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INDIGENOUS TECHNICAL KNOWLEDGE IN POTATO CULTIVATION AND ITS STORAGE IN RAIN FED FARMING SITUATION OF HAILAKANDI DISTRICT, ASSAM

Research Article

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ABSTRACT

This study summarizes the picture of indigenous management practices followed by the famers of Hailakandi district against insect pests and disease during potato cultivation and its storage. Study was mainly focused on organic farming as indiscriminate use of inorganic chemicals leads to hazardous effects on to all living organisms as well as environment. Potato is an important tuber crop and cultivated popularly by almost all the farming families of the district in small to large scale. Generally farmers of Barak valley prefer the local potato variety (reddish coloured and small in size) for cultivation and thereafter also store the harvested potatoes as seed materials for cultivating in the next year. During its cultivation and storage, farmers witness various problems due to insect pests and diseases. To tackle these problems they adopt many eco-friendly indigenous technologies right from potato seed treatment to its production and storage. Therefore, an effort has been made to inspect suitable indigenous technologies followed by farmers in potato cultivation and its storage. From the study it was revealed that the ITKs based on use of plant extract and application of pesticide mixture prepared from cow urine and tobacco leaves gives very good results in controlling insect pests like red ants, aphids, potato tuber moth, cut worm, white grub etc. and diseases like fungal and bacterial in field condition. Moreover, mixture of lime and organic pesticide mixture helps during storage of potato seeds.

Introduction

Introduction of high yielding varieties, practice of monoculture and haphazard manipulation of natural resources and careless and injudicious use of inorganic chemicals in agriculture results in degeneration of soil, outbreak of insect pest, human health and environmental hazards. Therefore, reduce of the ill effects of these inorganic chemicals is the need of hour. In coming day's approaches for growing agricultural productivity will have to give emphasis on adoption of eco-friendly management practices like indigenous technical knowledge (ITK) for and improving soil health and controlling insect pests and diseases more effectively and sustainably.

Farmers in developing countries have brilliant understanding of agriculture and natural resource management, which are more eco-friendly and sustainable. This knowledge is based on many generations of insights gained through close interaction within natural and physical micro environments (Rajasekaran *et al.*, 1991 and Kolawole, 2001). Indigenous knowledge is dynamic, changing through indigenous mechanisms of creativity and innovativeness and contact with other local and international knowledge systems (Warren, 1991). These are often elaborated and adapted to cultural and environmental conditions (Warren and Cashman, 1988). ITK is the knowledge of age old practices with trial and errors, natural selection and intense observation that can establish database on which followers, researchers and extension workers can design their research policy and experimental trials. It is influenced by the adaptive skills of local people, usually derived from many years of experience

(Thrupp, 1989), time tested practices in nature, strategies and techniques developed by the local people to cope with changes in their socio-cultural and environmental conditions and accumulated by farmers through constant experimentation and innovation (Rajasekaran, 1993).

North eastern region is one of the most fascinating regions having diversified indigenous culture. This region is also dissimilar in ecological habitats fluctuating from highlands to valley with rich variety in flora and fauna and traditional multiplicity. Ethnic populations of this province exercise their traditional practices of cultivating diverse crops in pure organic condition. Thus increase the value of the land (in terms of soil health) and environment for the sustainability of the system for forthcoming generations. In this background, identification, documentation and validation of scientifically sound indigenous practices will be useful in technology blending programme, generation of low-cost, location-specific and appropriate technology for greater benefit of the farming community. Chakravorthy (1982) reported about use of cow-dung cake gas as burrow fumigant to control field rats; using bow traps to control rats, use of *'Nochi'* leaves to control storage pests of paddy and digging field burrow and killing rats in Tamil Nadu. Gogoi (1989) reported about the use of plant twigs and/or leaves of *Ghora Neem* (*Melia azadirechta*), *Baghdoghban* (*Eupatorium odoratum*), *Bihlongani* (*Arthyrium*spp.), *Mahodi* (*Croton jupa*), *Posotia* (*Vitexnegude*), use of fruits of *RababTenga* (*Citrus grandis*), *Bontenga* (*Citrus meghaloxicarpa*) and use of fire at night as indigenous pant protection practices followed in *Sali* paddy in Assam.

It is observed that potato is an important tuber crop cultivated popularly by almost all the farmers of the district. They face various insect pests and disease and soil fertility related problems during its cultivation and storage. Keeping these facts in mind, the present study was commenced to document and encourage the effective and sustainable ITKs for controlling insect pests and diseases in potato cultivation.

Materials and methods

The study was carried out in five villages of Hailakandi district. Again five (05) farmers were selected randomly from each selected village. The sample of respondents for the study comprised of 25 farmers selected randomly from those five villages. The study combined the survey and participatory rural appraisal (PRA) techniques. Surveys included individual and group interviews with the respondent farmers. Participatory rural appraisal techniques namely, transit walk and semi-structured interviews were conducted. The task of identifying the indigenous practices was accomplished with the help of checklist of questions put during the course of transit walk and interviews. After locating the indigenous practices, a checklist of those practices were prepared and best three technologies were selected. ITKs, which were adopted by 60 % or more than that of the farmers, were taken into consideration for the analysis.

Results and discussions

From the investigation, 02 nos. of ITKs were found to be effective and practiced efficiently by the potato growers. These ITKs includes - preparation of pesticide mixture and mixture for potato seed storage which is discussed herewith.

1. Preparation of pesticide mixture

The study revealed that 67 % of farmers are aware of preparation of pesticide mixture and have been practicing in their potato fields. The materials required for preparation of 05 liters pesticide mixture are *viz.,* dry tobacco leaves (50g), *akond (Calotropisprocera)* leaves (300g), *ghatkund (Clerodendrum infortunatum)* leaves (700g), cow urine (4 lit), water (1 lit) and an earthen pot.

Preparation procedure of pesticide mixture:

Following steps are involved in the preparation of pesticide mixture that has been figured in plate 1.

Step I: Soak tobacco leaves for 3 - 4 hours in earthen pot

Step II: Pour the tobacco solution into another earthen pot

Step III: Add crushed leaves of *akond* and *ghatkund* to the tobacco solution

Step IV: Add cow urine

Step V: Cover with transparent plastic and seal

Step VI: Keep in pit with surface exposed to sun light for 20 - 25 days

Step VII: Filter the mixture

Step VIII: Pesticide mixture is ready to use in the field

From the study it was observed that using of this pesticide mixture@ 10 % was found to be effective against red ants, aphids, potato tuber moth, cut worm, white grub etc. and potato blight in field condition. Moreover, surface borne and fungal diseases were also found to be controlled effectively while treating the potato seeds in 10 % of pesticide mixture for 45 minutes before sowing in the field.

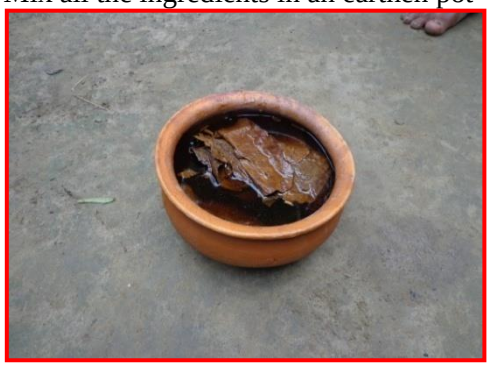
2. Potato seed storage mixture

From the investigation it can be depicted that73 % of farmers were aware of potato seed storage technology and have been performing to store potato seeds for the next year. The materials required for preparation 01 kg of potato seed storage mixture are *viz.*, lime (1 kg), pesticide mixture (100 ml), water (900 ml) and an earthen pot.

Preparation procedure potato seed storage mixture:

Following steps are involved in preparation of potato seed storage mixture that has been figured in plate 2.

Step I: Mix all the ingredients in an earthen pot

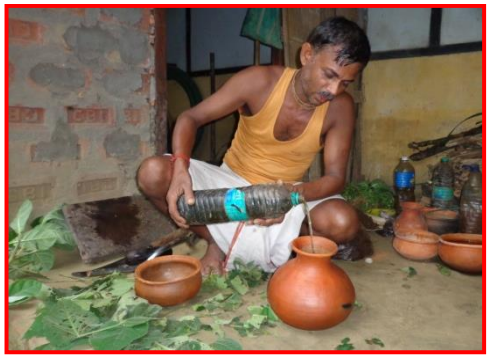


Step I

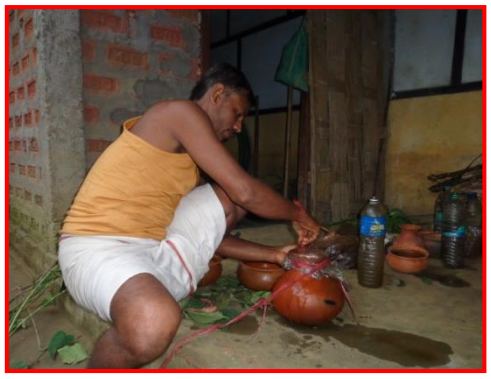
Step II: Mix the mixture with potato seeds

Step II

Step III



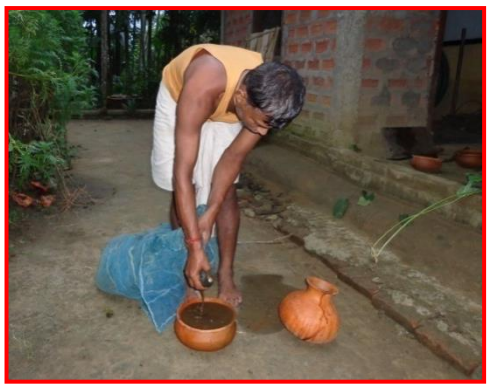
Step IV



Step V

Step VI

Step VII



Step VIII

Plate 1. Steps involve in preparation of pesticide mixture

Step I

Step II

Step III

Step IV

Plate 2. Steps involve in preparation of potato seed storage mixture and seed storage

Step III: After mixing sun dry the potato seeds for 4 - 5 days

Step IV: Hang the treated seeds in aerated plastic bag

From the study it was learned that, by using this seed storage technology farmers stored their potato seeds by providing effective check against storage pest and fungal rotting for next season. Moreover, people have been using various botanicals, crop residue like wood ash, husk etc., animal bi-products like cow dung, urine etc. to protect potato cropsboth in field and storage condition which was found to expressed similarly by Narayanasamy (2006) that these substances are safe, biodegradable, less persistent, non-toxic and easily available in and around their house dwellings and land. Also same kind of findings had been depicted by different authors working in the areas of traditional knowledge for the sustainable management of crops in traditional farming system (Thurston, 1992 and Chhetry and Belbahri, 2009).

Conclusion

ITKs are the gathered skillfulness, knowledge of a locality or a community and have been endorsed on from one generation to another. Proper use of these age old practices would provide us a greater scope to think about eco-friendly management of various field problems. Though, ITKs have been found effective and passing from generation to generation, they need to be validated scientifically along with identification of property and active ingredients present in the materials used and further that should be documented properly

and systematically. Such studies will be helpful for scientists in technology blending programme and in generation of low-cost, location-specific and appropriate technologies. Since the ITKs seem to be cheaper, locally and easily available and have lesser side effects, the use of these technologies may be encouraged with balanced and sensible scientific modifications.

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