The Andhra Agric. J 73 (1): 090-096, 2026
doi :10.61657/aaj.2026.259

Survey and evaluation of newer insecticides against pink stem borer *Sesamia inferens* (Walker) in rice fallow maize

M Nagesh
Regional Research Unit (Entomology), Regional Agricultural Research Station,
Lam, Guntur, Andhra Pradesh, India

ABSTRACT

Roving surveys in the rice fallow maize of united Guntur district during 2008 to 13 *rabi* crop seasons indicated that pink stem borer *Sesamia inferens* (Walker) was the major insect pest infesting it and was found to cause 1-23% deadhearts in the initial crop growth period. Spraying of newer insecticides *viz*., spinosad @ 0.30ml/lit, thiodicarb @ 1g/lit, chlorantranilliprole @ 0.3ml/lit, flubendiamide @ 0.2ml/lit, emamectin benzoate @ 0.25g/lit, novaluron @1 ml/lit. and chlorpyriphos @ 2.5 ml/lit. are found effective against pink stem borer both prophylactically (if sprayed from 12 days after sowing) and curatively (by spraying at low level of deadheart incidence) in rice fallow maize.

Keywords:*Chlorantraniliprole, Chlorpyriphos, Deadheart, Emamectin benzoate, Efficacy, Flubendiamide, Novaluron, Rice fallow maize roving survey, Spinosad, Thiodicarb and Yield.*

Maize is an important cereal crop consumed as food by man and feed by poultry, livestock besides its use in various industrial products. It is cultivated on nearly 193.7 million hectares in about 170 countries (FAOSTAT 2020). It is third most important food crop after rice and wheat in India, where in over 85% maize produced in the country used to be consumed as food. But now 60% of maize produced is being used as primary food for Indian poultry industry. India cultivates maize on 8.85 million hectares with a production of 34.25 million tonnes of which 13 million tonnes are diverted for ethanol production. As the Union government is aiming to increase ethanol blending in petrol from 13% to 20%, there will be a higher demand for maize production. As per Niti Ayog and other available data, in 2025-26 domestic demand for maize in India is expected to hit 51.3 million tonnes.

Farmers of Tenali revenue division of Guntur district of Andhra Pradesh are innovative in introducing maize crop under zero tillage conditions after the harvest of *kharif* paddy. They have been cultivaring it for the past 10 years. Now its area in erstwhile united Guntur district under zero tillage fluctuates from 70,000 ha. to 1,50,000 ha. depending on the availability of nagarjuna sagar project water and blackgram area. There are no scientific survey studies on major insect pests infesting maize under such conditions. Pink stem borer is one of the major insect pest attacking maize. The larvae of pink stem borer feeds on leaves resulted in formation of oblong elongated holes and it bores into central shoot that leads to drying and formation of dead heart. Due to its ravage the economic yield losses in maize ranges from 18% to 49% as reported by Agarwal *et al*. (2004), Deole *et al*. (2013) and Baladhiya *et* al. (2018). Panwar (2005) reported 25.7% to 78.9% yield loss due to pink stem borer in different regions of India. In monetary terms annual loss is about 11 crores in *rabi* due to pink stem borer in maize (Siddique and Marwaha, 1993). Surveys on major insect pests infesting maize and evaluation of newer insecticides under zero tillage is very essential to cater to the needs of farmers by giving right plant protection measures at right time of the crop. Hence the present studies were conducted on this aspect in rice fallow maize fields of Guntur district during *rabi* from 2008 to 2013 crop seasons.

MATERIAL AND METHODS

Roving surveys were conducted in rice fallow maize fields of Guntur district during *rabi* from 2008-2013 crop seasons. The number of dead hearts due

Table 1. Details of survey conducted on incidence of pink stem borer in rice fallow maize in Guntur district during 2008-13

S. No.	Date of the survey	Name of the village or mandal	Crop stage	Per cent of deadhearts
1	12.1.09	Tenali Vemur Kollur	16 DAS	1%
2	17.1.09	Burripalem Kativaram Ravidrapadu	20 DAS	9%
3	27.1.09	Pedaravuru Jampani Vemuru Kollur	25 DAS	7-23%
4	30.1.09	Chandolu Cherukupalli Repalli Eteru	30 DAS	6-9%
5	31.1.09	Nidubrolu Chebrolu	28 DAS	4%
6	6.2.09	Ananthavaram, Tenali	35-40 DAS	8%
7	17.2.09	Modukur Chebrolu	60 DAS	7-9%
8	28.3.09	Mangalagiri	Grain hardening	Severe incidence of *S.litura* and

S. No.	Date of the survey	Name of the village or mandal	Crop stage	Per cent of deadhearts
1	29.12.09	Tenali Pedaravuru Jampani Vemur, Kollur, Repalli	16-17 DAS	1%
2	5.1.10	Tenali,	20 DAS	20%
3		Chinthallanka (*Spodopetera litura)*	*S.litura*	
4	12.1.10	Tenali, Kativaram	25 DAS	2%
5	25.1.10	Tenali, Vemur Buthumalli	30 DAS	3%
6	28.1.10	Tenali Pedaravuru Jampani Vemur, Kollur, Repalli	30-45 DAS	2%

S. No.	Date of the survey	Name of the village or mandal	Crop stage	Per cent of deadhearts
1	17.1.11	Tenali Pedaravuru Jampani Vemur, Kollur, Bhattiprolu Chebrolu narakodur	16-18 DAS	2-4%
2	28.1.11	Tenali Gudivada Revendrapadu Nidamarru Neerukonda	25-35 DAS	2-3%

S. No.	Date of the survey	Name of the village or mandal	Crop Variety	Crop stage	Per cent of dead hearts	No.of larvae per dead heart
1	15.12.11	Tenali Pedaravuru Jampani Vemur, Chebrolu Narakodur	30v92 “	16 DAS to 20 DAS	2% to 4%	1 - 4
2	23.12.11	Tenali, Kativaram Gudivada Revendrapadu Nidamarru Neerukonda	“	22 DAS to 25 DAS	1% to 3%	1 - 3
3	28.12.11	Ithavaram, Sitripuram, Tsundur, Chebrolu	“	16 DAS to 20 DAS	1% to 3%	1 - 2
4	7.1.12	Gudivada,Tenali	“	25 DAS to 35 DAS	2% To 3%	2 - 3
5	12.1.12	Pedanandipadu Vatticheurkuru Prathipadu	“	30DAS to 40 DAS	4% to 8%	1 - 4
6	31.1.12	P.Tadiparru Ponnuru	“	30 DAS to 43DAS	5% to 10%	2 - 5
7	8.2.12	Tenali Pedaravuru Jampani Vemur, kollur, Kativaram Chebrolu Narakodur	“	40 DAS to 50 DAS	4% to 6%	1 - 3
8	18.2.12	Tenali, Kativaram Gudivada Revendrapadu Nidamarru Neerukonda, Bhattiprolu, Ponnur Chebrolu Narakodur	“	30 DAS to 50 DAS	5% to 15%	2 - 4

S.No.	Date of the survey	Name of the village or mandal	Crop Variety	Crop stage	Per cent of dead hearts	No.of larvae per dead heart
1	29.12.12	Nandivelugu	30v92	22to 23 DAS	3% to 20%	1 to 2
		Chintalapudi				
		Emani				
		Vallabhapuram				
2	8.1.13	Revendrapadu,	"	25 to 35 DAS	2% to 5%	2 to 3
		Tenali,Kativaram,	"			
		Pedaravuru,Jampani,	Kaveri 30v92			
		Vemur, Kollur				
		Vellatur				
		Bhattiprolu, intur				
		Ponnur				
		Chebrolu,				
		Narakodur				
3	11.1.13	Pedapalem	30v92 eden	30 to 40 DAS	4% to 20%	1 to 4
		Emani				
4	17.1.13	Revendrapadu,	Kaveri	30 to 43 DAS	5% to 10%	2 to 5
		Tenali, Kativaram,	30v92			
		Pedaravuru,	Eden			
		Jampani,	30v92			
		Vemur	"			
5	19.1.13	Narakodur	"	40 to 50 DAS	4% to 6%	1 to 3
		Chebrolu,				
		Repalle				
6	23.1.13	Angalakuduru	eden	45 DAS	5%	2 to 4

Table 2. Evaluation of prophylactic spraying of newer insecticides against pink stem borer *Sesamia inferens* in rice fallow maize during 2008-10 *rabi* season (pooled data of 2008-10 rabi crop seasons)

S.no	Insecticide	Dose	Mean Per cent of dead hearts	Yield Q/ha.
1	Emamectin benzoate	0.4 g/lit.	0.01 (0.57)a	101 a
2	Thiodicarb	1.0 g/lit.	0.01 (0.57)a	103.25 a
3	Spinosad	0.3 g/lit.	0.01 (0.57)a	102 a
4	Novaluron	1.0 g/lit.	0.01 (0.57)a	100.25 a
5	Flubendiamide	0.2 ml/lit.	0.01 (0.57)a	103.7 a
6	Chlorantraniliprole	0.30 ml/lit.	0.01 (0.57)a	102 a
7	Endosulfan	2.0 ml/lit.	0.06 (1.04)a	101.5 a
8	Control		29.33 (33.33)b	62.25 b
	CD		0.89	9.06
	CV%		10.69	5.34

Values in the paranthesis are arc sine transformed values. Values with same alphabet in each column do not vary significantly from each other

Table 3. Pooled efficacy of newer insecticides against pink stemborer *Sesamia inferens* in ricefallow maize during 2012-13 and 2013 – 14 rabi crop seasons

S.no	Insecticide	dose	Mean per cent of deadhearts	Yield Q/ha.
1	Spinosad 480SC	0.3 m/lit.	3.56 (10.76)a	69.51a
2	Thiodicarb 75 WP	1.0 g/lit.	3.79 (11.00)a	71.9a
3	Novuluron 5 EC	1.0 ml/lit.	4.83 (12.39)a	69.79a
4	Emamectin benzoate 5 WG	0.4 g/lit.	4.11 (11.62)a	69.85a
5	Flubendiamide 480 SC	0.20 ml/lit.	3.63 (10.88)a	72.41a
6	Chlorantraniliprole 18.5 SC	0.3 ml/lit.	3.69 (10.93)a	70.9a
7	Chlorpyriphos 20EC	2.5 ml/lit.	7.48 (15.81)b	63.98b
8	Control		23.26 (28.64)c	43.82c
	CD (0.05)		3.38	5.33
	CV%		13.8	4.6

Values in the paranthesis are arc sine transformed values. Values with same alphabet in each column donot vary significantly from each other

to the pink stem borer were recorded from 25 randomly selected plants per acre during the early stage of the crop growth.

For the evaluation of newer insecticides randomised block design was followed during 2008 to 2010 by giving the prophylactic insecticide sprays at 12 DAS and 22 DAS as the pink stem borer is causing the deadhearts right at 16 DAS due to the egg laying by it on paddy stubble sprouts and weeds under zero tillage. Plot size of 6x4 sq. m was maintained. 30v92 maize hybrid of Pioneer private company was used as test hybrid. Spacing of 60x25 cm was followed. Observations on per cent deadhearts were recorded at 45 DAG and were subjected to RBD analysis after angular transformation. Similarly during 2012-14 crop seasons the newer insecticides were evaluated in randomized block design soon after the incidence of pink stem borer is observed. Test hybrid, spacing and the plot size (6x4 sq.m) were same as above for each treatment plot. Maize grain yield in different treatments was also recorded. Spray fluid was thoroughly stirred before spraying ensuring that it is mixed well. Spraying was done with hydraulic knapsack sprayer @500 liters per ha. Two to three insecticide sprayings were given at seven day interval starting from appearance of incidence of pink stem borer. Observations on per cent dead hearts were recorded at 45 DAG and were subjected to RBD analysis after angular transformation.

The data of various parameters were subjected to ANOVA. The data was transformed to corresponding arc sine values (Gomez and Gomez, 1984)

RESULTS AND DISCUSSIONS

The data of various parameters were subjected to ANOVA. The data was transformed to corresponding arc sine values (Gomez and Gomez, 1984). From the perusal of the tables 1 it is evident that pink stem borer is the major insect pest attacking the maize crop causing the deadheart right at 16 DAS in rice fallows due to its egg laying on paddy stubble sprouts after the harvest of the paddy and several weed hosts like *Cyperus rotundus, Cynodan dactylon, Echinocloa crussgalli* and *Echinocloa colona* etc. Where as in upland, it causes deadhearts only after 25 days after sowing due to the clean cultivation. Its incidence on the basis of per cent deadheart varied from 1% to 23%. Systematic studies on survey of insect pests infesting rice fallow maize in Andhra Pradesh are lacking. However the present studies are in conformity with observations of Saroj *et al*. (2005) who recorded twice the populations of pink stem borer in paddy stubbles with a height of 30-45 cm than the plots with stubbles cut height of 10-15cm. Hence they attributed the wide spread introduction of custom hire mechanical harvesting in rice and wheat to recent increase in pink stem borer increase in rice and wheat cropping system. The present studies are also in corroboration with Manjunath *et al*. (2012) who recorded 32.48% - 66.39% pink stem borer incidence in major maize growing regions of Karnataka during *rabi* 2010 to

2012 at the early stages of crop growth (36 to 45 DAS).

As regards the efficacy of insecticides it is evident from the perusal of the table 2 that prophylactic sprays of newer insecticides including the endosulfan at weekly intervals starting from 10 DAS recorded nil deadhearts indicating that target pest is prevented at initial stages itself if the newer insecticides are prophylactically sprayed.

Pooled data (Table 3) on the efficacy of newer insecticides against pink stem borer during 2012-13 and 2013-14 *rabi* crop seasons indicated that all the newer insecticides were effective against the target insect pest. While the chlorpyriphos was the least effective insecticide.

The incidence of pink stemborer on the basis of per cent of deadheart incidence was lowest in spinosad@0.3 ml/l (3.56%) and was found to be on par with flubendiamide 0.2 ml/l (3.63%), chlorantriniliprole @0.3 ml/l (3.69%), thiodicarb @1.0 g/l (3.79%) emamectin benzoate @ 0.4g/l (4.11%), and novaluron @1.0ml/l (4.83%). Chlorpyriphos was the least effective insecticide with 7.48% deadheart incidence against 23.26% in control.

As regards yield highest grain yield was recorded in flubendiamide (72.41 q/ha.) and was found to be on par with all the insecticides except chlorpyriphos which recorded 63.98 q/ha. against control with 43.8 q/ha.

Studies on the efficacy of newer insecticides against pink stem borer in rice fallow maize are scanty specifically till the experimentation period. However, the present studies relating to the field efficacy of spinosad are inconfirmity with Deole *et al*. (2017) and Tarate *et al*. (2018) who reported low leaf injury in maize (2.94%) due to spinosad spraying. The present results of chlorantraniliprole are in tune with recordings of Prashant *et al*. (2016) who recorded lowest number of dead hearts (2.33 and 1.66) at 25 DAS and 40 DAS. The results of emamectin benzoate are in corroboration with Sahu and Deole (2017) and Manjunath and Jaffarbhasha (2018) who reported minimum number of pin holes(1.00) damage caused by pink stem borer. Chlorantraniliprole efficacy in the present studies is also in confirmity with Anuradha (2013) who recorded its higher efficacy against *C. partellus* in maize. Where as the studies on the thiodicarb, flubendiamide and novaluron are scanty in rice fallow maize. However present studies on efficacy of thiodicarb, flubendiamide and novaluron are in conformity with Anuradha (2020) who recorded lowest incidence of per cent dead hearts in lambda cyhalothrin followed by indoxacarb and chlorantriniliprole. She also reported that thiodicarb, novaluron, spinosad and flubendiamide were effective (0.92 to 1.57%) in reducing the formation of deadheart due to stem borer.

Anonymous(2020): FAOSTAT

Anuradha M 2013. Evaluation of Chlorantraniliprole (Coragen 20 SC) against maize stemborers. *International Journal of plant protection* 6 (1): 155-158

Anuradha M 2020. Evaluation of insecticides against stemborers in maize. *International Journal of plant protection* 13 (1): 98-100

Baladhiya H C, Sisodiya D B and Pathan N P 2018. A review on Pink stem borer, *Sesamia inferens*, Walker, a therat to cereals. *J. Ent. Zool. Stud*; 6 : 1235-39

Deole S, Dubey V K and Mehta N 2013. First record of pink stem borer, *Sesamia inferens* Walker in maize crop at Raipur (chattisgarh) region. *Insect Environ*., 19:164-65

Deole S, Dubey V K, Rana D K and Gauraha R 2017. Evaluation of newer insecticides against maize pink stem borer : major constraint insect pests of maize in *Raipur. J. of pl. dev. Sc;* 9: 335-39

Gomez K A and Gomez A A 1984. Statistical procedure for agricultural research, John Wiley Sons , New York 68 p.

Manjunath Chouraddi C P Mallapur K Basavana Goud and Patil R H 2012. Status of stem borers in major maize growing arears of Karnataka, India. *J. Exp. Zool*. *India* 15, No. 2, pp. 505-511

Manjunath J and Jaffarbhasha S 2018. Comparative efficacy of green labelled insecticides against *spodoptera litura* on bidi tobacco in scarce rainfall zone of AP. *J. Ent. Zool. Stud;* 6:1114-20

Panwar V P S 2005. Management of maize stalk borer *Chilo partellus*. In: Stress on maize in tropics. Zaidi, P.H and Singh, N.N, (ed)

Directorate of Maize research NewDelhi, pp. 324-375

Saroj Jaipal R K Malik, Ashok Yadav and Raj Gupta 2005. IPM Issues in Zero-tillage Systemin Rice-Wheat Cropping Sequence. Technical Bulletin (8). CCS *Haryana Agricultural University*, Hisar-125 004, India, pp. 32.

Siddique K H and Marwaha K K 1993. The vistas of maize entomology in India. Kalyani publishers, NewDelhi.p 184.

Tarate S P, Mohite P B and Valvi A S 2018. Field efficacy of different insecticides against ear head caterpillar (*Helicoverpa armigera* Hub.) infesting fingermillet. *J. Ent. Zool. Soc;* 6:281-285.

Received on 21.12.2025 and Accepted on 15.01.2026