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Evaluation of pesticidal plants for smallholder grain protection

Evaluación de plantas plaguicidas para la protección de granos de pequeños propietarios

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Widespread and indiscriminate use of synthetic pesticides for storage pest control can cause serious problems including: pest resistance build-up, pest resurgence, environmental and health concerns. Pesticidal plants can be an effective alternative for resource-poor farmers because of their local availability, ease of use and minimal cost. Knowledge of application methods, safety and efficacy of these pesticidal plants based on scientific evidence is scanty even though farmers are already using the materials. The insecticidal properties of different pesticidal plants used as grain protectants by smallholder farmers in Zimbabwe were evaluated against maize, cowpeas and beans storage insect pests to validate, improve and optimize the efficacy of the plants. In a series of experiments, eight local plants already being used by smallholder farmers were tested separately as leaf, fruit or bark powders or ashes admixed with grain and compared with a commercial pesticide or an untreated control. Application rates ranged from 2-5% w/w on-station or on-farm while in laboratory bioassays 2-10% w/w were used. The plants tested included *Dirostachys cinerea*, *Bobgunnia (Swartzia) madagascariensis*, *Bauhinia thoningii*, *Lippia javanica*, *Aloe* spp., *Spirostachys africana*, *Combretum imberbe* and *Maerua edulis*. Based on % insect damaged grain and insect mortalities; *B. madascariensis*, *L. javanica*, *Aloe* spp. and *Maerua edulis* showed potential. The bruchids, *Callosobruchus rhodesianus* and *Acanthosclides obtectus*, were particularly susceptible while the bostrychids, *Prostephanus truncates* and *Rhyzopertha dominica*, were less susceptible. Most of the plant materials were not persistent on grain and were not effective for more than 16 weeks whereas smallholder farmers normally store for about 32 weeks. This raises the need to reapply the materials mid-way the storage season. There is scope for optimising the efficacy of the plant materials and possible strategies are discussed. The results are discussed in the context of effective and sustainable use of the pesticidal plants by resource-poor farmers.