

A PRELIMINARY STUDY ON THE GROTH RESPONS OF YOUNG SAGO PALMSTO THE OMISSION OF N, P AND K FERTILIZERS IN SOULUTION CULTURE

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The growth response to the omissions of N, P and K fertilizers were studies in young sago palms cultured in continuously circulated solutions for 8 months. The treatments were (a) complete with N, P, K (b) omission of N, K (c) omission of N, P, K (d) omission of N (e) omission of P (f) omission of K (g) omission of N, P (h) omission of P, K and (i) water only. Trace elements (copper sulphate, zinc sulphate and sodium tetraborate) were added in all except the water treatment. The concentrations of the culture solutions were monitored with an EC meter and regulated at below 1000 μ S. Data collection was made at about 250 days of trial because those palms cultured without N showed rapid senescence of the older fronds.

Palms cultured in water and in solution with the omissions of N, NP, NK, NPK produced fronds that were distinctly pale and yellowish-green. At the initial stage, the frond emergence rates were rather similar in all the treatments regardless of inclusion or omission of N. With the omission of N, the delay in frond emergence was increasingly prominent after about 3-4 months in solution culture. On average frond is produced in about 2 months from the fifth month of treatment onwards. On average, these palms had a slower frond emergence rate of 0.57-0.71 per month as compared to 0.86- 1.05 in those palms with added N. Their average interval between new frond emergence were also slower, ranging from 31.6-43 days versus those of 24.2-29.6 in palms cultured with N inclusion. Palms cultured with N inclusion had a rather regular frond emergence rate throughout.

The highest first weight increase (144%) was found in palms culture with complete solution, higher than all other treatments of between 36%-93%. Generally, those with N inclusion had higher fresh weight increase those with N omission. Within the trial period, responses in growth to P and K omission were not obvious as compared to the complete nutrient treatment. Perhaps more time is required for P and K deficiency symptoms to develop. In all the treatments, difference in root number, percentage of root weight increase, frond length and leaflet umbers were rather obscure.

N was added in all the N—omission treatments at the end of 8 months and the sago palms were cultured further for 6 months to observe the effects of N-reversal. A distinct reversion of the N deficiencies was observed in all the N-reversal treatments.

The preliminary findings indicate that in young sago palms, deficiency symptoms and growth retardation develop most rapidly with nitrogen deficiency. Deficiencies in potassium and phosphorus caused a significant reduction in fresh weight increase but did not significantly affect the rate of frond production within the experimental period.