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Incidence of Tobacco Caterpillar, *Spodoptera litura* (Fab.) (Lepidoptera: Noctuidae) on BG II Cotton

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ABSTRACT

A survey was conducted in farmers' fields of Guntur district during *Kharif*, 2014 to know the level of incidence of *S. litura*. The incidence of egg masses was low during the season and ranged between 0.01-0.02 per plant in the surveyed villages. The incidence was first observed at 60 days after sowing (DAS) and continued till 90 DAS and later disappeared by 105 DAS. Mean larval population and damaged leaves were first observed at 60 DAS and peak level of incidence (0.85 larvae/plant and 10.4 damaged leaves per plant) was observed during 90 DAS and there after gradual decrease was observed. The larval population had reached zero by 150 DAS but mean damaged leaves appeared to be negligible by 150 DAS, which was in the range of 0.3-0.4 leaves per plant.

Key words : Egg masses, Damaged leaves , Larvae and *Spodoptera litura*.

Cotton (*Gossypium hirsutum*. L.), is an important cash crop grown around the world for local and export purpose in about 111 countries worldwide (Sagar and Patil, 2011). Pest problem in cotton is so intricate that as much as 56 per cent (50,000 tons of technical grade material) of total insecticides were utilised against this crop that occupies only five per cent of the total cultivated area (Mayee and Rao, 2002).

At this juncture, transgenic cotton which produces *B. thuringiensis* (*Bt*) toxins under Indian conditions have been effective against bollworms both under laboratory and field conditions (Kranthi and Kranthi, 2004). But Bollgard cotton containing *cry 1Ac* was found to be less effective against the *S. litura* (Soujanya *et al*., 2008). Later on dual toxin concept (Cry 1Ac + Cry 2 Ab) came in to existence that provides season long control and also effective against *S. litura.*

Farmers in Andhra Pradesh also seldom use insecticides on Bollgard II hybrids till 2011 against *S. litura*. However, wide spread incidence of *S. litura* was noticed on Bollgard II hybrids in varied cotton growing districts of Andhra Pradesh since, 2012 and then onwards farmers started applying insecticides (Novaluron 10 EC, lufenuron 4.5 EC and emamectin benzoate 5% WG). In Guntur district of Andhra Pradesh, farmers used 2500 litres of novaluron 10 EC during 2013-14 season as against nil during 2009-10 season against *S. litura* on Bollgard II.Hence, under these circumstances a survey was conducted to know the level of incidence of *S. litura* on *Bt* cotton

MATERIAL AND METHODS

A fixed plot survey was conducted for the assessment of the natural incidence and damage caused by *S. litura* on BG II cotton, for which five farmers' fields in potential cotton growing areas of Guntur district *viz.,* Narakoduru, Pedanandipadu, Chebrolu, Lam and Ravipadu were selected. Survey was conducted at 15 days interval from 45 to 150 DAS (*i.e.,* 45, 60, 75, 90, 105, 120, 135 and 150). In each of the cotton field, 20 plants were selected and marked in which data was collected. The incidence of pest. Incidence of *S. litura i.e.,* egg mass, larvae or leaf damage were documented to draw the information about the initiation of its incidence, the time of the peak incidence and its active period during the season.

RESULTS AND DISCUSSION

The mean larval incidence ranged from 0-0.85 larvae per plant during the season in the surveyed villages. Zero incidences were noticed in all the villages at 45 DAS. Highest incidence was noticed in the fields of Ravipadu and Narakoduru villages at 90 DAS (Table 1). The larval incidence started from 60 DAS which ranged between 0.2-0.3 larvae per plant with mean larval population of

0.24 larvae per plant. In all the surveyed fields, larval population were observed to be 90 DAS and ranged between 0.6-0.85 larvae per plant with a mean larval population of at 0.75 larvae per plant. There after decrease in larval population was noticed and reached nil by 150 DAS. Highest larval population was noticed at 90 DAS, which coincided with the peak reproductive stage of the crop (September).

The mean damaged leaves ranged from 0-10.4 per plant during the season in the surveyed villages. Zero incidences were noticed in all the villages at 45DAS. Highest incidence was noticed in the fields of Lam village at 90 DAS (Table 1). The damaged leaves were noticed from 60 DAS which ranged between 3.5-4.75 per plant with mean damage of 4.3 leaves per plant. In all the surveyed fields damaged leaves reached peak by 90 DAS and ranged between 9.36-10.3 leaves per plant (Fig 4.2) with a mean damaged leaves of 10.3 per plant. There after decrease in number of damaged leaves was noticed and reached to negligible levels which ranged between 0.25-0.45 per plant at 150 DAS. Highest damaged leaves were noticed at 90 DAS, which coincided with the peak reproductive stage of the crop.

Similarly the egg mass incidence was also observed, however the incidence is negligible. The number of egg masses per plant ranged from 0.01-0.02. The incidence was observed from 60 DAS to 90 DAS. No incidence was not observed after 90 DAS (Table 2).

The present findings derive support from the findings of Jeyakumar *et al.* (2007); Soujanya *et al*. (2008); Babu and Meghawal (2014) and Laxman *et al*. (2014) with respect to the period of initiation and activity of the pest. They reported that incidence of *S. litura* has been observed during September and October months on BG cotton. However, Prasad *et al*. (2009) reported that the

Table 1. Mean incidences of larvae and damaged leaves per plant by *S. litura* on BG II cotton hybrid.

Days After Sowing (DAS)	Pedhanandipadu		Ravipadu		Chebrolu		Narakoduru		Lam		Mean	
	Larva/ plant	Leaf damage/ plant	Larva/ plant	Leaf damage/ plant	Larva/ plant	Leaf damage/ plant	Larva/ plant	Leaf damage/ plant	Larva/ plant	Leaf damage/ plant	Larva/ plant	Leaf damage/ plant
45	0	0	0	0	0	0	0	0	0	0	0	0
60	0.25	4.35	0.3	3.5	0.25	4.8	0.2	4.3	0.2	4.5	0.24	4.3
75	0.35	5.55	0.45	5.9	0.45	6.15	0.45	6.1	0.4	6.8	0.42	6.1
90	0.6	10.2	0.85	10.3	0.75	10.3	0.85	10.2	0.7	10.4	0.75	10.3
105	0.25	7.1	0.55	6.7	0.4	7.1	0.5	6.9	0.4	6.95	0.42	6.95
120	0.15	5.05	0.3	4.75	0.25	5.0	0.3	4.6	0.15	4.65	0.21	4.8
135	0.1	3.3	0.15	3.5	0.15	3.85	0.1	2.95	0.1	3.7	0.12	3.46
150	0	0.45	0	0.25	0	0.35	0	0.3	0	0.4	0	0.34
Mean	0.21	4.49	0.33	4.36	0.28	4.68	0.3	4.42	0.24	4.66	0.27	4.52

Table 2. Mean incidence of egg masses of *S. litura* per plant in five villages on BG II cotton hybrid.

Days After Sowing (DAS)	Mean incidence of egg mass
45	0
60	0.01
75	0.02
90	0.01
105	0
120	0
135	0
150	0

activity of the *S. litura* was observed during October and reached peak by November and December months on BG cotton.

The level of larval incidence derive the support from the findings of Strickland and Annells (2005) who reported that Bollgard-II block having lower number of *S. litura* population as compared to INGARD and conventional cotton blocks. Further, Bheemanna *et al.* (2008) reported *S. litura* larvae were nil in MRC-7201 BG-II as compared to MRC-6322 BG genotype. Onkaramurthy (2008) has also reported that the average larval incidence collected at different periods (65DAS to 140DAS) of crop growth, where BG-II hybrids have recorded 0.00-0.03 larva per plant and BG hybrids have recorded 0.05-0.06 larva per plant and were statistically on a par with each other indicating that there was no differential susceptibility and were found to be superior over non-*Bt* genotypes. Soujanya *et al*. (2008) has also reported that the BG II hybrids were completely free from *S. litura*. Prasada Rao *et al*. (2011) reported incidence of *S. litura* was nil during *Kharif*, 2008 but negligible level of larval incidence was observed during *Kharif*, 2009 where it ranged between 0.00-0.03 on different BG II hybrids in the field which were proven superior to BG and non-*Bt* hybrids.

However, the present larval incidence is high, this was anticipated that BG II technology gene (*cry 1 Ac + cry 2 Ab*) is not a fool proof technology for *S. litura* (Kranthi, 2012) who reported that *cry 1F* is the candidate gene for *S. litura*, though BG II technology is superior over BG (*cry 1 Ac*) in managing *S. litura*. Further, *S. litura* is polyphagous surrving in ecosystem on several other host crops. Whenever population reaches peak on other crops and crop no longer retains higher population levels, grown up larvae starts migrating to the adjacent fields. Grown up larvae (> 3rd instar) can survive on the BG II crop and same portion of the population can complete their life cycle on BG II hybrids in the field.

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