Traditional Knowledge System and Pest Control Methods in Agriculture

Dr. Rantu Mani Deka
BarbhagCollege, Department of Zoology, Kalag, Nalbari, Assam, India

Abstract- This paper deals with the role of Traditional Knowledge System on Pest Control Methods in Agriculture. Traditional Knowledge (TK) refers to the practices, long-standing wisdom and skill developed by the indigenous local communities through their direct interaction with the natural environment over generations. Traditional Knowledge plays a great role in sustainable agriculture. These methods are inherently sustainable; as they promote biodiversity, reduce dependency on chemical fertilizer and pesticides. This technique also enhances soil health. In recent years, due to inappropriate use of chemical fertilizers and pesticides causes decreased activity of predator birds and beneficial insects and also leads to the pollution specially soil. Traditional Knowledge is the only key to save our environment from degradation. The study revealed that more than 70% of the people of Assam are engaged in agriculture. Among agricultural crops rice is the most dominant crop occupying 80 % of the total agricultural land. The farmers from different ethnic diversity have developed their own system in cultivation of various crops such as spraying of Neem, branch of Pasatia tree, application of ripe banana, applying of peeled ends of shaddock (Citrus sp.), smoking and spraying of cowshed etc. So, ancient knowledge system will be beneficial to Assam in particular in a country like India in general and lead to the sustainable development of the Nation.

Key Words: Traditional, Knowledge, Pest, Agriculture, Biodiversity.

INTRODUCTION

Insects are the more diverse group of animals living on earth. Insect's pests inflict damages to humans, farm animals and crops. Insects cause injury to plants either directly or indirectly to secure foods. They consume all parts of plants such as stem, leaves, buds, bark and roots etc. The losses of crops caused by insect pests are quite high in both developed and developing countries. The assessment of correct percentage of yield losses by insect is a difficult task. However, in India pest cause an estimated annually crops loss of around 147 million kg which is 10-35 % of total product.

Use of chemical fertilizers and pesticides considered to be basic input for modern agricultural technology. It causes contamination of almost every part of our environment. Traditional knowledge system encourages natural pest control measures where as inappropriate use of chemical fertilizers and pesticides causes decrease activity of predator birds and beneficial insects. Traditional Knowledge (TK) is only the key to save our environment.

Traditional Knowledge System (TKS) contains rich understanding of plants crop tree species, animal breeds and local biological resources. The traditional practice also helps the soil and underground water from degradation. TK is a vital asset that offers valuable insights and practices for achieving long term sustainability.

Several workers studied about the role of TKS on pest control methods in agriculture namely M. Bhuyan (2003), Dekat.et.al (2006), Dhaliwal et.al (2015), Dhaliwal et.al (2004), Atwal and Dhaliwal (2015), Khan and Sharman (2024), Kumari (2024). However, there is scarcity of work on role of Traditional Knowledge System (TKS) on pest control methods in agriculture. Therefore, the present study is designed to investigate the significance of Traditional Knowledge System on control of agricultural pest.

OBJECTIVES

The objectives of this paper are to review the role TKS in pest control methods in agriculture and its significance in sustainable agricultural practices.

METHODOLOGY

The study was solely based on secondary data. The information was gathered from different related books, Journal, Research Papers, websites, newspapers and

personal collections. Data were collected according to the fulfillment of objectives. Gathered experiences and knowledge are also incorporated in this paper.

RESULT & DISCUSSIONS

After going through study of different research papers, websites, observation of different agricultural crops of Borigog-Banbhag Development Block Nalbari District, Assam and asking questions to elderly people of the mentioned revenue circle which are involved in various agricultural practices relating to use of TK to control the agricultural pests. The obtained results are presented on Table-I.

Table-I TRADITIONAL PRACTICES OF CROP PROTECTION AGAINST PEST

Name of the Villages	Crops	Pest	Stages of Pest	Traditional practice applied	Methods of Application	Justification by Experts
Guwakuchi Baghmara Chatma Bilpar Kayakuchi	Paddy	Stem borer, Rice Hispa	Larvae, Pupae	Use of peel of Shaddock (*Citrus decumana*)	The peel of Shaddock is sliced into small piece and spread over the crop field	Death of insect occurs when come in contact with peeled rinds of shaddock probably rinds are bitter, aromatic and pungent, the fruit pulp is acidic.
	Paddy	Rice Hispa	Larvae, Pupae	Erecting dried jute stem after remming	the elongated dried jute stem is erected in the crop field	Attracts birds to take rest on the stem. The birds feed the adult moth of stem borer and swarming caterpillars
	Paddy	Rice Hispa Leaf Folder	Larvae, Pupae	Erecting the branches of Pasatia plants (*Vitex negunda*)	Stake the branches of the plant in different place of the affected field	it may act as fly repellant
	Paddy	Gandhi bug	Adult	Hanging of dead crabs or frogs	Dead frog or crabs are kept over the pegs in entire field	Gandhi bugs are attracted by the rotten smell emitted from the dead frog
	Paddy	Gandhi bug and Grass hopper	Adult	Setting fire near crop field	Setting fire with dried banana leaf and straw during early evening near the crop field	Insects migrate towards light and immolate themselves
	Mustard	Mustard aphid	Nymphs and Adult	Dusting the ash of paddy straw or cow dung	The ash collected from the said source dusted over the crop	Ash enhances host resistance to various insect pest
	Vegetable	Wasp and caterpillar	Adults	Smoking	Just near the crop smoke is created from burning the debris collected from the crop field, Sometimes dried chilly is also added during the burning	Smoke often act as repellant to various insect pest
	Vegetable	Brinjal shoots and fruit borer	Caterpillar	Dusting the ashes cow shed	Smog is created in the cow shed during evening by burning debris collected from cow shed waste and the ash dust produced is spread over the crop	Ash enhances host resistance against the pests
	Winter Vegetables	Red ants, Mites	Nymphs and Adults	Application of ripe Banana and molasses	Ripen banana along with molasses is placed under the sub-soil. The pest moves and crowded insight the substance and then the substance is picked up and it burnt of buried to kill the pest.	Rotten banana attracts the ants and mites and they feed on the substance

	Potato	Aphids and Mites	Nymphs and Adults	Spraying of tobacco leaf extract	Tobacco leaves are soaked for 24 hours in water and soaked solution are mixed with equal amount of water and sprayed over the crop field	It may act as repellant
	Potato	Wilt and red ants	Adult	Spraying of Neem *(Azadirachta indica)* extract along with mustard cake	Neem extract like Neem leaf powder, Neem sheed powder, Neem sheed cake, Neem leaf juice mixed with mustard cake is applied in the tiller during plantation	The azadiraction present in the neem seed and leaf act as antifeedent and growth retardant to insect
	Citrus Fruits	Shoot borer	Caterpillar and pupae	Spraying of water of Hookah (a traditional pipe for smoking tobacco)	Hookah, a devise of smoking tobacco where water is used insight the devise. This water is sprayed over the crop	It may act as repellant

From the above study (Table-I), it is observed that the cultivable crops such as paddy, vegetables, potato citrus etc. are infected with the pests. Out of which stem borer, rice hispa, leaf folder, Grasshopper and Gandhi bug are the chief pests for paddy cultivation. They can damage the vegetative and reproductive parts of the paddy. To control stem borer and rice hispa, the peel of shaddock is sliced into small piece and spread over the crop field which is highly effective. According to the experts, death of insects occurs when the insect comes in contact with peeled rinds of shaddock and probably rinds are bitter, aromatic and pungent, the fruit palps is acidic.

To control rice hispa, the elongated dried jute stem is erected in the crop field. The dried jute stem attracts birds to take rest on the stem. The birds feed the adult moth of stem borer and swarming caterpillars. Besides these to control stem borer, rice hispa and leaf folder, use of branches of pasatia tree (*Viten negunda*). The branches of this plant may work as fly repellant. To control Gandhi bug, we may use dead frog or toads and hanged on bamboo sticks erected in the crop field. The adult Gandhi bugs are attracted by rotten smell emitted from the dead frog. The study also revealed that Gandhi bug and Grass hopper damage the plants at their reproductive stage. The adult Gandhi bug and Grass hopper are generally harmful to the crops. To control such type of pest it is necessary to set fire with dried banana leaf and straw during early evening near the crop field. Another insect pest is popularly known as mustard aphid. The Nymphs and adult stage is harmful to the mustard crop. The mustard aphid can be controlled by dusting the ash of paddy straw or cow dung which increases the host resistance capacity to insect pest. It is observed that most of the vegetables are damaged by wasp and caterpillar which is controlled by smoking. Traditionally, to control wasp and caterpillar just near the crop smoke is created from burning the debris collected from the crop field, sometimes dried chilly is also added during the burning. The brinjal shoots and fruit borer may also damage the vegetables which can be controlled by dusting the ashes cow shed during evening.

Traditionally, the red ants' mites can be controlled by using ripe banana and molasses. The ripe banana along with molasses is placed under the sub-soil. The pest moves and crowded insight the substance and then the substances are picked up and it is burnt or buried to kill the pest. Rotten banana attracts the ants and mites and they feed on the substance. The Aphids and Mites damage the potato plants. To control such type of pest, tobacco leaves are soaked for 24 hours in water and soaked solution are mixed with equal amount of water and sprayed over the crop field. The potato plants can be damaged by red ants and traditionally which is controlled by spraying of Neem *(Azadirachta indica)* extract along with mustard cake. The azadiraction presents in the neem seed and leaf act as anti feedent and growth retardant to insect. The Citrus fruits are damaged by the shoot borer and it can be controlled by spraying of water of Hookah.

CONCLUSION

The traditional knowledge is hub of local resources and wisdom of farming community passing from generation to generation. It has been found that traditional knowledge is very effective as it possesses scientific background. However, more study and research is required for scientific validation in a systematic way. Improvement of traditional practice in an appropriate precision coupled with more scientific inputs will obviously erupt in a new era for protecting crops from pest and diseases without polluting our environment with agro-chemicals. But these practices are rapidly disappearing from generation to generation due to rapid urbanization, shifting of livelihood etc. In this context, collection, compilation and scientific validation of these traditional knowledge are very important.

ACKNOWLEDGEMENT

The author is grateful to all the farmers of experimental villages and the village headman of the respective villages for providing information relating to traditional methods of control of agricultural pests.

REFERENCE

[1] Atwal, A.S. and Dhaliwal, G.S.(2015). Agricultural Pest of South Asia and their Management, Kalyani Pub., New Delhi

[2] Bhuyan, M.(2003). Studies on some Potential insect control agents from plants of Northeast India, Ph.D Thesis, Dibrugarh University, Dibrugarh, Assam

[3] Deka, M.K., M. Bhuyan and Hazarika, K.L. (2006). Traditional pest management practices of Assam. *Indian Journal of Traditional Knowledge*. Vol.5 (1), Jan, 75-78

[4] Dhaliwal, G.S., Arora. R and Dhawan, A.K. (2004). Crop Losses due to Insect Pest in Indian Agriculture: An Update. *Indian J. Ecol*. 31(1): 1-7

[5] Dhaliwal, G.S., Jindal. V. and Mohindru B.(2015) Crop Losses Due to Insect Pest: Global and Indian Scenario. Indian Journal of Entomology. 77(2):165-168

[6] Khan, S. and Sharma, M. (2024). *An Overview on Indian Knowledge System. Integrated Journal for Research in Arts and Humanities*. Vol. 4, Issue-4: 42-46

[7] Kumari, D. (2024). Indian Knowledge for Sustainable Futures. International Journal of Novel Research and Development. Vol.9, Issue-3:259-262

[8] https://carijournals.org/journals/index.php/IJHSS/article/view/2079/2473

[9] https://www.un.org/development/desa/indigenous-peoples-and-the-conservation-of-nature.html