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Growth Characteristics of the Pineapple Cultivars 'MD2' and 'Flhoran 41' Compared With 'Smooth Cayenne'

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Introduction

New pineapple varieties are now well established in the markets and this "segmentation" will increase in the near future to offer consumers a real choice of differentiated products such as already exists for other fruits. At the growers level, different pineapple cultivars also means a need to adapt the cultural practices due to different behaviours of the cultivars in terms of growth, nutrient requirements and sensitivity to biotic and abiotic stresses. Examples of this diversified behaviour include:

- Ethephon dose for degreening may be lower for 'MD2', 'Flhoran 41' and 'Queen' than for 'Smooth Cayenne'
- 'MD2' is sensitive to phytophthora and to over-ripening but insensitive to Internal Browning
- 'Flhoran 41' is sensitive to soil-borne parasitism but shows exceptional quality characteristics for fresh market as well as for processing and does not need ethephon for degreening.
- 'Queen' shows very good fruit quality with a high level ascorbic acid but is very sensitive to Wilt and Internal Browning.

In addition, each variety has some unique growth characteristics.

Growth characteristics : plant weight, D leaves and number of leaves

We measured a few growth characteristics of 'MD2', 'Flhoran 41' and 'Smooth Cayenne', between planting and forcing. Classical planting material was used, in this case 400 g suckers, which are less susceptible to natural flower induction than bigger suckers (PY, 1960; Lacoeuilhe, 1975). The suckers were planted at a density of 55 000 plants/ha in Côte d'Ivoire during May 2005, a hot and humid period. The maximum temperatures ranged between 26.7 to 33.5°C with rainfall of 1700mm during the 10 months of the experimentation. Because the period of the experiment was very wet the plants were not irrigated.

Plant weights were similar for the three cultivars and the speed of growth also was similar. Exportable fruits, average weight 1.5kg, are obtained with 2.5 kg plants. This weight was reached, on average, after 240 days for 'Flhoran 41', 242 days for 'MD2' and 252 days for 'Smooth Cayenne'.

The increase in weight of the D leaves (as defined by Py *et al*, 1984) of the three cultivars shows the same pattern and follows the classical sigmoid growth curve observed for pineapple (Lacoeuilhe, 1976; Py, 1973) (Figure 1). 'MD2' D leaves had a greater weight than those of the other cultivars, about 10 g up to four-five months after planting. Then gradually the weight of 'Smooth Cayenne' D leaves increased until they were similar in weight to those of 'MD2' plants. The weight of 'Flhoran 41' D leaves follows the same pattern as did those for 'Smooth Cayenne' plants from planting to the 5th month but at the end averaged 10 g less than those of the two other cultivars.

'Flhoran 41' consistently had a higher number of leaves than did 'Smooth Cayenne', which had a higher number of leaves than did 'MD2'. Leaf numbers at 16 weeks after planting were 41 for 'Flhoran 41', 36 for 'Smooth Cayenne' and 30 for 'MD2' (Figure 2). At the time of forcing leaf numbers were 62 for 'Flhoran 41', 55 for 'Smooth Cayenne' and 50 for 'MD' (Figure 2).

Clearly 'Flhoran 41' has more but smaller leaves than either 'Smooth Cayenne' or 'MD2'. Since the weights of all plants were similar, under good growth conditions 'Florhan 41' compensates for having smaller leaves by having more of them. Finally, we confirmed that the classical correlation between D leaf weight and plant weight holds for these new cultivars.

We also observed the same behaviour on the same cultivars in greenhouse experiments in Martinique, (plants in pots, experiments still underway). The impact of nematodes on the three cultivars was evaluated by multiplying *Rotylenchulus reniformis* on *Phaseolus vulgaris* and then inoculating half the pots with this nematode during a 2-month growth period. Meanwhile the other half of the pots were freed from nematodes by a 2-month immersion of the soil before planting. The reduction of foliar emission due to nematodes was 10% on 'Flhoran 41' vs 2% for 'Smooth Cayenne' and 6% for 'MD2'. The D leaf weight was reduced by 62% and 59%, respectively, for the nematode sensitive 'Flhoran 41' and 'Smooth Cayenne' cultivars but was reduced only by 29% on 'MD2', which is more tolerant to *Rotylenchulus reniformis*.

Figure 1. D leaf weight for cultivars 'MD2', 'FIhoran 41' and 'Smooth Cayenne'

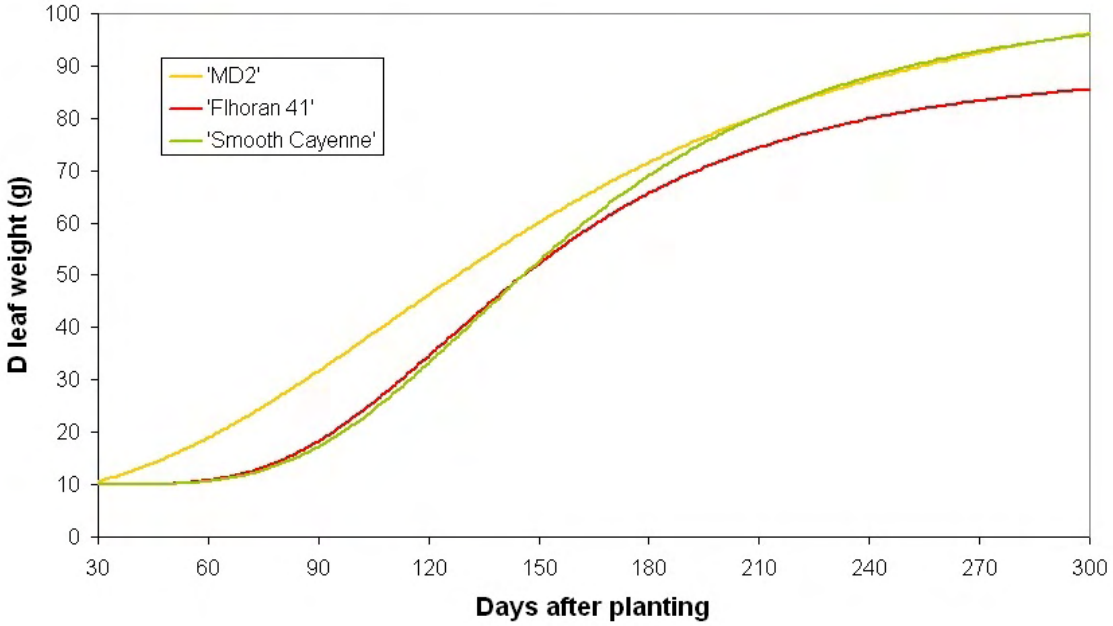
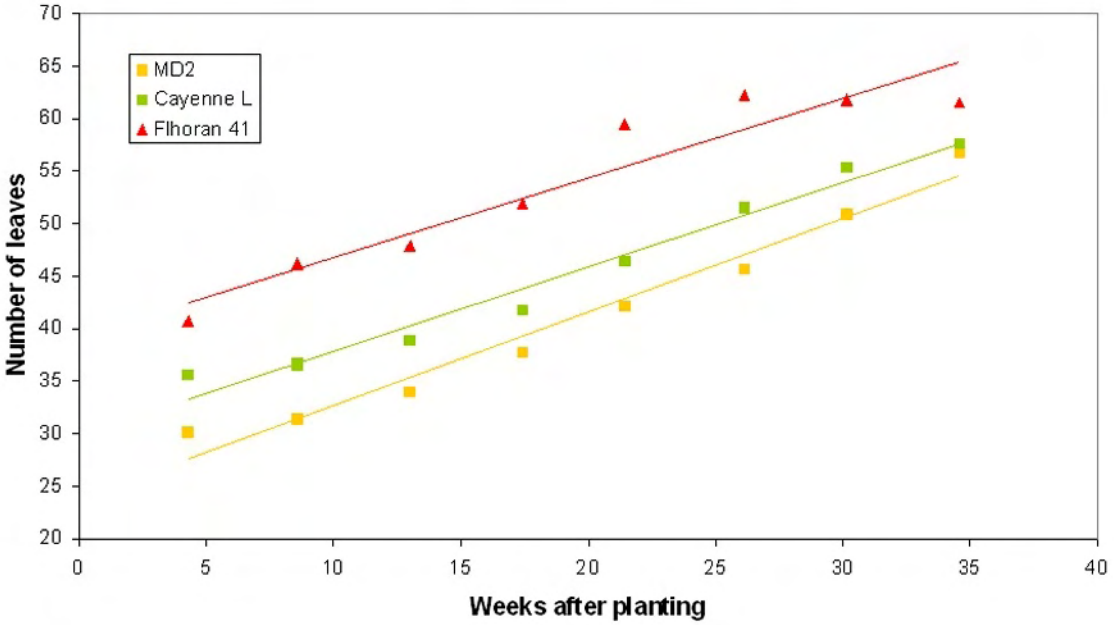


Figure 2. Leaf numbers for 'MD2', 'FIhoran 41' and 'Smooth Cayenne grown from 400g suckers.



Conclusion

The data for D leaf growth for the 3 varieties provides a good example of how careful growers must be with new varieties. D leaf weight is often used as an indicator of forcing time in pineapple, but it should be used with care. In 'Flhoran 41', a D leaf weight of 70 g is sufficient to get exportable fruits, whereas 80 g is the standard for 'MD2' and 'Smooth Cayenne'. As a matter of fact, we realized that on farms growing 'Flhoran 41', it was not easy to obtain a D-leaf weight of 80 g in Côte d'Ivoire conditions. Even more, it was unnecessary and sometimes led to the forcing of plants that had reduced growth rates, which resulted in plants yielding smaller fruits with fewer fruitlets/fruit as demonstrated by Lacoeuilhe (1975). Such other factors as susceptibility to nematodes can affect growth and yield and make it more difficult for growers to adapt themselves to new varieties.

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News From South Africa

Pineapple Farmers' Day

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A pineapple Farmers' Day was held on 9th November, 2006 at Summerhill Farm, Bathurst – the research farm of the partnership between the Agricultural Research Council's Institute for Tropical and Subtropical Crops and the Pineapple Growers Association. The 102 guests were welcomed by Dr. O. Van Rensburg, ITSC Director, followed by an Opening Address by Philip Clayton, Chief Risk Analyst of the Standard Bank of South Africa Limited. Entertaining and informative lectures were then given by a number of speakers, including:

- Graham Petty, Researcher, ARC-ITSC, Bathurst. "Effect of Telone® dosage levels on pineapples growing on clay-loam or sandy-loam soils."
- Nico Smit, Manager Sap Diagnostic Services, Omnia Nutriology. "Progress: Pineapple Sap Analysis."
- Elmarie Rabie, Researcher, ARC-ITSC, Hluhluwe. "Zululand Pineapple Research."
- Heather Raymond, Technical Manager, Phosyn/Yara South Africa. "Trace Elements in Pineapple."
- Matthew Lester, Associate Professor – Taxation, Rhodes University. "The Economic Conditions Facing Farmers."

A summary of one of these lectures is given below.

Evaluation of dosage levels of Telone II® (1,3 dichloropropene, 1110 g L^{-1}) for control of Root-knot nematode, Meloidogyne spp, on Clay-loam, and Sandy-loam Soils

Graham Petty, at Bathurst Farmers' Day.

Summary

Options, in the fight against pineapple nematodes, are very limited and becoming increasingly limited, and the South African pineapple industry has opted for the preplant use of the soil fumigant 1,3 dichloropropene (1110 g L^{-1}) (Telone®) at the registered rate of 100 L ha^{-1}. Visiting growers from overseas countries have expressed their reservations about the adequacy of this rate; however, due to the cost factor our growers have been reluctant to apply the product at higher rates. In an effort to resolve the dilemma and ascertain if the cost-benefit of higher rates would justify increasing dosage rates, a study was undertaken in the Bathurst district of Eastern Cape, South Africa, on effect of different Telone® rates on (a) Root-knot nematode infestation and damage, (b) plant growth, (c) fruit yields and gradings, and (d) nett increase in profitability.

Telone® was applied as preplant soil injection at rates in L ha^{-1} of 0, 100, 125, 150, 200 and 300, followed after 1 week by planting of 'Smooth Cayenne' tops/crowns. At 12 and 18 months after applying Telone®, assessments were made of the above