Pest management beliefs and practices of Manipuri rice farmers in Barak Valley, Assam

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Manipuri (Meitheis) community is a separate ethnic group of people which has different entity in Barak Valley of Assam. They possess unique culture and method of agricultural practices. In order to study the farmers’ participation and traditional pest management practices in paddy crop, the investigation has been undertaken with the Manipuri farmers. Three sites viz. Mainabond, Sonai and Rajwari were selected for the study to document the farmers’ participation/beliefs and traditional knowledge in paddy pest management. A total of 97 farmers were interviewed through the questionnaire. Mean education level was found higher (8.42 ± 0.81) in Sonai as compared to other two sites, which indicated maximum use of modern insecticides. Paddy yield was also found higher in Sonai (370.5 ± 0.45 kg/ha) than other sites. Regarding pest management and use of insecticide at Mainabond, the yield was found highest due to frequent sprays of insecticides, whereas 86.36% of farmers of Rajwari did not use insecticides, and 90.90% farmers gave importance to the harmful effects of insecticides particularly on human health. For the management of different storage, farmers practiced some indigenous methods besides chemical pest management. These traditional practices proved to be a sustainable method of insect-pest management in Barak Valley.

Keywords: Traditional Knowledge, Traditional Pest management, Meithei, Manipuri

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The settlement of Manipuris (Meitheis) in Barak Valley has been started since 18th Century by establishing a close relation through marriage by the Cachar Kings with the Princess of Manipur. Total population of Manipur in Barak Valley is 1, 00,697. A total of 196 Manipuri villages are found distributed in three districts of Barak Valley, viz. Cachar, Hailakandi and Karimganj1. More than 70% people are engaged in agriculture. Rice is the staple food crop occupying 80% of the total agricultural land. The farmers from different ethnic diversity of the region have developed their own systems of cultivation of various crops2. The paddy crop is cultivated during Aus (March-June), Amon (July-Nov) and Boro (Dec-Feb) throughout the valley. Manipuri community posses some indigenous technical knowledge (ITK) in the area of agricultural practices which are quite endemic. Recently, organic agriculture gains importance particularly for its rich biodiversity in the areas of Northeast India. The ITKs are ecofriendly and compatible to other pest management practices. Further, due to the rapid urbanization and developmental works, introduction of synthetic pesticides, the ethnic groups are promptly reducing their conservation attitude towards the long earned ITK that they are carrying from generation to generation. In this context, collection, compilation and scientific evaluation of the ITKs are very important for insect pests management with regard to this ethnic group3. Considering the impact of indiscriminate use of pesticides in agro-ecosystem which is a serious threat to the ITKs of Meithei community regarding pest management in rice crop in Barak Valley, the investigation was undertaken to evaluate the status of farmers’ participation and to encourage their traditional knowledge practices. Three sites, Mainabond, Sonai and Rajwari (Boro Jalenga), where Manipuri population were densely distributed, were selected for the study on farmers’ adoption of traditional knowledge base pest management practices in paddy crop among Meithei farmers. This valley is surrounded by hills from 3 sides except on the western side located at the latitude of 92°45’25.9E and longitude of 24°41’29.9N. The major part of the area is having low plain lands and wet lands (locally called beels) and hillocks (locally
called *tillah*). The climate of the region is subtropical, warm and humid. The average rainfall is 3,180 mm\(^4\). The area is having a rich fauna and flora. Paddy is cultivated on the plain lands to a considerable extent.

**Methodology**

A total of 97 Meithei farmers of 3 sites were interviewed by supplying questionnaire\(^5\). The theme of the questions centered on farmers’ participation in agriculture insect management, use of insecticides, their beliefs and their traditional knowledge based pest management in paddy crop\(^6,7\). For measuring their attitudes on the frequency of pesticide used and timing of insecticide responses, following assigned scores were used: 1=never spray insecticides; 2=spray insecticides rarely; and 3=spray insecticides once in every two years (occasionally). For timing of insecticide spray responses, the assigned scores were: 1=2–4 weeks after transplantation; 2=before the flowering stage; 3=during the flowering and milky stage; and 4=any time, when pest infection is seen. Attitude towards insect management the assigned scores were as follows: 1=insect should not be killed totally; 2=insects should be killed totally; and 3=insects should be killed up to threshold level (according to farmers view). For the measurement of opinions about insecticides, the assigned scores were: 1=it will increase the yield; 2=insecticides are harmful to health; 3=insecticides can cause more pest problems; and 4=there is no effect of insecticides. For evaluation of farmers’ beliefs, assigned scores were: 1=loss from insect damage is important; 2=killing of all insects is important; 3=applying insecticides to increase yield is important; 4=killing natural enemies is important; 5=beneficial insects are important; 6=health is important; and 7=insecticides causing more pest problem is important. For the collection of ITK based technologies, field surveys were conducted in the villages of Mainabond, Sonai and Rajwari. The information about the ITKs, regarding the management of rice pests being adopted by the farmers was collected through random sampling method by interview using the schedule. The data were coded and analysed\(^8\).

**Results and discussion**

The profile of the respondents revealed that the mean age of farmers in Mainabond: 54.9 ± 1.69; Sonai: 59.27 ± 1.98 and in Rajwari: 58.86 ± 3.36 yrs. Average education level was higher in Sonai (8.42 ± 0.81) (Table 1). Mainabond farmers were holding larger farm size (1.09 ha ± 0.55) followed by Sonai (1.08 ha ± 0.78), but yield was found to be higher in Sonai (370.5kg/ha ± 0.45) followed by Rajwari (349.2kg/ha ± 0.95). Data revealed that 86.36% farmers did not use insecticides and only 13.63% farmers sprayed insecticides; only 2.04% and 3.84% farmers of Mainabond and Sonai did not use insecticides (Figs.1&2). Most of the farmers of Mainabond and Sonai occasionally used insecticides. In case of spray timings, 79.59% farmers of Mainabond used insecticides at 2-4 weeks after transplantation, whereas 66.66% farmers of Rajwari used insecticides during the flowering and milky stages (Fig.2). Farmer’s perception regarding insect management and evaluation of beliefs revealed that 81.81% farmers of Rajwari expressed insects should not be killed, whereas 26.92% and 26.53% farmers of Mainabond and Sonai also viewed that insects should not be killed. 42.85% farmers of Mainabond believed insect should be killed up to threshold level means 10-15 nos of insects/10 sqm field area followed by 38.46% in Sonai (Fig.3). Most (91.83%) of the
farmers of Mainabond opined that use of insecticides increase the yield followed by 76.92% farmers (Sonai), whereas 90.90% farmers (Rajwari) posed their opinion that insecticides are harmful to health (Fig. 4). Evaluation of beliefs revealed that 96.15% and 91.83% of farmers of Sonai and Mainabond opined that application of insecticides increased the yield which is important; 90.90% of farmers of Rajwari believed that health is an important concern for them (Fig. 5).

As a traditional practice, Manipuri farmers used twigs of Nishinda plant (Vitex negundo L.) to control rice hispa, Dicladispa armigera (O.) insects of rice crop which repelled the insect because of foul smell. Utongthangmei which meant burning of clothes on bamboo sticks during night in the four corners of rice field attracted Leptocoryza sp. The fire was used as a trap. Another practice followed was placing a rotten crab on a stick, where infestation of Leptocoryza sp was predominant in the rice field. Rotten smell of crabs was used as a trap for the control of Leptocoryza sp. Spreading of Heigri (Dillenia indica L.) leaves over the stored rice repelled rice weevil (Sitophilus oryzae L.) was a common practice followed by the Manipuri farmers. Other way of repelling the stored grain pests is to spread Tezpata (Cinnamonum tamcals Nee & Eberm.) over the grains. Rice moth (Sitotroga cerealella L.) is controlled by using leaves of Chawai sabi (Poligonum hydropiper L.) in the stored rice which is used as a repeller. Kuthap (Clerodendrum viscosum Vent.) twigs are used to control Leptocoryza sp in the paddy fields. Neem leaves are used as a repeller against rice weevil (Sitophilus oryzae L.) in stored rice by Manipuri farmers (Table 2). These practices are very much prevalent in the villages which are ecofriendly,
having minimum cost, easily available in the ambient
climatic conditions and are also sustainable methods of
management of various insect pests. Profile of the
respondents reveals that average education level (years)
of Sonai are higher than the other two study sites. Yield
(kg/ha) was also found to be high in Sonai. This may
be due to use of chemical pesticides and fertilizers.
Farmers of Sonai have occasionally used insecticides,
whereas in Rajwari, they rarely used insecticides while
86.36% of farmers never used insecticides. They
mostly followed the traditional management practices
(Table 2). Perhaps this is the reason behind their low
yield of paddy but they maintained the ecofriendly
agro-ecosystem. In case of spray timings, moderate
number of farmers rarely used insecticides at 2-4
weeks after transplantation if intensity of infestation
was more during tender age of the paddy and
inflorescence. Evaluation of farmers (81.81%) beliefs
with a view that insects should not be killed (in
Rajwari), indicated the symbol of non-use of synthetic
pesticides. Most of the farmers opined that insecticides
will increase the yield; 90.90% farmers of Rajwari
thought that insecticides are harmful to health.

Conclusion
The study of selected farmer’s response revealed that
rice production was found to be higher in Sonai where
the use of insecticides was comparatively higher than the
other two sites. The educated farmers’ believed that
initially the use of insecticides increased the productivity
of rice but in the long run they preferred to follow the
traditional methods. The old aged farmers followed only
the traditional practices for pest management. *Meithei*
community still preferred the traditional knowledge
practices and beliefs for the control of rice pests in Barak
Valley of Assam which are non-insecticidal and
ecofriendly methods of pest control.

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