



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
© Agronomy
NAAS Rating (2026): 5.20
www.agronomyjournals.com
2026; 9(7): 188-191
Received: 11-05-2026
Accepted: 15-06-2026

S Douressamy
Sugarcane Research Station,
Cuddalore, Tamil Nadu, India

M Shanthi
Directorate of Centre for Plant
Protection Studies, Tamil Nadu
Agricultural University,
Coimbatore, Tamil Nadu, India

M Murugan
Department of Agricultural
Entomology, Tamil Nadu
Agricultural University,
Coimbatore, Tamil Nadu, India

D Sassikumar
Sugarcane Research Station,
Cuddalore, Tamil Nadu, India

R Thamizhvendan
Directorate of Tamil Nadu Rice
Research Institute, Aduthurai,
Tamil Nadu, India

K Subrahmaniyan
Acting Vice Chancellor, Tamil
Nadu Agricultural University,
Coimbatore, Tamil Nadu, India

Corresponding Author:
S Douressamy
Sugarcane Research Station,
Cuddalore, Tamil Nadu, India

Field evaluation of sugarcane clones against early shoot borer, *Chilo infuscatellus* (Snellen) and Internode Borer, *Chilo sacchariphagus indicus* (Kapur) (Crambidae: Lepidoptera) under natural climatic conditions

S Douressamy, M Shanthi, M Murugan, D Sassikumar, R Thamizhvendan and K Subrahmaniyan

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i7c.5917>

Abstract

Two field trials were laid out during 2024-2025 at Sugarcane Research Station, Cuddalore, Tamil Nadu, India with 15 IYT clones and 15 AYT clones, including varieties to evaluate under natural climatic conditions against early shoot borer, *Chilo infuscatellus* (Snellen) and internode borer, *Chilo sacchariphagus indicus* (Kapur) (Crambidae: Lepidoptera). No plant protection measures were adopted in experimental plots. All the standard agronomical practices were followed during the cropping season to raise the crop. The results of the field reaction on the damage level of early shoot borer IYT clones revealed that the cumulative mean per cent damage of early shoot borer ranged from 12.20(C22051) to 36.98(C22017). Four clones Viz., C22051, C22133, C22230 and C22 315 were registered as less susceptible with mean cumulative damage of 12.29, 13.10, 13.26 and 14.80 per cent respectively. Among the AYT clones, the cumulative mean per cent damage of early shoot borer ranged from 14.88(C16338) to 33.61(C21033). The clone C16338 was found less susceptible with mean cumulative damage of 14.88. Damage level of internode borer in the IYT clones revealed that the cumulative mean per cent damage of internode borer ranged from 11.65(C22044) to 40.85(C22051). Nineteen clones Viz., C22002, C22003, C22011, C22014, CoV09356, C22017, C22020, C22038, C22044, Co86032, C22133, C22224, C22228, C22230, C222058, C22283, C22 315 and CoC13339 were categorized as less susceptible. Among the AYT clones, the cumulative mean per cent damage of internode borer ranged from 23.80(C20085) to 36.75(C21033). Thirteen clones Viz., C16338, C18011, C18200, C19024, Co11015, C19028, C20007, C20072, Co86032, C20085, C21036, C21037 and CoC1333 were rated as less susceptible

Keywords: Sugarcane, clones, IYT, AYT, field evaluation, early shoot borer, internode borer, natural climatic conditions

Introduction

In Tamil Nadu, sugarcane is one of the important commercial crops and it has occupied a very prominent position on the agricultural map of India covering a large area in tropics as well as sub tropics. It is the major agro-industrial crop in India next to textiles. Sugar is still the most preferred sweetener and most widely used calorific food, especially in the developing countries. Sugar is today regarded as a mass consumption item and it also accounts for a large share of the total calorie intake of an average household (Pruthi, 1995) [6]. During last decades, production, productivity and sugar recovery have also shown remarkable resilience in productivity growth rate. Today there is a growing concern about susceptibility of sugar production as the growth rate has stagnated and another declining trend is seen in most of the cane growing districts. One of the reasons for the low productivity and recovery is increasing incidence of insect pests. Sugarcane crop has been associated with more than 120 species of insect pests including sap feeding, leaf feeding and stem borer (Suasa-and Allsopp, 2000) [9]. It has been estimated by Singh and Tomar (2003) [8] that the economic loss caused by the early shoot borer accounted to a 16–65% reduction in sugarcane setts and mother shoots, resulted in 22– 33% losses in cane yield. Early shoot borer infestation attains peak during summer months, water scarcity and poorly maintained crop. Although integrated management measures viz., sett treatment, early planting, frequent irrigation, behavioral,

biological and chemicals recommended for early shoot borer, farmers mainly rely on the usage of insecticides. Insecticides are not the best option for the control of *C. sacchariphagus indicus* due to the concealed habit of larvae and un amenable crop canopy (Ananthanarayana and David, 1986) ^[1]. Biological control and sex pheromone traps are known to minimize borer incidence levels but suffer from limitations (Mahesh *et al.*, 2018) ^[4]. In this context, cultivar resistance, a major component of long-term integrated pest management strategy for sugarcane moths in many sugarcane growing regions of the world (Reay-Jones *et al.*, 2005^[7]; Mahesh *et al.*, 2018^[4]; Wilson *et al.*, 2021^[10]) ^[7, 4, 10], can serve as a potential tool to reduce losses caused by borers. Keeping in view the importance of sugarcane and huge damage caused by different borers, experiments were carried out to study the resistance reaction of different Initial Yield Trial (IYT), Advanced Yield Trial (AYT) clones and the standard varieties against early shoot borer, *Chilo infuscatellus*, internode borer, *Chilo sacchariphagus indicus* during 2024-2025.

Materials and methods

Two field trials were laid out during 2024-2025 at Sugarcane Research Station, Cuddalore, Tamil Nadu, India with 25 IYT clones and 15 AYT clones, including varieties in two replications under Randomized Block Design. All the standard agronomical practices were followed during the cropping season to raise the crop. No plant protection measures were adopted in experimental plots.

Observations were made on the damage level of early shoot borer and inter node borer under fixed plot condition. Finally mean cumulative per cent damage of early shoot borer, internode borer was worked out. In each clone variety 5 clumps of sugarcane plants were observed for early shoot borer with number of dead hearts and total number of tillers and per cent dead hearts at 35, 75 and 95 days after planting and the cumulative per cent damage of early shoot borer was worked out. For internode borer infested canes and the total cane, the mean percent internode borer damage was assessed during 5th (150 days after planting) and 7th (210 days after planting). Damage rating was also done for both the pests. For early shoot borer damage rating was 0% -15.00 incidence: Less Susceptible (LS), 15.1 – 30% incidence: Moderately Susceptible (MS), > 30%: Highly Susceptible (HS). For internode borer damage rating was 0-30% incidence: Less Susceptible (LS), 30.1 – 50% incidence: Moderately Susceptible (MS), > 50%: Highly Susceptible (HS).

Results and Discussion

The results of the field reaction on the damage level of early shoot borer in the IYT clones revealed that the cumulative mean per

cent damage of early shoot borer ranged from 12.20(C22051) to 36.98(C22017). Four clones Viz., C22051, C22133, C22230 and C22 315 were registered as less susceptible with mean cumulative damage of 12.29, 13.10, 13.26 and 14.80 per cent respectively (Table 1). The results of the field reaction on the damage level of inter node borer in the IYT clones revealed that the cumulative mean per cent damage of internode borer ranged from 11.65(C22044) to 40.85(C22051). Nineteen clones Viz., C22002, C22003, C22011, C22014, CoV09356, C22017, C22020, C22038, C22044, Co86032, C22133, C22224, C22228, C22230, C222058, C22283, C22 315 and CoC13339 were categorized as less susceptible (Table 2). The results of the field reaction on the damage level of early shoot borer in the AYT clones revealed that the cumulative mean per cent damage of early shoot borer ranged from 14.88(C16338) to 33.61(C21033). The clone C16338 was found less susceptible with mean cumulative damage of 14.88.

The mean damage grade of Crown mealy bug and pokkah boeng disease ranged from 1.10 (C16338) to 2.20(Co 11015) (Table 3). The results of the field reaction on the damage level of inter node borer in the AYT clones revealed that the cumulative mean per cent damage of internode borer ranged from 23.80(C20085) to 36.75(C21033). Thirteen clones Viz., C16338, C18011, C18200, C19024, Co11015, C19028, C20007, C20072, Co86032, C20085, C21036, C21037 and CoC1333 were rated as less susceptible (Table 4). Higher infestation in loose sheath-clasp varieties suggested their suitability since tight leaf sheath is known to act as an adverse barrier for initial establishment of neonate larvae (Easwaramoorthy and Nandagopal 1986) ^[3], and it may also render leaf axils inaccessible for pupation. Such a trend was noticed earlier with the borer even in *S. barberi* clones (Mahesh *et al.*, 2019) ^[5]. Cane length, and length and girth of vulnerable portions are known to positively influence borer infestation in genotypes (Asha *et al.*, 2019) ^[2].

Conclusion

Field reaction on the damage level of early shoot borer in the IYT clones revealed that the cumulative mean per cent damage of early shoot borer ranged from 12.20 (C22051) to 36.98(C22017). Damage level of inter node borer in the IYT clones revealed that the cumulative mean per cent damage of internode borer ranged from 11.65(C22044) to 40.85(C22051). Damage level of early shoot borer in the AYT clones revealed that the cumulative mean per cent damage of early shoot borer ranged from 14.88(C16338) to 33.61(C21033). The results of the present investigation would be useful for the breeders to evolve suitable improved varieties of sugarcane having less susceptibility to early shoot borer and internode borer.

Table 1: Damage level of early shoot borer in different IYT clones/ varieties (2024-25)

Sl. No.	Clones/ varieties	Mean per cent damage of early shoot borer at 35DAP	Mean per cent damage of early shoot borer at 75DAP	Mean per cent damage of early shoot borer at 95DAP	Cumulative mean per cent damage	Grading index
1.	C22002	8.90	13.10	14.8	22.80	MS
2.	C22003	12.00	11.50	18.4	25.96	MS
3.	C22006	12.4	15.60	17.5	28.08	MS
4.	C22011	7.50	19.20	14.9	25.77	MS
5.	C22014	13.50	14.10	16.20	27.15	MS
6.	CoV09356	10.30	8.50	12.50	19.39	MS
7.	C22017	16.40	22.30	19.40	36.13	HS
8.	C22017	15.20	24.50	18.60	36.98	HS
9.	C22020	8.40	8.60	16.50	20.75	MS
10.	C22024	7.10	10.60	12.90	18.97	MS
11.	C22038	9.60	12.10	13.20	21.57	MS
12.	C22044	15.30	11.60	14.10	25.40	MS

13.	Co86032	11.10	12.40	12.50	22.32	MS
14.	C22051	4.35	6.90	8.60	12.29	LS
15.	C22052	6.70	9.80	11.80	17.53	MS
16.	C22133	6.50	8.50	10.20	13.10	LS
17.	C22224	9.80	11.20	13.20	21.20	MS
18.	C22228	5.90	12.50	15.40	20.83	MS
19.	Co11015	8.9	13.50	16.00	19.96	MS
20.	C22229	7.50	9.40	12.40	18.15	MS
21.	C22230	9.40	6.50	5.50	13.26	LS
22.	C222058	5.40	22.60	18.40	28.64	MS
23.	C22283	10.90	8.50	11.70	19.26	MS
24.	C22 315	6.90	7.90	9.10	14.80	LS
25.	CoC13339	9.60	10.40	16.20	22.43	MS

Table 2: Damage level of inter node borer in different IYT clones/ varieties (2024-25)

Sl. No	Clones/ varieties	Mean per cent damage of inter node borer 120 150DAP	Mean per cent damage of inter node borer at 210DAP	Mean per cent damage of inter node borer	Grading index
1.	C22002	26.50	29.40	27.95	LS
2.	C22003	24.50	22.50	23.50	LS
3.	C22006	12.50	15.50	14.00	LS
4.	C22011	13.50	24.50	24.50	LS
5.	C22014	21.50	23.50	22.50	LS
6.	CoV09356	33.50	20.40	26.95	LS
7.	C22017	37.20	27.80	32.50	MS
8.	C22017	20.50	11.50	16.00	LS
9.	C22020	36.40	14.50	25.45	LS
10.	C22024	56.00	21.50	38.75	MS
11.	C22038	16.60	27.50	22.05	LS
12.	C22044	11.50	11.80	11.65	LS
13.	Co86032	16.40	21.50	18.95	LS
14.	C22051	53.50	28.40	40.95	MS
15.	C22052	48.20	26.50	37.35	MS
16.	C22133	17.00	27.40	22.20	LS
17.	C22224	19.00	10.40	14.70	LS
18.	C22228	19.50	29.50	24.50	LS
19.	Co11015	35.40	32.40	33.90	MS
20.	C22229	37.20	28.50	32.85	MS
21.	C22230	26.50	18.50	22.5	LS
22.	C222058	28.60	23.50	26.05	LS
23.	C22283	36.40	21.50	21.50	LS
24.	C22 315	38.40	16.50	16.50	LS
25.	CoC13339	31.50	18.50	25.00	LS

Table 3: Damage level of early shoot borer in different AYT clones/ varieties (2024-25)

Sl. No.	Clones/ varieties	Mean per cent damage of early shoot borer at 35DAP	Mean per cent damage of early shoot borer at 75DAP	Mean per cent damage of early shoot borer at 95DAP	Cumulative mean per cent damage	Grading index
1.	C16338	9.30	6.20	8.50	14.88	LS
2.	C18011	13.60	10.80	9.80	21.20	MS
3.	C18200	8.80	10.40	12.60	19.72	MS
4.	C19024	14.0	9.40	8.50	19.77	MS
5.	Co11015	11.75	5.90	6.80	15.15	MS
6.	C19028	12.20	11.50	9.50	20.57	MS
7.	C20007	12.10	7.60	11.50	19.34	MS
8.	C20072	14.19	9.50	10.50	21.19	MS
9.	C20073	13.90	7.60	8.40	18.41	MS
10.	Co86032	14.30	8.80	9.20	19.90	MS
11.	C20085	10.30	7.50	10.40	17.4	MS
12.	C21033	14.40	8.90	13.20	33.61	HS
13.	C21036	9.50	12.50	9.40	19.84	MS
14.	C21037	14.00	11.40	11.40	22.82	MS
15.	CoC13339	9.90	10.50	10.50	19.16	MS

Table 4: Damage level of inter node borer in different AYT clones/ varieties (2024-25)

Sl. No.	Clones/ varieties	Mean per cent damage of inter node borer 120 150DAP	Mean per cent damage of inter node borer at 210DAP	Mean per cent damage of inter node borer	Grading index
1.	C16338	40.10	17.50	28.80	LS
2.	C18011	24.20	23.80	24.0	LS
3.	C18200	33.50	17.30	25.40	LS
4.	C19024	29.50	18.80	24.15	LS
5.	Co11015	33.50	25.50	29.50	LS
6.	C19028	30.80	20.50	25.65	LS
7.	C20007	35.80	23.50	29.65	LS
8.	C20072	40.50	18.50	29.50	LS
9.	C20073	51.50	21.50	36.50	MS
10.	Co86032	36.50	15.80	26.15	LS
11.	C20085	32.80	14.80	23.80	LS
12.	C21033	51.00	22.50	36.75	MS
13.	C21036	43.40	14.40	28.90	LS
14.	C21037	32.50	16.80	24.65	LS
15.	CoC13339	37.80	18.60	28.20	LS

References

- Ananthanarayana K, David H. Chemical control. In: David H, Easwaramoorthy S, Jayanthi R, editors. Sugarcane entomology in India. Coimbatore: Sugarcane Breeding Institute; 1986. p. 423-435.
- Asha N, Patel VN, Sugeetha G, Pankaja NS, Mahdev J, Kamaraddi V. Antixenosis and antibiosis of sugarcane varieties on the incidence of sugarcane internode borer, *Chilo sacchariphagus indicus*. International Journal of Chemical Studies. 2019;7:1008-1012.
- Easwaramoorthy S, Nandagopal V. Life tables of internode borer, *Chilo sacchariphagus indicus* (K.) on resistant and susceptible varieties of sugarcane. Tropical Pest Management. 1986;32:221-228. doi:10.1080/09670878609371067.
- Mahesh P, Srikanth J, Chandran K, Singaravelu B. Resistance of *Saccharum* spp. against *Chilo sacchariphagus indicus* (Kapur) (Lepidoptera: Crambidae) in India. Experimental Agriculture. 2018;54:83-95. doi:10.1017/S0014479716000697.
- Mahesh P, Srikanth J, Salin KP, Singaravelu B, Chandran K, Mahendran B. Phenology of sugarcane leaf hopper *Pyrilla perpusilla* (Walker) (Homoptera: Lophopidae) and its natural enemies in a crop island scenario. Crop Protection. 2019;120:151-162. doi:10.1016/j.cropro.2019.02.020.
- Pruthi S. History of sugar industry in India. New Delhi: Reliance Publishing House; 1995.
- Reay-Jones FPF, Way MO, Tamou MSe, Legendre BL, Reagan TE. Resistance to the Mexican rice borer (Lepidoptera: Crambidae) among Louisiana and Texas sugarcane cultivars. Journal of Economic Entomology. 2003;96:1929-1934. doi:10.1093/jee/96.6.1929.
- Singh D, Tomar PK. Effect of insecticides on juice quality and productivity in late planted sugarcane. Indian Journal of Sugarcane Technology. 2003;18(1-2):70-71.
- Suasa-ard W, Allsopp PG. Sugarcane pest management strategies in the new millennium. In: Proceedings of the IV ISSCT Sugarcane Entomology Workshop; 2000 Feb 7-10; Khon Kaen, Thailand. 2000.
- Wilson BE, White WH, Richard RT, Johnson RM. Evaluation of sugarcane borer, *Diatraea saccharalis*, resistance among commercial and experimental cultivars in the Louisiana sugarcane cultivar development program. International Sugar Journal. 2021;123:256-261.