

EFFECT OF APPLICATION OF N, P, K, Ca AND Mg ON
YOUNG WEST COAST TALL PALMS IN THE
ROOT (WILT) AFFECTED AREA

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ABSTRACT

The response to three levels of N, P and K and two levels of Ca and Mg by WCT palms from the seedling stage was studied in a $3^3 \times 2^2$ factorial split experiment conducted in loamy sand soil at CPCRI, Regional Station, Kayangulam since 1970. The fertiliser levels (adult) are: 500, 750, 1000 g N; 300, 450, 600 g P_2O_5 ; 1000, 1500, 2000 g K_2O ; 0, 12.5 kg Ca $(OH)_2$ and 0, 500 g MgO. The lime was applied broadcast uniformly and ploughed in, while the other fertilisers were applied only in the basins.

The effect of application of N was found significant in increasing the height of seedlings during the first year but not during the later years. The main effect of P was not found favourable on any of the characters. The effect of K was significant in increasing the girth at collar only during the third year. The response to Ca was significant in increasing the height of seedlings during the third year, but was highly significant on the number of functioning leaves during the fourth year. The main effect of Mg was highly significant in increasing the girth at collar, height, number of leaves produced, number of functioning leaves, early flowering and the cumulative yield of nuts harvested upto the seventh year. Irrespective of the treatments given, 19% of the palms had contracted the root (wilt) till December, 1977.

INTRODUCTION

Investigations on the etiology of the root (wilt) disease of coconut in Kerala have been in progress since the beginning of this century. The parasitic nature of the disease was reported, as early as 1908 by Butler; while its complexity was published in an exhaustive report by Menon and Nair (1951, 1952). However, the cause of the disease is still uncertain. The disease occurs in varying

situations and soil types. Fertiliser trials with varying levels, combinations and sources of NPK were found effective neither in curing the disease nor in preventing fresh incidence.

Studies on soil and tissue samples collected from disease-affected and disease-free tracts, generally, indicated a lower status of Ca and Mg and a higher status of N, P and K in the tissues of palms, growing in the disease affected areas (Verghese *et al.*, 1959; Robert Cecil, 1975; Pillai *et al.*, 1975). Nutritional imbalance with regard to the major nutrients was also evident in the tissues as well as in the soils of the disease affected areas (Verghese *et al.*, 1959; Pandalai, 1959; Verghese, 1966; Robert Cecil, 1975; Pillai *et al.*, 1975). The application of lime, as well as Ca and Mg salts, over a basal dose of NPK fertilisers resulted in an improvement of the conditions of the root (wilt) affected palms and their yields (Nair and Radha, 1959; Davis, 1966; Lal, 1966). The foliar yellowing in the outer whorls of root (wilt) affected palms has been markedly reduced when 2.0% solution of magnesium sulphate was sprayed at quarterly intervals (Anon., 1966). Systematic fertiliser trials, including Ca and Mg, to study the effect on the incidence and severity of the disease, however, were not conducted.

With a view to studying the effect of Ca and Mg, with varying levels and combinations of N, P and K, from the seedling stage, a fertiliser experiment was started in 1970 on WCT palms at the CPCRI Regional Station, Kayangulam. The present paper deals with the effect of the fertiliser treatments on the growth characters of the palms during the pre-bearing stage and also on the flowering habit and the incidence of root (wilt) disease upto December, 1977.

MATERIAL AND METHODS

These investigations were carried out on the experimental farm of CPCRI, Regional Station, Kayangulam. The farm is situated on the west coast of India, where the mean annual rainfall is 2508 mm. The soil is loamy sand, deep and well drained. The mechanical composition and the fertility status of the soil are given in Table 1.

The data show that the soil is inherently low in all the major plant nutrients, except P which is fairly well supplied.

Table 1. *The mechanical and chemical composition of the soil of the experimental area*

Mechanical composition (%)				Chemical composition							
Clay	Silt	Fine sand	Coarse sand	Availables (ppm)			Exchangeables (me/100 g)			pH	
				N	P	K	CEC	K	Ca		Mg
8.9	3.2	69.0	18.9	44	12	21	2.0	0.4	0.6	0.2	5.3

Split plot design where the main plot treatments were combinations of 3 levels of N, P and K, in a 3³ confounded factorial experiment confounding NP²K² and sub-plot treatments were factorial combinations of 2 levels of Ca and Mg was adopted, with single replication. The main plot size was 24 palms and the sub-plot 6 palms.

Nutrient levels (adult dose/palm/year)

N ₁ — 500 g N	P ₁ — 300 g P ₂ O ₅	K ₁ — 1000 g K ₂ O
N ₂ — 750 g „	P ₂ — 450 g „	K ₂ — 1500 g „
N ₃ — 1000 g „	P ₃ — 600 g „	K ₃ — 2000 g „
Ca ₀ — no lime	Mg ₀ — no MgO	
Ca ₁ — 12.5 kg slaked lime	Mg ₁ — 500 g MgO	

Lime was applied broadcast uniformly including the basins during June and ploughed in while the other fertilisers were applied in the basins in two splits viz. 1/3 and 2/3 of the annual dose during the pre-monsoon (April–May) and the post-monsoon (August–September) periods, respectively. The nutrients were given in the form of ammophos+urea for N and P, muriate of potash for K, slaked lime for Ca and magnesium sulphate for Mg. The nutrients were given at the rate of 1/3 adult palm dose after one year of planting, 2/3 adult dose after two years and the adult dose after three years and later. A basal application of 50 kg well rotten cattle manure was given to all the experimental palms during August every year since 1973.

Planting of one year old WCT seedlings was done in October, 1970 in one metre cube pits and no fertiliser was supplied at the