2014

March

Re-evaluation of Nutrients Requirements for Oil Palm Planting on Peat Soil*

HASNOL OTHMAN[1] , FARAWAHIDA MOHAMMAD DARUS[1]
Malaysian PalmOil Board. PO Box 10620, 50720 Kuala Lumpur, Malaysia

MOHD HISHAM MOHD NOR2 AND SAMSUDIN AMIT[2]
CCM Fertilizers Sdn. Bhd., Lot PT200, Persiaran Selangor, 40000 Shah Alam, Selangor Darul Ehsan, Malaysia

Peat/and with an area totalling approximately 2.6 million ha is considered a problematic soil in Malaysia, but has potential for oil palm cultivation. In Sarawak alone, peat area covers approximately 1.6 million ha or 13 per cent ofthe total land area in the state. The poor physical properties ofpeat such as low soil bulk density, high water table and presence of large quantity of plant biomass with varying stages of decomposition are among the factors that influence the fertiliser requirement of oil palm on peat. Under its natural state, peat is very acidic with lowfertility status and high C/N ratio. These properties seriously affect palm growth and yield which need appropriate fertiliser management.

Study at the Malaysian PalmOil Board (MPOB) Research Station in Teluk Intan, Perak showed that there was an 8 per cent to 15 per cent response to Nfertiliser application in the early years of planting. In later years, with improved mineralisation of the organic matter, the Nresponse declined with time. Work at MPOB Research Station in Sessang, Sarawak recorded no significant response to N fertiliser application onfreshfruit bunch (FFB) yield. The leafNlevels were sufficientfor treatments without Napplication (N) and 1.0 kg urea per palmper year (N) and the overall mean ranged.from 2.69 per cent to 2.79 per cent of N by dry weight. Low responses to Nfertiliser treatment on FFB yield and leaf N level suggest that the optimum rate ofNrequirement is lower than N_1 rate i.e. *possibly as low as 0.5 kg urea per palmper yearfor mature palms.*

MPOB's work at the Research Station in Sessang, Sarawak showed that application of Pfertiliser at rates 1.0 kg (P) and 2.0 kg (P) ofrock phosphate (RP) per palmper year significantly increased the FFB yield.from 144.7 kg to 154.3 kg and 158.0 kg per palmper year accounting for 7 per cent and 9 per cent increase over P unfertilised plots respectively.On the other hand, no significant differences in FFB were recorded between P_1 and P_2 rates. The P fertiliser treatment showed no response ofleafP in early years of planting. The leafP levels over the eight-year period showed a sufficient level even at P_0 rate ranging.from 0.145 per cent to 0.160 per cent of dry weight. Resultsfrom this study indicate that the optimum P fertiliser requirementfor mature oil palm on peat should not exceed 1.0 kg RP per palmper year.

Peat is highly deficient in K and oil palm requires high amount of external K application. MPOB's work at Teluk Intan, Perak showed that oil palm responded to Kfertiliser application (up to 6.0 kg MOP per palm per year) consistently. Study at MPOB Research Station in Sessang, Sarawak showed that K fertiliser treatment recorded low response ofFFB yield as well as leafK level. The application ofMOP up to 6.0 kg per palm per year (K3 rate) significantly increased the average bunch weight but not enough to increase the FFB yield substantially. In the early years, leaf K showed deficient levels for all K fertiliser rates ranging .from 0.76 per cent and 0.89 per cent of dry weight. Later, application of K fertiliser at K_2 and K_3 rates showed a sufficient leafK level. Current study at MP OB Research Station in Teluk Intan, Perak

show that the application of natural zeolite at 3.0 kg per palm per year significantly increased FFB yield of oil on peat. With zeolite application, optimum K fertiliser requirement recommended at the rate of3.5 kg per palm per year of MOP, was lower as compared to treatment without zeolite application (of5.0 kg per palm per year o fMOP).

Six selected NPK fertiliser rate combinations ranging from the lowest (NrfJC) to the highest (Nj>J<) rate were analysed for judicious optimum fertiliser input. The response of these N, P, K rates on six-year mean FFB yield showed that the application of $N_1Pj<_2$ rate gave the highest FFB yield. At the six-year mean FFB yield increased to 158.37 kg per palm per year giving an increase of 15 per cent and 10 per cent compared with $NrfJC_1$ and $N_1Pj<_1$ (i.e. 1 kg urea, 1 kg RP and 4 kg MOP per palm per year from year 5 onwards) rates respectively. An increase in fertiliser combination rate to more than $N_1Pj<_2$ showed no response on FFB yield production. MPOB :S work at the research stations in Teluk Intan, Perak and Sessang, Sarawak confirmed that there was adequate Mg in the peat to meet the palm :S requirement.

Keywords: Oil palm, peat soil, fertiliser requirement, zeolite.