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M.Sc. Thesis

**Evaluating the potential of indigenous plants against the
banana weevil as an alternative to synthetic carbofuran**

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ABSTRACT

The banana weevil (*Cosmopolites sordidus*) is a major pest of banana and plantain fields in the Ghanaian lowlands causing 50-100% yield losses where effective control measures are limited. This is especially evident with resource poor farmers who cannot afford frequent application of insecticides due to their costs and developed resistance by weevils. Therefore, indigenous plant material such as dried clove buds (*Syzygium aromaticum*), pepper fruits (*Piper guineense*) and neem seeds (*Azadirachta indica*) were evaluated for their insecticidal activity against the banana weevil.

The study was conducted at the Crops Research Institute in Kumasi, Ghana. The natural insecticides were tested in laboratory experiments as well as in a field study. In the latter, the plant materials were applied either as aqueous solutions or as powder and the weevil population at the experimental plants was recorded for 12 weeks using an established capture and release method. The direct repellence of the plant materials was determined using a two-choice settling preference arena and a no-choice repellence assay. Collected data were evaluated using analysis of variance for the laboratory experiment and analysis of covariance for the field study (Software SAS 9.3).

As all three plant materials repelled the weevils significantly from treated banana corms under laboratory conditions, they indicate promising potential for the use as natural insecticides. Percent repellence after 48 hours was 89% for cloves, 78% for pepper and 72% for neem seeds. Similar results were not confirmed in the field study, because decreasing soil moisture lead to a decline in the fields' weevil population. Hence, further studies are necessary to evaluate the natural insecticides under field conditions and to make this integrated pest management approach applicable for resource poor farmers.

This will not only contribute to increased banana and plantain production through reduced incidence of weevils, but also to reduce the use of synthetic insecticides.