Screening of some Biopesticides for the control of *Callosobruchus chinesis* in Stored Black Beans (*Vigna mungo*) in Imo State.

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Abstract: The influence of some oil extracts comprising Cashew nut oil (CNO), Coconut oil (CONO), Udara nut oil (UDNO),and Neem leaf oil in controlling stored black beans weevil (*Callosobruchus chinesis*) was investigated. The experiment was laid down in the laboratory using Completely Randomized Design (CRD). The results showed that the number of eggs and exit holes of C.chinesis were not significant at 5 % probability level before treatment with the extracts. Then after two months in storage the black beans were treated with the extracts and there was significant reduction of rate of oviposition and number of exit holes. The plots treated with coconut oil extract proved more effective than other oils and was therefore recommended for use by farmers for black beans storage under our agro-ecological zone. [Journal of American Science 2010; 6(5):186-188]. (ISSN: 1545-1003).

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1,Introduction

Black beans (*Vigna mungo*) belong to the family Leguminoseae. It probably originated from *Vigna soblobatus* which occur wild in India. It has been introduced to other areas in the tropics mainly by Indian immigrants (Taylor, 1971). It is utilized for human consumption and forms about 50 to 70 % of livestock feed (Adesuyi, 1978). It could be consumed as fresh or dried pod, boiled or roasted pods. In south eastern Nigeria where the beans are cultivated and consumed extensively insect pests have been the major constraints to the production and storage of the beans. The major post harvest losses and quality deterioration caused by storage pests on stored products are major problems facing agriculture in Nigeria (Adedire and Ajayi, 1996). In some countries the damage on stored products may be exceeded by rodents (Gwinner *et. al.*, 1990). *Callosobruchus chinensis* (L.) is an important pest of black beans in stores and seems to attack other stored pulses such as cowpea, groundnut, chickpea bambara groundnut, jack bean, and Pigeonpea (Adedire and Ajayi,1996)

The use of toxic metabolites such as gammalin, actellic dusts, Pilf palf, etc have been employed by farmers in Southeastern Nigeria for protecting black beans against damage by *C.chinensis* Though these pesticides have positive effect on the pests, they have continued to remain hazardous to man and his environment . In South eastern,Nigeria there are many cases of deaths resulting from consumption of black beans stored with pilf palf and actellic dusts. As a result of the interest of general public for consumption of organic food , the interest of researchers have been directed to finding alternative pesticide that should be environmentally friendly and which will not possess dangers to man.
Many botanicals have been shown to have great potentials as alternatives to the synthetic insecticides. For instance, Osisiogu and Agbakwuru, (1978), reported that the essential oil of *Denneltia tripetala* was effective in the control of cowpea bruchid *Callosobruchus maculatus* (F.), cowpea weevil *C.chinesis* (L.), and maize weevil *Sitophilus zeamais.* The heavier spray oil fractions are more effective at killing insects than the lighter oils (Luik,et. al.,2000).Therefore the main purpose of this research is to isolate an effective biopesticide for the control of weevil of black beans in storage.

2. Materials and Methods.

The research on storage of black beans was conducted at the Department of Crop Science and Technology, Postgraduate Teaching and research Laboratory, Federal University of Technology, Owerri, starting from May, 2007 to December, 2007.
The materials used were black beans bought from Ogbete market in Enugu state, cashew seeds, coconut, Udara seed and neem leaves.

Methods of preparing the Extracts.

The neem leaves were collected from the neem plant (*Azadirachta indica* (A.juss). They were air dried under shade for 3-4 days and crushed into a powder using a mortar and pestle. 1 kg of the powder was soaked in petroleum spirit and oil extracted with

a soxhlet extractor after heating at a temperature of 40 to 60^{o}c and kept for sometime to allow the spirit to evaporate. Coconut (Cocos *nucifera* (L.), cashew seeds (*Anacardium occidentalis*) and udara seeds (*Chrysophyllum albidum*) were cracked to expose the kernel and nuts and were later dried in the sun for three days and oil extracted .

The experiment will be laid down in the laboratory using Complete Randomized Design (CRD) with four replications. There were five treatments comprising cashew nut oil, coconut kernel oil, Udara oil, neem leaf oil, and control. These five treatments were replicated four times completely at random using plastic container with a cover to give a total of 20 treatment combinations. Five (5) ml of each of the oils were admixed with 1kg of black beans. Data was first collected on number of eggs present on the seeds before and after treatment and secondly on number of exit holes before and after treatment. Observations on or before treatment were made weekly at eight weeks intervals. 100 seeds were selected at random and examined with hand lens for presence of eggs and exit holes.

Analysis of data

Separation of means for statistical significance was by the use of Least Significance Difference as outlined by Obi, (1986).

3. Results

Table **1** and **2** show that there were no significant difference with respect to the number of eggs laid by the *C.chinesis* and their exit holes before extracts were applied. Tables **3** and **4** show there were significant difference at 5 % probability level after the application of oil extracts. On the average the coconut oil extract reduced the level of oviposition and exit holes by C.chinesis when compared with other plant oils.

4. Discussions

The non-significant effect observed with respect the no of eggs laid and their holes before the botanical extracts were applied is to be expected as the pests were moving and feeding freely without restriction. The efficacy of coconut oil in reducing the level of egg production and exit holes by C.chinesis better than other oils tested agreed with the findings of Alkolifi, (1989), who reported that coconut oil when applied to rice protected it against lesser grain borer (*Rhizopertha dominica*).

The coconut oil probably possessed strong ovicidal properties which may have depleted the oxygen level available to the eggs in the grains thus preventing the development of the eggs and causing their mortality.

Summary and Recommendations:

The oil extract from coconut kernel could be of great advantage in preventing damage caused by *C.chinesis* to stored black beans. However, further research need to carried out to assess the toxicological profile, ovicidal properties and appropriate rate of application.

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