

Effects of residual organic manure and supplemental inorganic fertilizers on performance of subsequent maize crop and soil chemical properties

ABSTRACT

Field experiments were conducted during 2014 and 2015 to evaluate the effects of residual organic fertilizers with supplemental inorganic fertilizers on performance of subsequent maize crop and soil chemical properties at Field 2, Faculty of Agriculture, Universiti Putra Malaysia, Serdang, Selangor, Malaysia. In the first season, the trial was conducted by using 4 nutrient management treatment (control, 100% poultry manure (PM), 100% NPK and 50% NPK + 50% PM) in 3 cropping system (sole maize, sole soybean and maize + soybean intercropping). The following trial was conducted by using the first experimental plot. After harvest of the crops in the first experiment, the biomass was left and incorporated manually into the soil before planting the subsequent maize crop. The experiment comprised of 14 treatments, 12 based on the first experiment and two additional treatments for comparison (control and 100% NPK). The treatments were laid down in a randomized complete block design (RCBD) with three replications. The results showed that all fertilizer treatments increased growth, yield and yield components of the subsequent maize crop. However, incorporation of maize residue alone was ineffective in increasing yield of the subsequent maize crop. The combination of crop residue with residual PM enhanced soil pH, organic matter and nutrient availability in the soil. The combined application of soybean residue + 50% residual PM + 50% phosphorous and potassium (PK) fertilizer and soybean residue + 100% PK gave maize yield same level as 100% NPK. Therefore, it can be recommended that substitution of 50% inorganic fertilizer with residual PM and substitution of N fertilizer in soybean residue is recommended to increase yield of maize and improve soil chemical properties.

Keyword: Crop residue; NPK fertilizer; Poultry manure; Residue; Yield