

Abstract

Experiments were conducted at Purdue University, West Lafayette, Indiana and at the Institute of Agronomic Research in Maroua, Cameroon to develop technologies for postharvest protection of cowpea against storage insect pests.

Various plant materials collected from local farms in northern Cameroon were screened to determine their effectiveness against cowpea weevil, *Callosobruchus maculatus* (F.). Most of the plant extracts tested had a statistically significant effect on adult emergence and oviposition. The effect of plant powders appeared to be largely mechanical in nature, and it seemed that there was a threshold concentration or ratio (cowpea volume: botanical volume) below which the plant material was less effective. Neem oil and shea nut oil were effective in reducing *C. maculatus* emergence and oviposition, suggesting a possible larvicidal effect.

Solar heaters capable of raising temperatures inside cowpeas to levels high enough to kill all stages of *C. maculatus* were constructed and tested successfully in northern Cameroon. These heaters performed best when an insulator was placed beneath the lower black plastic sheet of the heater. Temperatures attained did not significantly reduce seed germination. A large solar heater (50 kg capacity) was constructed which effectively disinfested cowpea grain even during the coolest months of the year in northern Cameroon. This 50 kg solar heater was also successfully used to disinfest cowpea seed germplasm in ziplock plastic bags. A permanent-type solar heater using corrugated galvanized tin was developed and tested. Results indicated that it was as effective as previous solar heaters in producing temperatures lethal to *C. maculatus*.

Triple bagging storage of cowpeas was investigated. One, two, and three layers of various thicknesses of plastic film were tested to evaluate their effectiveness. Two mil thick plastic bags were found to be easily perforated by *C. maculatus* larvae and adults. Four mil and 6 mil plastic bags offered more resistance to penetration. The number of layers of plastic film was important in preventing *C. maculatus* larvae and adult perforations. No larvae were able to penetrate three layers of 2, 4, or 6 mil plastic. Adults were able to penetrate 3 layers of 2 mil plastic only.