

Nitrogen triggers floriferous flush in strawberry guava (*Psidium cattleianum*)

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Photo 1: Three flowering shoots produced by a terminal branch after nitrogen fertilisation



Strawberry guava is a promising new fruit species in Réunion Island. Its phenological cycle in natural conditions is composed of a single floriferous flush followed by a 3 to 6 month resting period which lasts until the next annual floriferous flush. Empirical observations on strawberry guava grown in orchard suggest that complete fertilisation (NPK) triggers a floriferous flush leading to a harvest. The objectives of this study are to specify the factors affecting this floriferous flush: which nutrient(s) is (are) involved in the floriferous flush, and what are the effects of fertiliser amount and plant phenological stage on flush intensity?

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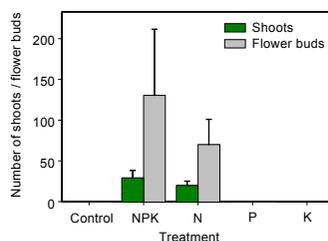
Materials and Methods

- Five and a half year-old orchard, 480 m of elevation.
- Five treatments were applied two months after the May 2000 harvest:
 - * control: no nutrient
 - * NPK treatment: 240 g 15.12.24 per plant, i.e. 36 g N, 28.8 g P₂O₅, 57.6 g K₂O
 - * N treatment: 138.5 g NH₄NO₃ per plant (36 g N)
 - * P treatment: 27.5 ml per plant of a 85% H₃PO₄ solution (28.8 g P₂O₅)
 - * K treatment: 115.2 g K₂SO₄ per plant (57.6 g K₂O)
- Complete randomised block design with 4 replicates per treatment.
- Fifteen terminal branches were randomly chosen and labelled on each plant when the treatment was applied. The number of shoots and flower buds produced by these labelled branches was recorded just before flowering, about 3.5 months after the treatment.

Results

NPK and N treatments triggered floriferous shoots shortly after nutrient application: buds swelled after 30 days and burst after 50 days. NPK treatment produced more shoots and flower buds than N treatment, but differences were not significant (Fig. 1). Control, P and K treatments did not trigger either floriferous or vegetative shoots.

Figure 1: Effect of the application of different nutrients (control = no nutrient) on the number of shoots and flower buds produced by 15 terminal branches of strawberry guava trees. Bars indicate standard deviation (n = 4 trees). For each variable, means are not significantly different (P > 0.05).



Effect of fertiliser amount and plant phenological stage on the triggered floriferous flush

Materials and Methods

- Four year-old orchard, 520 m of elevation.
- Six treatments were applied on different plants at two dates: April 1997, just after a heavy crop; and July 1997, after a three month resting period after harvest. Treatments were 0; 120; 240; 360; 480 and 600 g 15.12.24 per plant (0; 18; 36; 54; 72 and 90 g N per plant respectively).
- Trial design and observations were as in experiment 1.

Results

The plant response was significantly more intense when fertilisation was applied after a 3 months resting period after harvest than when applied at harvest, in particular for the number of flower buds (Fig. 2 and 3). The number of shoots and flower buds were significantly higher for fertilised plants (18-90 g N) than for control plants (0 g N), except for the number of flower buds on plants fertilised at harvest. For fertilised plants (18-90 g N), these variables increased with fertiliser amount but differences were not significant.

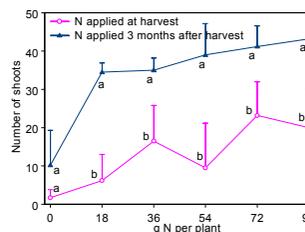


Figure 2: Effect of the amount of nitrogen applied to strawberry guava trees at two dates on the number of shoots produced by 15 terminal branches. Bars indicate standard deviation (n = 4 trees). For each N amount, means followed by different letters are significantly different (P < 0.05).

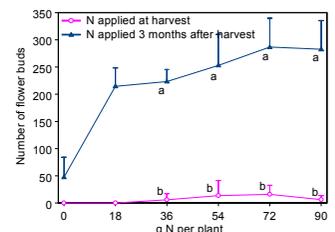


Figure 3: Effect of the amount of nitrogen applied to strawberry guava trees at two dates on the number of flower buds produced by 15 terminal branches. Bars indicate standard deviation (n = 4 trees). For each N amount, means followed by different letters are significantly different (P < 0.05).

Conclusions

- Nitrogen triggers a floriferous flush in strawberry guava, modifying thereby its natural phenological cycle.
- The amount of nitrogen applied does not affect the number of shoots and flower buds produced.
- The plant response is however affected by the plant phenological stage at fertilisation, with a weak response when nitrogen is applied at or just after harvest. This suggests that the plant response, in particular the number of flower buds, is related to the plant carbohydrate availability.
- To trigger production cycles with nitrogen has interesting consequences: several harvests per year, off-season production.