

EVALUATING THE YIELD AND ECONOMIC IMPACT OF OXAMYL AND IMIDACLOPRID TREATMENTS ON SUGARCANE UNDER VARYING STRESS CONDITIONS

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Introduction

Sugarcane grown in sandy soils ($\leq 10\%$ clay) is particularly vulnerable to drought stress and pest infestations, including nematodes, yellow sugarcane aphid (YSA), and thrips. A granular soil-applied synthetic pesticide containing oxamyl and imidacloprid as active ingredients was registered in 2019 for to manage these pests. Beyond pest control, imidacloprid has been reported to enhance plant stress tolerance in several crops.

This study aimed to:

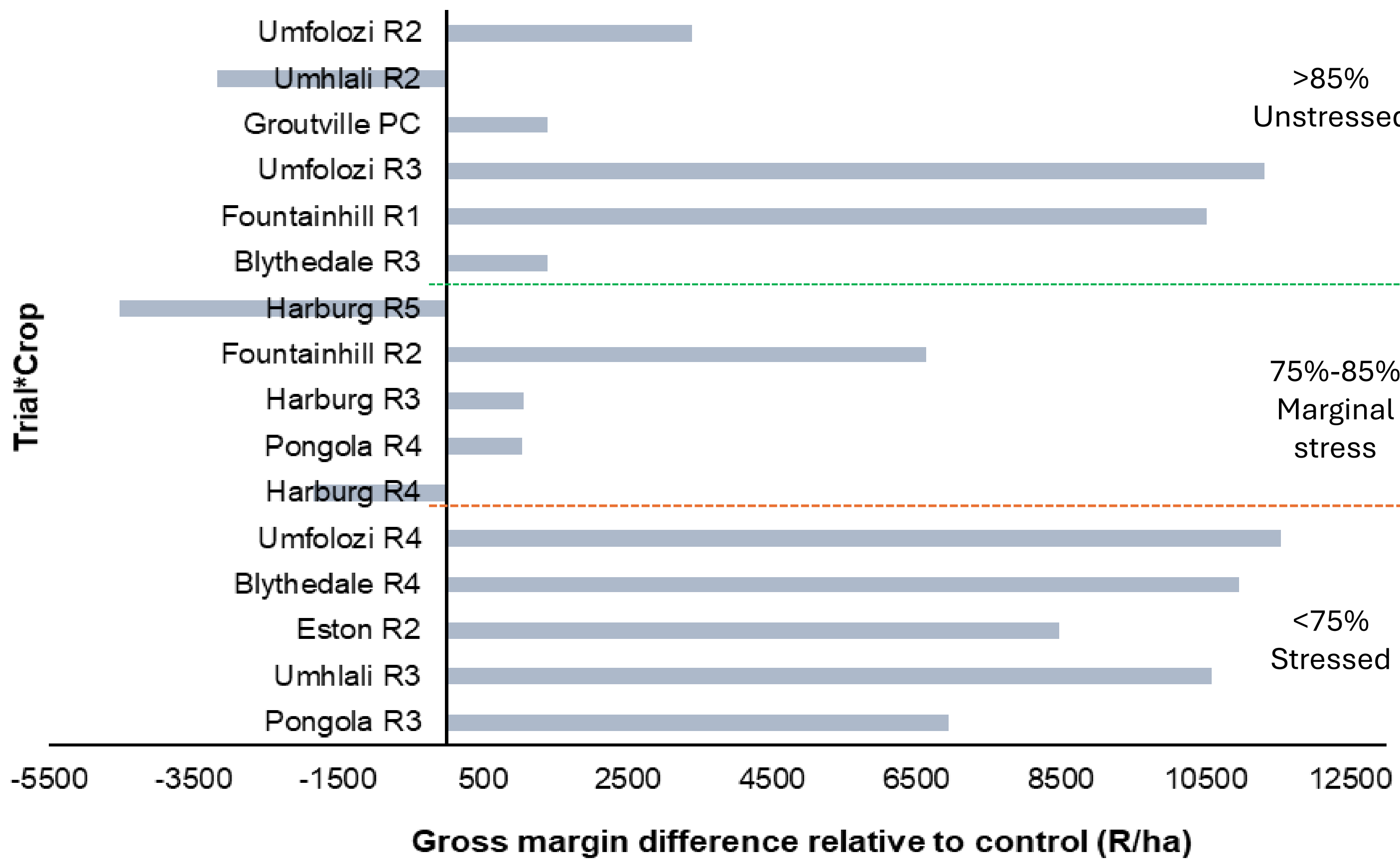
- Evaluate the yield response of different sugarcane varieties to oxamyl/imidacloprid treatments under varying stress conditions.
- Assess the economic returns and cost-effectiveness across ratoon crops.

Methodology

- The Study was conducted by South African Sugarcane Research Institute (SASRI), and trials were planted on soils with $\leq 10\%$ clay in the Midlands, North Coast, Umfolozi, and Pongola regions.
- Design followed a randomised Complete Block Design.
 - Treatments:
 - Sugarcane varieties treated with the oxamyl/imidacloprid product.
 - Untreated controls.
 - Sugarcane was manually harvested, weighed cane bundles and samples milled for sucrose analysis and to determine cane yield (t/ha).
 - Stress index was calculated as the average yield of untreated controls expressed as a percentage of modelled yield potential (from SASRI StalkGrow)
 - Analyses:
 - Statistical analysis, Genstat, ANOVA at 10% probability and Pearson's correlation.
 - Economic assessment using July 2024 RV price
 - Percentage yield increase (tch%).
 - Stress index such that higher index values suggest lower or no stress.



- All crops that had $< 75\%$ stress index show to have positive gross margins when treated.
- Most crops within the marginal stress and unstressed had positive gross margins. The difference between Pongola R3 & R4 was due to high RV Yield in R3 due to chemical treatment.
- The loss/negative gross margin may indicate some unmeasured factors that negatively impacted on some varieties' %cane yield increase.



Conclusions



Neonicotinoid insecticides have beneficial effects on the growth of sugarcane under stressed conditions by altering plant physiology. This may be variety dependent.



Plant physiological responses depend upon the presence of underlying stress, e.g., heat and water stress, shading by weeds, cold stress and attack by pathogens.)



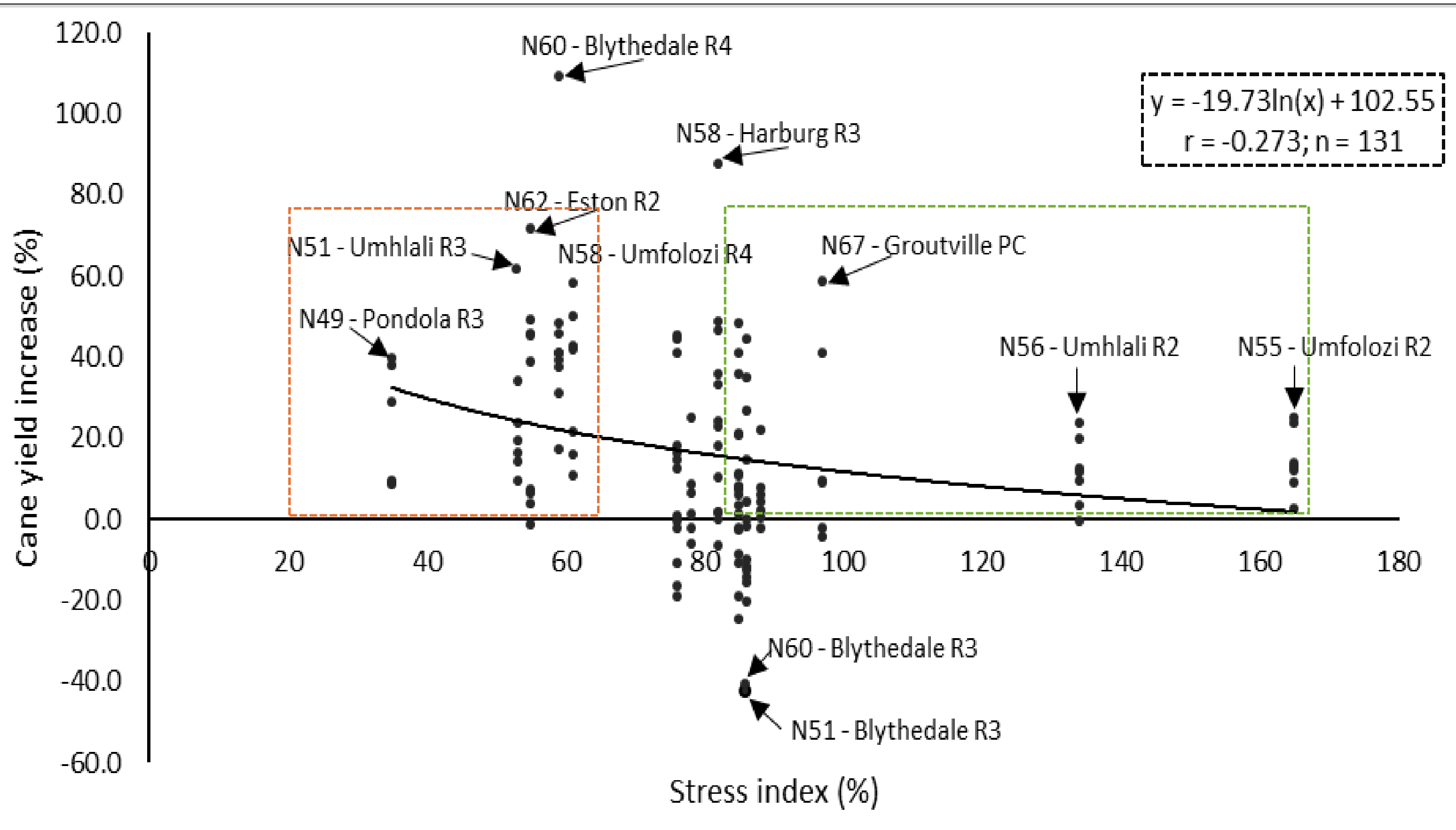
The product cannot legally be applied as a plant growth promoter - not registered as such.



However, it can be applied pre-emptively for the control of expected nematode, YSA and thrips infestations.

Results

- A significant negative correlation was found between percentage yield increase (tch) and stress index (Pearson's $r = -0.273$; $p < 0.01$; $n = 131$).
- Varieties N51, N60, and N62 showed yield gains above 60% when stress indices were below 75%.
- Low-stress sites (e.g., Groutville and Umfolozi) showed smaller gains, reflecting reduced pest pressure.



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