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Site-Specific Nutrient Requirement for two Different Maize Maturity Groups in Northern Nigerian Savannah Agro-Ecological Zone

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Abstract

Maize is the most widely grown cereal in Nigeria and yet its productivity has remained low. Blanket and imbalanced nutrient recommendations are one of the major reasons for low nutrient use efficiency and low crop productivity. The QUEFTS (quantitative evaluation of fertility of tropical soils) model was used to estimate site-specific nitrogen (N), phosphorus (P) and potassium (K) requirements for two different maize varieties from two maturity groups, i.e. a hybrid variety *Oba Super-1* (105-110 days to maturity) and an open-pollinated variety *EVDT-W-STR* (90-95 days to maturity) in the northern Nigerian savannah agro-ecological zone. Data from on-farm nutrient omission trials conducted in the 2015 and 2016 rainy seasons across the northern Nigerian savannah were used to calibrate QUEFTS model. The parameters of maximum accumulation (a) and dilution (d) in kg grain per kg nutrient for the model were N (28, 68), P (164, 492), K (20, 211) for *Oba Super-1* and N (32, 71), P (209, 528), K (30, 92) for *EVDT-W-STR*, respectively. The model showed nutrient contents of at 80% yield potential (8000 kg per hectare) of 22.37, 3.39 and 37.95 kg N, P, and K per 1000 kg of *Oba Super-1* grain and 16.94, 3.95 and 29.26 kg N, P and K per 1000 kg of *EVDT-W-STR* grain. These results suggested an average NPK ratio in the plant dry matter of about 6.6:1:11.19 for *Oba Supa-1* and 4.3:1:7.4 for *EVDT-W-STR*. The observed grain yields were in good agreement with the values simulated by the calibrated model ($r^2 = 0.79$ and 0.91 for *Oba Super-1* and *EVDT-W-STR*, respectively), indicating that the model can be used for site-specific fertiliser recommendations for maize in the northern Nigerian savannah agro-ecological zone.

Keywords: Maize, nutrient requirement, QUEFTS model