

**PAPER 5:
EFFECTS OF THREE GROWTH REGULATORS INDUCED FLOWERING ON YIELD
AND QUALITY OF RIPLEY QUEEN PINEAPPLE (*ANANAS COMOSUS*) IN FIJI.**

Manoa Iranacolaivalu & Kalolaini Colaitiniyara

Horticulture Section of the Research Division, Ministry of Agriculture, Fiji

EXTENDED ABSTRACT

Pineapple (*Ananas comosus* L.) is the second major fruit of Fiji, after banana. According to the last Fiji agricultural census (2009), around 445 hectares of planted pineapple are grown by 914 farmers producing about 2,800 tonnes of pineapples annually. The major producing areas (around 75%) lies in the intermediate zone of the Eastern part of the main island and the remaining comes from the dry zone of the Western part of Fiji. Pineapples are sold in hotels and municipal markets worth around FJD 1.8 million to farmers.

The main challenge facing pineapple farmers in Fiji is the seasonality of the crop. However, the availability of growth regulator (GR) chemicals encourage all year round production. The locally available GRs are Ethephon (48% 2-chloroethylphosphonic acid), Floraset (4% 1-naphthalene acetic acid), and EPGR 108 (10.8% 2-chloroethylphosphonic acid).

Table 1. Description of growth regulators

Ethephon (48% 2-chloroethylphosphonic acid)	Alpha-Naphtaline Acetic Acid or ANA
<p>Ethylene, a gaseous plant hormone, is responsible for the initiation of reproductive development in pineapple. Reproductive development can be forced in pineapple throughout the year with ethylene.</p> <p>2-Chloroethylphosphonic acids or Etyphon, available as "Ethrel", "Ethephon", or "EPGR 108". This is a world-wide used chemical for the harvest control in pineapple.</p>	<p>Available directly under the name ANA or under a range of trade names such as Floraset (4% 1-naphthalene acetic acid), recommended as rooting media as well as flowering hormone. However this chemical is an auxin and is less effective in flower induction than the above mentioned ethephon, with fruiting rates varying over an unacceptable range between 30% to 70% effectiveness, which is too low and unreliable for commercial production. It will be more effective in higher latitudes and can be used during periods with shorter days. As a rooting hormone, this chemical can be useful in the climates with distinct short days during seasonal periods of the year just before the natural season.</p>

The effectiveness of the three growth regulators in inducing synchronized flowering on "Ripley queen" pineapple were evaluated during the 2015 season at the Seaqaqa Research Station (SqRS) in the Northern part of Fiji.

Table 2. Conditions at the Seaqaqa Research Station (SqRS) during the experiment

Soil	WEATHER	EXPERIMENT MAINTENANCE
<p>pH: 5.6 N: 0.2% Olsen P: 1.0mg/kg K: 0.2 me/100g</p>	<p>Temp: 18.9 - 29.1 Rainfall: 17.5mm Rainfall days: 4 Humidity: 71%</p>	<p>BASAL: Mill Mud 5 tonnes/ha, super phosphate: 250kg. SIDE DRESS: Urea: 110kg/ha at 1 month after planting. NPK: 13:13:21 at 250kg/ha at 4 months interval after planting. Weed Control: As and when required</p>

The experiment was established in June 2014 using the randomized complete block design (RCBD), and the treatments are four rates of Ethephon, Floraset, and EPGR 108 in 3 levels (recommended rate, level 1 and level 2) and the control in factorial combinations. Ethephon and Floraset use 5ml, 10ml, and 15ml in 10L of water; while EPGR108 uses 30ml, 35ml, and

40ml in 10L of water. Solution mixture includes: chemicals + 10g Borax + 50g Urea + 10L water which is applied at a rate of 50ml/plant. There were three blocks and fifteen plants per plot for each treatment. Fruits are harvested at 85-90% ripeness with results focused on yield and fruit qualities. The collated data were analyzed statistically using CropStat and mean differences were separated for interpretation at 5% level of significance.

Based on the Analysis of Variance (ANOVA) there is significant difference in the treatments based on the crown weight (LSD 5%: 0.0672), total fruit length (LSD 5%: 0.0312) and fruit circumference (LSD 5%: 0.0061). The result showed that the treatments have some effects on the time taken from application of treatment to harvest: i.e. shorter duration for ethephon and floraset especially at Level A. For floraset, level B outweighs the other GRs in terms of highest fruit weight (1127 grams) and the lowest crown weight percentage (13.3%) compared with the control. There is a significant difference in the total fruit length between the treatments and the control. The treatments are showing some effects on the fruit length and circumference compared to the control, especially for floraset and EPGR108. The treatments do not have any effect on the sweetness or total soluble solid (TSS) of the pineapple fruit, however, the control supersedes the treatments.

Results have proven that the 3 growth regulators induce early flowering and better yield in Ripley Queen pineapple variety. EPGR108 and Ethephon showed similar results in terms of number of days taken from GR application to harvest. Floraset, known as a root inducing GR, proved to produce good results in terms of flower induction and yield. Future work needs to focus on expanding the experiment to include other pineapple varieties in Fiji (Smooth Cayenne and Veimama); evaluation of the GRs on ratoon crops (1 & 2); experiment to incorporate monthly planting of pineapple to determine the most appropriate period (month) for off-season production; GRs to be tested on alluvial soil type and in intermediate climatic zone; experiment on postharvest to evaluate shelf life and fruit quality; conduct residual tests on the MRL of the chemical and to conduct economic analysis of the treatments based on the production life of the crop.

Keywords: Fiji, growth regulators, pineapple

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