

# Impact of soil fertility management practices on major insect pests of Beans (*Phaseolus vulgaris* L.) and yield in Taita District, Kenya

## Abstract:

The common bean (*Phaseolus vulgaris* L.) is an important food and cash crop in Africa. It is estimated that it provides food for more than 100 million people and is a critical source of income for rural households. Despite its importance, common bean yields in parts of Africa have dropped in the last ten years by as much as 50 percent. This decline is attributed to low soil fertility, poor crop management, diseases and high incidences of insect pests. Key among the major insect pests of beans are the bean stem maggot (*Ophiomyia* spp), and the black bean aphid (*Aphis fabae*) accounting for yield losses ranging from 8 to 100% and 37 to 90% respectively. To overcome the insect pest problems of beans, insecticides were and are still used. However, problems have arisen, some quite serious to detract from the benefit realised from insecticides use. Consequently, it has become absolutely imperative that fresh approaches to pest control be undertaken. It is on this premise that the study sought to evaluate alternatives to the use of insecticides in controlling incidences of the bean stem maggot (*Ophiomyia* spp.) and the black bean aphid (*Aphis fabae*), and their impact on beans yield. Field trials were undertaken in Taita District where agriculture contributes to 95% of household income with very little or no fertility inputs in farms. In the study, the following were tested: two kinds of fertilizers, farmyard manure and Trichoderma seed coatings. Planting was done during the long rains. Field survey of *Ophiomyia* spp and *Aphis fabae* were conducted four weeks after bean emergence and at harvest to determine their incidence and prevalence. Plant mortality, plant survival, and yield were used as criteria for assessing crop loss. The addition of soil amendments had no influence on the levels of infestation of the bean stem maggot and the black bean aphid, and their associated plant mortality. However, soil fertility management positively influenced yield parameters such as the number of pods per plot, dry-seed, and bean-straw. Three treatments, namely Mavuno + Trichoderma, TSP + CAN and Mavuno were able to improve yield by 52.9, 48.9 and 46.7% respectively. These findings point to the fact that as much as soil fertility interacts with beans in a wide variety of ways including capacity to produce yield despite pest attack; soil amendments should not be used as a standalone means for improving productivity of cropping systems, since their influence on incidences of insect pests is minimal. Subsequently, in order to maximise yield, there is still a strong need to adopt holistic management approaches that integrates, not only, soil fertility management and pest management but also incorporates other agronomic best management practises.