



BIOLOGY OF GROUNDNUT BRUCHID *CARYEDON SERRATUS* (OLIVIER)

POONAM DESHMUKH, MANE P N¹*, UNDIRWADE D B AND SONALKAR V U²

Department of Entomology; ¹Oilseed Research Unit; ²Sorghum Research Unit,
Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola 444104, India

*Email: pnmane_ento@rediffmail.com (corresponding author)

ABSTRACT

Life stages of groundnut bruchid *Caryedon serratus* was studied in the laboratory of Seed Technology Research Unit, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2019-20. The bruchid was multiplied under laboratory conditions at 25± 2°C and 70% RH on groundnut pods. Egg, grub and pupal periods, adult longevity and total life period were examined. The mean life period of male groundnut bruchid was 69 days and for female it was 76.50 days. The grub (damaging stage) period lasted for 33 days.

Key words: *Arachis hypogaea*, *Caryedon serratus*, coleoptera, incubation period, grub, life stages, pupal period, storage, total life period.

Groundnut (*Arachis hypogaea* L.) is an important oilseed crop (Sakhare et al., 2018), and it is stored as pods (unshelled form) and in kernels (shelled form) by farmers, processors, seed agencies and other oil extraction units for about 6-9 months before final use. In India, storage losses of groundnut range between 10 and 15%. The postharvest losses in groundnut caused by insect pests, moulds and rodents vary from 10 to 25%. Among the pests, post-harvest insect pests like groundnut bruchid, *Caryedon serratus* (Olivier) is a primary feeder causing approximately 17-47% pods damage (Bhogeesh et al., 2014). It is the only species that can penetrate intact pods to infest kernels, and causes 19 to 60% loss. The grubs bore into the seeds via small holes and feed on the embryo and the endosperm and final instar grub comes out for pupation through exit holes (Sakhare et al., 2018). Its damage leads to poor germination and thus reduces the seed quality. The egg, larval and pupal periods of this ranged from 3 to 9, 19 to 38, 9 to 34 days, respectively, while the adult longevity and total lifecycle occupied 19 to 30 and 43 to 70 days, respectively (Sandeep et al., 2005). Such knowledge on life cycle is useful in synchronizing the timing of application of pest management tactics (Arif et al., 2017). Keeping this in view, a study was conducted on life stages of *C. serratus* on groundnut *Arachis hypogaea* from Akola, Maharashtra.

MATERIALS AND METHODS

The experiment was undertaken in laboratory of the Seed Technology Research Unit, Dr PDKV Akola during July 2019. Initial culture of *C. serratus* was obtained from naturally infested pods, with the beetle

identified by the small black markings on the elytra, incompletely covering the abdomen, broad hind femur with serrated antennae. The bruchid was then multiplied at 25± 2°C and 70% RH on groundnut pods, in plastic jars. Life stages were studied, and for adult emergence, a pair of male and female was kept in a container for mating and allowed for egg laying. Three vials were taken and 30 groundnut kernels with freshly laid egg such that one egg/ kernel were studied by putting it into vial and the open end of the vial was tied with muslin cloth. Observations were taken on egg, grub and pupal period, adult longevity and total life period. Egg period is the length of time taken from egg laying to hatching. It can be recognized by egg turning to opaque due to accumulation of bored material in the chorion. The grub period was recorded as the number of days taken from hatching of egg till last instar grub (i.e. fourth instar stage) which spins the papery cocoon. Pupal period is the period from the formation of cocoon till the adult emergence. Adult longevity is the period from adult emergence to its mortality.

RESULTS AND DISCUSSION

The egg period of *C. serratus* ranged from 7 to 8 days, with freshly laid eggs being creamy, translucent with tough chorion. The egg shell becomes opaque white or grey at hatching. The grub makes a circular cut on the surface of egg chorion a day before hatching, and grub period lasts for 32 to 34 days (mean 33 days). The grubs passed through four larval instars before pupation. The newly hatched first instar is creamy white, C shaped with prominent mandibles; while the full grown is pale pink. The pupal period lasts for 12

to 15 days (mean 13.5 days), with the pupa being dull white and papery. Adult longevity ranges from 14 to 16 days (mean 15 days) in case of males, and 20 to 25 days (mean 22.50 days) in females. Adult is reddish dark brown with small markings on the elytra, prominent compound eyes and 11 segmented antennae and showed sexual dimorphism; antennae were long and serrated in males than in females, whereas the pygidium (dorsum of posterior abdomen) was exposed in females than in males; in males, pygidium was projected downwards, so that in dorsal view it was hidden by the elytra; while in females the pygidium is visible dorsally projecting beyond the elytra. The females were slightly bigger than males. Total life period of the male from egg to adult ranged from 65 to 73 days (mean 69 days), while in female it was from 71 to 82 days (mean 76.50 days).

Mishra and Ranjan (2005) and Sakhare et al. (2018) observed 4.20 and 3.50 to 8.50 days as egg period of *C. serratus*, respectively. The grub period was 34.69 days, 19 to 38 days, 29 to 41 days and 28 to 34 days, respectively as given by Joshi and Ghorpade (2001), Sandeep (2005), Bhogeesh et al. (2014) and Sakhare et al. (2018). Mishra and Ranjan (2005) and Behera et al. (2016) reported these as 26.68 and 42.2 days of grub period, respectively, and Sakhare et al. (2018) observed 12.75 to 15.25 days of pupal period. Bhogeesh et al. (2014) observed 14.80 days as male adults period and 21.34 days as female adults period. Sundria et al. (2004) and Sakhare et al. (2018) found that it was 40.54 to 78.35 days, 89.9 ± 3.44 days and 67.50 to 76.00 days as its life period, respectively.

ACKNOWLEDGEMENTS

Authors thank the Seed Technology Research Unit and Department of Entomology, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola for providing facilities.

REFERENCES

- Arif M J, Gogi M D, Sufyan M, Nawaz A, Sarfraz R M. 2017. Sustainable insect pest management. University of Agriculture, Faisalabad, Pakistan. 17-47 pp.
- Behera P, Anita Mohanty, Patra D, Sundar Karn D. 2016. Life cycle of ground nut seed beetle (*Caryedon Serratus*). Indian Journal of Oilseed Research 5(6): 4-6.
- Bhogeesh B M, Mutthuraju G P, Pradeepa S D, Thirumalaraju G T, Arati Pannure, Bommasha B. 2014. Evaluation of newer insecticides as fabric treatment against *Caryedon serratus* (Olivier) (Coleoptera: Bruchidae) on stored groundnut. International Journal of Plant Protection 7(1): 35-40.
- Joshi V B, Ghorpade S A. 2001. Life-history of groundnut pod borer, *Caryedon serratus* (Olivier) under ambient conditions. Journal of Insects Science-Ludhiana 14(1/2): 72-74.
- Mishra, Prabhat Ranjan. 2005. Bio-ecology and management of the groundnut bruchid, *Caryedon serratus* (Olivier) under coastal Orissa conditions. Ph D Thesis, Orissa University of Agriculture and Technology, Bhubaneswar. 73-88 pp.
- Sakhare V M, Mutkule D S, Kharade V G. 2018. Biology of groundnut bruchid, *Caryedon serratus* (Olivier) on different groundnut varieties. Journal of Entomology and Zoology Studies 6(4): 1577-1580.
- Sandeep R S. 2005. Biology and management of groundnut pod borer *Caryedon serratus* (Olivier) in groundnut pods. M Sc Thesis, Acharya N G Ranga Agricultural University, Rajendranagar, Hyderabad. pp. 48-51.
- Sundria M M. 2004. Bio-ecology and management of groundnut bruchid, *Caryedon serratus* (Ol.) in groundnut. Ph D Thesis, MPUAT, Udaipur. pp. 28-30.

(Manuscript Received: November, 2020; Revised: January, 2021;

Accepted: January, 2021; Online Published: March, 2021)

Online published (Preview) in www.entosocindia.org Ref. No. e20384