
Biology of *Sturmia convergens* (Diptera:Tachinidae) parasitizing monarch butterfly, *Danaus chrysippus* damaging Akanda (*Calotropis gigantea*) in Bangladesh

K.N. Ahmed, L.C. Mohanta¹, M.A. Al-Helal, and S.C. Ghose

BCSIR Laboratories, Dhaka, Quadrat-E-Khuda Road, Dhanmondi, Dhaka-1205, Bangladesh,
E-mail: knahmed2010@yahoo.com

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Sturmia convergens (Wiedemann) is an endoparasite of the monarch butterfly, *Danaus chrysippus* (L.) larvae which feeds on the leaves of an indigenous medicinal plant ferent parts of Bangladesh. This was recorded as a akanda (*Calotropis gigantea*) abundantly grown in diptachinid endoparasite of the monarch butterfly, *Danaus chrysippus* larvae (2). Parasitism of pine pests *Diprion pini* L. and *D. sertifer* by a tachinid, *S. inconspicua* has been reported in west Slovakia (6). Shapiro (7) described that *S. scutellata* parasitized caterpillars of gypsy moth. The parasitism of lepidopterans by the tachinid insects i.e. *S. bella* and *S. vanessae* has also been enumerated by several authors (3,5, 1). The biology of this promising tachinid parasite has not yet been reported and described in Bangladesh. Therefore, some observations on the biology of *S. convergens* and its possible role as bio-control has been invested. The parasitized *D. chrysippus* caterpillars along with the leaves of 'akanda' plant were collected by hand-picking from different plants grown in BCSIR Laboratory Campus, Rajshahi during November to January, 2003. Each of collected caterpillars was kept in isolated Petridishes (8cm diam.) for possible parasite emergence. Fifteen replications were maintained for this ob-

ervation. The tachinid parasites emerged from the parasitized lepidopteran larvae and butterflies came out from unparasitized ones. The mortality of the collected and reared caterpillars due to parasitization by this dipteran were carefully noted. The development of *S. convergens* occurred within the alimentary canal of the host and it was confirmed by dissecting a number of 5 parasitized or infected caterpillar larvae. The egg, larval and pupal periods of the parasite were observed carefully. The adult life span, life cycles of both the parasite and the host were also recorded. The experiments were carried out in the prevailing room temperature and relative humidity condition. The measurements of the different stages of the parasite were calculated with the aid of ocular and stage micrometers. Morphometrics of egg, larval and pupal and adult stages of tachinid parasitoids were taken using ocular micrometer. The development of the tachinid fly, *S. convergens* was accomplished in the body of the host caterpillar of *D. chrysippus*. The total life cycle lasted for 38.1 ± 2.02 days at an average room temperature of 17°C and 65-70 % RH (Table 1). The duration of development and morphometrics of parasite are presented in Tables 1 & 2. *S. convergens* has been reported as a parasite of

D. chrysippus devouring the leaves of *C. gigantea* in India (2). The female adult parasite completed a life span of 3.8 ± 0.83 days. Our observation was almost similar with that of Mathavan (2) who reported that *S. convergens* lives for 3.0 ± 1.5 days in starved condition. In the present study it was observed that due to lack of proper nourishment of the tachinid larvae from the host body, some parasites could not complete their development as adults. *S. convergens* passed through three larval instars during its development. The mean length and breadth of 3rd or final instar maggot were 7.7 ± 1.45 and 2.8 ± 0.20 mm, respectively. Morphometrics of different stages of *S. convergens* is given in Table 2. The adult female was 9.8 ± 0.51 mm in length and 12.0 mm in wing expanse. The adult fly is creamy-white in colour with black patches, bears semicircular large eyes which are pale brownish; antennae short and aristate type, wings creamy-white in colour with brownish venation, thorax swollen above and creamy white with black patches longitudinally. The thorax ends in a circular lobe of cream colour. The abdomen is 3-segmented in female and black with creamy-white patches. Anal segment is triangular with thick pointed bristles projecting outwards. Legs black in colour, ventrally head, thorax and abdomen are black in colour. The parasitized pupa of *D. chrysippus* showing two emerging holes of the tachinid parasite, *S. convergens* (Fig. A). The full grown adult female of *S. convergens* (Fig. D) and a deformed adult parasite (Fig. E) were noted. The total life cycle of the host, *D. chrysippus* was completed in about 55 days

during January and February, 2003 when the temperature range from 10-15°C. The larval and pupal periods of this host were nearly 15 and 30 days, respectively. About 25% natural mortality of the collected host larvae was observed. This indicated that *S. convergens* seems to be one of the important biological control agents causing mortality of *D. chrysippus* larvae. In laboratory conditions, *D. chrysippus* larvae caused 12.6 % mortality and it was high during the pupal stage (2). However, in the present investigation it was noticed that the larvae of this parasite came out from butterfly pupae by cutting their cuticles. Pupae of the parasite were formed in the rearing Petri dishes in short interval. The parasitic nature of other tachinid flies has also been noted earlier; *S. vanessae* parasitized lepidopteran larvae of *Eulia cupressana* Dup. (8). The control of hairy caterpillar, (*Eupterote canaraica* Moore) by the parasitic tachinid, *S. sericariae* Cornalia was reported by Joseph *et al.* (1) in India.

Literature Cited

1. Joseph KJ Narendran TC Rao MA. 1983 *Tropical Journal of Pest Management* **29**: 166-72.
2. Mathavan S. 1975 *Current Science* **44**: 554-55.
3. Mellini E. 1957 *Bollettino dell'Istituto di Entomologia, Bologna* **22**: 69-98.
4. Murthy DV. 1959 *Current Science* **6**: 256
5. Ramkrishna Ayyar TV. 1963 *Handbook of Economic Entomology for South India*, Madras, India.
6. Schinitschek E. 1941 *Zeitschr Pflanzenkrankh* **51**: 257-78.
7. Shapiro VA. 1956 *Zhur. Obshch. Biol.* **17**: 227.
8. Zocchi RO. 1957 *Redia* **42**:359-82.



Fig. 1. A - Parasitized pupa from which *Sturmia convergens* adult emerged- two openings seen through the pupa, B - A pupa of *S. convergens*, C - A pupa showing hole underside from which *S. convergens* adult emerged, and D - An adult female parasite, *S. convergens*.

Table 1.

Durations of different life stages and longevity of *Sturmia convergens* at mean room temperature of 17°C and 65-70% RH

Life stages/parameters	Mean duration (days) ± SD
Egg	5.3 ± 0.41
Larva	7.4 ± 1.14
Pupa	25.1 ± 1.60
Egg to adult emergence	38.1 ± 2.02
Longevity ♂♂	2.7 ± 0.19
Longevity ♀♀	3.8 ± 0.83

*data based on 15 observations

Table 2.

Morphometrics of different stages of *Sturmia convergens*

Life stages	Mean length (mm) ± SD	Mean breadth (mm) ± SD
Egg	1.2 ± 0.15	-
1st instar larva	1.9 ± 0.39	0.54 ± 0.11
3rd instar larva	7.7 ± 1.45	2.8 ± 0.20
Pupa	10.3 ± 0.63	3.9 ± 1.63
Adult ♂♂	8.7 ± 0.47	2.7 ± 0.21
Adult ♀♀	9.8 ± 0.51	3.4 ± 0.28

*data based on 20 observations