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Effects of adult male and female *Callosobruchus maculatus* emergence longevity on different gram varieties

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Abstract

The maximum adult emergence PUSA-256 (90.60%) followed by KGD-1168, Pant G-186, KW-168 and PUSA-267 were 88.73, 88.70, 88.68 and 84.43 percent respectively. The maximum male longevity found in variety K-850 (5.93) at par with Radhe JG-315, KPG-59, Kabuli chana K-3256, L-550 and PUSA-267 were 5.46, 5.10, 5.20 and 5.02 days respectively. The female longevity is the minimum longevity of PUSA-256 (5.16) the maximum longevity period was found K-850 (6.36).

Keyword:- Callosobruchns maculates, emergence longevity, male and female.

Introduction

Grain legumes commonly known as pulses are important for food and feed, and for sustainable cropping systems in many countries of Asia. Seeds of various pulse species are used as staple human food and their straw is a valued source of animal feed. More than a dozen of pulse crops are grown in various cropping systems throughout the year and their consumption provides nutritional requirements to the consumers, most particularly in the developing world. Pulses provide a substantial amount of protein, carbohydrates, fibers, vitamins, unsaturated fatty acids, macro and micro-nutrients in the daily diet of people. To provide enhanced nutritional security, enrichment of human food with nutrients can be attained through food diversification, supplementation, food-product fortification and biofortification of them, bio fortification can be a better option, where the concentration of nutrient elements in seeds can be increased through plant breeding. Some of the essential nutrients like vitamins, and metals, such as Calcium (Ca), Magnesium (Mg), Phosphorus (F), Potassium (K) Iron (Fe), Zinc (Zn), Selenium (Se) and Iodine (I) although require in a trace amount but are important to maintain optimum health. Among them, Fe, Zn, Se, I and Vitamin-A deficiencies are widespread.

Among the food grains, India is the major producer of pulses, which are cultivated over an annual average area. The production of Arhar-gram annually is 662 and 697 kg/ha. In U.P. its production is 991 and 915 kg/ha respectively. But in storage, many problems are created such as the decay of grains and damage of grains by pests. Pests of grains damage the quantity as well as its quality. Its marketing value is reduced and the seller is affected by unacceptance of the pulses.

The average Indian diet is highly imbalanced mainly due to a lack of protein sources. Most people are vegetarian by habit and others can hardly use animal proteins in their diets because of its high cost. The major source of protein in their diet is pulses of various types. Which covers a total estimated area of 22.4 million hectares producing an average of 11.57 million tons of grain per year. This quantity is

hardly enough to meet the minimum requirement of 104 g of pulses per head per day. The per capita consumption of pulse in India has been worked out to be 65 g.

The C. maculatus are commonly reared from the seeds of leguminous plants. Larva eats so fast that it has to move into a fresh seed and on attaining maturity cuts a disc in the seed coat and pupates below it. When the beetle is ready to emerge the disc opens and by this adult comes out. No information is available about the hibernation of these beetles. *Callosobruchus maculatus* Fab. Are pests to crops in India but are destructive to stored pulses. Six species of Bruchids are known of which two namely *Callosobruchus maculatus* (Fab.) and *Collosobruchus chinensis* (Linn) greatly damage stored pulses in the rural condition in India.

Materials And Methods- The adult beetle of the test insect (*Callosobruchus maculatus*) were collected from the local granaries, and godowns and brought to the laboratory for mass culturing on gram kept in two glass jars of 10 kg capacity. Well identified firstly emerged 20 pairs of male and female of *Callosobruchus maculatus* were released in a glass jar containing fresh seeds of gram and covered with muslin cloth and tied round with rubber band, which was kept at room temperature on The newly emerged 1-2 days old adults were taken as the parental population for the development of mass culture. Under the progeny experiment as detailed in 4 the beetles of the F1 population were counted in each variety regularly till removed to prevent egg laying. Finally, the total number of males and females in the F1 population was recorded to get the percent adult emergence. To record the longevity of male and female adults, the date of their emergence and death (complete the life cycle) of 10 adults of each sex were noted separately on each variety and the weighted means were recorded.

Result And Discussion- The maximum adult emergence PUSA-256 (90.60%) followed by KGD-1168, Pant G-186, KW-168 and PUSA-267 were 88.73, 88.70, 88.68 and 84.43 percent respectively. The minimum adult emergence K-850 (58.60) followed by Radhe JG-315 KPG-59, Kabuli chana K-3256, L-550 and PUSA-267 were 58.60, 59.68, 65.83, 68.23 and 72.03 percent respectively(Table1)(Fig.1). The adult emergence recorded by Aldana (1983), Kulkarni et al. (1985), Singhal and Singh (1985), Singh (1987), Singhal (1987), Mehta and Chandel (1990), Mohammad et al. (1997) screened that eight different strains/varieties of mungbean, MB-26, MB-48, MB-55, MB-63, MB-33, MB-87, MB-246 and kranti for susceptibility to *C. chinensis* based on the number of egg laid, duration of development of the immature stages, percentage adult emergence and weight loss due to damage by the pest. Rajapakse (1996) the Effect of four botanicals on the oviposition and adult emergence of C. chinensis. Singh and Pandey (2001), Dwivedi and Seema (2003) Observed the efficacy of Lantana camera extract on the development, grain damage and population management of Corcyra cephalonica. It was found effective significantly to suppress adult emergence causing 87.32% population control of rice. Paudal et al. (2003), Aslam et al. (2006), Raghav et al. (2008), Bhalla et al. (2008), Kumar and Bhalla (2008), Dauda et al. (2012), Verma et al. (2010b), Alice et al. (2013) also reported.

A significant variation was found in the longevity of adult beetle. The maximum male longevity found in variety K-850 (5.93) at par with Radhe JG-315, KPG-59, Kabuli chana K-3256, L-550 and PUSA-267 were 5.46, 5.10, 5.20 and 5.02 days respectively. The minimum longevity period PUSA-256 (4.20) followed by KGD-1168, Pant G-186 and KW-168 being 4.50, 4.96 and 5.00 day's respectively. The female longevity the minimum longevity of PUSA-256 (5.16) followed by KGD-1168, Pant G-186 and KW-168 are 5.23, 5.36 and 5.29 the maximum longevity period was found K-

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850 (6.36) followed by Radhe JG-315. KPG-59, Kabuli chana K-3256 and L-550 have 6.00, 5.66, 5.46 and 5.43 day's respectively (Table1)(Fig1). Similar to these findings were also observed by Rajak and Pandey (1965), Grindland et al. (1986), Negi et al. (1997) Negi et al. (1997) reported egg laying and adult emergence of Callosobruchus chinensis on the green gram (Vigna radiata) treated with Pongam oil. Pandey and Singh (1997a), Pandey and Singh (1997b) observed the effect of neem bark powder (0.2-0.8%w.w) on C. chinensis in stored chickpeas. Neem bark powder reduced seed damage and insect population. Mulatu et al. (2000), Singh and Kumar (2000), Pandey and Khan (2000) observed the antifertility effect of *Clendron siphonathus* leaf extract on C.chinensis under 28±30C temp. 75% RH and 16 hrs photoperiod. C.siphona-nathus leaf extract doses were administered in *C.chinensis* females through the dipping method. Singh and Pandey (2001), Aslam et al. (2006) and Fox and Moya-Larano (2009) in species where males provide nuptial gifts, females can improve this nutritional status and thus increase their.

Table 1: Adult emergence, longevity (male and female) *Callosobruchus maculatus* on different gram varieties

S. No.	Varieties	Mean adult emergence (percent)	Mean longevity (Day's)	
			Male	Female
1.	L-550	72.03 (58.05)*	5.20	5.43
2.	KGD-1168	88.73 (70.36)	4.50	5.23
3.	K-850	58.60 (49.95)	5.93	6.36
4.	KW-168	88.68 (70..27)	5.00	5.36
5.	KPG-59	65.83 (54.21)	5.16	5.66
6.	PUSA-256	90.60 (72.15)	4.20	5.16
7.	Radhe JG-315	59.68 (50.53)	5.46	6.00
8.	Pant G-186	88.70 (70.36)	4.96	5.33
9.	PUSA-267	84.43 (66.74)	5.02	5.38
10.	Kabulichana K-3256	68.23 (55.67)	5.10	5.46
	S.E. ± (M)	4.405	0.365	0.332
	C.D. (P=0.05)	4.175	N.S.	N.S.

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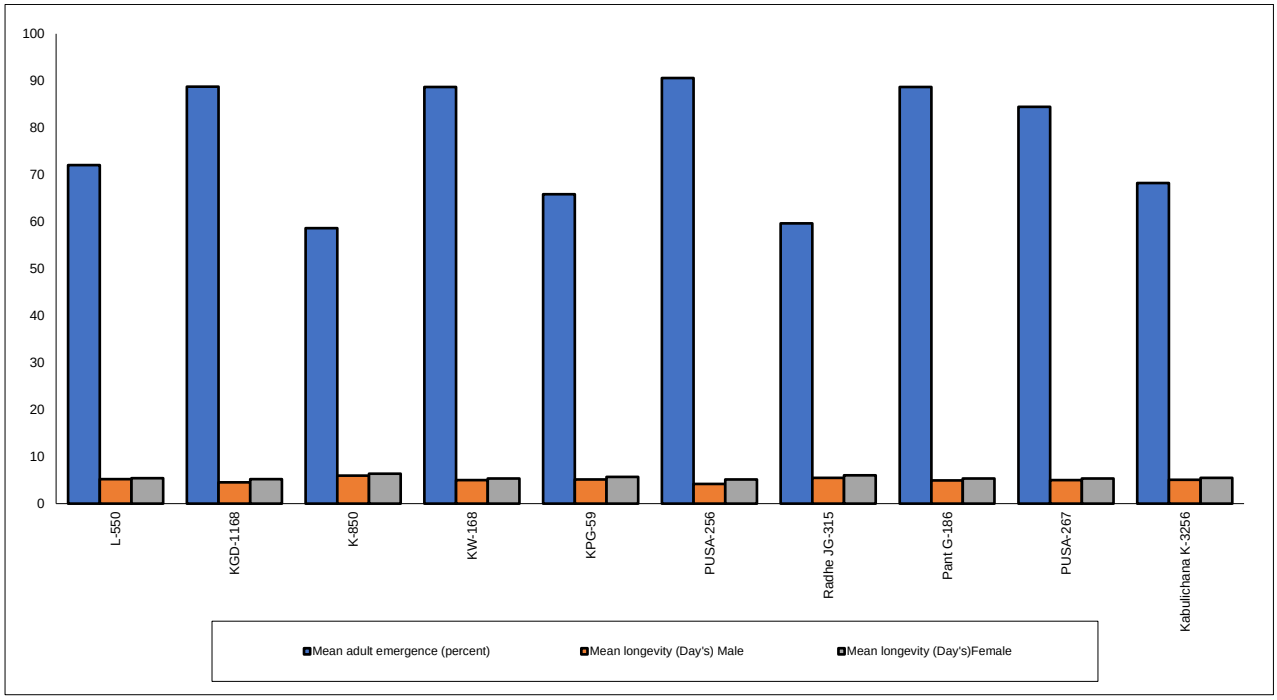

Reffrences-

1- Aldana Alfanso, H. M. (1983). Effect of temperature on the development and mortality of the immature stages of *C. maculatus* F. in chickpea. *Revista Colombian Entomologic*, **9**(1-4): 27-30.

2- Alice, J.; Sujeeta, R.P. and Srikanth, N. (2013). Effect of hot and cold treatments for the management of Pulse beetle *Callosobruchus maculatus* (Fab) in pulses. IOSR *Journal of Agriculture and Veterinary Science (IOSR-JAVS)*, **3**(3): 29-33.

3- Aslam, Muhammad; Shaheen, Asif; Farid, Abbas and Saba Ambreen, (2006). Management of *C. chinensis* Linn. Through use of resistance in stored chickpea varieties. *World Journal of Agricultural Sciences* **2**(1): 82-84.

4- Bhalla, S.; Gupta, K.J; Lal, B.; Kanpur, M.L.; Khetarpal, R.K. (2008). Efficacy of various non-chemical methods against pulse beetle *Callosobruchus maculatus* Fab. ENDUR International Conference Diversifying Crop Protection, 12-15 October France, 1-4.

5- Dauda, Z.; Maina, Y.T. and B.I. Richard (2012). Insecticidal Activity of *Garlic* (*Alivum sativum* (L)) oil on *Callosobruchus maculatus* (F) in Post-Harvest Cowpea 2 (3): 29-36.

6- Dwivedi, S. C. and Garg, Seema (2003). Toxicity evaluation of flower extract of *Lantana camera* on the life cycle of *Corcyra cephalonica*. *Indian Journal of Entomology*, **65**(3): 330-334.

7- Kulkarni, S. G.; Harode, S.; Deshpandey, A. O.; Boriker, P. S. and Puri, S. N. (1985). Damage and losses in selected containers. *Agric. Sci. Digest. India*, **5**(2): 108-110.

8- Kumar, Praveen and Bhalla, Shashi (2007). Low temperature treatments to control pulse beetle *Callosobruchus maculatus* in moog bean. *Indian Journal of Plant Protection*. **35**(1): 39-42.

9- Mehta, P. K. And Chandel, Y. S. (1990). Studies on host preference of pulse beetle, C*allosobruchus analis* F. to different pulses. *Himachal Journal of Agric. Researches*, **16**(1-2): 31-33.

10- Muhammad, Husain; Ray, G. C. and Husian, M. (1997). Laboratory evaluation of some mungbean strains for susceptibility to pulse beetle, *Callosobruchus chinensis* Linn. *Bangladesh Journal of Entomology*, **7**(1-2): 21-26.
11- Paudel, L. R.; Sharma, R. K. and Sharma, Kirti (2003). Evaluation for resistance against khapra beelte *Trogoderma granarium* Evert. In stored maize. *Annals of Plant protection Sciences* **11**(2): 237-242.
12- Raghav, K.; Dushyant; Sharma,P. K. and Rajvanshi, S. K. (2008). Screening of maize germplasm against *Trogoderma granarium* (Everts). *Annals of Plant protection Sciences*. **16**(2): 377-380.
13- Rajak, R. L. and Pandey, N.D. (1965). A life history of pulse beetle, *Callosobruchus chinensis* Linn. (Colepotera: Bruchidae), *Labdev, J. Sci. Tech.*, **3**: 119-123.
14- Rajapakse, R.H.S. (1996). The Eefect of four botanicals on the oviposition and adult emergence of *C. Chinensis*. *Eatomone*. **21**(3-4): 211-215.
15- Credland, P.F.; Dick K.M. and Wright, A.W. (1986). Relationships between larval density, adult size and egg production the cowpea seed beetle, *Callosobruchus maculatus*. *Ecolo. Entomol.* 11:41-50.
16- Singh, S. K. (1987). Relative resistance of some genotypes of chickpea, *Cicer arietinum* L. to pulse beetle, *Callosobruchus chinensis* Linn. *Research and development Report*, **4**(2): 204-207.
17- Singhal, S. K. (1987). Studies on the relative resistance of some genotypes of chickpea, *Cicer arietinum* L. to pulse beetle. *Callosobruchus chinensis* Linn. *Bulletin of Grain Technology*, **25**(2): 235-239.
18- Singhal, S. K. and Singh, R. (1985). Relative susceptibility of promising varieties of chickpea and green gram to pulse beetle, *Callosobruchus chinensis* Linn. *Bulletin of Grain Technology. 23*(1): 28-32.
19- Singh, V. N. and Pandey, N. D. (2001). Growth and development of *Callosobruchus chinensis* Linn. On different gram varieties. *Indian Journal of Entomology*, **63**(2): 182-185.
20- Rajapakse, R.H.S. (1996). The Effect of four botanicals on the oviposition and adult emergence of *C. Chinensis*. *Eatomone*. **21**(3-4): 211-215.
21- Verma, R. A.; Pal, Anamika and Lal, Dinesh (2010). Screening of husked rice varieties against *Sitotroga cerealella*. *Annals of Plant Protection Sciences*, **18**(1): 244-245.
22- Negi, R. S.; Meera; Srivastava; Saxena, M.M. and Srivastava, M. (1997). Egg laying and adult emergence of *Callosobruchus chinensis* on green gram (*Vigna radiata*) treated with pongam oil. *Indian Journal of Entomology*, **59**(2): 170-172.
23- Pandey, N. K. and Singh, S. C. (1997b). Effect of neem bark powder on infestation of pulse beetle, *Callosobruchus chinensis* in stored chickpea. *Indian Journal of Entomology*. **59**(2): 161-163.
24- Pandey, N. K. and Singh, S. C. (1997a). Observation on the biology of the pulse beetle *Callosobruchus chinensis* Linn. Infesting stored pulses. *Journal of Zoology* **17**(1): 38-42.
25- Mulatu, Baye and Gebremedhin, Tadesse (2000). Ovipostion deterrent and toxic effects of various botanicals on the Adzuki bean beetle *Callosobruchus chinensis* Linn. *Insect Science and its Application*. **20**(1): 33-38.

26- Singh, S. C. and Kumari, Rina (2000). A study of the biology of *Callosobruchus chinensis* Linn. Infesting stored pulses (grain legumes) in India. *Indian Journal of Entomology*. **62**(4): 319-322.
27- Pandey, S. K. and Khan, B. Mehrooz (2000). Effects of Celrodebdron siphanathus leaf extract on the adaptability by *Callosobruchus chinensis* to its own population density through dipping method. *Indian Journal of Entomology* **62**(2): 133-140.
28- Singh, V. N. and Pandey, N. D. (2001). Growth and development of *Callosobruchus chinensis* Linn. On different gram varieties. *Indian Journal of Entomology*, **63**(2): 182-185.
29- Fox, C.W. and J. Moya-Larano (2009). Diet affects female mating behavior in a seed feeding beetle. *Physiological Entomology*, **34** (4): 370-78.
30- Aslam, Muhammad; Shaheen, Asif; Farid, Abbas and Saba Ambreen, (2006). Management of *C. chinensis* Linn. Through use of resistance in stored chickpea varieties. *World Journal of Agricultural Sciences* **2**(1): 82-84.
31- Sachan.Priyanka, Sharma, Amit , Srivastava, S.P (2018). Efficacy of various plant products on fecundity and incubation period of Callosobruchus maculatus on gram varieties Asian journal of Agriculture & life Science Vol.3(2) ISSN:2455-6149.
32- Sachan.Priyanka, Srivastava, S.P, Srivastava, Nidhi (2022). Boi Chemical test on Gram Varieties Protein of Fresh and Infected Grain Against Callosobruchus maculates. Indian Journal of Advanced Zoology. ISSN:2582-9521, Vol.2 Issue-1.