



Impact of Soil Fertility Management Practices on Insect Pests and Diseases of Maize in Southwest Cote d'Ivoire

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ABSTRACT

Objectives: Integrated soil fertility management (ISFM) is essential for sustainable management of tropical soils. However, soil fertility management is able to affect plant susceptibility to pests and diseases. The study investigated impact of soil fertilization practices on maize pests and diseases during two identical and simultaneous trials setup in South-West Cote d'Ivoire.

Methodology and Results: Experiments were laid out using complete randomized block designs with three replicates and four treatments: (1) control; (2) chemical fertilization; (3) fertilization with cattle manure; (4) association "maize + legume" combined with chemical fertilization. Overall, 22 insect species collected and two diseases (maize streak disease and curvularia leaf spots) observed at both sites. Only cattle manure clearly increased pest and disease damages. The use of cattle manure significantly increased leaf infestation rate and maize streak disease frequency at both sites. Similar impact of NPK and cattle manure was obtained on maize yields either in monocropping or in mix cropping.

Conclusions and application of findings: This study clearly confirmed that ISFM is able to affect plant susceptibility to pests and diseases. Cattle manure attracted a diversity of insects of diverse functional groups such as air-borne pests. These latter affected some plant parts; in this case, maize leaves which infestation rate significantly increased. This attraction for multitude insects may increase vector-borne diseases such as maize streak which frequency significantly increased at both sites. Consequently, despite the potential of cattle manure to increase maize yield, their use as organic fertilizer requires to take some precautions. So, the promotion of cattle manure as organic fertilizer in substitution of chemical fertilizer in tropical regions where it is available is encouraged. However, it should be converted into compost or pre-treated for optimal use in agriculture. Finally, mix cropping could be suggested for optimization of economic profit.

Keywords: Maize, leaf infestation, maize streak disease, soil fertility management, cattle manure