

INCREASED RESISTANCE OF SUGARCANE TO ELDANA SACCHARINA WALKER (LEPIDOPTERA: PYRALIDAE) WITH CALCIUM SILICATE APPLICATION

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The stalk-boring pyralid *Eldana saccharina* Walker is the most important pest in sugarcane in South Africa. Resistant varieties can reduce the impact of the pest, particularly in rain-fed regions of the sugar industry where water stress is more likely, but additional measures that enhance plant resistance deserve consideration.

Applied silicon (as sodium or calcium silicate) and varietal differences in silicon content have increased plant resistance to pests in sugarcane (Pan et al., 1979; Elawad et al., 1985; Gupta et al., 1992) and rice (Djamin and Pathak 1967; Hanifa et al. 1974; Tayabi and Azizi 1984). In this study, six commercial varieties of sugarcane (N11; N12; N16; N17; N21; NCo376) were treated with calcium silicate to investigate the effect of silicon on resistance to *E. saccharina*.

A replicated split-plot trial using cane planted in pots containing river sand, was established in a shade house during January 1998. Two treatment levels of calcium silicate (2500 kg/ha and 5000 kg/ha or approx. 198 and 395 kg/ha of pure silicon, respectively) were applied at planting and again at 6 months. Controls received no calcium silicate. The plants were artificially infested with *E. saccharina* eggs at 9.5 months. The trial was harvested 6 weeks later to record *E. saccharina* borer performance (larval and pupal numbers and mass), as well as borer damage (stalk length bored and number of internodes bored).

The higher silicon treatment level (5000 kg/ha) significantly reduced borer performance and damage compared with the con-

trol (Table 1). Borer mass was reduced by 20% and borer damage by 24% between the control and the higher treatment level (Table 1). Values for the 2500 kg/ha treatment were intermediate between controls and the higher treatment. The interaction between variety and silicon treatment was non-significant when varieties were examined individually in the analysis; however, it approached significance for number of internodes bored ($F=3.6$) when combined results from (two) susceptible (N11 + N16) and (two) resistant (N12 + N21) varieties were compared in the ANOVA. The ameliorating effect of silicon on resistance was greater for susceptible than for resistant varieties.

Results indicate that calcium silicate application in the field may produce a substantial increase in resistance of sugarcane to *E. saccharina* attack. As the effect of silicon on resistance was greater for susceptible (high sucrose) varieties, silicon application may reduce the risk of planting of such varieties in rain-fed areas where borer attack is a greater threat.

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Table 1. Effect of applied silicon on resistance of sugarcane to *Eldana saccharina* expressed as a percent of the trial mean (=100%) (F crit.=4.0; p=0.05). Figures in parentheses are differences between control and treatment values.

Ca silicate level (kg/ha)	Stalk length bored (% of trial mean)	No. internodes bored (% of trial mean)	Total borer numbers (% of trial mean)	Total borer mass (% of trial mean)
Control (nil)	114	112	110	115
2500	100 (14)	100 (12)	98 (12)	93 (22)
5000	87 (27)	88 (24)	92 (18)	92 (23)
F-value	7.7	10.4	5.1	6.0
LSD (p=0.05)	19	15	16	18
C.V.%	48.0	37.3	39.3	45.4

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