

POSTER SUMMARY**SCREENING TRANSGENIC SUGARCANE PLANTS FOR RESISTANCE TO ELDANA LARVAE****Jacob RM¹, Ligege RW¹, Meyer GM¹ and Snyman SJ^{1,2}**¹South African Sugarcane Research Institute, Durban, South Africa²University of KwaZulu-Natal, Durban, South Africa

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Abstract

Genetically modified (GM) sugarcane expressing CRY proteins from the bacterium *Bacillus thuringiensis* (Bt), which controls lepidopteran insect pests including *Eldana saccharina* (eldana), is being developed at SASRI. Once GM plants contain the novel protein, the efficacy of eldana control is determined using bioassays. This process is usually lengthy, but SASRI has developed an *in vitro* Plantlet Bioassay (IVPB) to rapidly screen for lines that are resistant to feeding eldana larvae. Recognising these lines at an early stage will enable greater efficiency of resource utilisation, as only those lines causing eldana mortality will be tested further.

Eldana larvae in glass vials fed on sugarcane plantlets expressing a CRY protein do not survive beyond seven days and they have a low mean weight gain after five days compared with unmodified controls. Mortality after five days is defined by the percentage of dead larvae or converted to 100% when the mean weight of the surviving larvae is less than 1.2 times the starting mean weight. Additionally, a damage adjusted mortality metric accounts for visible damage caused by feeding larvae, thereby ranking GM line resistance.

The initial validation of the seven-day IVPB compared results from a four-month *ex vitro* shade house bioassay. Eleven resistant GM lines from the latter, without bored internodes indicating their resistance to eldana, showed minimal damage from the feeding larvae and a high larval mortality (97.57% mean damage adjusted mortality) in the IVPB. Untransformed controls and a GM line that resulted in >5% internodes bored in the *ex vitro* bioassay, showed feeding damage and no larval mortality in the IVPB, indicating susceptibility. However, one GM line identified as resistant in the *ex vitro* assay (0.79% internodes bored), was susceptible to feeding eldana larvae in the IVPB. Preliminary findings show that the IVPB is a reliable means of early screening for insect-resistant sugarcane in the GM program.

Keywords: Bt sugarcane, genetic modification, *in vitro* bioassay, *Eldana saccharina*