

The bioactivity of materials from the leaves of *Ocimum kilimandscharicum* was tested against *Sitophilus zeamais* Mots chulsky (Coleoptera: Curculionidae), *Rhyzopertha dominica* (Fabricius) (Coleoptera: Bostrichidae) and *Sitotroga cerealella* (Olivier) (Lepidoptera: Gelechiidae) in maize and sorghum grains in the laboratory. Exposure of adults of the three insect species to dried ground leaves and essential oil extract of *O. kilimandscharicum* induced 100% mortality after 48 h. Fresh and dried whole leaves were not toxic to *Sitophilus zeamais* or *R. dominica*. Grains treated with dried ground leaves and essential oil extract caused significant reductions in the number of progeny and survival rate of all three pest species tested. There was no adult survival or progeny production in grains treated separately with each of the two materials at doses of 25.0 g (dried ground leaves) and 0.3 g (essential oil) per 250 g of grain, respectively. Unlike *R. dominica* and *Sitotroga cerealella*, grains treated with fresh leaves enhanced the feeding activity of *Sitophilus zeamais*. Ground leaves and the essential oil, however, protected the grains against feeding by all three species, resulting in lower weight loss and number of damaged seeds compared with untreated grains. All the plant materials were repellent to *S. zeamais* with the essential oil extract applied at 0.3 g/250 g of grain evoking the highest repellent action. There was, however, considerable variation in the repellency of the materials against *R. dominica* and *Sitotroga cerealella*. The results are discussed in terms of the efficacy of *O. kilimandscharicum* for protection against loss due to insects in traditional grain storage in developing countries.