

**Title** Effectiveness of products from four locally grown plants for the management of *Acanthoscelides obtectus* (Say) and *Zabrotes subfasciatus* (Boheman) (both Coleoptera: Bruchidae) in stored beans under laboratory and farm conditions in Northern Tanzania

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### Abstract

The effectiveness of whole or powdered leaves (botanicals) from four locally grown plant species applied at a rate of 1.5 kg per 100 kg beans (*Phaseolus vulgaris*) against *Acanthoscelides obtectus* and *Zabrotes subfasciatus* was compared under laboratory and farm conditions. In the laboratory, *Chenopodium ambrosioides*, applied as powder or as whole leaves, was the most effective, with 100% mortality of adult insects in less than three days and no progeny. Less *C. ambrosioides* (about 200 g per 100 kg beans) still resulted in 100% mortality within 24 h. *Tagetes minuta* applied as powder also increased mortality and reduced oviposition and progeny production significantly. The other treatments – *T. minuta* applied as leaves, and *Azadirachta indica* or *Cupressus lusitanica* applied as powder or as whole leaves – had no significant effects upon mortalities, oviposition rate, or progeny production compared with control treatments. When the rate of application was increased to about 8.3 kg per 100 kg beans, there was a slight increase in mortality using *T. minuta* and *A. indica*, but not with *C. lusitanica*. An additional trial with *C. ambrosioides* from different collections and with plants at different stages of development revealed considerable variations in the efficacy of the treatment.

In the on-farm trials, *A. indica*-seed powder was the most effective treatment, followed respectively by leaf powders of *C. ambrosioides*, *C. lusitanica* and *T. minuta*. All treatments were significantly more effective than the control in reducing the numbers of live insects; they also reduced numbers of damaged beans and maintained germination rates after 5 months of storage. The results of evaluations of the treatments made by farmers just after the trials and five years later are reported.