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Evaluate theeffects of botanicals on Hatching percentage of pulse beetle in chickpea.

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ABSTRACT

Among the several pulses in the human diet, the chickpea (*Cicer arietinum* L.) is the most abundant source of protein and plays a significant role in the agricultural economy of our nation. The main insect pest, *Callosobruchus chinensis* L., damages grain quality by polluting it and lowering its nutritional value. It also causes significant losses during storage. The goal of the current study was to determine how C. chinensis grows and develops on Bengal gramme (variety-Radhey) and to assess how seed protectants affect the fecundity and hatching percentage of C. chinensis. Applying neem leaf powder at a rate of 15 g/kg of seed resulted in a significantly maximal reduction in fecundity, or 9.30 eggs/female. In the grains treated with neem leaf powder, the hatching percentage is 15.10 percent; this is significantly different from the untreated rate of 88.58 percent.

Key words: Chickpea (*Cicer arietinum* L.), seed, fecundity and hatching percentage.

Introduction

Pulses are classified as leguminous crops in the Papilionaceae sub-family and Leguminosae family. Bangladesh is home to a wide variety of pulses, including mungbean (*Vigna radiata* L.), cow pea (*Vigna unguiculata* L.), black gramme (*Vigna mungo* L.), chick pea (*Cicer arietinum* L.), and grass pea (*Lathyrus sativus* L.). In Bangladesh, traders store the majority of the pulse crops once they are harvested. Additionally, the farmers kept pulse crops in storage for use as planting material the next year. The grain was kept in the warehouses by all of the growers and dealers. However, it is regrettable that the bruchid attack causes significant losses to the grains. There are 100 species of bruchids, which are abstractly divided into 56 genera and 5 subfamilies, according to Southgate (1979). The two most prevalent bruchid species are *Callosobruchus chinensis* (L.) and *C. maculatus* (Fab.), which are both referred to as pulse beetles. Originally from East Asia, this bug is now found all over the world. Maintaining a reserve food grain store is essential to guaranteeing a steady supply at a consistent price. Agricultural methods date back roughly 10,000 years, while food grain storage dates back about 4,500 years. This was done as a precaution against famines and poor

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harvests. Insect infestation losses are a major issue when it comes to grain storage, especially in Bangladeshi villages and towns.in some of the countries of the world. It has been estimated that about 15-20% of the world agricultural production is lost every year. Out of this 8% production is lost every year due to insect infestation alone. Chickpea is used in wide range of different preparation in our country and has a good source of energy 416 calories per 100g chicken along with protein 18 to 20 per cent carbohydrate 51 to 70 per cent 4 to 10 per cent minerals, calcium, phosphorus and iron and vitamins also.In India, chickpea is the premier *rabi* followed by lentil, field pea and lathyrus. As far as production is concerned, India ranks first in the world and contributes around 70 per cent (Anonymous, 2015). Due to invasion of the beetle, deterioration in quality and quantity of stored pulse.The grubs bore into the pulse grains which become unsuitable for human consumption and for the production of sprouts. This is important pests of pulse crop in India under storage conditions (Raja et al., 2000; This awareness has created worldwide interest in the development of alternative strategic including the re-examination of using plant derivative materials is more readily biodegradable. Some are less toxic to mammals, may be more selective in action and may disgrace the development of resistance. The main advantage is that they may be easily and cheaply produced by farmers and small-scale industries as crude or partially purified extracts. In two decades, Considerable efforts have been made at screening plants in order to develop new botanical insecticides as alternative to the existing insecticide.

Materials and Methods

The present investigation was carried out on growth and development of *C. chinensis* on Bengal gram (variety-Radhey) and to evaluate effects of seed protectants on pupation percentage and pupal period of *C. chinensis*.

Test insect: *Callosobruchus chinensis* Linn.

Taxonomy of insect:

Phylum : Arthopoda

Class : Insecta

Order : Coleoptera

Supper Family :Chrysomeloidea

Family :Bruchidae

Genus : *Callosobruchus*

Species : *chinensis*

The present study was conducted in the Insectary, Department of Agricultural Entomology, AKS University, Satna, M.P. during 2019-20. The chickpea variety *Radhey* was selected to conduct the investigation on *C. chinensis* which was obtained from department of Genetics & plant breeding, AKS University, Satna, M.P. The adults of pulse beetle were

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initially collected from infested stock of local granaries and brought to the laboratory for the mass culture and rearing on gram variety (*Radhey*) kept in 2 kg capacity plastic container filled with 1 kg chickpea. 20 freshly emerged pairs of males and females of pulse beetle were released in a plastic container filled with fresh seeds of gram and covered with muslin cloth and tied around with rubber band and kept at room temperature. The food of container culture was replaced with fresh one, as and when it is needed. The newly emerged adult from the culture were used in the present study. The seeds of gram were properly sterilized in an electric oven at a temperature of 55^0c for 24 hours to make it free from any contamination. The seeds were again conditioned in regulated temperature and 75±5 % relative humidity under desiccators. (Solomon 1951). The experiments were based on "complete randomized design" (CRD) with 7 treatments and 3 replications. The 50 g grains of gram was weighted with the help of physical balance. Five pairs of C. chinensis of same age obtained from the laboratory culture were introduced in each jar, covered by muslin cloth and tied with rubber band and kept under the room temperature in the P.G. laboratory of the department with a view to study the fecundity and hatching percentage, 100 newly hatched grubs were kept in specimen jars separately containing 100 grain of each treatment. Total number of eggs laid on grains of each treatment were counted and recorded after 6 days of release the adults in the samples. The data of egg laying and hatching were also recorded daily to find out the incubation period in each variety. The hatching percentage was calculated accordingly.

Results and Discussion

The neem leaf powder @ 15g/kg of seed, dhatura leaf powder @ 15g/kg of seed and mustard oil @ 3ml/kg of seed were found at par effective in minimizing the hatching i.e. 22.98, 20.20 and 20.93 per cent, respectively. Similarly Mulatu B. et al reported (2000) Oils of *Azadirachta indica*, *Milletiaieferrnginea* and *Chrysanthemum cinerariaefolium* were the most effective in partially or completely preventing egg laying, and no bruchids emerged from the few eggs laid. The *Phytolacca dodecandra*, *Hageniaabyssinica* and *Schinus molle* treatments had no significant effect on the bruchids and most of the eggs laid developed into adults. Kachare et al (1994) reported that neem, karanj and castor oil were quite effective in suppressing the eggs hatching of C. chinensis on pigeon pea seeds.

Effect of different indigenous plant products on hatching percent of *Callosobruchus chinensis L*. in gram grains:

SR. No.	Treatment	Dosages (g/ml) per kg. of seed	Hatching per cent
1.	Neem Leaf Powder	15g	22.98(4.85)

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2.	Dhatura Leaf Powder	15g	20.20(4.55)
3.	Castor Leaf Powder	15g	19.57(4.48)
4.	Oak Leaf Powder	15g	18.09(4.31)
5.	Mustard Oil	3ml	20.93(4.63)
6.	Linseed Oil	3ml	20.53(4.59)
7.	Coconut Oil	3ml	19.13(4.43)
8.	Untreated		89.20
	CD 5%		2.52
	SE, (d)		1.19

Conclusion

On the basis of results which was obtained present experiment, the following conclusion are brought out, which may be useful for scientists, research workers and farmers. The *neem* leaf powder @15 g/kg of seed, *dhatura* leaf powder @ 15 g/kg of seed and mustard oil @ 3 ml/kg of seed were found at par *effective*in *minimizing* the hatching i.e. 22.81, 20.35 and 21.29 per cent, respectively

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