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Research Article

Tribal Indigenous Pest Control Practices in Garo Hills Districts of Meghalaya for Sustainable Agriculture

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ABSTRACT

The study was carried out on indigenous technological knowledge that is being practiced by the tribal farmers in different villages of Garo Hills districts of the Meghalaya. The study was conducted in two districts viz. West Garo Hills and South Garo Hills districts in the year 2015 with sample size 120. The data were collected through personal interview method and participatory techniques. A total of 15 indigenous technology were identified. Out of these, 13 practices were used by the respondent farmers for control of pest in rice and other crops and 2 practices were found to be used by them for the control of storage pests in rice. Identification of scientifically sound indigenous practices will be helpful to the scientist in developing different technologies relevant to the grass root level.

Key words: Tribal farmers, indigenous, insect-Pest Control, ITK, Garo Hills

INTRODUCTION

Indigenous Technology Knowledge (ITK) refers the unique traditional local knowledge existing within and developed around the specific conditions by women and men indigenous to a particular geographic area [1]. Insect pests and diseases are the major problems that cause crop losses. For Controlling menacing diseases and insect- pest in agriculture, farmers for centuries, have relied on indigenous methods. It has been found that all of those are not effective [2]. Generally farmers use only indigenous common ingredients available in their surroundings for insect pest management. Indigenous knowledge is found to be socially desirable, economically affordable, and sustainable and involves minimum risk

and rural farmers and producers [3]. So the study was conducted to identify various ITKs practiced by the tribal farmers for management of insect pest in rice and other crops.

METHODOLOGY

The study was conducted in 2 districts of Garo Hills of Meghalaya viz. West Garo Hills and South Garo Hills in the year 2015. Twelve villages from each district selected randomly for the study thus making a total of 24 villages. From each village 5 farmers (above 45 years) were selected randomly making a sample size of 120. Data for the study were collected through survey and Participatory Rural Appraisal. The survey include individual interview of the respondent. Transact walk and semi structure interview schedule are used as PRA tools.The indigenous practices were collected with the help of list of question during transect walk and interviews. To assess the extent of adoption of each of the indigenous practices were ranked according to their response through focus group discussion. The extent of adoption of different indigenous practices was determined in terms of frequency and percentage.

RESULT AND DISCUSSION

A total of 15 nos. of indigenous technologies practices identified (Table No.) which were practice with different proportion of farmers for management of insect pest in rice and others. Out of these, 13 practices was used by the practicing farmers for the control of control of pest in rice, maize and vegetables and 2 practices were found to be used by them for the control of stored pest in rice. The frequency for adoption of indigenous technologies practices by the respondent farmers were also made. The frequency of adopter farmer for each indigenous practice was shown in percentage. The percentage of farmer adopting different indigenous practices ranged for 20.8% to 84.0%. The practice of clipping of rice leaves before transplanting was found to be adopted by the highest proportion of farmers (84.0%) followed by the sprinkle of ashes in Onion, okra, brinjal, tomato and cucumber and rice, maize etc for the Pumpkin beetles, leaf defoliating insects, leaf miners, thrips and aphids are practice 79.2% of the respondents. Destroying caused by the rodents is the major problems faced by the farmers after harvest. It is found that 77.6% of the respondents usedempty mustard oil tin used by opening one side in the foot hills of store house (locally it is called Jam) for control of rodents. Farmers do not have storage facility except rice into their house or village so 74.4% of the respondent hanged thematured maize cobs, cow pea and ladish finger etc on top of their cooking chulah(a traditionally made fire place for cooking food)after harvest to escape from destroying by the stored grain pest for sowing into their field in the next year. The rice bug, another important pest of rice, caused damage by feeding on the sap of milky grain and turn them chaffy [4].Therefore 60.8 % of the tribal rice growers of this area hanged dead crab with a stick in the middle of the paddy field during panicle initiation stage. The rotting smell of the crab attracts gundhi bugs towards crab instead of attacking towards rice panicle. After 7 to 8 days, when the crab was dried up the rice milky stage will be over.It is found that stem borer causes great losses to the rice grower .To minimize the attack of stem borer in paddy field, 58.4% of the farmers spread the cover of pamelo*(Citrus*

grandis L) fruit in all the side of the paddy field. They said the smell of the pamelo cover reduces the attack of stem borer to some extent.Stored of food grain after harvest is found to be a big problem in most places of the farmers. So 45.6 % of the respondents mixed dried curry and neem leaves with the grain during storage @ 2-3gm/kg of grain for control of rice weevil and grain moth in their grainery. The smell of curry leaves and neem leaves act as insect repellent in storage.The study reveals that 39.2% of the respondent used sticks of highly branched top of bamboo are erected in the field for birds sitting and act as predator for foliage feeding insects. It was found that 28.0% of the respondents used the mixture ingredient of cow urine – 10 litres + Neem leaf – 2 kg + Custard apple (Attafal) leaf- 1 kg + Dry Tobacco leaf– 1 kg+ Akon – 0.5 kg + *Dhatura* leaf – 0.5 kg for the control of gundhi bugs in paddy. They locally called it *Kit Nimontrok*. It is totally organic and easy to made and eco-friendly and which is followed by 27.2%of the respondents were making fire near rice field in the night time during milky panicle initiationstage. The light in night times attracts the gundhi bugs to move towards light and immolate themselves. The study found that 30.4 % of the respondents spreading the small branches of curry leaves in paddyfor the control of insect pest infestation caused by stem bore and case worm. They said that the smell of curry leaves act as repellent stem bore, case worm and other insects. The affect caused by the aphids and thrips is common in most of vegetables during rabi season. To control its infestation 25.6% of the respondents spray the mixture of cow dung -10 kg + Ghee – 2 kg + Honey – 500 ml with -200 litre of water. It control leaf defoliating insects to some extent and improve the growth and yield of crops also. Birds also causemaximum losses to the rice during crop maturity stage especially in short duration rice. 24.8% of the respondents hangs large numbers of black polythene in the rope in two side of the paddy field to screw birds.It is simple and easy technique which checks the loss of paddy to75-80 %. It was shown that most of the house hold grows ash gourd near their house or into their kitchen garden. 22.4% of the respondent covering tender fruits of ash guard with plastic polythene or gunny bags to avoid the attack of fruit fly. The fruits flycauses oozingout from the fruits and makes spot on the fruit, which reduce the price during selling by the farmers in the market. Insect pest are the major concerns in paddy cultivation, sometimes they directly cause damage to the crops and sometimes also act as a carrier of diseases. The study reveals that 21.6% of the respondentsused the branch of bitter oleander placed in the corners and middle of the paddy field to drive away the rice hispa, gandhi bugs and grass hopper. The smell of bitter oleander act as insect pests repellent in paddy.

CONCLUSION

The identified indigenous practices revealed that it is considered to be safe, biodegradable, easy to use, made from locally available materials. The study concluded that proper identification, documentation and scientific analysis of traditional practices of farmers would provide us to eco-friendly management of insect pest in cultivation practices. Indigenous practices are organic based insect pest management techniques. Plant parts and animal byproduct were the main component of pest control. ITKs are a part of integrated insect biodegradable and eco-friendly technologies for the farmers or grass root level programme.

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List of Table:

Table no.: 1.Indigenous Technological Knowledge practiced by the tribal farmers of Garo Hills districts of Meghalaya

Sl. Nos.	ITK	Crop	Insect & pest control	Village practiced	Benefits	Adoption of the technology	
						Frequency	Percentage
1.	Clipping of rice leaf before transplanting of seedling	Rice	Stem borer	Okkapara, Shyamnagar, Dengnapara, Dengasi, Samandalgre, Bhoirakupietc	Carry of the eggs to the main field	105	84.0
2.	Sprinkling of ash	Onion, okra, brinjal, tomato and cucumber and rice, maize etc	Pumpkin beetles, leaf defoliating insects, leaf miners, thrips and aphids.	Puthimari, Amongpara, Noranggre, Marapara, Shyamnaga, Rakhaldubietc	It is simple and easy to apply, cheap and effective method for insect pests, use of local raw material, eco-friendly and has no side effect.	99	79.2
3.	Empty mustard oil tinused by opening one sidein the foot hills of store house	Paddy	Rodents	Samandalgre, Marapara, Rongbokgre, Sananggre,	It is simple structure and easy to made at home which control destroying of	97	77.6

	for control of rodents			Wetregre, Amongpara, Noranggre, Dengnapara	rodents in paddy seeds in store house to maximum extent		
4.	Hanging the crops on top of their cooking *chulah* after harvest	Maize, cow pea and ladish finger etc	Store grain pest	Kamagre, Samandalgre, Marapara, Rongbokgre, Sananggre etc.	Maize cobs cobs can be kept for longer period	93	74.4
5.	Hanging of dead crab with a stick in the middle of the paddy field during panicle initiation stage	Rice	Gandhi bugs	Rongdenggre,Rongsepamindagre, Wetregre, Samandalgre, Phuljhori etc	The rotting smell of the crab attracts bugs towards crab instead of attacking towards rice panicle. After 7 to 8 days, when the crab was dried up the rice milky stage will be over.	76	60.8
6.	Spread the skin/cover of pamelo in all the side of the paddy field.	Rice	Stem borer	Dengasi, Dopatchigre, Ashimgre, Samandalgre etc	They believed the smell of the *pamelo* cover reduces the attack of stem borer to some extent	73	58.4
7.	Curry leaves and neem leaves are dried and mixed grain during storage @ 2-3gm/kg of grain	Rice	Weevil and grain moth	Samandalgre,Rongsep, Adengre, Wetregre	Smell of curry leaves and *neem* leaves repels insect.	57	45.6
8.	Sticks of highly branched top of bamboo are erected in the field for birds sitting	Rice	For foliage feeding insects	Dengnapara, Dengasi, Rongbokgre, Noranggre etc	Birds act as predator	49	39.2
9.	Spreading the small branches of curry leaves in paddy field	Rice	Stem borer and case worm	Ketkipara, Dengasi, Samandalgre etc	Control insect pest infestation to some extent	38	30.4

10.	Cow urine – 10 litres + Neem leaf – 2 kg + Custard apple (Attafal) leaf- 1 kg + Dry Tobacco leaf– 1 kg+ Akon – 0.5 kg + *Dhatura* leaf – 0.5 kg.	Rice	Gandhi bugs	Bhoirakupi, Rakhaldubi, Ashimgre etc	Locally they called it *Kit Nimontrok*. It is organic and easy to made and eco-friendly	35	28.0
11.	Making fire near rice field in the night time during milky panicle initiation stage	Rice	Gundhi bugs	Kuralbhanga, Shyamnagar, Puthimari, Noranggre etc	Gundhi bugs move towards light and immolate themselves	34	27.2
12.	Cow dung -10 kg + Ghee – 2 kg + Honey – 500 ml + Water-200 lit	Rabi vegetables	Aphids and thrips	Phuljhori, Dengasi, Bhoirakupi etc	It control leaf defoliating insects to some extent and improve the growth and yield of crops	32	25.6
13.	Hangs maximum numbers of black polythene with rope in two side of the paddy field to screw birds	Rice	Birds screw	Marapara, Rongbokgre, Sananggre, Noranggre etc	Simple and easy to made and the save the loss of paddy by the birds to75-80 %	31	24.8
14.	Covering tender fruits with plastic poly/gunny bags to avoid destroy of fruit fly	Ash gourd	Fruits fly	Puthimari, Marapara, Bhoirakupi	Save from oozing out and destroys of the fruits	28	22.4
15.	Branch of bitter oleander placed in the corners and in the middle of the paddy field to drive away the insect pests of paddy.	Rice	Rice hispa, Gandhi bugs and grass hopper	Marapara, Sananggre, Rongbokgre, Noranggre etc	Saves from insect pest attack with the smells of flowers and leaves	27	21.6