



## Comparative biology of *Helopeltis theivora* Waterhouse (Heteroptera: Miridae) on *Psidium cattleianum* (Myrtales: Myrtaceae) and *Camellia sinensis* (Ericales: Theaceae)

Anju Antony, K.K. Srikumar and B. Radhakrishnan\*

Department of Entomology, UPASI Tea Research Foundation, Tea Research Institute, Valparai 642 127, Tamil Nadu, India.

Email: anjuantony34@gmail.com; \*director@upasitearesearch.org

**ABSTRACT:** Studies on the life history of *Helopeltis theivora* on *Psidium cattleianum* shrub is an alternate host of *H. theivora*. Biology of *H. theivora* on this shrub was studied for the first time. Incubation period varied for  $8.6 \pm 0.3$  (d). Total nymphal developmental period was  $20.3 \pm 2.84$  (d). Adult female lived longer than male. Incubation period and the total nymphal developmental period of *H. theivora* on *Psidium cattleianum* was significantly lower than *Camellia sinensis*.

**KEY WORDS:** *Helopeltis theivora*, *Psidium cattleianum*, *Camellia sinensis*, biological parameters

*Camellia sinensis* L.O. (Kuntze) a perennial crop and grown as a monoculture over large continuous areas during the last 160 years had formed a stable tea ecosystem for widely divergent endemic or introduced pests (Mamun *et al.*, 2014). More than one thousand species of arthropod pests are known to attack tea all over the world, though only about 300 species of insects are recorded from India (Das, 1965). Among them, *Helopeltis theivora* (Heteroptera: Miridae) is a major pest of cocoa and tea in India and other countries of Asia. It has also been reported damaging other economically important plants such as black pepper, camphor, cashew and cinchona (Stonedahl, 1991). Typical feeding damage by *Helopeltis* spp. appears as a discoloured necrotic area or a lesion around the point of entry of the labial stylets inside the plant tissue (Srikumar and Bhat, 2012). In a severe attack, bushes virtually cease to form shoots and the affected area may not flush for weeks (Ahmed,

1996). *Psidium cattleianum* Sabine (Myrtaceae), the strawberry guava, was recorded as important alternate host for this pest. *Psidium cattleianum* is an evergreen shrub or small tree to 8 m (25 ft) tall, with gray to reddish-brown peeling bark and young branches round and pubescent. Leaves are opposite, simple, entire, glabrous, elliptic to oblong, to 8 cm (3 in) long ([www.fleppc.org/ID\\_book/psidium/20cattleianum](http://www.fleppc.org/ID_book/psidium/20cattleianum)). The present investigation was conducted to study the male and female developmental rate, incubation period, nymphal, adult longevity and fecundity of *H. theivora* on *P. cattleianum* and *C. sinensis*

Life history of *H. theivora* was studied under laboratory conditions at UPASI Tea Research Foundation Valparai, India. Adults (No. 20) of *H. theivora* were collected from UPASI tea fields by using long test tubes (17.5 cm × 3 cm). Adult bugs were allowed to pair on different bottles fed with

\* Author for correspondence

Table 1. Life history of *Helopeltis theivora* on *P. cattleianum* and *C. sinensis*

Host	Nymphal development period ( in days)					Total development period ( in days)		Incubation period for egg (in days)
	First	Second	Third	Fourth	Fifth	Male	Female	
<i>P. cattleianum</i>	2.6±0.3	3.0±1.0	3.6±0.6	4.6±0.6	6.3±0.3	16.0±0.7	17.0±0.7	8.6±0.3
<i>C. sinensis</i>	2.0±0.2	1.0±0.1	4.0±0.4	2.0±0.2	5.0±0.5	14.8±0.1	15.8±0.3	6.0±0.6
CD (P = 0.05)	NA	NA	NA	1.901	0.950	NA	NA	0.950

Table 2. Longevity and fecundity of *Helopeltis theivora* on *P. cattleianum* and *C. sinensis*

Host	Fecundity		Fecundity
	Male	Female	(No of eggs laid)
<i>P. cattleianum</i>	22 ± 0.57	26 ± 0.58	90 ± 2.5
<i>C. sinensis</i>	17 ± 0.56	21 ± 0.57	120 ± 2.1
CD (P=0.05)	2.328	2.328	5.345

young shoots of *P. cattleianum* and *C. sinensis* and in the bottle (25 cm x 11 cm) separately. The shoots with the eggs were kept for hatching. After hatching the nymphs were reared in different glass bottles (11.0 cm x 5.5 cm) closed with nylon mesh to prevent migration. The fresh *P. cattleianum* and *C. sinensis* shoots kept in water filled vial were supplied as food on every alternate day. Observations were made on the morphological changes during incubation period and duration of nymphal instars. The newly emerged males and females from the nymphs were separated and kept for pairing. The mated adult was fed with fresh tender shoots of *P. cattleianum* and *C. sinensis*. The process was repeated twice and observations were made on various biological parameters.

Comparative study of developmental stages of *H. theivora* on *Camellia sinensis* and *P. cattleianum* revealed that the developmental period was lower on *C. sinensis* than *P. cattleianum*. There was no significant variation in the developmental periods of I, II and III instars

on both host plants. The study was in line with Roy *et al.* (2009) who recorded the nymphal development period varied from 8.4 to 16.2 days. Even though the developmental periods of male and female were longer on *P. cattleianum* there was no significant difference on both host plants (Table 1). Incubation period was prolonged on *P. cattleianum* (8.6 ± 0.33 d) than *Camellia sinensis* (6.0 ± 0.6 d).

Female showed longer longevity when fed with *P. cattleianum* (26d) than *C. sinensis* (21d). And male showed less lifespan when fed with *P. cattleianum* (22d) than *C. sinensis* (17d) *Psidium* (Table 2). The significant different between the *P. cattleianum* and *C. sinensis* are same respectively. The result is in accordance with the study of Sudhakaran and Muraleedharan (2006) who recorded the average longevity of females was 48 d whereas males lived for only 28 days in tea. Fecundity was lower on *P. cattleianum* than *C. sinensis*.

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