

**PRELIMINARY STUDIES INTO THE INSECTICIDAL
PROPERTIES OF POWDERED LEAVES OF *OCIMUM GRATIS SIMUM*
(LAMIACEAE) ON PESTS OF STORED COWPEA SEEDS
(*Callosobruchus maculatus* F.) coleoptera: Bruchidae.**

SHWARPSHAKKA S. Y.,
ASHIGIDI, A.E. and VELGAKKA V. S

ANIMAL PRODUCTION DEPARTMENT
FEDERAL COLLEGE OF ANIMAL HEALTH AND PRODUCTION TECHNOLOGY
NATIONAL VETERINARY RESEARCH INSTITUTE, VOM

ABSTRACT

A 90-day laboratory experiment was conducted to investigate the insecticidal properties of leaves powder *Ocimum gratissimum* on pests of stored cowpea seeds. Results revealed that leaves powder *Ocimum gratissimum* was effective in the (prophylactic and therapeutic) control of *Callosobruchus maculatus* in stored cowpea. It is suggested that *Ocimum gratissimum* leaf powder can be a suitable substitute for commercial/synthetic insecticides considering their cost and residual effects on human.

Keywords: Insecticidal properties, *Ocimum gratis simum* (Lamiaceaea), pests,
Callosobruchus maculates, Cowpea seeds.

INTRODUCTION

Cowpea is one of the cheapest sources of plant protein in the tropics. Several species of insect pest, *Callosobruchus maculatus* being the most common and most devastating naturally infest the dry seeds which are rich in protein during storage. Previous works on chemical control of storage insect's pests of grain legumes and cereals have centered on the use of pyrethroids, phostoxin and aetellic dust (Matthews and Maliphant 1993). Current trends seek alternatives to the synthetic insecticides with attention focused on the use of natural products of plant origin, which are effective but not toxic to man.

Improvement in processing and storage of food products has not been consistent with increase in output. Substantial food losses, both on-farm and off-farm generally estimated at 20 - 40% of most harvested products are due to wastage as a result of poor handling and lack of adequate storage facilities. Many peasant farmers in Nigeria today are now being encouraged, to utilize local medicinal plant potentials within their environment for the purpose of either prevention or control of storage insect pests. Such materials may have high potentials for use in prevention, control and preservation during the course of production and storage of crops. However, one basic way to achieve this is through toxicological and photochemical screening of the medicinal plant extract. The present study not only investigates the development and potential damage of the insect pest on cowpea, but also evaluates the efficacy of a natural plant product as toxicant against *Callosobruchus maculatus* infesting the cowpea seeds.

MATERIALS AND METHODS

Plant Materials

Clean cowpea seeds were purchased from a local market in Vom, Nigeria.

Fresh healthy leaves of *Ocimum gratissimum* were collected from a farm in Vom, Nigeria.

Preparation of Natural Product

The plant leaves were washed clean with water before being oven dried at 50°C, ground with pestle and mortar, then sieved with 2mm sieve. The leaf powder was used for the insect bioassay.

Insect Rearing

Adult *C. maculatus* were obtained from infested cowpea seeds purchased from a local market in Vom, Nigeria. The bruchid was maintained in jars in the laboratory under a day/night temperature of 28°C/20°C and about 80 - 90% relative humidity. Clean cowpea seeds in Bagco bags (Alh. Salisu Sharada Co. Ltd. Kano)were infested with imaginable males and females of the insects.

Bioassay on bruchid infested seeds

Four volumetric weights of 5, 10, 15 and 20 grams of the preparation were applied to 5kg of cowpea in two replications. The seeds were shaken gently to enable the preparation mix evenly with seeds.

Infestation of treated seeds with mated female insect

Each of the replicates in all the treatments was infested with 10 pairs of male and female *C. maculatus* imaginable.

Damage Assessment on Seeds

After 90 days, the treatments were examined for exit holes on seeds of adult emergent, total number of bruchids found alive and number of eggs laid in each treatment. Seeds carrying exit holes were taken per replicates in all the treatments.

RESULTS AND DISCUSSION

Results obtained from the mean number of live bruchids, eggs deposited on seeds treated with *Ocimum gratissimum* leaf powder and number of exit holes are shown in figure 1.

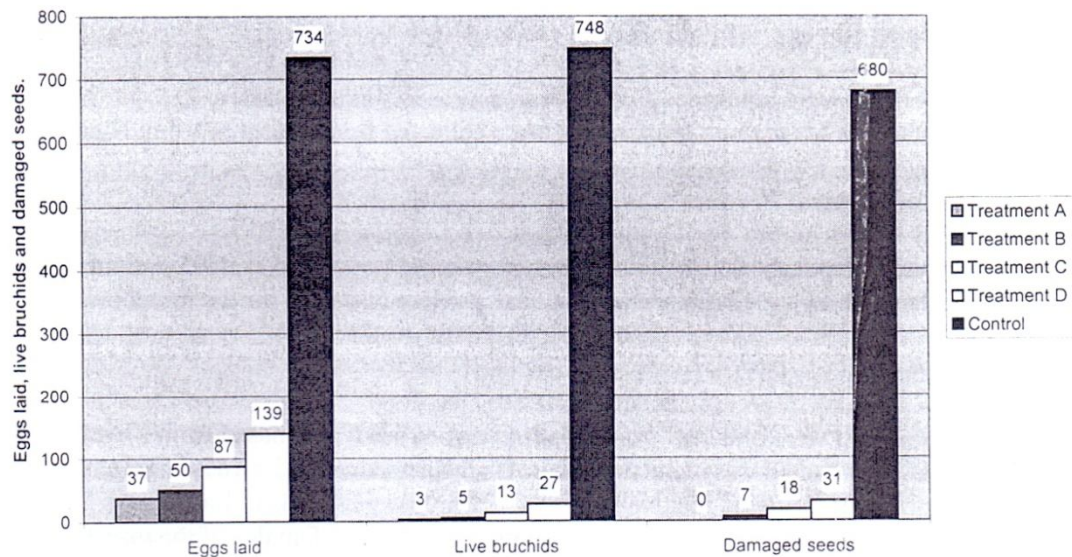


Fig 1: Effects of *Ocimum gratissimum* on eggs laid, live bruchids and damaged seeds.

Mated females fed seeds treated with 20 grams of the preparation laid fewer eggs. Similarly, the number of live bruchids in all the treatments showed concentration or dose dependence. Treatments A and B recorded a significantly lower number of bruchids ($P=0.05$) compared to treatments C and D. Assessment of seeds for exit holes indicated that treatment A recorded no exit holes, treatment B recorded 7 exit holes, treatment C and D recorded 18 and 31 exit holes respectively. However, the control recorded as high as 680 exit holes. These results show that *Ocimum gratissimum* leaf powder considerably reduced bruchids population in cowpea and hence offered protection to stored cowpea for upwards of 90 days. Daramola *et al* (1998) reported that local herbs were very effective in the control of insect pests in store. They are cheap and effective if properly used and some of them act as fumigants while others act as contact insecticides. Some of the plant materials include dried orange peels, bitter leaves, neem fruits, and pounded pepper and *Ocimum gratissimum* leaf. Previous studies by El Said *et al* (1969) indicated that the saponin, alkaloids and tannins present in the leaves of the study plant were responsible for the insecticidal effects.

Although the reproductive efficiency of female bruchids showed concentration or dose dependence, reproduction potential was significantly reduced ($P=0.05$) in Treatment A as earlier reported by Ewette and Bamigbola (1998) who used three natural plant extracts as toxicants against *Callosobruchus maculatus* infesting bambara groundnut.

Since insects pests are of great importance in grains and crop production in Nigeria and elsewhere, effective and efficient control measure against the common pests of stored grains using *O. gratissimum* leaf powder will improve the general output of farmers, thus increasing their standard of living and the foreign exchange earnings of the country. *O. gratissimum* leaf powder can therefore be used to treat stored grains against common insect pest after proper drying of the grains.

REFERENCES

- DARAMOLA A. M.** (1998). Introduction to Tropical Monocotyledons. p173-174.
- EL SAID S. & Rabb R. A** (1969). An investigation into the efficiency of *Ocimum gratissimum* used in Nigerian native medicinal plants media . Samaru Journal of Agric. Education. Vol. No 1 & 2 p17.
- EWETE, F. K.** and **BAMGBOLA K.A.** (1998). Effects of Three Natural Prod. Extracts as Toxicant - Journal of Tropical Forest Resources Vol. 14.1 p1-8.
- MATTHEWS, W.A.** and **MALIPHANT, P** (1993). The fate and insecticidal activity of pirimiphos-methyl in stored wheat grain: Pestic Science 37: p93-97.
- MILSA, P.** and **CHALZIE F.** (1998). Entomology in Nigerian Economy. Research in Focus. Vol.2 p459.
- WUDIRI E. & HASSAN J. E.** (1992). Pests and diseases of selected tropical crops Entomology Society of Nigerian Abstract. Vol. 10 No 4 p20 - 25.