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Relative Varietal Preference of *Callosobruchus Maculatus* (Fab.) in Different Green Gram Varieties (Free choice Test)

Sangeeta Gupta* and S. D. Apte

Department of Zoology, Govt. Post Graduate College, Khargone (M.P), India

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ABSTRACT

Free choice test was concluded at room condition in three replicates by accurately weighing ten healthy seeds of each variety. They were kept equidistant from each other on the periphery of big circular trough. The top of the trough was covered with muslin cloth, held in position by rubber bands. Ten pairs of freshly emerged beetles (within 24 hours of age) were through released centrally into each through the opening made in the centre of muslin cloth cover. The beetles were removed 24 hours after their release and different observation were recorded in each treatment. Out of the 10 varieties tested. The result indicated that the preference of C. maculatus number of beetles oriented on the seed, number of eggs per seed, seed damage, loss in seed weight was found to be highest in the seeds of variety VGG-29 & UPM – 97 – 34 (100%) and it decreased in the following manner –TM – 98 – 37 (90%) > RMG – 502 (80%), Phule – M – 9338 (80%) UBGG – 52 (80%) KM – 2170 (70%), Knargone – 1 (70%) GAUM – 9801 (60%) and AKM – 1505 (60%). No variety was found to be free from C. maculatus infestation. These observations thus confirmed the variety AKM – 1505 to be least susceptible and varieties UPM – 97 – 34 and UGG – 29 to be highly susceptible to the pest. Further larger and heavier seeds with smooth surface were highly preferred by the pest as they provided more surface area for oviposition and enough food and space for the development of the grubs.

Key words: Green Gram seed, different variety, *Callasobruchus maculatus*

INTRODUCTION

Pulses are important in diet as they are major source of protein and several amino acids. It is also a rich source of energy, minerals and certain vitamins. India is the largest producer of pulses in world, it cultured on 23.63 million hactare area and 14.76 metric ton production [1].The *Callosobruchus species of pest* attacks on legumes seeds during both pre and post harvest stages all over the world but *C. maculatus*, *C. analis* and C. *chinensis* are the predominant pest species in India [2]. The entire immature stage of the insects lives on legume seeds, where they cause weight loss, decrease in germination potential and reduced the nutritional as well as market value. It was recorded that 32.2 to 55.7 per cent loss in seed weight and 17.0 to 53.5 per cent loss in protein content [3]. In India, over 200 species of pests have been recorded infesting different pulses seeds [4]. Among these,*C. maculates* (pulse beetle) is a major pest that causes serious damage to the pulses grains.In view of this, an attempt has been made to know relative varietal preference of *Callosobruchus Maculatus* (Fab.) among different green gram varieties *viz*; VGG – 29, UPM – 97 – 34, TM – 98 – 937, RMG – 502, Phule – M – 9338, UBGG – 52, KM – 2170, Khargone – 1, GAUM – 9801 and AKM – 1505.

MATERIALS AND METHODS

Insect culture

The culture of *C. maculatus* was raised on the green gram in the lab and the removal and transfer of the culture and carried out by aspirator Beetles emerged from these cultures were used in the experiment within 24 hours. Saxes were distinguished on the basis of antennae and abdomen [5].

Free choice test was concluded at room conditions. Accurately weighing ten healthy, sound and well filled seeds were kept in big circular trough (25 mm diameter x 8.5 cm height). The top of the trough was covered with muslin cloth, held in position by rubber bends.Ten pair of freshly emerged beetles (within 24 hour of age) was released. The opening was then plugged with cotton wool. The beetles were removed 24 hours after their release.

The following 10 varieties were taken as treatment VGG – 29, UPM – 97 – 34, TM – 98 – 937, RMG – 502, Phule – M – 9338, UBGG – 52, KM – 2170, Khargone – 1, GAUM – 9801 and AKM – 1505.

RESULTS AND DISCUSSION

In the present study total ten varieties were tested. Higher number of beetle were oriented on seeds of variety VGG – 29 and present seeds oviposition were observed on varieties TM – 98- 37, UPM – 9734, VGG – 29 on which highest number of egg/seed were laid. The highest seed damage was realized in varieties UPM – 97-37 and VGG – 29 (100%) followed by TM – 98 – 37 (90%), RMG – 502 (80%), Phule – M – 9338 (80%), UBGG – 52 (80%), KM – 2170 (70%), Khargone – 1 (70%), GAUM 9801 (60%), AKM – 1505 (60%) respectively. No variety was found to be free from *C. maculatus* infestation. Highest loss in seed weight was in variety VGG – 29 (85%), while lowest was in variety AKM – 1505 (57.94%). These observations thus confirmed the variety AKM – 1505 to be least susceptible and varieties UPM – 97 – 34 and VGG – 29 were found to be highly susceptible to the pest (Table-1). The weight of freshly emerged beetles had highly significant positive correlation with weigh of the seed (r = 0.945) and the regression equation was Y = 0.000088 + 0.00022 X ; where Y is weight of the seed.

Table:1 - Showing percent reduction in seed weight on different varieties of green gram seeds

Category	Percent Reduction in Seed Weight	Varieties
Highly Susceptible	74.48 to 81.31 % Weight loss	Phule – M-9338, RMG – 502, TM – 9837, UPM – 97 – 34, VGG – 29
Moderately Susceptible	64.85 to 74.47 % Weight loss	UBGG – 52
Less Susceptible	50.56 to 64.84 % Weight loss	AKM – 1505, GAUM – 9801, Khargone – 1, KM – 2170
Resistance		Nill

The result indicate that the larger and heavier seeds with smooth surface were highly preferred by the pest as they provided more surface area for oviposition and ample food and space for the development of the grubs.

Whereas, Smooth surfaced seed coat in various pulses were preferred for oviposition by *C. maculatus* by Girish [6]. Ghosal and Senapati [7] noticed the per cent seed damage by *C. chinensis*, was highest in lentil (42.6) followed by green gram (29.9), grasspea (22.4), red gram (18.6), Bengal gram (11.3), cowpea (13.8) and pea (10.5). However, The seed damage by *C. analis* was found to be highest on cowpea (19.6) followed by black gram (11.0), green gram (13.8) and lowest on pea (9.8). It was found that grain damage by *C. analis* was significantly highest in green gram (86.67%) as compared to pea, black gram and horsegram [8]. Chakraborty and Mondal [9] studied the physico-chemical parameters of pulses affecting the bruchid (*Callosobruchus chinensis* linn.) infestation and found that ovipositional preference was dependent on the seed color, seed texture, seed weight, thickness of seed coat, seed moisture and various chemical parameters. Bhargava *et al.* [10] studied the effects of of *C. chinensis* on cowpea, mung bean, moth bean (*Vigna aconitifolia*), gram, pigeon pea, pea and soybean and observed that fecundity, adult emergence and adult longevity were greatest on cow pea and lowest on soybean. Rahdha and Susheela [11] performed study on five different legumes with respect to ovipositional preference of *C. maculatus* and found that cowpea seeds are the most vulnerable legume seeds and are the most suitable host. It was observed that females distribute eggs in a manner that reflects relative mass of seeds better than relative seed surface area [12]. According to Fatemeh et al. [13], *C. maculatus* (Coleoptera: Bruchidae) is found to be the most damaging pest of legume seeds in the tropics and subtropics. Hamad et al. [14] studied the eighteen chickpea genotypes for their susceptibility to *C. maculatus* in relation to the number of undamaged seeds, number of emergence holes per 50 seeds and found that resistance to the bruchids seems to be a more heritable trait than the other two damage characters and number of emergence holes was a better indicator of seed resistance than the number of eggs present on the seeds. Findings of present investigation also supports the works of previous authors.

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