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**PROJECT: Taro Fertiliser Rate Trial 2004**

**Project Officer: M. Traynor**

**Location: Property of Mr Sok Lee – Darwin River**

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***Objectives:***

***To establish a fertiliser response trend for “Bun Long” taro under local dry season conditions.***

***To record the effect of a range of fertiliser inputs on marketable corm yield.***

***To provide the basis for a sound fertiliser recommendation for current and potential taro growers.***

**Background:**

Recommendations for fertiliser rates for ‘Bun Long’ taro vary widely depending on location and management. Local taro growers are producing good crops with the recommended fertiliser inputs but these rates are speculative and possibly excessive to requirements for optimum marketable yield. This recommendation is tested along with experimental rates to more accurately quantify the nutrient requirement for taro in the Top End dry season environment.

**Method:**

*Planting material*

Propagation was done with ‘setts’ which consist of the upper 1 – 3 cm tip sections of sucker corms with 30 – 40 cm of leaf stalk attached.

*Trial design*

Plants 0.6 m apart.

Twenty four plants per bed.

Eight fertiliser rates randomised over two blocks of four beds.

One row per treatment rate.

Buffer plants at each end of beds.

One buffer row each side of four bed block.

Buffer rows subject to the same rate as adjacent treatment row.

*Management*

Site pH was adjusted to 6.5 using agricultural lime and standard basal fertiliser was applied to the beds. The trial crop was planted on 19/05/04. Irrigation spray jets were installed between plants so applied fertiliser was adequately watered into the soil. Soil moisture was monitored with tensiometers.

Pest and disease control was performed by the grower as required.

Harvest of plots commenced at 210 days after planting (DAP) and was determined by plant maturity indicators observed by the grower.

Fertiliser treatments were monitored by leaf nutrient analyses. Samples collected were the second youngest open leaf blade from three designated tagged plants in each treatment. Plants were sampled each month, 10 days after the monthly fertiliser application. The petioles were removed as close as possible to the blade. Leaves were then washed, oven dried, milled and analysed.

#### *Fertiliser treatments*

The following fertiliser treatments were the total applications over six months. These were divided into six equal applications, applied monthly for six months after planting. The rates are in kg/ha and were applied as side-dressings using muriate of potash, urea and superphosphate.

20% (100 N, 40 P, 240 K)

40% (200 N, 80 P, 480 K)

60% (300 N, 120 P, 720 K)

80% (400 N, 160 P, 960K)

100% (500 N, 200 P, 1200 K) farmer's rate

120% (600 N, 240 P, 1440 K)

160% (800 N, 320 P, 1920 K)

200% (1000 N, 400 P, 2400 K)

#### *Data*

Monthly leaf nutrient analyses were conducted for each treatment.

Corm number and individual weight per plant were recorded.

Corms were graded to the following standard provided by Taro Growers Australia.

Large: 1.25 kg – 3 kg

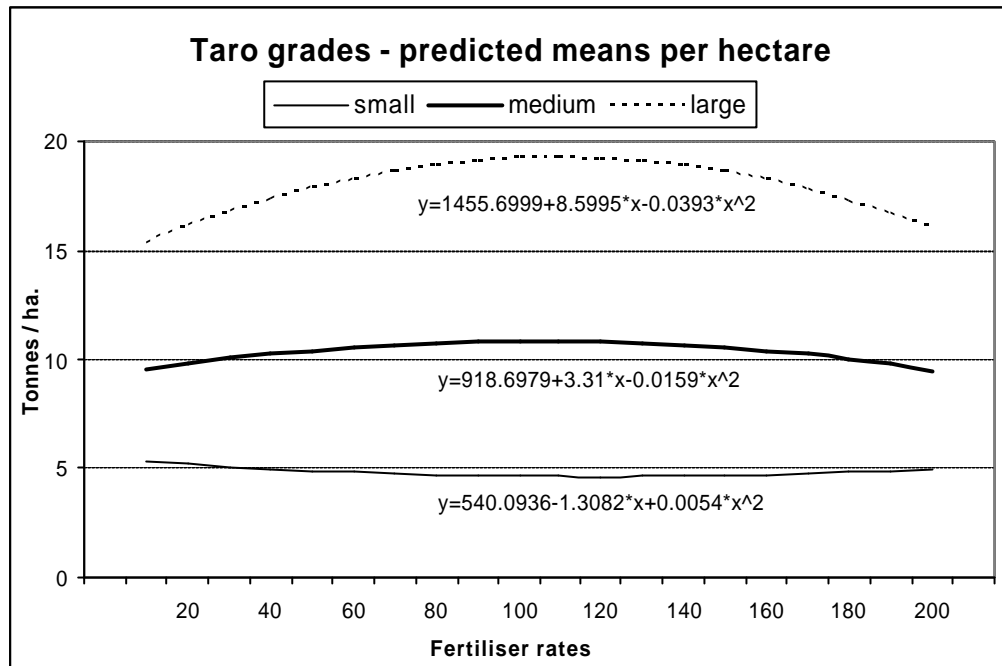
Medium: 0.75 kg – 1.25 kg

Small: 0.35 kg – 0.75 kg

#### **Results:**

Due to the limited area available for the trial, the design was restricted to only eight data points and used as a pilot study to determine where the response to fertiliser reached a peak.

Figure 1 shows the predicted market yield response. The equations produced indicate the value of fertiliser where yield is at a maximum for each market grade. There was a poor relationship within the small grade with no significant maximum. The medium and large grades showed loose relationships with maximum yield produced at 104% and 109% fertiliser inputs.



**Figure 1.** Taro grade means

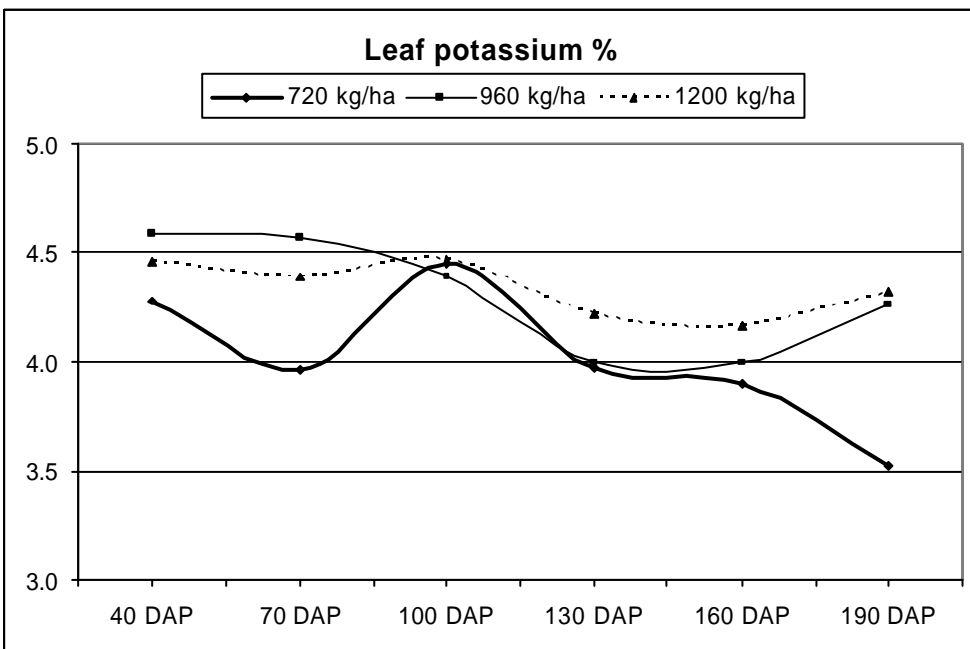
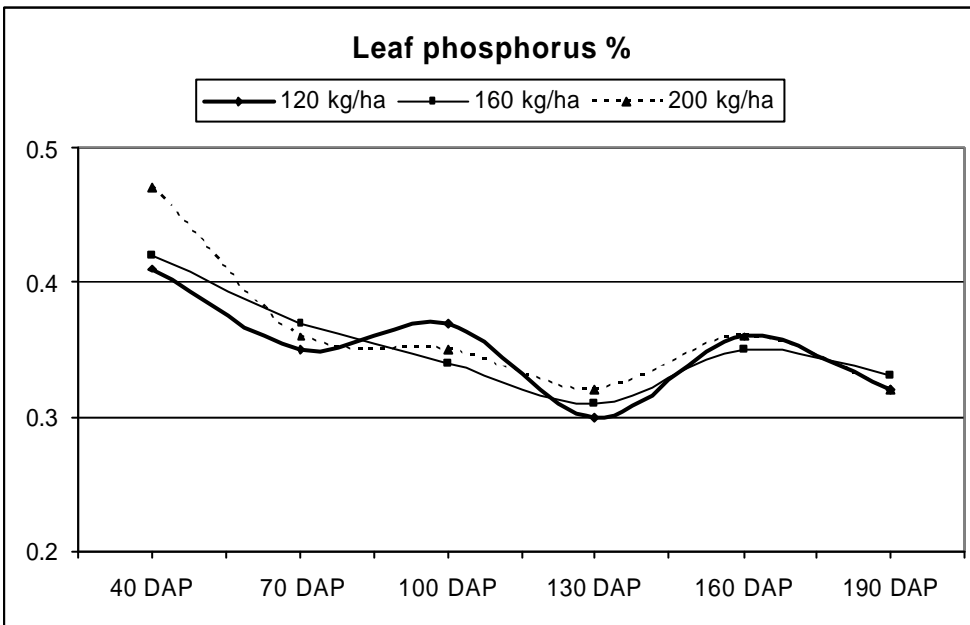
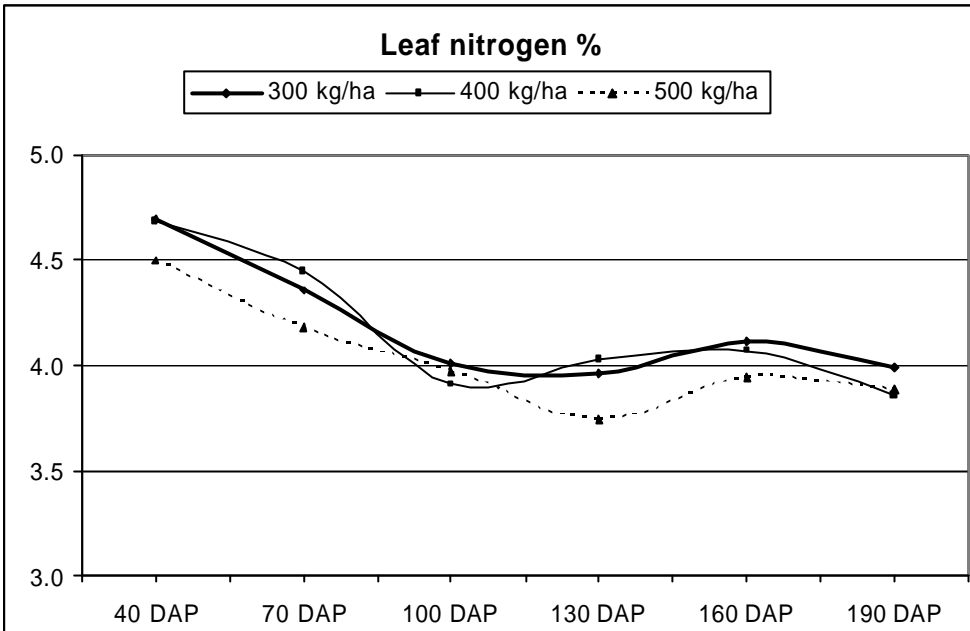
Table 1 shows the market yield of the fertiliser rates applied in the trial and shows that the yield response of taro to increasing amounts of fertiliser is not dramatic. The treatment with 60% of the farmer's rate was sufficient to attain 95% of maximum marketable yield. This data indicates that fertiliser is not a strong determinant of marketable yield in 'Bun Long' taro.

**Table 1.** Taro yield response to fertiliser

N:P:K (kg/ha)	Treatment	Marketable means (tonne/ha) 10 000 plants/ha				% of maximum market yield
		small	medium	large	total	
100:40:240	20	5.16	9.79	16.12	31.07	89.36
200:80:480	40	4.96	10.26	17.37	32.59	93.74
300:120:720	60	4.81	10.60	18.30	33.71	96.97
400:160:960	80	4.70	10.82	18.92	34.44	99.06
500:200:1200	100	4.63	10.91	19.23	34.77	100.00
600:240:1440	120	4.61	10.87	19.22	34.70	99.80
800:320:1920	160	4.69	10.41	18.26	33.36	95.95
1000:400:2400	200	4.94	9.45	16.04	30.43	87.52

### Nutrient monitoring

The following charts show the NPK leaf levels for the treatments that produced at least 95% of maximum marketable yield. These levels could be used as a guide to the adequate leaf nutrient concentrations throughout growth. Large amounts of fertiliser, particularly nitrogen, promote excessive above-ground growth and reduce dry matter allocated to the corms and result in reduced yield. Although not presented in this report, the high fertiliser treatments in the trial maintained high leaf nitrogen levels throughout all growth phases including the period of maximum dry matter production and corm enlargement (100 to 130 DAP). This resulted in more dry matter allocation to plant tops at the expense of corm growth.



### *Conclusion*

This trial showed that the 'farmer's rate' is excessive and that a 40% reduction in fertiliser inputs would result in only a 3-4% reduction in marketable yield. Although the limitations of this trial required that the fertiliser be applied in a solid form, the injection of fertilisers through irrigation would be the method used by growers. The trial will be repeated in 2005 with a demonstration planting using injected fertiliser on the same grower's property. This will lead to a sound fertiliser recommendation for taro growers in the Top End.

### *Acknowledgment*

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- ? DPIFM Chemistry Laboratory for leaf nutrient analyses.
- ? DPIFM Biometrician Mark Hearnden.