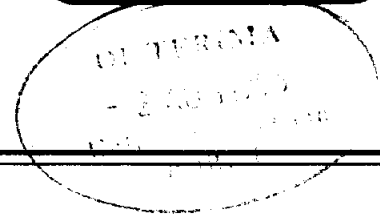


# P FERTILIZER REQUIREMENTS FOR OIL PALM: INLAND AND COASTAL SOILS

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**T**o maintain good productivity, oil palm as a perennial plantation crop has a high requirement for major nutrients. However, in practice P fertilizers are applied in much smaller amounts relative to other nutrients such as nitrogen and potassium. With the current planting of high yielding palms, improved agro-management practices, and increase in the use of N and K fertilizers, the requirement for P nutrient is increasing. This is more important in new areas being developed for oil palm cultivation particularly where inherent soil P is low.

## OPTIMUM P FERTILIZER RATES

Oil palm ffb yield response to different rates of P fertilizer on inland and coastal soils at two different periods were studied. Results have conclusively shown positive yield response to P fertilizer application for both type of soils.

The yield response of oil palm to application of phosphate rocks (CIRP) fertilizer is generally profitable up to at least **3-4 kg/palm/yr** on inland soils (*Table 1*).

**Table 1: FFB Yield Response to P Fertilizer Rates on Inland Soils.**

Other Fertilizers	First Period			Second Period		
	P0	P1	P2	P0	P1	P2
	----- Rate of CIRP (kg/palm/yr) -----					
	0.7	1.9	3.8	0.5	1.6	3.2
	----- FFB Yield (T/ha/yr) -----					
Control	21.6	23.2	25.1	18.7	19.2	19.6
Optimum	24.8	26.6	28.7	22.2	24.2	26.5

Studies by PORIM and the oil palm industry conducted in Peninsular Malaysia have shown that full responses to N and K fertilizers were obtained only when adequate P fertilizer rates were applied. This paper will serve as a guide to the P fertilizer requirements in oil palm replants in inland and coastal soils in Peninsular Malaysia.

The yield response of oil palm replants on coastal soils to application of CIRP is generally profitable up to **2-3 kg/palm/yr** provided only N (and not K) fertilizer is needed (*Table 2*).



**Table 2: FFB Yield Response to P Fertilizer Rates on Coastal Soils**

Other Fertilizers	First Period			Second Period		
	P0	P1	P2	P0	P1	P2
	----- Rate of CIRP (kg/palm/yr) -----					
	0	2.5	5.0	0	2.5	5.0
	----- FFB Yield (T/ha/yr) -----					
Control	23.6	23.9	23.7	22.1	22.8	22.6
Optimum	25.5	27.2	28.4	25.9	27.7	29.1

### **P FERTILIZER REQUIREMENTS WITH TIME**

On inland soils there is no indication whatsoever of any reduction in P fertilizer requirement with time due to residual effects in oil palm replants.

On coastal soils, response to P fertilizer tends to increase (rather than decrease) with time.

### **INTERACTION WITH OTHER FERTILIZERS**

On inland soils, full P response depends on adequate N fertilization, particularly in later years. Conversely no response to N fertilizer is obtained if P is inadequate. It is therefore strongly recommended that high rates of the cheaper P fertilizer be applied in order to ensure maximum benefit from the more expensive N fertilizer.

Response to P fertilizer on coastal soils is observed only if N fertilizer is also applied. Conversely, response to N fertilizer is severely restricted if P fertilizer is not applied.

### **OPTIMUM LEAF AND SOIL P LEVEL**

On inland soils the optimum leaf P level is approximately 0.165% regardless of age and an increase in P fertilizer rate is recommended if levels are lower.

In addition a very strong response to P fertilizer can be expected if soil extractable P in the weeded circle is below 15 ppm P, whilst no response is likely above 150 ppm P.

On coastal soils neither leaf nor soil P level have been found to be of any use in indicating P fertilizer requirement.

### **CONCLUSION**

Generally most of the soils in Peninsular Malaysia are inherently low in soil P. Field studies have shown that the P fertilizer requirement of oil palm replants on the poorer inland soils is high and does not reduce with time. Similarly on coastal alluvial soils, adequate P fertilizer needs to be applied in order to achieve full response from N fertilizer.

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