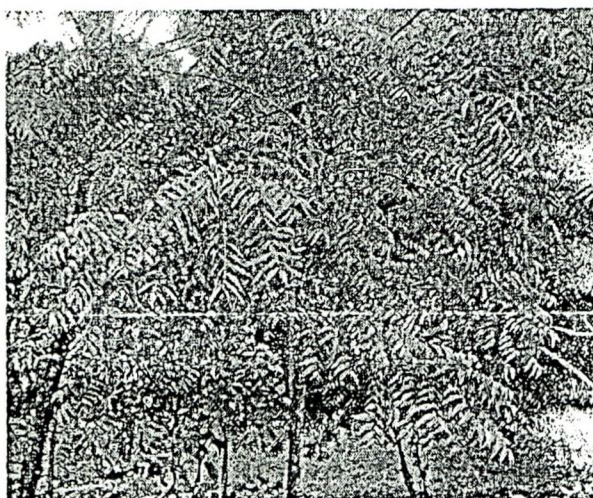
Introduction

Agriculture in India is the means of livelihood of almost two thirds of the work force in the country. Although agriculture began about 10,000 years ago, the practice of storing food grains began about 4,500 years ago as a safeguard against poor harvests and famines due to adverse weather conditions and/ or pest attacks (Levinson and Levinson 1985).

Food grains form an important part of the vegetarian Indian diet. Grain production has been steadily increasing due to advancement in production technology, but improper storage results in high losses of food grains. According to World Bank Report (1999), post-harvest losses in India amount to 12 to 16 million metric tonnes of food grains each year, an amount that the World Bank stipulates could feed one-third of India's poor. The monetary value of these losses amounts to more than Rs 50,000 crores per year (Singh, 2006).

Food grains are harvested once in a year, but consumed throughout the year, therefore storage is an inevitable step in the normal pathway of grain from harvest to consumption. Food grain production in India is enough to feed its population if we are able to minimize the post harvest losses particularly the storage losses. Attentions towards the reduction of losses during post harvest operations are needed. Food grain losses in India during storage at the farm level approximate 10% of the production (Lal, 1998).

Earlier, farmers all over the world used simple plant preparations to protect their stored products against pest damage. The insecticidal properties of the neem tree have been known for many years. People in India placed neem twigs and leaves in their beds, in cupboards and stored grains to reduce infestation by moths and used oil as a protectant for stored pulses. These traditional methods were pushed to the background or even forgotten with the introduction and wide distribution of synthetic pesticides during the last decades (Schmutterer, 1995).



Pest control, as practices today in most developing countries relies mainly on the use of imported pesticides. This dependence has to be reduced. Although pesticides are generally profitable on direct crop return basis, their use often leads to

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contamination of terrestrial and aquatic environments, damage to beneficial insects, accidental poisoning to humans and livestock, and the twin problems of pest resistance and resurgence (Pimentel and Lehman, 1993). Need of the hour is to strengthen traditional means of storage with modern inputs and to provide cheaper storage to farmers so as prevent enormous storage losses.

For ecologically sound, equitable and ethical pest management, there is a need for control agents that are pest – specific, nontoxic to humans and other biodegradable, less prone to pest resistance and resurgence, and relatively less expensive. Among various options, neem has been identified a source of environmentally “soft” natural pesticides (Sexena, R.C, 1999).

Neem has much to offer in solving global agricultural and environmental pollution problems. It cannot be achieved without building awareness of its potential and dissemination of neem-based technology for pest management.

The study was conducted in Coimbatore district of Tamil Nadu. Out of 21 blocks in the district, Anamalai block was selected. From Anamalai block, two villages namely Anna nagar and Thathur were selected for the awareness creation based on the amount of food grain production and quantity of losses during storage. With this background, this study was undertaken with the objective of creating awareness on neem to control insect and pest in stored food grains.

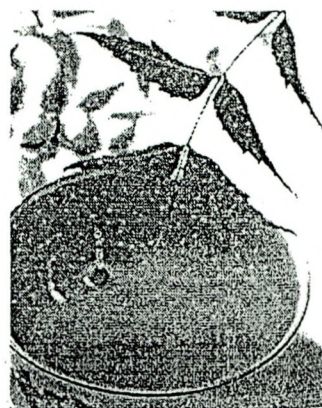
Course Content of the Training Programme

The food grains should be properly cleaned, dried, graded and cooled before storage. The moisture content of the stored food grains should be brought down below the safe level, which is 14 per cent for paddy and 12 per cent for other food grains

The storage room should be properly cleaned

Neem leaves should be placed in top and bottom of the storage containers

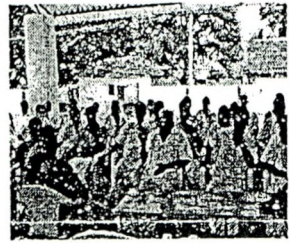
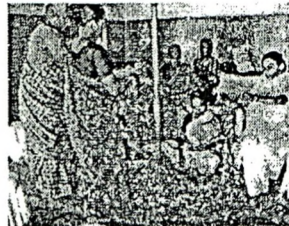
The walls and ceiling of the storage room should be white washed and sprayed with neem leaf extract or neem kernel in the proportion of 1:100 (1 litre extracts mix with 100 litre of water) once in 15 days.



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- Disinfect the storage rooms with neem leaves smoke before storing food grains to avoid insect attack
- Dry neem leaves under shade and grind the dried neem leaves into powder. Make neem leaf powder packet using muslin cloth. Place the packet in stored food grains
- Gunny bags and polythene bags can be treated with neem leaf extract for storing food grains to avoid insect attack
- Mix a small quantity of neem seed oil with food grains before storing.
- The dunnage (arrangement on the floor to stack food grain sacks) should be made up of neem wood or black polythene sheet treated with neem leaves extract to avoid insect infestation

Conduct of training programme in the selected villages



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The impact of the awareness programme on role of neem to control insect and pests in stored food grains were assessed on the following lines:

- a. Knowledge gained
- b. Attitudes developed
- c. Adoption of neem based pest management practices in stored food grains

- a. Knowledge gained by the farmers

Table I exhibits the percentage of knowledge gained by the farmers through the awareness programme.

TABLE - I
PERCENTAGE OF KNOWLEDGE GAINED BY FARMERS

S.No.	Aspects	In Percentage	
		Before Training	After Training
1	Operations involved in post harvest technology	70	100
2	Causes of grain spoilage	40	100
3	Insect infestation in grain	70	100
4	Safeguarding grains from moisture and fungus	30	80
5	Insecticides and fumigants	10	70
6	Problems of using synthetic insecticides and pesticides	10	70
7	Neem based pest management practices in stored food grains		
	a. Before storage	40	100
	b. During storage	20	100
	c. After storage	40	90
	d. Advantages of neem based storage practices of food grains	20	100

It is clear that there was a significant gain in knowledge among the recipients of the training on post harvest technology. Their knowledge on neem based pest management practices seemed to be better after the training programme. As a follow up of the training programme, they showed great interest in learning new methods in reducing losses during storage.

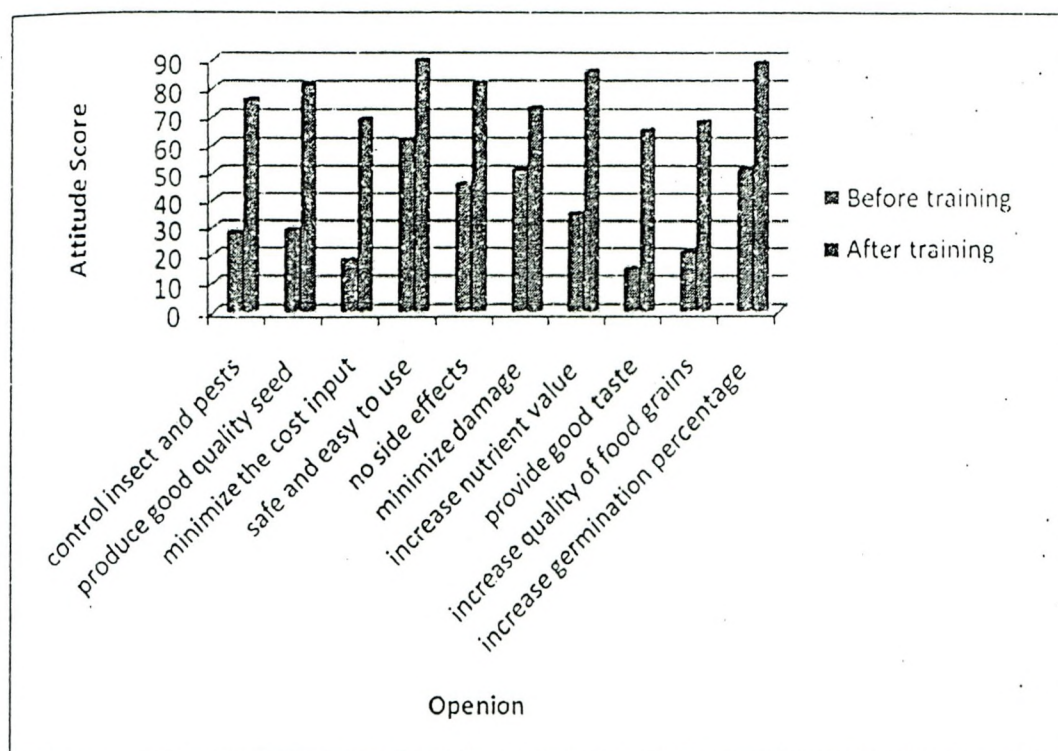
- b. Attitudes developed by the farmers

An attitude scale was developed based on Likert's Summated Rating Scale Technique. Each item in the scale was provided with five response categories. They

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were strongly favourable, favourable, neutral, unfavourable and strongly unfavourable with scores 5, 4, 3, 2 and 1. Based on the responses obtained against each items, total attitude scores was obtained and shown in Figure 1

Attitude scores obtained by farmers on Neem based pest management practices



It is evident from the above figure that the training programme changed the attitudes of farmers on use of neem to control insects and pest in stored food grains. The attitude score has increased from a minimum score of 21 to a maximum score of 90 after attending the training programme. Farmers realized the benefit of using neem based pest management practices in stored food grains.

c. Extent of adoption of neem based pest management practices in stored food grains

After providing awareness on neem based pest management practices in stored food grains, farmers were encouraged to adopt the storage practices effectively. Periodically the farmers were guided on storage practices. The adoption level of neem based pest management practices in stored food grains is given in Table II.

TABLE II
ADOPTION OF NEEM BASED STORAGE PRACTICES

S.No.	Neem based storage practices	Percentage of households
1	Pre storage treatments, cleaning and drying of grains	100
2	Preparation of storage rooms and structure <ul style="list-style-type: none">• Cleaning of storage room with neem extract• Use of dunnage made out of neem	98 96
3	Neem leaf extract spray in storage structure	90
4	Use of neem leaves in storage containers	98
5	Use of improved storage structure <ul style="list-style-type: none">• Use of disinfected gunny bags• Use of disinfected polythene bags	90 91

It was found that cent per cent of the farmers dried food grains before storage and 98 per cent of the farmers using neem leaves in the storage containers. More than 90 per cent of the farmers used dunnage, disinfected gunny bags and disinfected polythene bags.

Conclusion

The awareness programme in the selected villages has made a significant impact on the storage practices of food grains. The farmers were highly satisfied with the conduct of the awareness programme and they showed greater interest in learning and adopting new concepts related to neem based pest management practices in stored food grains. The training helped the farmers to control the avoidable storage losses and to save each and every grain produced.

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