



## Insect Pests of Yard Long Bean (*Vigna unguiculata* subsp. *sesquipedalis* L.) in Major Growing Areas of Bangladesh

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### Abstract

The survey was conducted in intensive yard long bean growing areas such as Jessore, Dhaka, Narsingdi, Comilla and Chittagong of Bangladesh to know the pest incidence and their level of infestation on yard long bean during March to October 2009. The study comprised of 75 sample farmers through intensive field visit for field data collection and inspection. Pest complex of yard long bean and their intensity of incidence were more or less similar in five surveyed areas and there were at least nine out of ten insect pests at different growth stages in each sample area, which were aphid, pod borer, thrips, red mite, leaf miner, leaf beetle, green sting-bug, jute hairy caterpillar, hooded hopper and semilooper in descending order. It was revealed that aphid and pod borer were the major insect pests in the study areas. They were found to severely infest in yard long beans. Semilooper caused minor damage which occurred only in Jessore, Chandina and Mirshawrai sample areas.

**Keywords:** Insect pest, yard long bean, Bangladesh

### 1. Introduction

Yard long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Walp) is an important leguminous vegetable grown very profitably all over Bangladesh. It is also known as asparagus bean, string bean, snake bean or vegetable cowpea (Purseglove, 1977). It is mostly grown in Chittagong, Chittagong Hill Tracts (CHTs), Faridpur, Noakhali, Comilla and Rangpur districts. At present, it is extensively grown in Dhaka, Chittagong, Comilla, Narsingdi, and Jessore districts and also other districts of Bangladesh. It is extensively grown in *kharif* season when there is shortage of vegetables supply in the market. A serving of 100 g of yard long bean contains 50 calories, 9.0 g of total

carbohydrates, 3.0 g of proteins, 0.2 g total fat and 0.8 g of minerals (Anon., 2013). Yard long bean is one of the economically important vegetable crops in Bangladesh. The area occupied by this crop was 5857.49 ha and the production was 21348 t during the year 2008-2009 (Anon., 2010). It is one of the vegetables having exporting potential in Bangladesh.

The cultivation of this crop faces various problems including the pest management (Rashid, 1993). Yard long bean is especially attractive to aphids (*Aphis craccivora*, *Myzus persicae* and *Aphis gossypii*), green stink bug (*Nezara viridula*) and red spider mite (*Tetranychus* spp.). Greasy cutworms (*Agrotis ipsilon*) often cause damage just after emergence

(Grubben, 1993). The insect pests have been reported as one of the serious problems to yard long bean cultivation in the country (Rashid, 1999). However, their levels of infestation in different growing regions have not been reported so far. The pest complexes including the major ones are also not exactly known from the major growing areas. One of the major constraints for this bean production in Bangladesh is the attack of pod borer, *Euchryisops cnejus* (Dutta *et al.*, 2004). Legume pod borers' populations have been found to reduce up to 100 percent of crop yields in pigeon pea in Bangladesh (Rahman *et al.*, 1981). Aphid, the most destructive pest, causes damage by sucking sap from flowers, buds, pods and tender branches of the plants and reduces the viability of plant (Thaker *et al.*, 1984). Reports on the insect pests' incidence and their management techniques for the yard long bean in its major growing areas of Bangladesh are scanty. The present survey was, therefore, undertaken to know the insect pest incidence and their level of infestation in yard long bean in the major growing areas of Bangladesh.

## 2. Materials and Methods

The survey was conducted in the farmers' field in five major growing areas of yard long bean such as Jessore (Jessore sadar), Dhaka (Savar), Narsingdi (Shibpur), Comilla (Chandina) and

Chittagong (Mirshawrai) during March to October 2009. The study comprised of sample farmers' survey and intensive field visit for field data collection and inspection.

### 2.1. Selection of survey locations and their features

Jessore sadar, Savar, Shibpur, Chandina and Mirshawrai are the intensive yard long bean growing upazillas of Jessore, Dhaka, Narsingdi, Comilla and Chittagong districts, respectively. One union was selected from each upazilla and from each selected union, one yard long bean field of which 15 sample farmers were randomly selected for the survey and inspection (Table 1). Selected farmer's fields are Natuapara of Haibathpur union under Jessore Sadar upazilla, Daywin of Birulia union under Savar upazilla, Ghasirdiah of Ieubpur union under Shibpur upazilla, Pihor of Borokuit union under Chandina upazilla and East Govnia of khuiyachora union of Mirshawrai upazilla. For this purpose, a list of yard long bean growers of the randomly selected location was prepared with the help of the Sub-Assistant Agricultural Officers (SAAOs) of the respective location. From the list of each location, 15 farmers were randomly selected. Thus, a total of 75 farmers were selected for interview and their individual plots were inspected for the survey (Table 1).

**Table 1.** Selected five sample locations for survey and their features

Locations of Farmer's field	No. of surveyed farmers	Union	Upazila	District	Agro-ecological zone
Natuapara	15	Haibathpur	Jessore Sadar	Jessore	11
Daywin	15	Birulia	Savar	Dhaka	28
Ghasirdiah	15	Ieubpur	Shibpur	Narshingdi	28
Pihor	15	Borokuit	Chandina	Comilla	19
East Govnia	15	Khuiyachora	Mirshawrai	Chittagong	23

## 2.2. Methods of data collection

Data were collected directly from the sample farmers by administering pre designed and pre tested questionnaires (Instrument 1) and recording of data in pre-formatted register (Instrument II) was done at 15 days interval from the sample farmer's crop fields through field and crop observation.

In questionnaire survey, the researcher directly interviewed the sample farmers and collected data on overall cultivation practices including methods of pest control, insect pests incidence in general and major pests infestation, pod borers and aphid, in particular. In this context, data were collected by systematic sampling.

## 2.3. Data processing and output generation

All the collected data were coded, tabulated, checked and calculated by using simple statistical methods, e.g. mean percent etc.

## 3. Results and Discussion

### 3.1. Cultivation of yard long bean

Cultivation related data were collected directly from the sample farmers by administering pre-designed questionnaire through field and crop observation.

Among the sample farmers, 26.67% cultivated yard long bean for 1-4 years, 61.33% farmers cultivated yard long bean for last 5-10 years and the rest 12.00% farmers cultivated yard long bean for more than last 10 years. In case of variety used by the farmers, 25.33% farmers used their own preserved seeds and 74.67% farmers purchased seeds from market (Table 2).

In case of fertilizer application, 29.33% farmers applied fertilizer at a rate less than that of requirement, 49.34% farmers used required amount of fertilizers and 21.33% farmers applied excess quantity of fertilizers in the yard long bean field. On the other hand, 66.67% yard long bean farmers applied organic manure and 33.33% farmers did not apply any organic manure in their fields (Table 3).

### 3.2. Training on integrated pest management (IPM)

On an average, 5.33% of the sample farmers received IPM training, whereas 94.67% did not receive any types of training. Among the sample farmers, only 6.67% farmers had knowledge about natural enemies (predators) of harmful insects while 73.34% farmers had no knowledge about natural enemies (Table 4).

**Table 2.** Cultivation (years) and varieties used by the respondents in different surveyed areas of Bangladesh

Districts	Location	(% ) Farmers' experience of cultivation of yard long bean (years)			Variety used by the respondents (%)		Name of the variety
		1-4	5-10	>10	own	purchased	
Jessore	Jessore sadar	66.67	26.67	6.67	46.67	53.33	Kashem king, kagarnati
Dhaka	Savar	33.33	53.33	13.34	33.33	66.67	Toki, lalbani, BARI barbati 1
Narsingdi	Shibpur	20.00	73.33	6.67	13.33	86.67	BU barbati 1, toki, BARI barbati 1
Comilla	Chandina	6.67	80.00	13.33	26.67	73.33	Greenfield, kagarnati, 1070
Chittagong	Mirshawrai	6.67	73.33	20.00	6.67	93.33	Banalata, toki, kagarnati
Mean		26.67	61.33	12.00	25.33	74.67	

**Table 3.** Fertilizer and manure application in yard long bean farming by the farmers of surveyed areas of Bangladesh

Location		% farmers applied fertilizer < required	% farmers applied required fertilizer	% farmers applied fertilizer > required	% farmers applied organic manure	% farmers avoid organic manure application
Districts	Upazilla					
Jessore	Jessore sadar	20.00	53.34	26.66	73.33	26.67
Dhaka	Savar	73.33	20.00	6.67	53.33	46.67
Narshingdi	Shibpur	20.00	66.67	13.33	93.33	6.67
Comilla	Chandina	26.67	60.00	13.33	66.67	33.33
Chittagong	Mirshawrai	6.67	46.67	46.66	46.67	53.33
Mean		29.33	49.34	21.33	66.67	33.33

**Table 4.** Knowledge about natural enemies and training on IPM among the respondents (of yard long bean) at surveyed areas of Bangladesh

Location		(%) farmers having Knowledge about natural enemies	(%) farmers having no Knowledge about natural enemies	(%) IPM trained farmers	(%) farmers having no training on IPM
Districts	Upazillas				
Jessore	Jessoresadar	13.33	86.67	13.33	86.67
Dhaka	Savar	0.00	100.00	0.00	100.00
Narshingdi	Shibpur	6.67	93.33	6.67	93.33
Comilla	Chandina	13.33	86.67	6.67	93.33
Chittagong	Mirshawrai	0.00	100.00	0.00	93.33
Mean		6.67	73.34	5.33	94.67

### 3.3. Pest complex of yard long bean and their intensity of incidence

As presented in Table 5, semilooper, hooded hopper, jute hairy caterpillar and green sting bug rated their appearance and damage severity as rating 1 i.e, insignificant damage while green sting bug, leaf beetle, leaf miner, thrips and red mite were rated as rating 2 i.e, low damage. At the same time, pod borer and aphid were rated their appearance and damage severity in rating 8 and 9, respectively i.e., causing severe damage. Rating scale 1 & 2 rated as minor pests and rating scale 8 & 9 rated as major insect pests of yard long bean surveyed in five areas of Bangladesh. This rating scale was supported by the rating scale of Egho (2010), Litsinger *et al.* (1977) and

after Jackai and Singh (1988), who conducted studies on legume insect pest complex.

Table 6 and Figure 1, indicate the pest complex of yard long bean, their level of incidence and damage severity. But they were very similar in 5 surveyed areas and there were at least 9 (nine) out of 10 (ten) insect pests at different growth stage in each sample area, which were listed in descending order based on their lowest intensity of incidence.

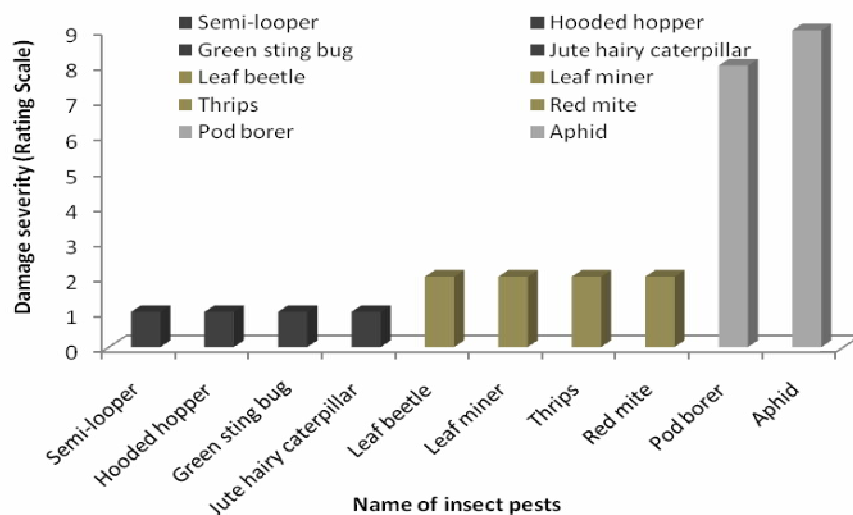
The description along with photographs of the insect pests appearing at different stages of the plant growth, nature of damage caused by them, and the pest status as observed by the farmers under their field condition are presented in Table 7.

**Table 5.** Scale for rating the level of incidence and damage severity of insect pest complex of yard long bean in five surveyed areas of Bangladesh

Name of pests (descending order based on their lowest density of incidence)	Level of incidence		Damage severity		Status
	Rating	Appearance	Rating	damage	
Semilooper (0,1)	1	incidence is not always	1	Very insignificant damage	Minor
Hooded hopper (1,2)	1	very low in number	1	insignificant damage	Minor
Jute hairy caterpillar (1,2)	1	very low in number	1	insignificant damage	Minor
Green sting bug (3,4)	1	very low in number	1	insignificant damage	Minor
Leaf beetle (4,5)	2	incidence in small number	2	Low damage	Minor
Leaf miner (5,6)	2	incidence in small number	2	Low damage	Minor
Thrips (7,8)	2	incidence in small number	2	Low damage	Minor
Red mite (7,8)	2	incidence in small number	2	Low damage	Minor
Pod borer (9)	8	incidence in moderate no.	8	severe damage	Major
Aphid (10)	8	incidence in high number	9	severe damage	Major

**Table 6.** Pest complex and their intensity of incidence of yard long bean in five surveyed areas of Bangladesh

Item	Pest complex and intensity of incidence in surveyed areas				
	Jessore sadar	Savar	Shibpur	Chandina	Mirshawrai
Incidence of insect pests at different growth stages (descending order based on their lowest density of incidence)	Semi-looper (1) Hooded hopper (2) Green sting bug (3) Jute hairy caterpillar (4) Leaf beetle (5) Leaf miner (6) Thrips (7) Red mite (8) Pod borer (9) Aphid (10)	Hooded hopper (1) Green sting bug (2) Jute hairy caterpillar (3) Leaf beetle (4) Leaf miner (5) Thrips (6) Red mite (7) Pod borer (8) Aphid (9)	Hooded hopper (1) Green sting bug (2) Jute hairy caterpillar (3) Leaf beetle (4) Leaf miner (5) Thrips (6) Red mite (7) Pod borer (8) Aphid (9)	Semi-looper (1) Hooded hopper (2) Green sting bug (3) Jute hairy caterpillar (4) Leaf miner (5) Leaf beetle (6) Thrips (7) Red mite (8) Pod borer (9) Aphid (10)	Semi-looper (1) Hooded hopper (2) Jute hairy caterpillar(3) Green sting bug (4) Leaf beetle (5) Leaf miner (6) Thrips (7) Red mite (8) Pod borer (9) Aphid (10)



**Fig. 1.** Pest complex, their level of incidence and damage severity of yard long bean in surveyed areas of Bangladesh

**Table 7.** Insect pest complex of yard long bean at different growth stages in farmers' field of surveyed areas during *kharif* season, 2009

Plant stage	Name of insects	Description of insect	Nature of damage	Pest status
Vegetative stage	Leaf beetle (Unidentified)	Adults were medium, oval shaped, brownish yellow back	Made numerous holes at the lower leaves of plant	Minor
Vegetative stage	Jute hairy caterpillar, <i>Spilosoma obliqua</i> Lepidoptera	Adults were deep yellow, dense hairy body and brownish black head	Fed on the young leaves leaving vines	Minor
Vegetative stage	Leaf miner (Unidentified)	Larvae are small, green in colour and black head	Young larvae mine into the leaf, tunneled it, feeding and leaving a transparent leaf blade	Minor
Vegetative and flowering stage	Semilooper ( <i>Diachrysia</i> spp.) Noctuidae, Lepidoptera	Caterpillars were green and formed loop at motion	Caterpillars fed on leaves by scratching green matter leaving midribs and veins	Minor

Vegetative and flowering stage	Thrips <i>Megalurothrips</i> spp. Thysanoptera	Adult insects were minute, yellowish brown, tan or black with feeble wings. Nymphs are pale yellow	Both larvae and adults attacked unopened leaves, bud and flower. Fed on pollen and rasp other flower parts and sucked plant juice	Minor
Vegetative and flowering stage	Hooded hopper <i>Leptocentrus taurus</i> Membracidae Hemiptera	The pronotum extended backward over the entire abdomen and had two horn-like processes laterally	Adults and nymphs caused damage by sucking sap from succulent plant parts	Minor
Vegetative and flowering stage	Red mite, <i>Tetranychus</i> spp. Tetranychidae Acarina	Tiny red spiders with bristly backs hardly visible with naked eye. Had eight legs. Spined small webs on leaves, twigs and flower buds	Sucks sap from leaves. Small yellow or brown spots (stipples) may also appear on the tops of the leaves	Minor
Flowering and fruiting stage	Pod borer, <i>Euchrysops cnejus</i> Lycaenidae Lepidoptera	Male were light purple, female were heavily black-dusted with the wing bases pale shining blue. Underside is pale buff with usual lycaenine markings as spots and stripe. Possesses a pair of string-like tails	Flowers and young pods with bore holes and presence of slug like caterpillar. Larval entry hole on pod is plugged with excreta. Infested pods and flowers webbed together	Major
Vegetative, flowering and fruiting stage	Aphid, ( <i>Aphis craccivora</i> Kosh), Aphididae, Hemiptera	Adults were small in size, greenish brown, and brown or black in colour and occurred both in alate and apterous forms	Both adult and nymphs crowded together in clusters under leaves, on twig, inflorescence and pod. Caused damage by sucking sap	Major
Vegetative, flowering and fruiting stage	Green sting bug, <i>Nezara viridula</i> , Pentatomidae, Hemiptera	Adults shield-shaped, dull green color, five-segmented antennae, dark red or black eyes. Small black dots along abdomen sides. Wings completely covered the abdomen. Had malodorous scent	Piercing-sucking mouthparts. Salivary fluid pumped down and liquefied food was pumped up food canal. Fed upon all plant parts	Minor

Results revealed that aphid (*Aphid craccivora*) and pod borer (*Euchrysops cnejus*, *M. vitrata*) occupied the same status (major) in respect of the level of incidence and damage severity in 5 surveyed areas. They were found to cause severe infestation in yard long bean in farmers' field. Semilooper (occupied the lowest status, which did not occur in all the sample areas. Semilooper (*Diachrysis orichaicea*) was not found in Savar and Shibpurareas while it was observed in Jessore, Chandina and Mirshawrai (Table 6).

#### 4. Conclusions

Aphid and pod borers were found as the major insect pests of yard long bean in Jessore, Dhaka, Narsingdi, Comilla and Chittagong districts of Bangladesh. Therefore, appropriate management approaches should be taken to combat aphid and pod borers infestation as well as to increase the yield of yard long bean of those areas.

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