

**RESEARCH ARTICLE :**

# Resistance to borer complex infestation in sugarcane clones

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**SUMMARY :** Field trials were conducted in Randomized Block Design with three replications at Sugarcane Research Station, Tamil Nadu Agricultural University, Sirugamani Tiruchirappalli, Tamil Nadu, India. The infestation levels in clones of sugarcane were assessed and graded. Sugarcane clones were categorized based on the degree of resistance/susceptibility according to resistance scale. The first set of field experiments revealed that early shoot borer infestation and per cent of dead heart was minimum in Si 2011-355 (4.17 %) and maximum in Si 2011-349, Si 2011-415, Si 2011-598 and Si 2011-631 (8.70 %). The internode borer damage was recorded minimum in Si 2011-359 (8.0 %) and maximum (37.5%) in Si 2011-371. The clone Si 2011-359 recorded higher cane yield of 131.40 t/ha and minimum 93.67 t/ha in Si 2011-631 In the second set of experiment among the twenty six clones, Si 2012-329 (6.00 %) and Si 2012-38 (39.40 %) recorded the minimum and maximum dead heart damage due to early shoot borer, respectively. The internode borer damage was 3.80 per cent in Si 2012-329 which was the minimum among the clones of sugarcane.

**KEY WORDS :**

Sugarcane, Early shoot borer, *Chilo infuscatellus*, Internode borer, *Chilo sacchariphagus indicus*

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## **BACKGROUND AND OBJECTIVES**

Sugarcane is an important cash crop of India being grown in an area of 5.12 mha. With annual production of 341 m mt, with the productivity of 69.84 t/ha (Sugar India, 2015 and 2016). In Tamil Nadu the area under sugarcane is about 3.36 mha. with a production of 5.12 million tonnes. The average yield of the promising cane in Tamil Nadu is 106 million t/ha. Sugarcane borers are the major pests and consequently reduce quality and quantity of cane and cane sugar. Most of the high sugar

content sugarcane varieties are susceptible for borers viz., early shoot borer, *Chilo infuscatellus* (Snellen) and internode borer, *Chilo sacchariphagus indicus* (Kapur) which cause 20 % crop loss in field and 15% in sugar recovery (Sardana and Singh, 2002). Among various technologies involved for increasing the yield and qualitative attributes, the inherited characters play a vital role. A need for more number of early maturing sugarcane varieties with high sugar content having high yield potential with resistant or

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**Table 1 : Borer complex infestation on dead heart basis and internode damage basis in early maturing sugarcane clones**

Clones	Dead heart (%)	Reaction	Internode borer damage (%)	Reaction	Cane yield t/ha
Si 2011-349	8.70	LS	26.09	MS	112.4
Si 2011-355	4.17	LS	12.50	LS	123.5
Si 2011-359	4.00	LS	8.00	LS	131.4
Si 2011-371	8.33	LS	37.50	MS	121.8
Si 2011-415	8.70	LS	13.04	LS	105.2
Si 2011-417	8.00	LS	32.00	MS	110.8
Si 2011-423	4.00	LS	28.00	MS	107.6
Si 2011-426	4.35	LS	13.04	LS	104.4
Si 2011-513	8.33	LS	20.83	MS	120.2
Si 2011-589	7.41	LS	18.52	MS	128.3
Si 2011-597	4.17	LS	25.00	MS	99.4
Si 2011-598	8.70	LS	30.43	MS	123.3
Si 2011-617	8.00	LS	32.00	MS	136.3
Si 2011-621	4.55	LS	22.73	MS	95.5
Si 2011-631	8.70	LS	17.39	MS	93.6
Si 2011-633	4.35	LS	34.78	MS	120.7
TNAU Si 7	8.00	LS	28.00	MS	115.7
Co 86032	8.33	LS	29.17	MS	127.4
C.D. (P=0.05)	6.71		23.83		23.1

**Table 2 : Borer complex infestation on dead heart basis and internode damage basis in early maturing sugarcane clones**

Clones	Dead heart (%)	Reaction	Internode borer damage (%)	Reaction	Cane yield t/ha
Si 2012-03	24.37	MS	46.69	MS	147.0
Si 2012-04	24.07	MS	40.00	MS	127.0
Si 2012-07	23.17	MS	36.03	MS	153.6
Si 2012-09	19.60	MS	24.18	MS	149.3
Si 2012-16	19.03	MS	51.85	S	115.6
Si 2012-20	18.67	MS	26.60	MS	135.0
Si 2012-31	16.70	LS	24.70	MS	131.3
Si 2012-32	16.63	MS	24.20	MS	139.6
Si 2012-34	11.47	LS	22.00	MS	142.0
Si 2012-38	39.40	MS	17.20	MS	125.0
Si 2012-62	23.23	MS	16.10	MS	121.4
Si 2012-39	11.20	LS	38.89	MS	142.2
Si 2012-40	11.63	LS	34.07	MS	120.6
Si 2012-47	12.07	LS	27.78	MS	120.6
Si 2012-64	6.60	LS	37.14	MS	145.5
Si 2012-70	14.80	LS	28.89	MS	140.8
Si 2012-72	11.50	LS	42.13	MS	160.5
Si 2012-76	13.07	LS	57.50	MS	120.4
Si 2012-78	8.40	LS	7.60	LS	131.4
Si 2012-83	24.67	MS	25.30	MS	120.6
Si 2012-512	11.27	LS	11.40	LS	142.5
Si 2012-523	7.70	LS	6.20	LS	120.2
Si 2012-328	10.60	LS	10.00	LS	128.3
Si 2012-329	6.00	LS	3.80	LS	99.4
Si 2012-339	16.87	MS	14.80	LS	123.3
Si 2012-346	12.77	LS	10.40	LS	136.3
S.E. $\pm$	1.90		6.14		
C.D. (P=0.05)	4.07		10.80		25.16
C.D. (P=0.01)	5.65		16.63		

moderately resistant to major borer pests. At present, no sugarcane variety is completely resistant to any of the sugarcane borer pests. Adoption of high yielding varieties with better quality attributes is the cheapest technology (Rao *et al.* 2003). The sugarcane varieties Co 86032, CoSi (Sc) 6, CoC 24, CoV 94101, CoV 92102, Co 94008 and Co 94012 are the popularly grown varieties, often succumb to pest and diseases, of which the borers cause a major loss in cane yield and loss of sugar per cent (Thirumurugan *et al.*, 2004). Koenar (1976) stated that selection of resistant varieties against borers was an effective and economical control measure. The present study was conducted to find out the resistance level in different sugarcane clones against borer infestation.

## RESOURCES AND METHODS

An experiment was conducted in Randomized Block Design with three replications at Sugarcane Research Station, Tamil Nadu Agricultural University, Sirugamani Tiruchirappalli, Tamil Nadu, India during 2014-15. Fourty three sugarcane clones were planted in 5m x 5m row with 0.8 m spacing. All the recommended cultural practices were adopted uniformly except plant protection. Observations on early shoot borer and internode borer incidence were recorded at 15 days intervals. The infestation levels in clones of sugarcane were assessed and graded. Sugarcane clones were categorized based on the degree of resistance/susceptibility according to resistance scale given by Sheshagiri Rao and Krishnamurthy (1973).

## OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

### Sugarcane clones :

The first set of field experiments revealed that early shoot borer infestation and per cent of dead heart was minimum in Si 2011-355 (4.17 %) and maximum in Si 2011-349, Si 2011-415, Si 2011-598 and Si 2011-631 (8.70

%). The internode borer damage was recorded minimum in Si 2011-359 (8.0 %) and maximum (37.5%) in Si 2011-371. The clone Si 2011-359 recorded higher cane yield of 131.40 t/ha and minimum 93.67 t/ha in Si 2011-631 (Table 1).

In the second set of experiment among the twenty six clones, Si 2012-329 (6.00 %) and Si 2012-38 (39.40 %) recorded the minimum and maximum dead heart damage due to early shoot borer, respectively. The internode borer damage was 3.80 per cent in Si 2012-329 which was the minimum among the clones of sugarcane. The clone Si 2012-07 recorded higher cane yield of 153.60 t/ha and minimum 9.67 in Si 2012-78. The clone Si 2012-72 recorded higher cane yield of 160.50 t/ha and minimum 99.4 t/ha in Si 2012-329 (Table 2).

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