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EFFECT OF APPLICATION OF MACRO AND MICRONUTRIENTS AND IRRIGATION ON THE INCIDENCE OF YELLOW LEAF DISEASE OF ARECANUT

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ABSTRACT

A field trial was conducted to study the effect of the application of macro and micronutrients and irrigation on the incidence of yellow leaf disease of arecanut. NPK and micronutrients were applied in combination. Neither NPK nor micronutrients had any ameliorative effect on the disease while irrigation coupled with manuring maintained the yield at economic level.

INTRODUCTION

THE arecanut palms in South Kerala and parts of Karnataka are affected by the destructive yellow leaf disease. Yellowing of the foliage and discolouration of the endosperm are the main symptoms. The actual cause of the malady is not clearly known. It has been variously attributed to a sap transmissible virus (Menon, 1963) and mycoplasma (Nayar, 1971). Investigations conducted on plant diseases such as wilts (Shroeder and Walker, 1942; Walker and Foster, 1946; Wei *et al.*, 1952), root rots (Russel and Sallans, 1940) and rusts (Daly, 1949; Haggeness, 1942; Stakman and Aamdot, 1924) offer ample evidence on the effects of plant nutrition on disease development.

The present studies were undertaken to assess the effect of macro- and micronutrients and irrigation on the incidence of this disease.

MATERIALS AND METHODS

A field trial was laid out in 1961 on a 5 × 5 randomised block design with the treatments, (i) no cultivation, no manuring; (ii) NKP fertilizers with irrigation; (iii) NPK fertilizers without irrigation; (iv) NPK fertilizers + micronutrients with irrigation; and (v) NPK fertilizers + micronutrients without irrigation.

The treatments were given from the seedling stage. N, P, and K were supplied as straight fertilizers, *viz.*, ammonium sulphate, superphosphate, and muriate of potash. Each palm received 45 gm N, 68 gm P_2O_5, and 70 gm K_2O per year. All the micronutrients, *viz.*, Fe, Na, Mn, Mg, Zn, S, Mo, Cu, and Ca were mixed together and applied ($FeSO_4$: 45.5 gm; $Na_2B_4O_7$: 18·0 gm, $MnSO_4$: 54·0 gm; $ZnSO_4$: 18·0 gm; Na_2MoO_4: 1·9 gm; MgO: 36·0 gm; S: 4·5 gm; $CuSO_4$; : 18·0 gm; and CaO: 136·0 gm, per palm per year). Irrigation was given at four days' intervals during the dry period. The trial was laid out in a virgin laterite area reclaimed by clearing the forest. The palms were observed from the very young age for disease development, morphological characters, and yield.

RESULTS AND DISCUSSION

The disease made its first appearance in 1968, *i.e.*, when the palms were about 7 years old (Table I). Since then, there was a sharp rise in disease incidence in all the treatments including control.

The results indicated that the application of macro- and micronutrients with or without irrigation did not have any effect on disease development. The yields of palms receiving irrigation were significantly higher than those without irrigation while the control gave very poor yield (Table II).

Even though irrigation during summer did not have any ameliorative effect on disease development, it could render the palms more productive, almost double that of the non-irrigated. In South Kerala, where irrigation is not a regular practice, palms are subjected to drought during the summer months. In the absence of any prophylactic or curative treatment against the disease, it is necessary to adopt other suitable measures which would render the plants more tolerant to the onslought of the disease. Regular NPK manuring with

TABLE I

Percentage of disease incidence (1968-72)

Treatment	Percentage of disease incidence				
	1968	1969	1970	1971	1972
Control—no cultivation, no manuring..	0·03	10·70	13·30	29·33	64·00
NPK with irrigation ..	0·04	9·30	20·30	30·66	62·66
NPK without irrigation ..	0·03	8·00	16·20	42·66	64·00
NPK + Micronutrients with irrigation	0·04	12·00	20·30	45·33	68·00
NPK + Micronutrients without irrigation	0·00	10·70	21·10	41·33	68·00

TABLE II

Average number of nuts per tree in the different treatments (1968-72)

Treatment	1968	1969	1970	1971	1972
Control—no cultivation, no manuring ..	1·13	6·95	19·80	8·79	30·70
NPK with irrigation ..	88·60	278·92	208·80	154·33	208·40
NPK without irrigation ..	25·91	58·65	61·00	49·23	120·00
NPK + Micronutrients with irrigation	108·87	253·47	216·00	157·39	211·80
NPK + Micronutrients without irrigation	37·56	66·35	78·80	67·95	172·70

irrigation has been found to be beneficial in maintaining arecanut palms to give economic yields in areas affected by yellow leaf disease.

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DISCUSSION

JOSEPH : Could it be an instance of drought, since you can control it by just irrigation ?

RAWTHER : No, the disease is not controlled by irrigation, but only an economic yield is obtained by it.

PUSHPADAS: How were micronutrients applied ? And how about foliar application ?

RAWTHER : By soil application. It may be worth trying foliar application.

PUSHPADAS: Was the soil analysed for N, P, and K ? And was there any deficiency noticed ?

SHAMA BHAT: No deficiencies of these elements have been noticed.