

MANAGEMENT OF *Spodoptera litura* Fabricius ON CABBAGE

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ABSTRACT

A field experiment was carried out to evaluate the various insecticides against S. litura on cabbage. On number basis, the results revealed that the minimum per cent infested cabbage heads were found in the treatment of spinosad 45 SC and it was at par with emamectin benzoate 5 SG, indoxacarb and thidicarb 75 WP. Untreated control recorded 28.35 per cent infested cabbage heads, which was higher as compared to other treatments. On Weight Basis, the results revealed that the minimum per cent infested cabbage heads were found in the treatment of spinosad 45 SC and it was at par with emamectin benzoate 5 SG and indoxacarb 14.5 SC. Untreated control recorded 25.03 per cent infested cabbage heads, which was higher than other treatments.

KEY WORDS : Cabbage, *S. litura*, Management, Insecticides

INTRODUCTION

Spodoptera litura Fabricius is an important lepidopterous, noctuid, polyphagous and multivoltine pest. It has worldwide distribution and cosmopolitan in food habit, feeding on the plants of economic importance. The typical flavour in cabbage is due to glucoside "Sinigrin" which contains sulphur. Cabbage also possesses medicinal properties having indol-3-carbinol which helps in curing bowel cancer and constipation. It also increases appetite and speed up digestion. Moreover, it is useful for the patients of diabetes (Mini and Krishnakumary, 2005). The most interesting property of this vegetable is its power to reduce the risk of developing a colon cancer. This is due to its high content in fibers (2.3 g) and other chemicals (Anon., 2011). It also contains a kind of phytochemical known as anticarcinogenic isothiocyanates (ITCs) which stimulate our bodies to break down potential carcinogens i.e. cancer causing

agents (prostate cancer) through the induction of glutathione S-transferases (GSTs) (Joseph *et al.*, 2004). Besides cabbage, this pest is known to cause heavy losses to tobacco, castor, groundnut, tomato and other agricultural crops which proves its tremendous polyphagous nature (Atwal, 1986). The damage is done by larval stage and is often serious. Cabbage as a vegetable crop harvested at rather short intervals and often consumed as raw without much processing. Besides this, the excessive use of only chemical insecticides has also been criticized for their deleterious effects like development of insecticide resistance in insects and pest resurgence. *S. litura* has been reported to show higher level of resistance against many of the insecticides used in the country, Hence it was necessitate to use the newer chemical insecticides or biopesticides against *S. litura* (Ramkrishnan *et al.*, 1984).

MATERIALS AND METHODS

A field experiment was carried out to evaluate the per cent damage of various insecticides against *S. litura* on cabbage during the year 2013-14 at Agronomy Instructional Farm, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar with Randomized Block Design replicated thrice with eleven treatments.

Per cent damage to cabbage heads on number basis

The cabbage heads were harvested from net plot area and sorted into healthy and infested heads recorded separately for each plot.

Per cent damage to cabbage heads on weight basis

The healthy and infested heads were weighed separately and recorded per net plot.

RESULTS AND DISCUSSION

Per cent infested cabbage heads

Number base

Perusal of results in Table 1 and depicted graphically in Fig.1 indicated that the percentage infested cabbage head (number base) differed significantly among various treatments.

The results revealed that the minimum per cent infested cabbage heads were found in the treatment of spinosad 45 SC @ 0.025 per cent (9.26 %) and it was at par with emamectin benzoate 5 SG @ 0.025 per cent (10.74%), indoxacarb 14.5 SC @ 0.007 per cent (11.87%) and thiodicarb 75 WP @ 0.075 per cent (13.50%) and found significantly superior over rest of the treatments. However, thiodicarb 75 WP @ 0.075 per cent remained at par with rynaxypyr 20 SC @ 0.006 per cent (16.56%), profenophos 40% + cypermethrin 4% @ 0.017 per cent (16.96%) and neem oil @ 0.5 per cent (19.68%). Rest of the treatments viz., SNPV @ 250 LE/ha (21.04%), *Bacillus thuringiensis* 5×10⁷ spores/mg @ 0.2 per cent (22.90%) and *Beauveria bassiana* 2 × 10⁸ cfu/gm @ 0.4 per cent (24.62%) were

failed to protect cabbage heads from the attack of *S. litura* and remained at par with untreated control (28.35%).

Thus, it can be concluded that, spinosad 45 SC found significantly superior over rest of the treatments followed by emamectin benzoate 5 SG, indoxacarb 14.5 SC and thiodicarb 75 WP with minimum per cent infested cabbage heads due to *S. litura* under field conditions.

Mallareddy (2004) reported that spinosad was the most effective against *S. litura* in cabbage. Singh *et al.* (2014) noted that among different insecticides tested, spinosad 45EC, novaluran 10EC and indoxacarb 14.5SC were comparatively more effective against *S. litura* on cauliflower. *B. bassiana* was also effective and at par with lower dose of indoxacarb and NPV @ 300 LE/ha. Among biopesticides NPV was cheaper than *B. bassiana*. The above reports are strongly in support of the present findings.

Weight base

Perusal of results presented in Table 2 and depicted graphically in Fig. 2 indicated that the percentage infested cabbage head (weight base) differed significantly among various treatments.

The results revealed that the minimum per cent infested cabbage heads were found in the treatment of spinosad 45 SC @ 0.025 per cent (5.54 %) and it was at par with emamectin benzoate 5 SG @ 0.025 per cent (7.67%) and indoxacarb 14.5 SC @ 0.007 per cent (8.69%) and they were significantly superior over rest of the treatments. However, indoxacarb 14.5 SC @ 0.007 per cent remained at par with thiodicarb 75 WP @ 0.075 per cent (12.44%). Thiodicarb 75 WP @ 0.075 per cent, rynaxypyr 20 SC @ 0.006 per cent (13.55%), profenophos 40% + cypermethrin 4% @ 0.017 per cent (14.85%) and neem oil @ 0.5 per cent (16.13%) remained at par with each other and performed significantly superior over untreated control. Treatments with SNPV

@ 250 LE/ha (18.25%) also remained significantly superior over untreated control. However, *Bacillus thuringiensis* 5×10^7 spores/mg @ 0.2 per cent (20.16) and *Beauveria bassiana* 2×10^8 cfu/gm @ 0.4 per cent (20.97%) were failed to protect weight loss in cabbage heads and remained at par with untreated control (25.03%).

Thus, it can be concluded that, spinosad 45 SC found significantly superior over rest of the treatments followed by emamectin benzoate 5 SG and indoxacarb 14.5 SC, which gave minimum per cent infested cabbage heads due to *S. litura* under field conditions. Among non chemical pesticides, neem oil and SNPV also performed better and remained significantly superior over untreated control.

Mallareddy (2004) reported that spinosad was the most effective against *S. litura* in cabbage. Singh *et al.* (2014) noted that among different insecticides tested, spinosad 45EC, novaluran 10EC and indoxacarb 14.5SC were comparatively more effective against *S. litura* on cauliflower. *B. bassiana* was also effective and at par with lower dose of indoxacarb and NPV @ 300 LE/ha. Among biopesticides NPV was cheaper than *B. bassiana*. The above reports are strongly in support of the present findings.

CONCLUSION

On number basis, the minimum per cent infested cabbage heads were found in the treatment of spinosad 45 SC and it was at par with emamectin benzoate 5 SG, indoxacarb and thidicarb 75 WP. On weight basis, the minimum per cent infested cabbage heads were found in the treatment of spinosad 45 SC and it was at

par with emamectin benzoate 5 SG and indoxacarb 14.5 SC.

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Table 1 : Per cent infested cabbage heads due to *S. litura* at harvest (Number base)

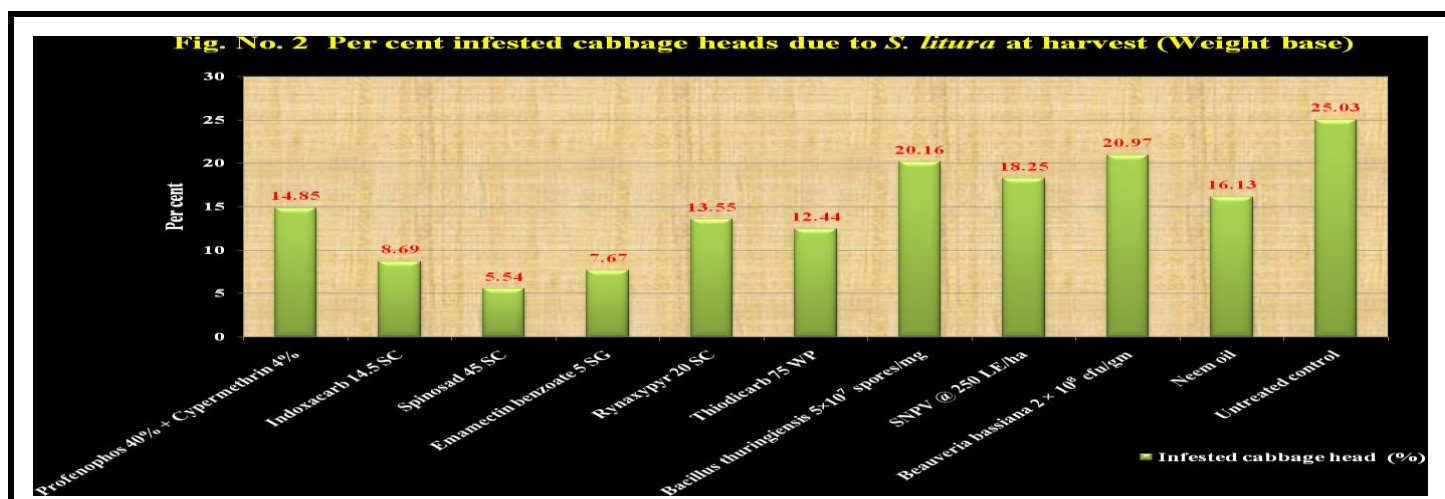
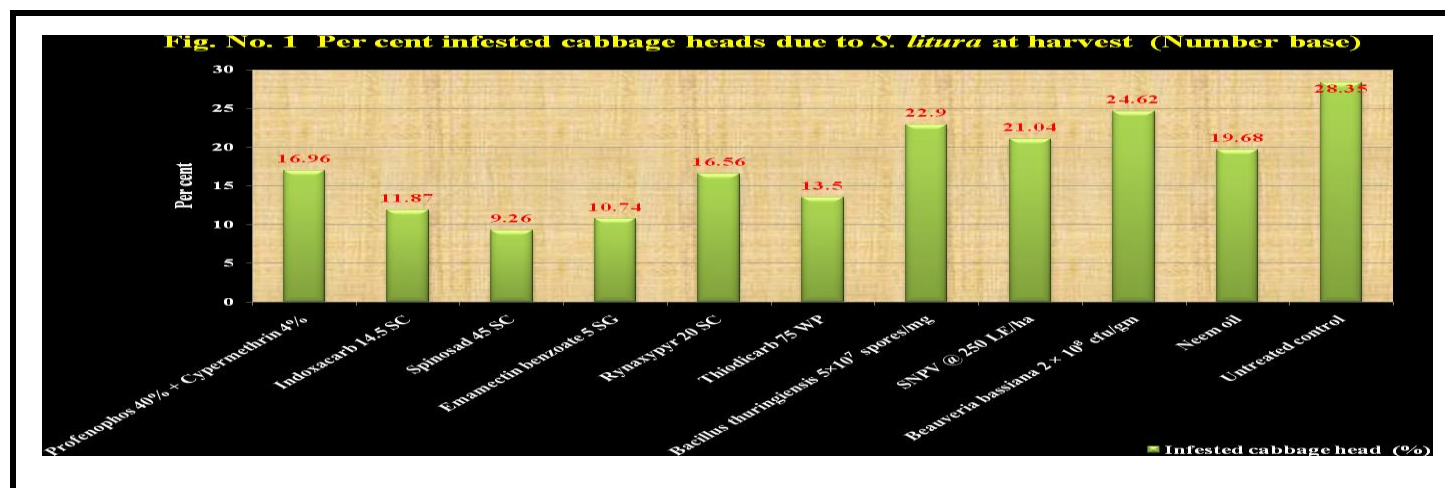
Sr. No.	Treatment	Concentration (%)	Infested cabbage head (%)
1	Profenophos 40% + Cypermethrin 4%	0.017	24.32 (16.96)
2	Indoxacarb14.5 SC	0.007	20.15 (11.87)
3	Spinosad 45 SC	0.025	17.72 (9.26)
4	Emamectin benzoate 5 SG	0.025	19.13 (10.74)
5	Rynaxypyr 20 SC	0.006	24.01 (16.56)
6	Thiodicarb 75 WP	0.075	21.56 (13.50)
7	<i>Bacillus thuringiensis</i> 5×10 ⁷ spores/mg	0.2	28.59 (22.90)
8	SNPV @ 250 LE/ha	-	27.30 (21.04)
9	<i>Beauveria bassiana</i> 2 × 10 ⁸ cfu/gm	0.4	29.75 (24.62)
10	Neem oil 1500 ppm	0.5	26.34 (19.68)
11	Untreated control	-	32.17 (28.35)
S.Em. ±			1.70
C.D. at 5 %			5.02
C. V. %			11.97

Arc sin transformed values, figures in the paranthesis are retransformed value.

Table 2: Per cent infested cabbage heads due to *S. litura* at harvest (Weight base)

Sr. No.	Treatment	Concentration (%)	Infested cabbage head (%)
1	Profenophos 40% + Cypermethrin 4%	0.017	22.67 (14.85)
2	Indoxacarb14.5 SC	0.007	17.14 (8.69)
3	Spinosad 45 SC	0.025	13.61 (5.54)
4	Emamectin benzoate 5 SG	0.025	16.08 (7.67)
5	Rynaxypyr 20 SC	0.006	21.60 (13.55)
6	Thiodicarb 75 WP	0.075	20.65 (12.44)
7	<i>Bacillus thuringiensis</i> 5×10 ⁷ spores/mg	0.2	26.68 (20.16)
8	SNPV @ 250 LE/ha	-	25.29 (18.25)
9	<i>Beauveria bassiana</i> 2 × 10 ⁸ cfu/gm	0.4	27.25 (20.97)
10	Neem oil 1500 ppm	0.5	23.68 (16.13)
11	Untreated control	-	30.02 (25.03)
S.Em. ±			1.29
C.D. at 5 %			3.82
C. V. %			10.08

Arc sin transformed values, figures in the paranthesis are retransformed value.



[MS received: September 25, 2015]

[MS accepted: September 28, 2015]