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Maize Yield Response to Mulch, Burning and Insecticide Application on an Ultisol

STEFAN HAUSER

International Institute of Tropical Agriculture (IITA), Congo, The Democratic Republic

Abstract

Maize is gaining importance in the humid forest zone due to its early maturity, low labour input and ease of marketing. However, farmers face problems of supplying sufficient N to high density maize sole crops. Mulches from species with high N content can overcome this problem at low capital cost, yet retaining large quantities of mulch has been shown to reduce plant density. One reason could be damage to germinating seeds by insect or other pests hiding in the mulch layer. This study evaluated the yield response of maize to mulch application versus bare soil and the consequences of insecticide application to protect seedlings. Maize was planted at 20 plants m^{-2} to determine germination rates and thinned to 6.67 m^{-2} in late May and late September. The trial was a 2 factorial design with 6 replicates; 1st factor was insecticide application versus nil, 2nd factor was biomass management at three levels: Mulch mixed of *Senna spectabilis* (75%), *Chromolaena odorata* (20%) and *Calliandra calothyrsus* (5%) leaves was applied at 10 Mg ha^{-1} and either retained or burned versus bare soil. Mulch application was only in the 1st season.

Insecticide application had no effect on germination rate 93% and 25% in the 1st and 2nd season, respectively. Plant density at harvest was unaffected by insecticide and biomass management in both seasons. Cob density was highest in mulch retained followed by mulch burned. Marketable cobs were only produced when mulch was applied. On bare soil virtually no yield was attained (55 kg ha^{-1}), when mulch had been burned 269 kg ha^{-1} and when mulch had been retained 795 kg ha^{-1} of grain were harvested. The difference between mulch retained and the other treatments was significant at $p < 0.002$. In the second season, bare soil and previous mulch burned produced 255 kg ha^{-1} grain while mulch retained produced 606 kg ha^{-1} ($p < 0.002$). Mulch application when burned had thus no yield effect, while a single application of retained mulch increased yield in the following 2nd season.

Keywords: Cameroon, cob production, germination, insect damage, maize grain yield, ultisol