



A study on the biology of *Callosobruchus chinensis* (L.) infesting stored chickpea (*Cicer arietinum* L.)

Key words : Biology, Morphometrics *Callosobruchus chinensis* (L.)

Chickpea (*Cicer arietinum* L.) is the third most important grain legume in the world. It has been well recognized as a valuable source of dietary proteins. Generally farmers store chickpea for longer periods for seed purpose, which are attacked by insects. The pulse beetle, *Callosobruchus chinensis* (L.) is considered as a most destructive pest of pulses. The biology of pulse beetle was earlier investigated by different workers (Pandey and Singh, 1997; Singh and Kumari, 2000 and Mandal and Konar, 2006). Study of biology will reveal the most opportune periods and vulnerable stage of the pest for taking of protection measures for better management. Hence, attempt was made in the present investigation to study the biology of the pulse beetle on chickpea for better management.

The experiment was conducted at Post Harvest Technology Centre, Agricultural College Campus, Bapatla during the months of August to October, 2006. The parental culture was obtained from the laboratory and fresh culture was maintained for study of biology. The freshly emerging adults were used for experiments.

One hundred healthy chickpea seeds were taken into small plastic bottles (10 cm X 6 cm) into which five mating pairs of freshly emerged adults were released to determine the number of eggs laid. Seeds with eggs were kept separately and observed for hatching, larval growth and adult emergence. The morphometrics of test insect were also observed by using binocular microscope, stage micrometer in conjugation with ocular micrometer.

Mating, oviposition and fecundity:

Mating of pulse beetle lasted for 6-8 minutes and average oviposition period was 7.3 days which was in conformity with studies of Singh and Kumari (2000) and Raina (1970). The fecundity of female ranged from 62 to 89 eggs with an average of 76.5 eggs. Takasugi (1924) reported a range between 70-80 eggs per female. Raina (1970) noted an average of 78 eggs per female with a range of 63-90 eggs.

Incubation and hatching period:

The eggs were translucent and creamy coloured (Raina, 1970; Singh and Kumari, 2000). The average incubation period was 6.07 days with a

range of 4-9 days. The findings are in conformity with Singh (1962) who reported incubation period as five days, Howe and Curie (1964) 4.2 days, Dina (1971) 5.5 days and Patel *et al* (2005) 5.03 days.

Larval and Pupal Period

In the present study the combined larval and pupal period of bruchid in chickpea seeds ranged from 13-22 days with an average of 17.40 days. Raina (1970) recorded the combined larval and pupal period as 18.8 days, Singh and Kumari (2000) 20 days and Patel *et al* (2005) 20-22 days.

The adult longevity ranged from 6 to 11 days with an average of 8.2 days which was in accordance with Raina (1970) who reported adult longevity from 6 to 11 days averaging 7.6 days.

Complete development from egg to adult took an average of 26.5 days. Dina (1970) reported total life cycle of *C. chinensis* ranged from 24.5 to 31 days while Pandey and Singh (1997) recorded a period of 20 to 28 days for completion of life cycle.

Morphometrics

Morphometrics of *C. chinensis* was recorded by using binocular microscope, stage micrometer in conjugation with ocular micrometer and length and breadth of egg ranged from 0.60 to 0.63 mm and 0.30 to 0.38 mm with an average of 0.62 and 0.34 mm respectively. Subsequently the length of larva, pupa and adult ranged from 3.50 to 3.83 mm, 3.10 to 3.41 mm and 2.42 to 2.66 mm with an average of 3.70 mm, 3.32 mm and 2.60 mm while the breadth ranged from 1.58 to 1.72 mm, 1.37 to 1.67 mm and 1.43 to 1.69 mm with an average of 1.66, 1.45 and 1.61 mm respectively (Table 2).

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Table 1: Biology of *C.chinensis* on chickpea seeds under laboratory conditions

Stage	Number studied	Duration in days	
		Average	Range
Egg	50	6.07	4-9
Larva	50	10.15	8-13
Pupa	50	7.25	5-9
Adult longevity	10	8.20	6-11
Total life cycle	10	26.50	22-31
Oviposition period	10	7.30	6-9
Fecundity	10	76.50	62-89

Table 2: Morphometrics of different life stages of *C. chinensis*

Stage	Number studied	Length (mm)		Breadth (mm)	
		Average	Range	Average	Range
Egg	10	0.62	0.60-0.63	0.34	0.30-0.38
Larva	10	3.70	3.50-3.83	1.66	1.58-1.72
Pupa	10	3.32	3.10-3.41	1.45	1.37-1.67
Adult	10	2.60	2.42-2.66	1.61	1.43-1.69

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