

## ROLE OF GROWTH REGULATORS ON REDUCING THE EXTENDED AND VARIABLE QUIESCENT PERIOD IN SOURSOP FRUIT DEVELOPMENT

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Soursop (*Annona muricata* L.) cultivation faces several challenges, including the protogynous nature of its flowers, limited pollinator presence, and a prolonged, highly variable initial quiescent period during fruit development. This study aimed to assess the effects of plant growth regulators (PGRs) on reducing the initial quiescent period, enhancing fruit growth, and increasing fruit set in soursop. Hand-pollinated flowers were treated with various concentrations of naphthaleneacetic Acid (NAA) alone and in combination with gibberellic Acid (GA3). Treatments included NAA concentrations of 1000, 2000, 3000, 4000 ppm and 5000 ppm, as well as combined applications of NAA 4000 ppm + GA3 1000 ppm and NAA 5000 ppm + GA3 1000 ppm. Each treatment was replicated across three blocks of 10 samples, with a total of 24 trees being used in this study. Hand pollination flowers without PGR applications were considered as the control. Weekly measurements of fruit length and circumference were recorded, with the quiescent period considered broken upon rapid increases in these metrics. The data were analyzed using a repeated mixed model and a Poisson regression, with the number of weeks until the quiescent period was broken as the dependent variable. The results indicated that NAA concentrations of 3000 ppm significantly reduced the quiescent period, achieving the shortest median time to success. Higher NAA concentrations did not consistently yield better results, and the addition of GA3 showed no significant improvement ( $p < 0.05$ ) over the use of NAA alone. All PGRs applications recorded more than 90% fruit set compared to the non-PGR applied control, which only achieved 63% success. Application of 3000 ppm NAA concentration demonstrated strong potential for practical application, offering the shortest quiescent period (5 weeks), greater success and the lowest fruit drop rates. Furthermore, the findings highlighted the benefits of using NAA at optimal concentrations to enhance soursop cultivation. This approach offers promising methods to improve fruit set and reduce the quiescent period of soursop.

**Keywords:** Fruit drop, Fruit set, Gibberellic acid, Hand-pollinated flowers, Naphthaleneacetic acid