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Knowledge and Perception on Rice Pests in South 24 Parganas District of West Bengal

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ABSTRACT

A survey was conducted to study the perception and knowledge gap analysis of paddy pests in selected villages of Budge Budge II Block of South 24 Parganas, West Bengal. Data were collected through focus group discussion, group meeting, personal interview, key informant interview from 100 respondents. Maximum respondents surveyed belonged to general caste (47%). About 42 per cent of the land under paddy cultivation was medium land and 58 per cent of the land was low land. Aman paddy shared the major rice area (45%) and 57 per cent paddy growers totally depended on local market for seed procurement while 14 per cent of the farmers used the seeds of their own. Ten numbers of rice varieties were identified as cultivated variety during *boro* season. 27 per cent family cultivated Lalat (medium duration variety) which is relatively resistant to stem borer and blast. Stem borer was identified as major insect of rice; 51.16 per cent respondent reported that the infestation level was up to 41-60 per cent in case of stem borer. Blast, brown spot, sheath rot, bacterial leaf blight, false smut and khaira were reported to infest the rice fields though the infestation level was generally low to moderate. Training, farmers' field schools, field days, information from progressive farmers and other sources like mobile phone/ television programme etc. were identified as sources of technology diffusion method of which training was identified as the most effective tool over other methods as reported by the farmers.

Key Words: Disease, Insect, Paddy, Respondent.

INTRODUCTION

Agricultural production has increased through area expansion and increasing use of high yielding seeds, chemical fertilizers, pesticides and irrigation water. Yet, the pains of hunger continue to be a common experience of many people in the world today. Food shortages in developing countries are aggravated by rapid population growth. Land frontiers are closing down, and there is little, if any, scope to bring additional land under cultivation. Green revolution technologies have now been widely adopted and the process of diminishing returns to additional input usage has set in. Concurrently, agricultural production continues to be constrained by a number of biotic and abiotic factors. For instance, insect pests, diseases and weeds cause considerable damage to potential agricultural production though the global losses due to insect pests have declined from 13.6 per cent in post-green revolution era to 10.8 per cent towards the beginning of this century.

Rice (*Oryza sativa*), the significant member of the family Gramineae, is one of the most important food crops which contribute staple diet to about 2.7 billion people world over. China and India together account for more than half of world's rice area and along with Indonesia consume more than three- fourth of the global rice production (Hossain 1997). India is one of the world's largest producers of white rice and brown rice accounting for 20per cent of world rice production. Among the rice producing states, West Bengal is by far the most important producer and holds leading position, accounting for about 15 per cent of the total

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quantity of rice produced in India. Several biotic stresses are associated with gap of potential yield and actual yield (Prakash *et al,* 2014). Some of the major diseases and insect pests of rice as listed by ICAR-CRRI, Cuttack are: blast, BLB, RTD, sheath blight, false smut, brown spot and sheath rot, and insects are yellow stem borer (YSB), BPH, GLH, gall midge, hispa, leaf folder and gundhi bug out of 100 species of insects. Average yield loss due to various insect pests in Asia where more than 90per cent of the world's rice is produced is about 20 per cent (Pathak and Khan, 1994).

Knowledge about the crops and their growth stage wise pest infection are the major fundamentals of plant health management (Mancini *et al,* 2011). This study was conducted forperception analysis of rice pest spectrum and information diffusion system method in selected villages of Budge Buge II Blocks of South 24 Parganas district on pilot basis.

MATERIALS AND METHODS

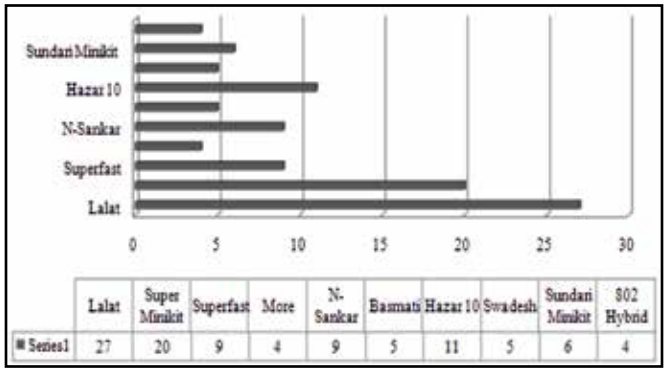
The study was conducted in five selected villages (Dongaria, Itali, Telari, Uttar Raypur and Dakshin Raypur) of Budge Budge II Block of South 24 Parganas district, West Bengal, India. Situated at the funnel shaped bay head in the eastern sea board of India, South 24 Parganas, the largest district of West Bengal is also one of the most densely populated one with a population of 81.6 lakhs (2011 census). Eastern Coastal Plain, hot Sub-humid to semi-arid Eco –Region. District South 24 Parganas was selected purposively for as the area was ideal with respect to the problem and convenient for the researcher having infrastructural facilities. In case of selection of block and villages also purposive sampling technique was taken. For selection of respondents complete enumeration technique was adopted. One hundred farmers were finally selected purposively from the list that was collected from the villages (20 each from one village). The respondents were interviewed through personal interview with the help of structured schedule which was developed for the study. Before selection of the research topic pilot study was conducted. On the basis of this information the present study was finalized. Basic situational and background information were collected during pilot study.

A baseline survey of small farmers was conducted in the five preselected rural communities where rice is one of the major crops in the cropping patterns. The selected villages have alluvial type of soil having potentiality to grow paddy. Land situation is having low to medium; in low and medium land paddy is suitably grown. Twenty numbers of respondents from each village were selected having at least 10 katha of land under rice cultivation. Depending on the objectives and information domain identified through focus group discussion, group meeting, interview schedule of respondent, PRA and key informant were indentified with the help of literature survey. A structured interview schedule was prepared after pre testing for elimination, addition and alteration with non-sample respondents of the study area comprising background information, covering socio-demographic features of the household, pest spectrum etc. Data were collected from the respondents during the period of first week of April to last week of May, 2018.

RESULTS AND DISCUSSION

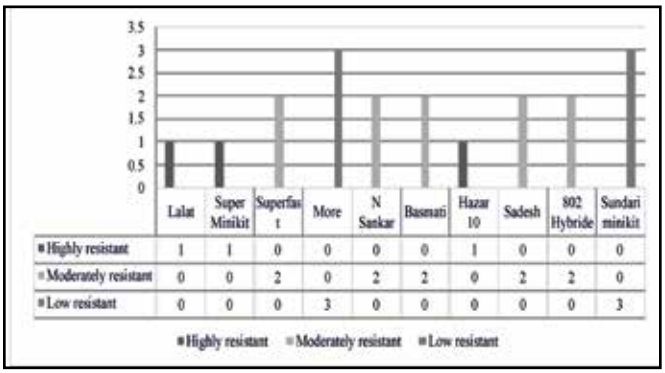
Demographic Characteristics of the Respondents:

Socio-economic characters are very important factors for any technology adoption and dissemination. There are lots of literature available regarding interactions between socio-economic parameters related to technology adoption. So, for successful technology adoption and dissemination socio-economic profile of the ultimate user needs to be analyzed first. Among the respondents 16% were female respondents and 84% were male respondents and average age of the respondents varied between 40-60 yrs (65%). In respect of caste distribution of the informant, majority of the sample respondents in respect belongs to general caste (47%) and 72% of the paddy farmer used to cultivate paddy in leased lands.



	Lalat	Super Minikit	Superfast	More	N-Sankar	Basmati	Hazar 10	Swadesh	Sundari Minikit	802 Hybrid
Series1	27	20	9	4	9	5	11	5	6	4

Figure 1. Different rice varieties cultivated in the study location in respect of respondents



	Lalat	Super Minikit	Superfast	More	N Sankar	Basmati	Hazar 10	Sadesh	802 Hybride	Sundari minikit
Highly resistant	1	1	0	0	0	0	1	0	0	0
Moderately resistant	0	0	2	0	2	2	0	2	2	0
Low resistant	0	0	0	3	0	0	0	0	0	3

Figure 2. Categorization of varieties in respect of resistance

Categorization of the land type and suitable rice cultivation

In the present study, it was found that most of the lands belonged to medium to low land. There was no upland field where rice was grown; 42 per cent of the land belonged to medium land and 58 per cent of the land belonged to low land. In all the three season that is aus, aman and boro rice is cultivated by the farmers. Aman contributed major rice area (45%) followed by boro (38%) and aus (17%) and seeds were procured from local market by 57 per cent of the sample farmers. Variety of a crop plays a pivotal role for maximizing the yield and thereby maximizing the benefit. Still location specific preferences were found to be one of the important social aspects in variety selection. Ten different varieties were identified to be cultivated during boro season- Lalat, Sundari minikit, PAN 802, Gobindobhog, N sankar, Super minikit, Super shyamali, Hazar 10, Swadesh (Fig. 1 and 2).

Pest spectrum of rice in respect of their identity, symptom of damage and infestation level

Insect

In West Bengal out of common 13 insect and one nematode have been reported to infest the rice crop; it has been observed the 7 of them are quite familiar to the respondents and rest of the insect pests were not reported by the respondents to infest rice though they are familiar with mealy bug, mite, thrips and nematode but their infestation was not identified in rice by the respondents. The rice stem borer *S. incertulas* infesting the plant from seedling to maturity was one of the main problems and yield limiting factor in the rice fields (Sarwar, 2011). Damage symptoms of stem borer complex that is the dead heart during vegetative growth and white ear head during flowering stage are familiar to 86 per cent of the respondents and the majority of the farmers (51.16%) reported that the infestation level was up to 41-60 per cent while 29.06 per cent of the farmers have an idea about the infestation of stem borer. It was observed from the study that the level of infestation ranged between 21-40 per cent. Sigsgaard (2000) also reported that among stem borers the most important species, in particular *Scirpophaga incertulas* (Walker) and *S. innotata* (Walker) (Lepidoptera: Pyralidae). *S. incertulas* usually comprised more than 90 per cent of the borer population in rice. Another pyralidid Lepidoptera namely rice leaf folder (*Cnaphalocrocis medinalis*) is now becoming one of the important pests of aman paddy throughout West Bengal. In the study area, 58 per cent of the total respondents were able to identify the symptoms of leaf folder and 49 per cent of respondents could identify the symptoms of rice hispa. Leaf folder was not found to be so critical (0-20%) in damaging paddy as reported by the 65.5 per cent and in case of hispa only 0-20 per cent was reported by the 85.71 per cent of the respondent farmers.

Among the Heteropteran insect pests, brown plant hopper (BPH) and green leaf hopper (GLH)

are commonly known to the farmers as colloquial term 'Badami Soshok Poka' and 'Shyama Poka'. About 58 per cent and 57 per cent of the total respondents were able to identify the infestation caused by BPH and GLH respectively. The infestation of BPH and GLH were not so high (0-20%) as reported by the 65.5 per cent and 98.24 per cent respondent farmers. Rice Gundhi-bug (*Leptocoryza oratorius* and *L. acuta*) infest the crop during milky stage of the crop and make the grain chaffy. Crushed snail mixed with insecticide and put into the fields to capture the adults is one of the indigenous technology knowledge (ITK) regarding gundhi bug management and is very popular among the farmers. In the study area 81 per cent of the total respondents could identify the symptoms and its damage was reported as 41-60 per cent (Table 1).

*Dicladispa armigera*or rice hispa was one of the major pests before two to three decades throughout the paddy growing areas of West Bengal. But presently the status of the pest is taken as minor. Onion shoot is the typical damage symptom of Gall midge (*Orcelia oryzae*).The Ceccidomid fly could be identifiable by 41 per cent of the respondents and the status of infestation was found to be little as 95.12% of them reported that the infestation level of the pest was very low (0-20%). None of the respondents had an idea regarding infestation of army warm (*Mythimna separata*), horned caterpillar (*Melantis leda*), case worm (*Nimphula depunctalis*), while some of them know about thrips, mite and mealy bug but none of respondent reported about their infestation.

Disease

In the study area six diseases *viz.,* brown spot, blast, bacterial leaf blight, khaira, false smut and sheath rot were identified to infest paddy. During interrogation through focus group discussion, group meeting and personal interview it was found that all these six diseases occurred in paddy were quite known to them. Brown spot is known to occur in all the paddy growing areas. In the study area brown spot disease was familiar to only 4.30per cent of the respondents and the damage was reported as (0-20%). One of the dreadest diseases of rice is blast locally known as '*Jholsa'* was reported to infest the crop at a level of 21-40 per cent being reported by 65.43 per cent over 81per cent of the total respondents familiar with the infestation of blast. Bacterial leaf blight is another important disease of rice caused by *Xanthomonus campestris* pv Oryze; 44 per cent respondents identified this disease and out of these respondents 43.18 per cent reported the infestation of BLB which was up to the tune of 0-20 per cent, while according to 65.91 per cent of the respondents the infestation of BLB was relatively moderate (21-40%) (Table 1).

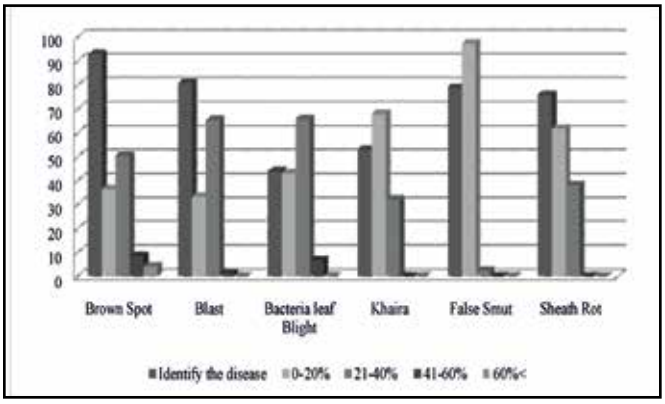


Figure 3. Knowledge on identification of disease symptoms and perceive level of infestation

Zinc is one of the most important micro nutrients for successful crop production and deficiency of zinc causes '*khaira'* disease. About 53 per cent of the farmers could identify the symptoms of *khaira.* Among them 67.92 per cent reported that the occurrence of *khaira* disease was up to 0-20 per cent while moderate level of infestation (21-40%) was reported by 32.08% of the farmers. False smut locally called as '*Lakshir Mol'* was found to damage the crop during the ripening stage and 76 per cent of the farmers could identify the symptoms caused by sheath rot locally called as '*Kholapocha'*. Naeimi *et al* (2003) reported that the Sheath rot occurs in most rice-growing regions of the world and usually causes yield losses ranging from 20 to 85%. Among them 61.84 per cent reported that the occurrence of the disease was up to 0-20 per cent while moderate

Table 1.Knowledge on identification of insect pest, their damage symptoms and perceive level of infestation

Pests	Respondent farmers identifying the symptoms	Level of infestation			
		0-20per cent	21-40per cent	41-60per cent	<60per cent
Insect					
Stem borer	86	12.79	29.06	51.16	6.97
Brown plant hopper	58	65.5	27.5	6.89	0
Green leaf hopper	57	98.24	1.75	0	0
Leaf Folder	58	65.5	27.5	6.89	0
Rice ear head bug	81	83.95	16.04	0	0
Hispa	49	85.71	14.28	0	0
Gall midge	41	95.12	4.07	0	0
Army worm	0	0	0	0	0
Mealy bug	0	0	0	0	0
Thrips	0	0	0	0	0
Horned caterpillar	0	0	0	0	0
Case worm	0	0	0	0	0
Panicle mite	0	0	0	0	0
Disease					
Brown spot	93	36.56	50.54	8.60	4.30
Blast	81	33.33	65.43	1.23	0
Bacterial leaf blight	44	43.18	65.91	6.82	0
Khaira	53	67.92	32.08	0	0
False Smut	79	97.47	2.53	0	0
Sheath Rot	76	61.84	38.16	0	0

level of infestation (21-40%) was reported by 38.16 per cent of the respondents (Fig. 3).

Pest management is highly influenced by the principle *'know our pest'* as effective pest management depends on the bio-ecology of the biotic organism associated to the crops. In our study area the farmers selected to respond have moderate to good knowledge on the major pest of paddy; but also it is essential to extend the objectives of safe handling of pesticides with judicious pesticide application. Farmers used to start spraying the crop once the visual symptom has arrived; simultaneously it is quite difficult to expect the computation of ETL of pest. Understanding farmers' perception is key factor in the development of sustainable and cost-effective integrated pest management strategies (Cabasan *et al,* 2019). The focus of IPM is to protect and encourage natural predators of pest insects (Naranjo *et al,* 2015). Up gradation of knowledge level about pest and pesticides are pre-requisite of pest management. Braun *et al* (2000) showed that using variation tools in IPM education to farmers has increase farmers IPM adoption and can make informal educational method effective on farmers IPM knowledge and active farmers observation skills used in FFS enhanced farmers tendency to adopt IPM (Khisa *et al,* 2005).

CONCLUSION

From the above survey conducted in five villages of Budge Budge II Block of South 24 Parganas district showed that maximum land situation of the study area was low to medium land where Aman paddy shared maximum area. Lalat was the predominant rice variety during Boro season which showed tolerance against stem borer and blast, the pre dominant pest of rice. Majority of the farmers were acquainted with the infestation of major pests of rice but having no idea about the attack of the army worm, horn caterpillar (commonly called as Lyada by the farmer), panicle mite. Thus, safe, efficient, low cost pest management approaches are needed to reduce reliance of farmers to pesticides and to improve agricultural production and food security of small holder farmers; simultaneously it is essential to focus on more extension activities to know the bio-ecology of the pest so that the tendency to injudicious use of pesticides will be lowered.

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