Comparative Studies of the Effect of the Leaf of Castor Oil Seed and Coffe Senna on Beans Weevil (*Callosobruchus maculatus*) Infestation

BY

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COMPARATIVE STUDIES OF THE EFFECT OF THE LEAF OF CASTOR OIL SEED AND COFFE SENNA ON BEANS WEEVIL (Callosobruchus maculatus) INFESTATION

BY

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PROJECT

SUBMITTED TO THE
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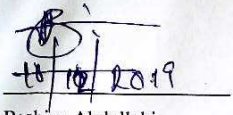
In partial fulfilment of the requirements
For the award of the Degree of
BACHELOR OF SCIENCE
PLANT SCIENCE AND BIOTECHNOLOGY

NOVEMBER, 2019

DECLARATION

I here by declare that this project is written by me and it has not been presented before in any application for Bachelor Degree except for quotations and summaries which have been duly acknowledged.



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2/12/19

Date

CERTIFICATION

This project entitled "Comparative Studies of the Effect of the Leaf of Castor Oil Plant and Coffe Senna of Beans Weevil (*Callosobruchus maculates*) Infestation" meets the regulation governing the award of Bachelor of Science of the Federal University Gusau and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work dedicated to my family thatgive me support and unquantifiable investment in my life, may Almighty Allah reward them abundantly.

ACKNOWLEDGMENT

All Praises and thanks be to Almighty Allah, the creator of the heavens and the earth, the Lord of mankind for his decree towards the success of this project.

Firstly, I would like to express my sincere gratitude and appreciation to my able principal supervisor, Mal. Nura Suleiman, for his patience, guidance and constructive criticisms throughout the course of my project.

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TABLE OF CONTENT

CHAPTER FIVE

LIST OF TABLES

ABSTRACT

The comparative effect of Castor Oil Plant (*Ricinus communis*) and Coffee Senna (*Cassia occidentallis)* leaves powder was evaluated for the control of *Callosobruchus maculatus* on stored cowpea.The research was carried out for the period of 52 days (insects culturing, botanicals preparation and laboratory bench work). The Fresh leaves of *Ricinus cummunis* and *Cassia occidentallis* was obtained at Sabon Gida, opposite federal University Gusau, separately in polythene bag and dried at room temperature for twenty one days and then pounded into fine powder separately with the use of mortar and pestle. Different concentrations of the powder (0.5g, 1.0g and 1.5g) were used. The infected Bean were exposed to the powder concentrate treatments for 24, 48 and 72 hours respectively. The experiment was replicated three times in a completely randomized design (CRD). Data obtained were analyzed using analysis of variance (ANOVA). The results obtained from the research showed that *Ricinus Communis* leave powder has insecticidal activity against the cowpea bruchids, the effect of the leaves powder increased with increase in concentration and Higher concentration rate (1.5g per 25g of infected cowpea seed) significantly killed more *Callosobruchus maculatus* than others concentration used for the study at 0.05% level of significant. However the leaves powder of *Ricinus Cummunis* showed more significant increase in the mortality and show good potential as insecticidal for protecting stored cowpea. Based on the finding of this research, Its therefore recommend that farmers should be used the leaves powder of *Ricinus cummunis* to protect their stored Cowpea against *Callosobruchus maculatus.*

CHAPTER ONE

Introduction

1.1 Background of The Study

Ricinus cummunis , (the castor bean) or castor oil plant, is a species of perennial flowering plant in the spurge family, Euphorbiaceae . It is the sole species in the monotypic genus ,*Ricinus* , and subtribe , Ricininae .(Rizzardo, 2012).

Ricinus cummunis or castor oil plant has high traditional and modern medicinal values. The individual parts of the plant like the seed, seed oil, leaves and the roots showed their importance in pharmacology (Chanetal.,2010). The genus *Ricinus* is monotypic, with *Ricinus cummunis* being the only species (Ramprasad et al.,2010)

Traditionally, the plant has been used as a remedy in the treatment of different diseases throughout the world. In modern pharmacology, it has analgesic, antioxidant and anti-inflammatory properties as well as properties against diabetes, asthma, tumors, and other medicinal uses (Singhet al,.2015)

Castor oil seeds, despite its name, is not a true bean . Castor is indigenous to the southeastern Mediterranean Basin ,Eastern Africa , and India, but is widespread throughout tropical regions (and widely grown elsewhere as an ornamental plant)(Phillips,.etal,.2017)

Castor seed is the source of castor oil , which has a wide variety of uses. The seeds contain between 40% and 60% oil that is rich in triglycerides , mainly ricinolein . The seed also contains ricin , a water-soluble toxin , which is also present in lower concentrations throughout the plant.(De Geer, 2005).

1.2 *Cassia occidentallis*

Cassia oscidentallis is a pantropical plant species. The species was formerly placed in the genus Cassia . Cassia oscidentallis is an annual to Short lived perennial herb to small shrub with a pantropical distribution (PROTA, 2016). This species is recognized as an inversive herb or a problematic weed that affects crops and plantation all over it's range (PIER, 2016). The plant is reported to be poisonous to cattle (Barth etal.,2010). The plant contains anthraquinones. The roots contain emodin (Chukwujekwu,2006) and the seeds contain chrysarobin and N-methylmorpholine (Kim etal.,2004).

Despite the claims of being poisonous, the leaves of this plant have been used in the diet of the Maldives for centuries in dishes such as mas huni and also as a medicinal plant. (Xavier Romero-Frias,2003).

Cassia occidentallis Its ability to colonize a wide range of climatic and edaphic conditions is epitomized by its occurrence in East Africa where it is found at altitudes of 0-1740 metres above sea level (Brenan, 2001). Though probably less important than the related weeds, Cassia obtusifolia and Cassia tora. *Cassia oscidentallis* has the potential to become a weed of more wide spread significance. In the USA it is on the regulated invasive list for Florida (Invasive Plant Atlas of the United States, 2016).

1.3 *Callosobruchus maculatus*

Is a genus of beetles in the family Chrysomelidae, the leaf beetles? It is in the subfamily Bruchinae, the bean weevils. Many beetles in the genus are well known as economically important pests that infest stored food stuffs. These beetles specialize on legumes of the tribe Phaseoleae, which includes many types of beans used for food. Host plants include mung bean (Vigna radiata), adzuki bean (Vigna angularis), rice bean (Vigna umbellata), cowpea (Vigna unguiculata), Bambara groundnut (Vigna

subterranea), pigeon pea (Cajanus cajan), lablab (Lablab purpureus), and common bean (Phaseolus vulgaris). They can also be found in peas, lentils, chickpeas, and peanuts.

Most species in the genus are native to Asia. They can be found in warm regions in the Old World. They occur in places outside of their native range as introduced species. At least 11 species of legumes are natural hosts for these beetles, including wild and domesticated plants. Some are considered pests because they invade stores of legume foods, such as beans and lentils. They lay eggs on the seeds and the larvae consume them as they develop. They emerge from the seeds as adults *Callosobruchus maculatus* in particular is well adapted to living in dry beans and seeds because it does not require food or water to reproduce. It can invade a store of chickpeas and infest 100% of the seeds.

1.4 Statement 0f Research Problem

Castor 0il plant and *Cassia occidentallis* grow abundantly in wild and their leave acquiered as a source of food and medicine. Resarch showed that the leaves of this plant are also poisanous to some insect and animals. But litle study have been carry out to certain efficient for controlling the infestation of storage cowpea. This necessitide the choice of the topic to determine and compare their effect in cowpea been weevils.(Ofuyaet al., 2008)

1.5 Justification

Cassia occidentallis is very valuable plant use for curing different illness but its poisonous to some organism while *Ricinus cummunis* is also economic important Plants but possessed poisonous leave different effect on both human and animals. Both plant have photochemical in their leaves and there for suspected to be effective in controlling the devastating effects of *Callosobruchus maculatus*.

1.6 Aim

The aim of this study is to compare the effect of castor oil plant and Cassia occidentallis leaves powder on bean weevil (*Callosobruchus maculatus*).

1.7 Objective

To compare the effect of Leaves powder of *Ricinus Cummunis* and *Cassia occidentallis* on *Callosobruchus maculatus* .

CHAPTER TWO

2.1 Literature Review

Cowpea, *Vigna unguiculata* (L.) is grown mostly in semi-arid areas, including Shinyanga, Mtwara and Kigoma, due to its drought tolerance (Myaka et al., 2002). It is also efficient in fixing nitrogen and enriching the soil (Brisibe et al., 2011). Cowpea has nutritional benefits because it is rich in protein, making it suitable for many people who cannot afford to buy other protein sources such as meat and fish (Oparaeke et al., 2006). It is mostly cultivated as a grain legume, and is also widely used as a leafy vegetable. Cowpea production in Nigeria is relatively low and does not meet local demand, partly due to high insect infestation at both pre- and post-harvest stages (Swella and Mushobozy, 2007). The most important insect pest in stored cowpea is the bruchid, *Callosobruchus maculatus* (Fabricius 1775) (Coleop-tera: Chrysomelidae) (Swella and Mushobozy, 2007). In Africa, 30– 80% of cowpea production, valued at over US$ 300 million, is either lost or suffers damage annually as a result of bruchid infestation (Brisibe et al., 2011). Losses attributed to *Callosobruchus maculatus* in stored cowpea result in both quantitative and qualitative reduction, manifested by food and nutrition insecurity, and low incomes for commercially oriented farmers (Ileke and Olotuah, 2012).

Management of *Callosobruchus maculatus* has been dominated by chemical control using fumigants and synthetic insecticides (Lale and Kabeh, 2004).

However, the use of synthetic insecticides in crop protection programmes around the world has resulted in disruption of the environment, pest resurgences, development of resistance to pesticides, lethal effects to non-target organisms in agro ecosystems, toxic residues in food and water bodies, as well as direct toxicity to users

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(Schafer and Kegley, 2002). This calls for an urgent need to develop alternative ecologically safer, economical, readily affordable and user-friendly pest control techniques, such as using locally available plants with insecticidal properties (Adedire et al.,2011)

2.2 Nutritional Value of Cowpea

The Nutritional value of cowpea is in the composition of its grains. The grain is rich in protein up to around 30 percent in some varieties. In addition, the grain contains micronutrients such as iron and zinc which are necessary for healthy living (Boukar*et al.*, 2010). The raw type seeds contain an average per 100g of edible matter, 10.0g water, 22.08g protein, 59.18g carbohydrate, 3.78g fibre, 3.7g ash, 104mg calcium, and other elements in negligible magnitude. The energy value is 1.420kj (340Kcal) per 100g (Raemackers, 2001).

Cowpea seeds are also rich source of minerals and vitamins (Hall *et al.*, 2003). Cowpea is sometimes called poor man's meat or vegetable meat by researcher due to its high protein content. Cowpea grains contain 23.4% protein, 1.8% fat and 60.5% carbohydrates and also a good source of vitamins and phosphorus (Adeyemi*et al.*, 2012).

2.3 Uses of Cowpea

Cowpea can be used as forage, hay and silage when used as forage. It should only be lightly grazed after flowering (FAO, 2012). In some Africa countries, several varieties has been grown together for both food and feed (Cook *et al.*, 2005). Cowpea is commonly cultivated as a nutritious and highly palatable food source in the southern United State, Middle East, Africa, Asia and throughout the tropics and subtropics. The seed is reported to contain 24% crude protein, 53% carbohydrates and 2% fat (FAO, 2012).

Cowpea is eaten by deer as forage and is commonly used in food plots for dear. A variety of birds, including wild turkey eat the seeds and the plant can be used by quail as cover. Some varieties of cowpea are used specifically for wild life purpose (Ball *et al.*, 2007). Its long taproot and wide vegetable spread make it an excellent plant for erosion prevention and weed suppression. Allelopathic compound in the plant and may help to suppress weeds (Clark, 2007).

2.4 Effect of Bruchid on Cowpea

The production of cowpea is restricted by a number of biotic and abiotic factors, both in the field and the seed in storage. Among the constraining biotic factors are insect pests (Swella & Mushobozy 2007).The cowpea bruchid, *Callosobruchus maculatus* (F.) (Coleoptera: Bruchidae), is a cosmopolitan field to store pest, ranked as the principal post harves Corresponding author. Apart from cowpea which is the major legume susceptible to infestation by *Callosobruchus maculatus*, bambara groundnut (Vigna subterranea) is another susceptible species (Vidal, etal,.2001).

As a protein source, it is a legume that can effectively substitute cowpea considering the rate at which the demand for cowpea is increasing by the day. Bambara groundnut is important for small holders and their households because the beans are an important source of food security, being nutritious and high in protein (Hillocks et al, 2012). It has the potentials to improve nutrition, food security, foster rural development and support sustainable land care (National Research Council, 2006). The crop is one of rural African's most popular grain legumes, ranking third in importance after groundnut (Arachis hypogeal L.) and cowpea (Vigna unguiculata (L.) Walpers) (Lale and Ajayi, 2001). Its potential has however been limited due to storage insect pest attack of which a major one is *Callosobruchus maculatus*. Species of the genus *Callosobruchus* (*Coleoptera: Bruchidae*) seriously damage legume seeds,

especially in warm parts of the Old World from which it originates (Udayagiri and Wadhi, 1989)

Damage as high as 100% by *Callosobruchus maculatus* is possible especially when legume seeds are left untreated over a period of time. The use of chemical is the most prominent method for controlling stored product pests and has traditionally been used to protect grain (Arthur 1996). However, some negative effects have been associated with the use of chemical such as ozone layer depletion, high costs of chemicals, resistance of pests to pesticides and harmful effects on human beings (Bell and Wilson 1995) As a result of the problems that synthetic insecticides cause to the environment as well as to human health, there has been an up-surge of research on plant products for the control of insect pests (Islam etal.,2009)

2.5 *Callosobruchus maculatus*

The adult male bruchid are 2-3mm long, reddish brown in colour with typical curve appearance compared to other members of the bruchids family. They are not true weevil because they lack heads that prolonged into a long snout. The female wing covers are distinct with black and grey colours possessing two black spots near the middle and the males is completely black or brown. The head is hypognathous and provided with pairs of segmented antennae which are serrate or pectinate. The mouth parts are biting and boring type which is best used during larval stage. The prothorax is freely movable. The thorax bears the pairs of legs with femora often swollen . There are two pairs of wings; the first pairs is modified into elytra which covers only a part of the abdomen. The hind pair of wings is membranous and longer than forewings and protected by the elytra. The abdomen is exposed at the posterior end with atleast five free sternitos (Radha and Susheela,2014).

2.5.1 Origin and Distribution of Cowpea Bruchid

According to Rotimi and Ekperusi (2012), the cowpea bruchid originated from Arica as a dominant species. It is widespread throughout the tropic and subtropics and subtropics region of the world. It is a common pest of stored produced, and hence is field to store pest. Other crops which serve as alternative host to this pest includes soya beans, pigeon pea (Radha and Sulshecla,2014)

2.5.2 Life Cycle of *Callosobruchus maculatus*

Once inseminated, adult females will lay (oviposit) single fertilized eggs on the external surface of a bean. Individual eggs (0.75mm long) are oval or spindle shaped, clear, shiny and firmly glued to the bean surface. The larvae that hatches from the egg burrows through the seeds coat and into the bean endosperm without moving outside the protection of the egg. Once the larvae burrows into the bean, the remaining egg (shell) becomes opaque white or mottled as it fills with frass (faeces) from the larvae. The larvae burrow and feed on the cowpea endosperm and embryo, undergo a series of moults, and burrows to a position just underneath the seed coat prior to pupation.

Although the seed coat of the bean is intact, a round 1-2mm window is apparent at the location where the beetle is pupating. Pupation is the complete metamorphosis of the larval maggot to a winged adult. The adult that result from pupation chews through the seed coat and emerges from the bean. The adult are fully mature 24 to 36 hours after emergence. Males seek female to inseminate and female store viable sperm in the sperm theca (structure in the female reproductive tract for storing sperm). Neither male nor female adults require food or water during their short adult lifetime (10-14days) (Christopber and Lawrence, 2014).

2.6 *Ricinus cummunis*

Ricinus Cummunis or castor bean plant, is an indigenous to the south-eastern Mediterranean Basin, Eastern Africa, and India, but is widespread throughout tropical regions (and widely grown elsewhere as an ornamental plant). Castor seed is the source of castor oil , which has a wide variety of uses. The seeds contain between 40% and 60% oil that is rich in triglycerides, mainly ricinolein. The seed also contains ricin, a water-soluble toxin, which is also present in lower concentrations throughout the plant.(Phillips, etal 1999.)

Ricinus cummunis can vary greatly in its growth habit and appearance. The variability has been increased by breeders who have selected a range of cultivars for leaf and flower colours, and for oil production. It is a fast-growing, suckering shrub that can reach the size of a small tree, around 12 m (39 ft), but it is not cold hardy .

The leaves are 15–45 cm (5.9–17.7 in) long, long-stalked, alternate and palmate with five to twelve deep lobes with coarsely toothed segments. In some varieties they start off dark reddish purple or bronze when young, gradually changing to a dark green, sometimes with a reddish tinge, as they mature. The leaves of some other varieties are green practically from the start, whereas in yet others a pigment masks the green color of all the chlorophyll -bearing parts, leaves, stems and young fruit, so that they remain a dramatic purple-to-reddish-brown throughout the life of the plant. Plants with the dark leaves can be found growing next to those with green leaves, so there is most likely only a single gene controlling the production of the pigment in some varieties.

The stems and the spherical, spiny seed capsules also vary in pigmentation.

The fruit capsules of some varieties are more showy than the flowers. The flowers lack petals and are unisexual (male and female) where both types are borne on the same plant (monoecious) in terminal panicle -like inflorescences of green or, in some

varieties, shades of red. The male flowers are numerous, yellowish-green with prominent creamy stamens ; the female flowers, borne at the tips of the spikes, lie within the immature spiny capsules, are relatively few in number and have prominent red stigmas .(Christopher Brickell, ed. 1996).

The fruit is a spiny, greenish (to reddish-purple) capsule containing large, oval, shiny, bean-like, highly poisonous seeds with variable brownish mottling. Castor seeds have a warty appendage called the caruncle, which is a type of elaiosome . The caruncle promotes the dispersal of the seed by ants (myrmecochory).(Joshi M.; etal 2004)

2.6.1 Effectiveness Of *Ricinus cummunis* Leave Powder On Insect

Ricinus cummunis possess insecticidal properties which control insect pests such as *Callosobruchus maculatus* and Acanthoscelides obtectus (Salas and Hernandez, 1985). reported its insecticidal properties against Nasutitermes species and rust red flour beetle, Tribolium castaneum. It has also been reported to significantly reduce weight loss in wood pieces exposed to termites (Sharma et al., 1990).

Leave extract of *Ricinus cummunis* has been reported to be effective against Culex pipiens, Aedes caspius,Culiseta longiareolata and Anopheles maculipennis (Diptera: Culicidae) (Aouinty et al., 2006;) reported the insecticidal activity of dried ground leaves of *Ricinus cummunis* against *Callosobruchus maculatus* (Coleoptera: Bruchidae). Castor oil has insecticidal activity against Zabrotes subfasciatus (Coleoptera: Bruchidae) (Mushobozy et al., 2009). Apart from the oil found in the seed, other components of the seed include ricin (Achaya et al.,1964; Darby et al., 2001), Ricinine found in the seeds and leaf of *Ricinus cummunis* is effective in the control of Myzus persicae (Homoptera: Aphididae) (Olaifa et al.,1991). This work has its merit in the fact that the extraction method does not use organic solvent which can reduce costs and the press used for the extraction can be locally fabricated by

local farmers. As well, *Ricinus cummunis* is available in developing Asian and African countries and some parts of the developed world. Hence local farmers can adopt the product with less cost and reduced ecological risks.

2.6.2 Medicinal uses of *Ricinus cummunis*

Castor oil has many uses in medicine and other applications. An alcoholic extract of the leaf was shown in lab to protect the liver from damage from certain poisons.(Sabina E.P., etal 2009) Methanolic extracts of the leaves of *Ricinus cummunis* were used in antimicrobial testing against eight pathogenic bacteria in rats and showed antimicrobial propèrties. The pericarp of Ricinus showed central nervous system effects in mice at low doses. At high doses mice quickly died. A water extract of the root bark showed analgesic activity in rats. Antihistamine and anti-inflammatory properties were found in ethanolic extract of *Ricinus cummunis* root bark. (lomash V etal,.2010)

2.6.3 Toxicity of *Ricinus Cummunis*

The toxicity of raw castor beans is due to the presence of ricin . Although the lethal dose in adults is considered to be four to eight seeds, reports of actual poisoning are relatively rare.(wedin G.P etal,.1986)According to the Guinness World Records, this is the world's most poisonous common plant. Symptoms of overdosing on ricin, which can include nausea, diarrhea, tachycardia, hypotension and seizures , persist for up to a week. However, the poison can be extracted from castor by concentrating it with a fairly complicated process similar to that used for extracting cyanide from almonds. If ricin is ingested, symptoms may be delayed by up to 36 hours but commonly begin within 2–4 hours. These include a burning sensation in mouth and throat, abdominal pain, purging and bloody diarrhea. Within several days there is severe dehydration, a drop in blood pressure and a decrease in urine. Unless treated, death can be expected

CHAPTER THREE

3.0 Materials and Method

3.1 Study Area

This research was conducted in Plant Science and Biotechnology laboratory, Department of Biological Sciences, Faculty of Science, Federal University Gusau, Zamfara State. From July to November 2019.

3.2 Insect culture

The Infested cowpea seeds were procured at Gusau central market. The infested seeds containing the eggs was separated and kept inside a container for the eggs to hatch, after then, the young bruchids were introduced into fresh cowpea seeds for culturing, a muslin cloth was used to covered the top of the container to ensure adequate aeration and prevent other insect from entering. The cowpea bruchids was cultured For two weeks in plant science and Biotechnology laboratory, Federal University Gusau.

3.2.1 Collection and Preparation of plant Materials

The fresh Leaves of *Ricinus cummunis* and *Cassia occidentallis* were obtained from Sabon Gida, opposite Federal University Gusau separately in a polythene bag. All the plant leaves obtained were shade dried, in a ventilated area in Plant Science and Biotechnology laboratory, Federal University Gusau. The plant leaves were pounded into fine powder separately with the use of mortar and pestle and after then; the pounded leaves of *Ricinus cummonis* and *Cassia occidentallis* were sieved separately.

3.2.3 Application of Treatment

Three different doses (0.5g, 1.0g, and 1.5g) of *Ricinus cummunis* and *Cassia occidentallis* powder were applied into three samples of infected 25g of cowpea seeds and also 25g of infected cowpea seeds was left as control in the bottle.

The seeds and the leaves powder was shaken vigorously until the powder adhered over the surface of the seeds and covered with a muslin cloth and held in place with rubber bands. Each treatment was replicated three times. The experiment was arranged in a Completely Randomized Design on a laboratory bench.

3.3 Mortality Recorded

3.3.1. Mortality Rate of Cowpea Bruchid

Data on mortality rate were obtained by counting the number of dead cowpea bruchid in each of the Kilnerjar after application of treatment. The data was recorded on the interval of 24 hours, 48 hours, and 72 hours respectively.

3.4 Experiment Design

The experimental design used was completely randomize design(CRD) with three (3) treatments 0.5g, 1.0g, and 1.5g of *Ricinus cummunis* and *Cassia occidentallis* leaves powder were applied to the untreated cowpea seeds and 0g to the control.

Table 1: Experiment Layout for Leaves Powder of *Risinus cummunis*

Treatment / Replica	R1	R2	R3
T1	T1	T1	T1
T2	T2	T2	T2
T3	T3	T3	T3
T4	T4	T4	T4

key

T_1 = 0.5g

T_2 = 1.0g

T_3 = 1.5g

T_4 = 0.0g (Control)

Table 2: Experimental Layout of *Cassia occidentallis*

Treatment / Replica	R1	R2	R3
T1	T1	T1	T1
T2	T2	T2	T2
T3	T3	T3	T3
T4	T4	T4	T4

key

T_1 = 0.5g

T_2 = 1.0g

T_3 = 1.5g

T_4 = 0.0g (Control)

3.5 STATISTICAL ANALYSIS

The data obtained were analyzed using analysis of variance (ANOVA) to determine the significance difference between the treatments. Significant level was achieved at $P \leq 0.05$ using Latin Square Design (LSD), and t-test was used to compare the effects *Risinus cummunis* and *Senna occidentallis* leaves extract on *Callosobruchus maculates* in cowpea.

CHAPTER FOUR

4.1 Results

The Results confirm that *Ricinus cummunis* and *Cassia occidentallis* leave powder is very effective against *Callosobruchus maculatus.*

At 0.5 concentration of *Ricinus cummunis* leave powder against 25g of infected Bean, 7 mortality rate were recorded, When treated with 1.0 concentration against 25g, of infected Bean 3 mortality rate were recorded and 1.5 concentration against 25g of infected Bean 5 mortality rate were recorded respectively At day 1.

At The same day for that of *Cassia occidentallis* leave powder at 0.5 concentration against 25g of infected Bean 2 mortality rate were recorded, At 1.0 concentration against 25g of infected Bean 2 mortality rate were recorded and 1.5 concentration against 25g of infected Bean 4 mortality rate were recorded. At 0.5 concentration *Ricinus cummunis* leave powder against 25g of infected Bean 9 mortality rate were recorded, At 1.0 concentration against 25g of infected Bean 4 mortality rate were recorded and at 1.5 concentration against 25g of infected Bean 7 mortality rate were recorded Respectively At day 2. Also for *Cassia occidentallis* leave powder At 0.5 concentration against 25g of infected Cowpea Bean 3 mortality rate were recorded, At 1.0 concentration against 25g of infected Bean 3 mortality rate were recorded and for 1.5 concentration against 25g of infected Bean 4 mortality rate were recorded Respectively At day 2. At 0.5 concentration of *Ricinus cummunis* leave powder against 25g of infected Cowpea Bean 11 mortality rate were recorded, At 1.0 concentration against 25g of infected Bean 5 mortality rate were recorded and for 1.5 concentration against 25g of infected Bean 10 mortality rate were recorded.

While for *Cassia occidentallis* At 0.5 concentration against 25g of infected bean 4 mortality rate were recorded, At 1.0 concentration against 25g of infected Bean 6

mortality rate were recorded and for 1.5 concentration against 25g of infected Bean 4 mortality rate were recorded Respectively At day 3.

Table 3: Mortality rate in *Ricinus cummunis* leave Powder

Infected Cowpea	25g	25g	25g
No. of Days	Day1	Day 2	Day 3
T 1, 0.5	7	9	11
T2, 1.0	3	4	5
T3, 1.5	5	7	10
T4, CONTROL	-	-	-
T Average	5	6.7	8.7
Mortality %	20	26.8	34.8

Table 4: Mortality rate *in Cassia occidentallis* leave Powder

Infected Cowpea	25g	25g	25g
No. of Days	Day1	Day 2	Day 3
T 1, 0.5	2	3	4
T2, 1.0	2	3	6
T3, 1.5	4	4	4
T4, CONTROL	-	-	-
T Average	2.7	3.3	4.7
Mortality %	10.8	13.2	18.8

CHAPTER FIVE

5.1 Discussion

This research showed that the *Ricinus cummunis* and *Cassia occidentallis* leave powder are effective against *Callosobruchus maculatus*. However the leave powder of *Ricinus cummunis* is more effective because mortality rate of *Callosobruchus maculatus*, was high in *Ricinus cummunis* leaves powder. Hence it has good potential as insecticide for protecting the stored Cowpea. The finding of this research was in agreement with that of (Nujira, et Al,.2014) reported that increase in mortality rate due to inhibitory effect of plants powder on growth, development and q-amylase activity in the red flour battles Tribalism (coleoptera:Tenebrionidae). (Adenekan, et Al.,2008) reported that increase in mortality due to the effect toxicity of *Ricinus cummunis* powder on *Callosobruchus maculatus* was in agreement with (Bamphitilhi, et Al,. 2015), who reported on the control of Cowpea bruchid, *Callosobruchus* (coleoptera:Bruchidae). Using natural plants products and resulted in increase of mortality rate.

5.2 Conclusion

Based on the results of this research, *Ricinus cummunis* and *Cassia occidentallis* leave powder at different concentration were effective against *Callosobruchus maculatus*. However the leaves of *Ricinus cummunis* showed more significant effects on *Callosobruchus maculatus* and is suggest to be potential as botanical insecticidal for protecting stored cowpea seeds.

5.3 Recommendation

- Base on the Results of this research its recommended that farmers should used the leave powder of *Ricinus cummunis* to protect their storaged Cowpea *vigna unguiculata* to induce the loss cowpea by *Callosobruchus Maculatus.*
- Further Research is carry out on other Plant Leave Powder for the discovery of bio insecticidal infestation.

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