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SOME OBSERVATIONS ON THE BIOLOGY OF GROUNDNUT SEED BEETLE *CARYEDON SERRATUS* (OLIVIER) (COLEOPTERA ; BRUCHIDAE)

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ABSTRACT

The biology of groundnut seed beetle (bruchid) was studied under laboratory conditions. The mean duration of pre-oviposition, oviposition, incubation, grub, pre-pupal, female and male adult bruchids were recorded. The duration of total life cycle of *Caryedon serratus* (Olivier) from egg laying to adult emergence was found to be 46 days.

Groundnut (*Arachis hypogaea L.*) is an important commercial crop in many parts of the tropics, particularly in semi-arid areas. When stored before utilization, groundnuts are susceptible to the attack of many insects. Among the insect pests attacking the groundnuts in stores, the groundnut seed beetle (bruchid), *Caryedon serratus* (Olivier) is the only insect species known to infest kernels, intact pods and is thus potentially the most important pest of unshelled groundnut. Studies on this serious pest were carried out in laboratory in the Department of Entomology, S.V. Agricultural College, Tirupathi, Andhra Pradesh.

Observations on the biology were made by maintaining two different sets of jars with *C.serratus*. In each set, three batches of 100 healthy pods per batch were maintained in the jar and pair of freshly emerged beetles were released uniformly to know the morphometrics of different instars of the grub, the developmental duration of different stages of bruchid and the total life cycle.

Under laboratory conditions (mean temperature 30±2°C and R.H. 70%) the pre-oviposition period was 22 hours. Eggs were laid singly and glued to the surface of groundnut pods. Each female bruchid laid about 53 to 95 eggs at the rate of 5 to 7 eggs per pod and oviposition period ranged from 9 to 10 days. The fecundity was more in the first four days than in the subsequent period of oviposition. Eggs were flattish-oval in out line and pale-white in color. Freshly laid eggs were translucent and turned light yellowish by third day. On fifth day, the developing embryo could be seen as a black spot through the translucent egg chorion and the grub could also be visible through the egg chorion next day (6th day). On seventh day, eggs turned milky white indicating the emergence of grub and before hatching the grub, chewed the egg shell and subsequently on 8th day the grubs made circular hole on the pod and entered into kernel. The length of egg ranged from 0.10879 to 0.11479 mm while width ranged from 0.0788 to 0.08651 mm.

The grubs of *C. serratus* were stout, fleshy, wrinkled, curved and apodous. Grubs mostly caused damage to the kernels by feeding on the endosperm and other contents of kernels which made them hollow. The grubs passed through four instars and emerged out of the pod, leaving a characteristic round hole of about 3 mm in diameter on the pod wall and migrated to the bottom of heap and constructed oval papery cocoons. The nuts at the base of the heap were invariably heavily damaged by further generations of the insect. Adult emergence, mating, and oviposition occurred at considerable depth within heaped bulk or bag-stack. However, these observations contradict earlier findings, which suggested that infestation by *C. serratus* is largely confined to

Table 1. Duration and size of length, width (in mm) of different life stages of the groundnut seed beetle, *C. serratus*

S.No.	Particulars	Duration (Days)	Size (mm)	
			Length	Width
1.	Pre-oviposition period	22 hours	-	-
2.	Oviposition period	9.5	0.10879 to 0.11479	0.0788 to 008651
3.	Incubation period	8.0	-	-
4.	Larval period			
	i. First instar grub	4.4	0.19 to 0.2	0.1
	ii. Second instar grub	4.5	0.25 to 0.34	0.16 to 0.19
	iii. Third instar grub	4.5	0.59 to 0.65	0.28 to 0.42
	iv. Fourth instar grub	9.5	1.20 to 1.25	0.56 to 0.79
5.	Pre-pupal period	1.5	-	-
6.	Pupal period	15.5	5.5 to 7.5	3.0 to 4.5
7.	Adult		5.0 to 7.0	
	Female	30.2		
	Male	27.4		

the surface layers of a bulk or stack of groundnuts (Green, 1959). It was found that the length and width of first instar grub increases with increasing width of head capsule, as it advances to final instar. The length of first, second, third and fourth instar grubs were ranging from 0.19 to 0.2 mm, 0.25 to 0.34 mm, 0.59 to 0.65 mm and 1.2 to 1.25 mm respectively. The width of first to fourth instar grubs were in the range of 0.1 mm, 0.16 to 0.19 mm, 0.28 to 0.42 mm and 0.56 to 0.79 mm respectively. The papery-white-oval cocoons measured 5.5 to 7.5 mm in length and 3 to 4.5 mm in width (Table 1).

The adult bruchid was reddish-brown with dark irregular markings on the elytra. It has large prominent compound eyes and is distinguished by the presence of broad-hind femur with conspicuous comb of spines. The adult measured 5 to 7 mm in length. Sexual dimorphism was distinguished by observing the pygidium. In case of males, pygidium projected downwards, so that in dorsal view it was hidden by the elytra, whereas in females pygidium projected beyond the elytra and dorsally visible. The observations indicated that the female bruchid lived longer than males. However, Davey's (1958) reported that the longevity of *C. serratus* adults varied from 10 to 35 days at 25 °C and 60% R.H. In the present study durations of egg, first, second, third, fourth instar grubs, pupa and adult were 8, 4.4, 4.5, 4.5, 9.5, 15.5 and 30.2 days (females), 27.4 days(males) respectively. The duration of total life cycle from egg to adult was found to be 46 days under the test conditions (30±2°C and R.H. 70%). The observations were nearer to the documentation made by Dick (1987a) and Delobel (1989), who reported that at 30-33°C and 70-90% R.H., the mean developmental period was 40 days.

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