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Scientific Note

FARMERS' RESPONSE ON MUNG BEANS CULTIVATION AND PEST MANAGEMENT PRACTICES IN SELECTED COASTAL DISTRICTS OF BANGLADESH

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A comprehensive survey was conducted by extensive tour in Patuakhali, Barguna, Barisal, Jalokathi and Pirojpur coastal districts of Bangladesh to know the farmer's perception on the insect pests attacking mung bean and their management practices adopted by them during January to April 2019. Results of survey revealed that among the respondents (farmer's) the highest rate of mungbean farmers (66.00%) cultivated local mung bean variety followed by BARImung 6 (8.00%) and BARImung 5 (6.00%). Most (90.00%) of the mung bean growers opined that insect pests viz., flea beetle, leaf roller, whitefly, jassid, aphid, thrips and pod borer complex (*Maruca* sp and *Helicoverpa* sp.) attacked mung bean at different growth stages, among which flea beetle and pod borer were the most damaging insect pests. The rate of knowledge of farmers about mung bean insect pest infestation was 48.00% (thrips), 40.50% (aphid), 37.00% (leaf roller), 31.00% (white fly), 21.00% (jassids) and 15.50% (hairy caterpillar). Mung bean growers applied only chemical pesticides where majority (18.50%) of the growers sprayed virtako 40 WG followed by karate 2.5EC (13.80%) and voliam flexi 300SC (12.50%) while 1.50% growers applied actara for the management mungbean insect pests.

Keywords: Farmers' response, insect pest problems, pest management, pesticides

Mung bean *(Vigna radiata* L.*)* is the most important legume crops in Asia and gaining popularity in other continents (MoA 2011). Currently, mung bean is cultivated on more than 7.3 million hectares worldwide and produced 5.3 million tones (Nair *et al*. 2022). It contains about 51% carbohydrate, 26% protein, 4% mineral, and 3% vitamins (Yadav *et al*. 1994). Furthermore, it has the capacity to fix atmospheric nitrogen for the sustainability of agriculture (Ali and Gupta 2012).

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Mung bean seeds have a significant amount of vitamin C, iron and calcium when sprouted (Gwag *et al*. 2010). The immature grains of the mungbean are consumed as a vegetable and provide plant protein, fiber and phytonutrients, all of which have significant health advantages. In East and Southeast Asia, mung bean is commonly used to produce bean sprouts as well as to produce transparent noodles and mung bean paste, while in East Africa, it is more commonly consumed as a bean stew (Nair and Schreinemachers 2020). Mung bean is mainly grown by farmers because it is a potential rotational crop, has high market value, easily grows with minimum soil moistures with little or no land competing in the bulge, a short maturity period, an alternative option of animal feed and can be easily grown with a minimum labour requirement. Among several biotic and abiotic stresses, attack of insect pests is one of the major limiting factors of mung bean production. There have been reports of several insect pests infesting mungbean, causing significant losses by harming the various parts (seedlings or germs, leaves, stems, blooms, buds and pods, etc.) of the plants (Karim and Rahman 1991). Mung bean attacks by greater than 64 species of insect pests (Lal 1985). The most significant ones include stem flies, pod borers, spotted pod borer, pod bug, flea beetles, aphids, thrips, whiteflies, leaf hoppers and hairy caterpillars. Insect pests are responsible for 42% and 58% losses at pre-flowering and post-flowering stages, respectively of mung bean (Malik 1992). Since adoption responses of mung bean farmers on cultivation, insect pest occurrence and their management practices are important for increasing the production as well as productivity levels, hence this study was undertaken to know the farmers' responses on mung bean cultivation, insect occurrence, and its management problems faced and suggestions to overcome these problems.

The survey was conducted in 5 major mung bean growing coastal districts of Bangladesh viz., Barishal, Patuakhali, Barguna, Jalokathi and Pirojpur. In the survey program, a total of 10 Upazilas (two from each district) were selected under 5 sampled districts. The selection of respondents (mung bean farmers) was made on a stratified sampling technique for sampled districts and simple random sampling technique. Twenty mung bean farmers were interviewed face-to-face through pre-tested questionnaire from each selected upazila of the district. Thus, a total number of 200 farmers were selected through random sampling method from among the mung bean growers and interviewed personally. The selected upazilas were Barguna

sadar, Amtoli from Barguna, Patuakhali sadar and Dumki from Patuakhali, Barishal sadar and Banaripara from Barishal, Pirojpur sadar and Bhandaria from Pirojpur, Jalokathi sadar and Nalcity from Jalokathi district. The used variables/indicators were demographic: address, age, sex, social education, profession, area of mung bean cultivated land, name of used variety/varieties, incidence of their known insect pests, pests control measures practiced by them in the field. The field level data collection was taken from January to April 2019. Collected data were classified, tabulated and analyzed by using statistical method WASP program for frequency and percentage.

Major varieties cultivated by farmers: Most (66.00%) of the mung bean farmers cultivated local mung bean varieties due to high market price (Table 1). On the other hand, 8.00% farmers cultivated in BARI mung- 5 and 26.0% famers cultivated in BARI Mung- 6.

Table 1. Cultivated mung bean verities by the farmers

Varieties	Respondents	
	No. of respondent [N=200]	Percentage
BARI Mung - 5	16	8.00
BARI Mung - 6	52	26.00
Local Mung	132	66.00
Total	200	100

Major problems faced by farmers during mung bean cultivation: Most (92.00%) of the mung bean farmers opined that the insect pest attack was the major problem. Besides, the lack of training (76.00%) among the mung bean farmers followed by lack of modern varieties (64.50%), high price of pesticides (62.0%) and lack of marketing facilities (60.50%) were faced. Conversely, the lowest (47.00%) proportion of farmers reported about the weed infestation followed by lack of irrigation facilities (52.50%) which were the major problems faced by the farmers during mung bean cultivation (Table 2).

Table 2. Problems faced by the farmers during mung bean cultivation

SL No.	Major problems	Major problems faced by the farmers	
		No. of respondents [N=200]	Percentage
1	Insect pest attack in field	184	92.00
2	High price of pesticides	125	62.00
3	Lack of modern verities	129	64.50
4	Lack of irrigation facilities	105	52.50
5	Lack of marketing facilities	121	60.50
6	Lack of farmers training facilities	151	76.00
7	Weed infestation	94	47.00

Knowledge on the use of insecticides of mung bean growers: Among the respondent the highest rate (42.50%) of mung bean growers had moderate knowledge on insecticides use followed by 39.00% had low knowledge. On the other hand, the lowest percent (7.50%) mung bean growers had no knowledge on insecticides use followed by 11.00% who had high knowledge (Fig. 1).

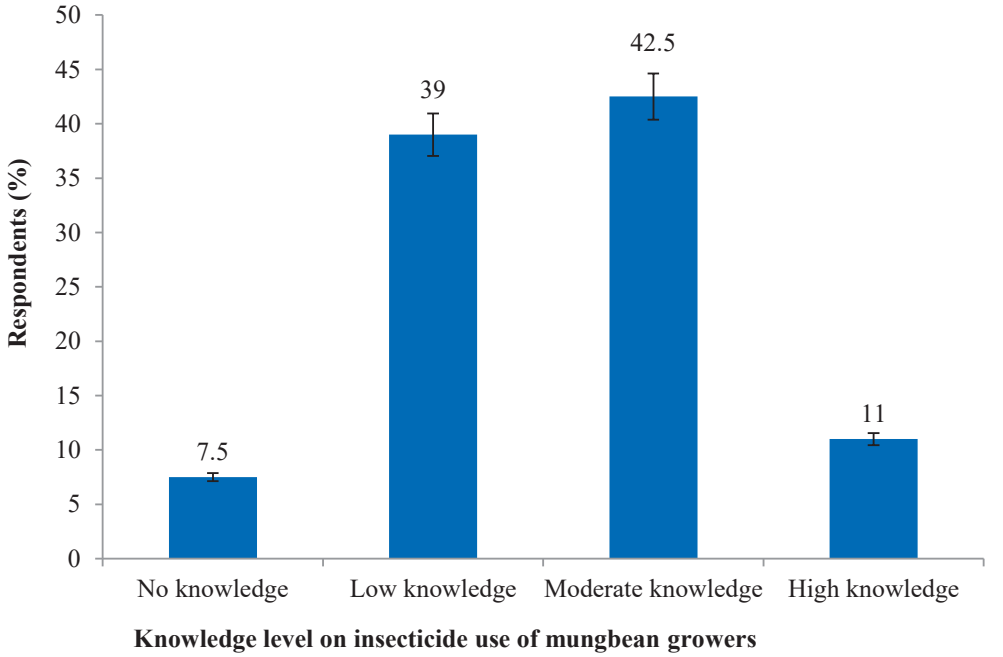


Fig. 1. Levels of knowledge on the use of insecticides among the mung bean growers

Seasonal occurrence of insect pests in mung bean: Results revealed that, out of 200 respondents, 100.00% farmers reported that pod borer infestation was found as the highest followed by flea beetle (87.50%) infesting mung bean. Whereas, 48.00% farmers reported that the mung bean was attacked by thrips, followed by aphid (40.50%), leaf roller (37.00%), whitefly (31.00%), mite (24.00%), jassids (21.00%) and hairy caterpillar (15.50%) (Table 3).

Table 3. Farmers' response on occurrence of insect pests of mungbean in the field

Name of insect pests	Response on pest incidence	
	No. of respondents [N=200]	Percentage
Pod borer	200	100.00
Flea beetle	175	87.50
Thrips	96	48.00
Aphids	81	40.50
Leaf roller	74	37.00
Whitefly	62	31.00
Mite	48	24.00
Jassids	42	21.00
Hairy caterpillar	31	15.50

Opinion on chemical insecticides used for controlling insect pests of mung bean: Majority of the mung bean farmers (18.50%) farmers sprayed Virtako 40 WG in mung bean field but Voliam flexi was sprayed by 12.50% farmers which was followed by Nitro 505 EC (9.50%). However, the lowest (0.50%) opinion expressed by the mung bean farmers who sprayed karate 2.5 EC in mung bean field, which was followed by Actara (1.50%), Mite Scavenger 250 EC (2.00%), Vertimec 1.8 EC (2.50%) (Table 4).

Table 4. Farmers' response on the use of pesticides used for managing insect pests of mung bean in field

Trade name of insecticides	Generic name of insecticides	Response on insecticide effect % Response
Virtako 40 WG	Thiomethoxam+Chlorantrainliprole	18.50
Voliam flexi	Thiomethoxam+Chlorantrainliprole	12.50
Nitro 505 EC	Chlorpyrifos+ Cypermethrin	9.50 8.50
Raise 20 SL	Imidacloprid	7.50
Imitaf 200 SL	Imidacloprid	6.50 6.00
Malathion 57 EC	Organophosphorus	5.50
Dimeothion 40 EC	Organophosphorus	4.50
Amithrin plus	Abamectin + Betacypermethrin	4.00 4.00
Salvo 20 SP	Acetamiprid	
Contaf 50 EC	Hexaconazole	
Amistertop	Azoxystrobin +Difencoazole	
Admire 200 SL	Imidacloprid	3.50
Ripcord 10 EC	Cypermethrin	3.00
Vertimec 1.8 EC	Abamectin + Beta cypermethrin	2.50
Mite scavenger 250 EC	Abamectin + Beta cypermethrin	2.00
Actara	Thiomethoxam	1.50
Karate 2.5 EC	Lambda cyhalothrin	0.50
Total		100

Over 87 percent of the farmers reported flea beetle was also a problem for mung bean cultivation. Some farmers who planted mung beans in larger areas wanted to take advantage of the high price of mung beans in the market. Minimum number of the farmers had adopted improved varieties, recommended seed rate, spacing, time and method of sowing. Hundred percent of the farmers mentioned that pod borers were the most important constraints of mung bean production in the study area. The findings of the present study were almost supported by Shilpkar *et al.* (2021) who reported that majority (52.50%) farmers belonged to medium adoption category followed by 40.83 per cent belonged to low adoption level. Meanwhile, some of the respondents opted to utilize smaller land areas because of high production expenses, limited time to tend their farms, and the fear of losing money due to uncertainties in

the country's agriculture sector (Domingo 2023). Besides that, a lack of access to high quality pesticides at a reasonable cost also a significant challenge for farmers. Most of the farmers have also suffered from getting high yielding varieties, a poor sale price during harvesting, price volatility, postharvest loss due to attack of weevils. Mung bean farmers were challenged by the high cost of farm inputs, the low farmgate price of mung bean at harvest, farm destruction caused by stray farm animals, the threat of wide spread pest infestation, and the low volume of production (Domingo 2023). Based on findings, it is suggested that the management limitations can be minimized by assuring availability of fertilizers and acquiring skill for seed treatment by the farmers. The study suggests that the above practices which had low adoption by farmers should be given due attention by extension agencies, so that the existing level of adoption of such practices can be increased.

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