

MANAGEMENT OF STORED GRAIN PESTS, Callosobruchus maculatus
(F.) AND Sitophilus oryzae (L.), UTILIZING BOTANICAL PESTICIDES
AND SOME NON CHEMICAL METHODS

By

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Thesis

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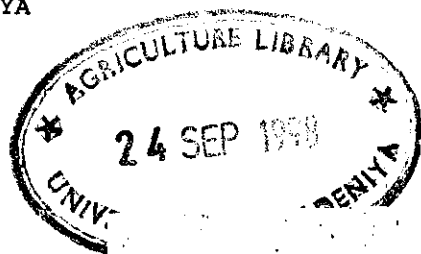
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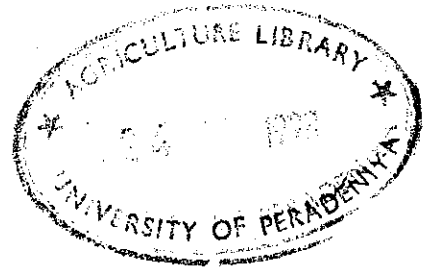
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ABSTRACT



Dried plant powders, acetone and petroleum ether extracts of *Lantana camara*, *Eucalyptus camaldulensis* and *Tridax procumbans*, paddy husk ash, activated kaoline clay and untreated kaoline clay were tested for their insecticidal and ovicidal effects on the pulse beetle, *Callosobruchus maculatus* (F.) and rice weevil, *Sitophilus oryzae* (L.) reared on stored green gram seeds and rice grains respectively. Acetone extracts of the three plant species on *C. maculatus* caused adult mortality ranging from 51, 55 and 96%, reduced egg laying capacity by 47, 66 and 91% and egg hatchability by 36, 40 and 71% at 10% w/v concentration (6.25g ai/kg seeds) level. Petroleum ether extracts of the three plant species on *C. maculatus* caused adult mortality ranging from 41.5, 60 and 68%, reduced egg laying capacity by 58.5, 75 and 84.5% and egg hatchability by 23, 26 and 30.5% at 10% w/v concentration level (6.25g ai/kg).

Acetone extracts of the three plant species on *S. oryzae* caused no adult mortality at any level, reduced adult emergence ranging from 23, 33 and 46.5% and reduced apparent weight loss of grains by 71, 73 and 89% at 10% w/v concentration level (6.25g ai/kg). Petroleum ether extracts of the three plant species on *S. oryzae* caused no mortality at any level, reduced adult emergence ranging from 42, 51 and 69% and reduced apparent weight loss by 63, 88 and 91% at 10% w/v concentration level (6.25g ai/kg). These results indicate a high potential of three plant species for the extraction and formulation of botanical insecticides. Dried plant powders also showed to be effective in the control of the pulse beetle.

Out of the three non chemical products on *C. maculatus*, activated kaoline clay reduced the population levels of pulse beetle by more than 90% at low dose of 2%. Paddy husk

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ash against *C. maculatus* showed a population reduction of 54% at dose of 5%. Untreated kaoline clay was not effective against *C. maculatus*. Activated kaoline clay on *S. oryzae* caused adult mortality of 35%, reduced adult emergence by 87% and reduced apparent weight loss of rice grain by 75% at a dose of 5%.

Activated kaoline clay with dried plant powders of *L. camara*, *E. camaldulensis* and *T. procumbans* reduced oviposition rate of the pulse beetle ranging from 62 to 88% and reduced adult emergence by 59 to 81.5% at 5% of concentration of mixture of activated kaoline clay and plant powder at a ratio of 3:1. Paddy husk ash with dried plant powders of three plant species, reduced oviposition rate of the pulse beetle ranging from 37 to 67% and reduced adult emergence by 48 to 60% at 5% concentration of mixture of paddy husk ash and plant powders at a ratio of 1:1. Thus activated kaoline clay could be considered as most effective followed by 3:1 ratio of activated kaoline clay with plant powder, 1:1 ratio of plant powder and paddy husk ash. Paddy husk ash can be considered as a moderately effective control agent for the pulse beetle, *C. maculatus*.

In experiments where large amounts of seeds were tested, the loss of insect damaged green gram seeds due to insect damage by count and weight three months after treatment were less than 1% at 1,3 and 5% levels of activated kaoline clay, 50% at 5% of paddy husk ash and 5% of 3:1 mixture of activated kaoline clay with *L. camara* plant powder. These results show that activated kaoline clay alone is highly effective at 1,3 and 5% levels, followed by paddy husk ash and 5% of 3:1 mixture of activated kaoline clay with *L. camara* against pulse beetle, *C. maculatus*, under normal storage conditions.