Appl. Ent. &phytopath.
Vol. 58. Nos: 1 & 2, Feb. 1991

CONTROL OF KHAPRA BEETLE, *TROGODERMA GRANARIUM* EVERTS. IN DECORTICATED GROUNDNUT WITH VEGETABLE OILS

O.O. ODEYEMI
Department of Biology,
Federal University of Technology,
Akure, Nigeria.

Summary

The potency of groundnut, *coconut* and the *African palm* oils admixed with decortaicated groundnut seeds were tested on *Trogoderma granarium* Everts.

There was a significant reduction($P < 0,05$) in adult emergence, adult mortality and larval mortality as the dosages increased in each oil . The seed damage and weight loss of infested groundnut seeds were were significantly lower ($P < 0, 05$) in each oil treatment as dosages increased.

A reduction in the viability of groundnut seeds treated with vegetable oils was observed with 74-90% germination in the oil-treated seeds and 96% in the control. Regression analysis showed positive correlations between dosage rates and adult mortality , larval mortality and seed germination in each oil. A negative relationship was observed between the dosage rates and emergence of offspring, seed damage and weight loss for each oil type.

Introduction

In recent years, increasing attention has been given to the control of storage pests through the use of vegetable oils which non-toxic to consumers. *Groundnut oil* when applied to cowpea gave some control of the cowpea bruchid during storage (Singh, Luse,Leuschner and Nangju, 1978; Schoonhoven, 1978) Yuntai and Burkholder (1981) reported that oils of cotton seed , soyabean, maize and groundnut suppressed *Sitophilus granarius* L.in wheat Ivbijaro (1984 a and 1984 b) found that groundnut oil at dosage rates of 5- 20 ml kg completely controlled infestation of stored maize by *Sitophilus zeamais* (Motsch) and *S oryzae* (L.). Also Schoonhoven(1978), reported that on beans,the crude oils of cotton seed , soyabean and coconut palm were more effective than the purified oils in reducing the progeny of *Zabrotes subfasciatus* (Boheman).

Vegetable oils especially African *palm oil* are used extensively for cooking in Africa, The potential use of any of the oils in the control of insect pests of stored seeds will enhance its status as a broad based seed protectant.

This paper reports the use of oils of groundnut, coconut and African Palm to control *Trogoderma granarium*, a pest of decorticated groundnut.

Materials and Methods

Oils of groundnut (*Arachis hypogaea* L.) ,coconut (*Cocos nucifera* L.) and African palm (*Elaeis guineensis* Jacq.) were purchased from the market and filtered through a Whatman number 10 filter paper in a glass funnel.Groundnut seeds of the variety MK 374 with moisture content of 6.13 ready for storage, was fumigated for 46h with *quickphos* tablets and aerated for 68h. The seeds were mixed with the filterate of each vegetable oil at the rate of 0.1, 0.3, 0.5, 0.7 and 1.0 ml per 50g in a 250 ml kilner jar. Each jar was shaken mechanically for 2 minutes to allow effective coverage of the seed surface with oil. All jars were held at a fluctuating room temperature of 28-33 C° throughout the period of study.

Adult emergence

Two male and four female beetles (0-24h old) were introduced into each jar containing oil treated groundnut seeds and oil-free seeds (control) at three replicates each. The reproductive capacity of female beetles in treated and oil - free seeds was assessed by observing the number of emerged adults, percentage of seed damage and weigth loss after emergence of the filail generatton.

Larval mortality

Twenty third instar larvae were placed in each bottle containing groundnut seeds mixed with the different oils at varied dosages. The protective capacity of each oil was assessed by recording the number of dead larvae after 36 hours of exposure.

Adult mortality

Twenty male and female adults (24-48 hr. old) were placed in another set of jars containing the treated seeds and oil free seeds. The protective effect of each oil was assessed by recording the number of dead adults on the 5 th day.

Seed germination

Jars of treated and oil free groundnut seeds were left undisturbed for 4 weeks. From each treatment , 10 seeds were placed on two layers of moistened filter paper in a 9 cm diameter petri-dish and watered daily. The seeds were scored for germination on the 14th day of planting.

Result and Discussion

Table I shows a significant reduction ($P < 0,05$) in all oils in adult emergence adult mortality and larval mortality of *T. granarium* as the dosages increased. At a high dosage of 1.0 ml per 50g seed, *rancidity* occurred in groundnut seeds treated with groundnut oil. *Even at low* dosages, vegetable oils have a severe effect on the development of the beetle.

The potent action of the oils may be due to the level of chemical toxicity and physical properties possessed by each oil type. The mode of action of oils was partially attributed to interference with normal respiration resulting in suffocation of the growing stages (Hewlett, 1974 Schoonhoven, 1978).

Seed damage expressed as the number of exit holes and as loss in weight of infested groundnut, were significantly lower ($P < 0,05$) in each oil treatment as dosages increased (Table 2). Although palm oil was *least* effective than the other oils in reducing damage and weight loss in treated groundnut seeds, it was supperior to the oil-free control.

With a range of 74-90% germination in the oil-treated seeds and 96% in the control, a reduction in the viability of groundnut seeds treated with vegetable oils was observed (Table 2). Yuntai and Burkholder (1981) observed a reduction in the viability of wheat grains treated with vegetable oils at a dosag of 5-10 ml kg^{-1} although Ivbijaro(1984 b)reported that maize grains surface treated with groundnut oil at doses of 10-20 ml kg^{-1} retained their viability.

Figures 1, 2 and 3 show the regression analysis for each oil type. There was positive correlations between the dosage rates and adult morality, larval mortality and seed germination. Also a negative relationship was observed between dosage rates and emergence of offspring,seed damage and weight loss for each oil type.

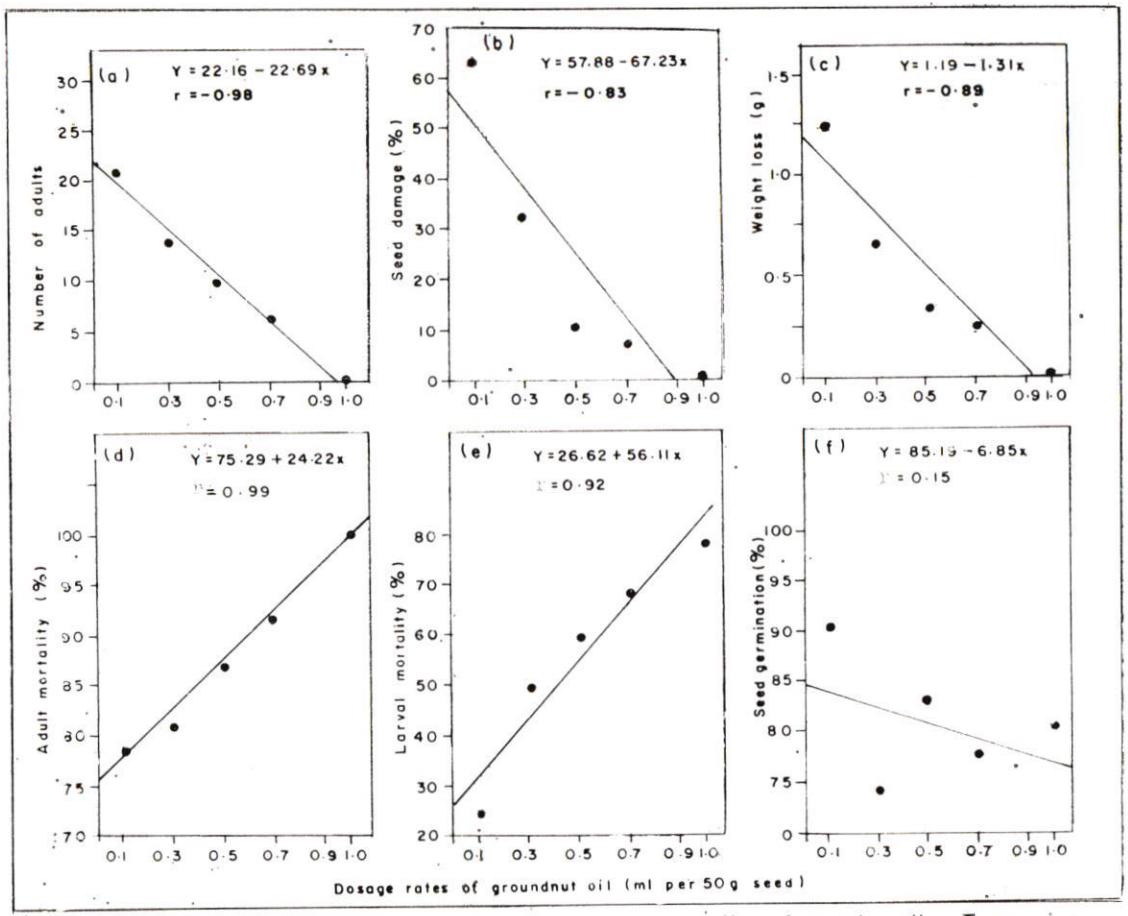

Fig.1 : Scatter diagram of mean values showing relationships due to effect of groundnut oil on T. granarium

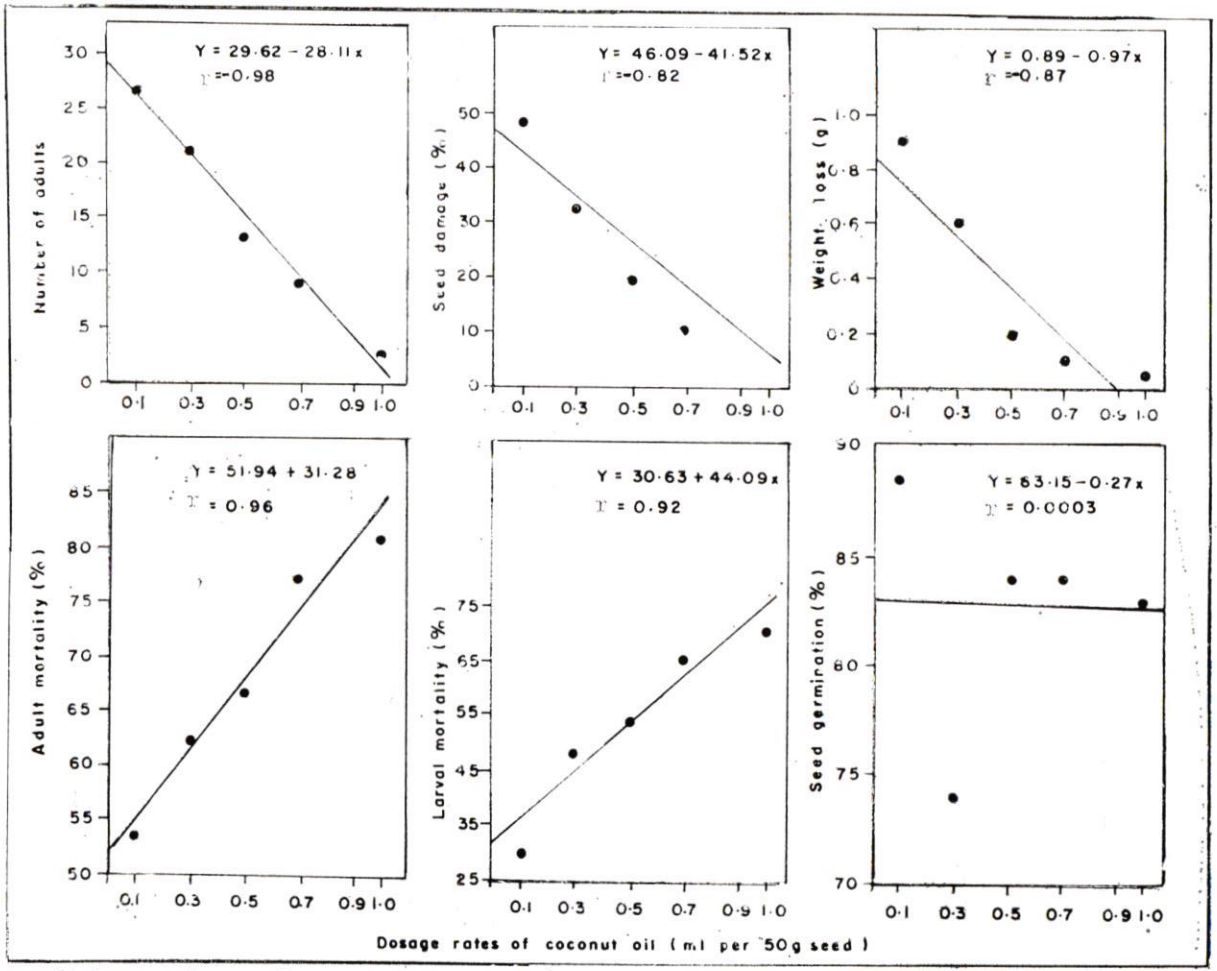

Fig. 2: Scatter diagram of mean values showing relationships due to effect of coconut oil on T. granarium.

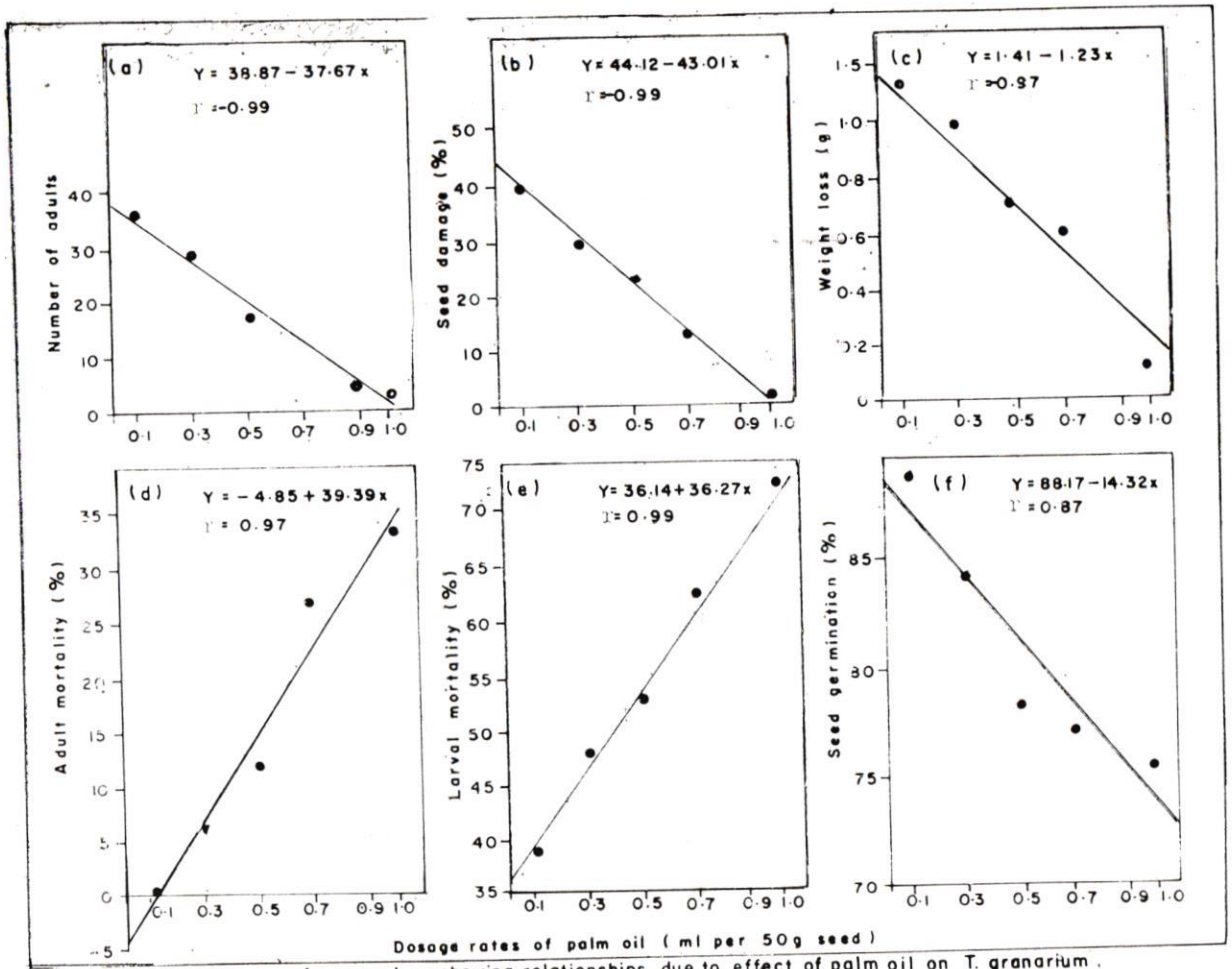

Fig. 3 : Scatter diagram of mean values showing relationships due to effect of palm oil on T. granarium .

References

HEWLETT, P.S., 1974. The toxicities of three petroleum oils to the grain weevils. *Ann. Appl. .Biol.* 34: 575-585.

IVBIJARO, M.F., 1984a.Groundnut oil as a protectant of maize from damage by the maize weevil, *Sitophilus zeamais* Motsch. *Prot. Ecol.* 6: 267-270.

IVBIJARO, M.F., 1984b. Toxic effect of groundnut oil on the rice weevil, *Sitophilus oryzae* (L.) *Insect Sci. Appl.* 5: 251-252.

SCHOONHOVEN, A.V. 1978. Use of vegetable oils to protect stored beans from bruchid attack. *J. Econ. Ent.* 71(2): 254-256.

SINGH, S.R., LUSE, R.A., LEUSCHNER, K., AND NANGJU, D. 1978. Groundnut oil treatment for the control of *Callosobruchus maculatus* (F.) during cowpea storage. *J. Stored. Prod. ,Res.*, 14: 77-80.

YUNTAI, Q AND BURKHOLDER, W.E. 1981. Protection of stored wheat from the granary weevil by vegetable oils. *J. Econ. Entomol.* 74: 502-505

Address of the author:

Dr.O.O. ODEYEMI. Department of Biology,Federal University of Technology, P.M.B- 704, Akure, Nigeria.

Appl. Ent. & phytopath.
Vol. 58. Nos: 1 &2, Feb .1991

BIOLOGY AND CHEMICAL CONTROL OF *MYOPARDALIS PARDALINA*

E. EGHTEDAR

Plant Pests and Diseases Research Institute

Summary

In a survey conducted by the auther it was found that. *Myopardalis pardalina* Big.Overwinters as a pupa in the depth of 10-12 cm from early October to 20th of May, and starts flying in nature. Since at this time, The cucurbits are without flower, the insect continues to live on the weeds.

The population of the first generation increase around 20th of June, when the flowers change to fruit. The female fly lay egg under the skin of young fruits. In nature the eggs hatch after 4-5 days at 30-32C° and 40-45% relative humidity. The young larvae start feeding and move toward the seed. As the result of the movement fruits rot and deteriorated. The fly larvae,then come out of fruits and pupate in soil. The duration of larval and pupal stage is 13-14 and 14-15 days, respectively. This pest has four generations in shiraz and its vicinity. The duration of each generation is 30 days.

35% Phosalone (1.5/1000), 80% Trichlorofon (1.5/1000) and 20% Fenvalerate (0.5/1000) reduce the fly population effectively.

References

JANJUA, N.A 1947: Biology of melon Fly *Myopardalis pardalina* in Indian J. Ent. 16(3) 227-223, 6 fig.

GABRIELITH-SHAPAN (R) 1963: Bigoton sweet melons in Israel Review of App. Ent. vol. 51-39-42.

GIRY.H. 1962: Elazig cevresinde kavun singeginin biyolojisi. Uzerinde incelemeler App. Ent. no 43, vol. 5.

PAPAMONOW.S.J 1953: uber manche furdie ukraine und krim schädlichen Fruchtfliegen mit quarantanebedeutung. Rew. of App. Ent. vp, 41.

RF KACK (V.N). 1931: Studies on biology and control of the melon-fly App. Ent. vol. 19.

Address of the author:

Dr. E. EGHTEDAR. Plant Pests & Diseases Research Department, Agricultural and Natural Resources Research Centre of Fars, Shiraz, Iran.