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Evergestis forficalis (L.) (Lepidoptera, Crambidae), a pest of cruciferous crops in the UT of Jammu and Kashmir, India

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ABSTRACT: Detailed studies on the pest biology, identification, nature and extent of damage, host plants and natural enemies of *Evergestis forficalis* (L.) (Lepidoptera, Crambidae) on cruciferous crops in Kashmir valley, India is reported. The biology of the pest on *Brassica oleracea* var. *acephala* is documented. The pest was found to be active in the field from July to September and inflicted serious damage to some economically important cruciferous plants in Kashmir Valley. One ichneuomonid parasitoid, *Chorinaeus* sp. has been recorded on the pest. © 2023 Association for Advancement of Entomology

KEY WORDS: Biology, extent of damage, host plants, parasitoid, *Chorinaeus, Brassica oleracea*

Evergestis forficalis (L.) (Lepidoptera, Crambidae), the garden pebble, is found in Europe, the Palearctic and North America and some parts of Asia. The moth has been reported as a pest on several crucifers/ Brassicaceae vegetable crops in India (Gupta, 1994; Bhat *et al.,* 2011; Bhat and Ahanger, 2018; Chandra *et al*., 2019; Anonymous, 2023). However, after a thorough literature study, indicated no detailed study on *E. forficaluis*, biology, host-range, nature and extent of damage and its natural enemies in Jammu and Kashmir. The present study encompasses the various aspects of the pest under taken.

A weekly extensive field survey was conducted at two study sites in two districts of Kashmir Valley during the year 2021 viz., vegetable field at Danderkhah Batmalo Srinagar District (34.0687°N; 74.7783°E) and another vegetable field at Serch Chowdrybagh in Ganderbal District (34.2165° N; 74.7719° E). The vegetable farms were surveyed. One plot was selected for sampling from each of the study site in above mentioned study areas. Samples were collected by hand picking method by using gloves. The sampling procedure was standardized by way of direct count technique where in number of larvae per plant was counted from at least 10 plants in four corners of the plot. The immature stages (larvae/caterpillars/pupae) of the pest were searched on the host plants and were collected and brought to the laboratory. The field data of the pest regarding number of eggs, larvae on each searched plant and nature and extent of damage of host plants, was recorded. The immature stages were reared in rearing containers in the laboratory to rear them as adults simultaneously observing for emergence of parasitoids, if any. The rearing was done at normal room temperature (around 30-32 ^{0}C) and in dry condition with proper hygiene and care maintained in rearing room. The larvae, during rearing, were frequently supplied with fresh leaves of the host plant. The debris and

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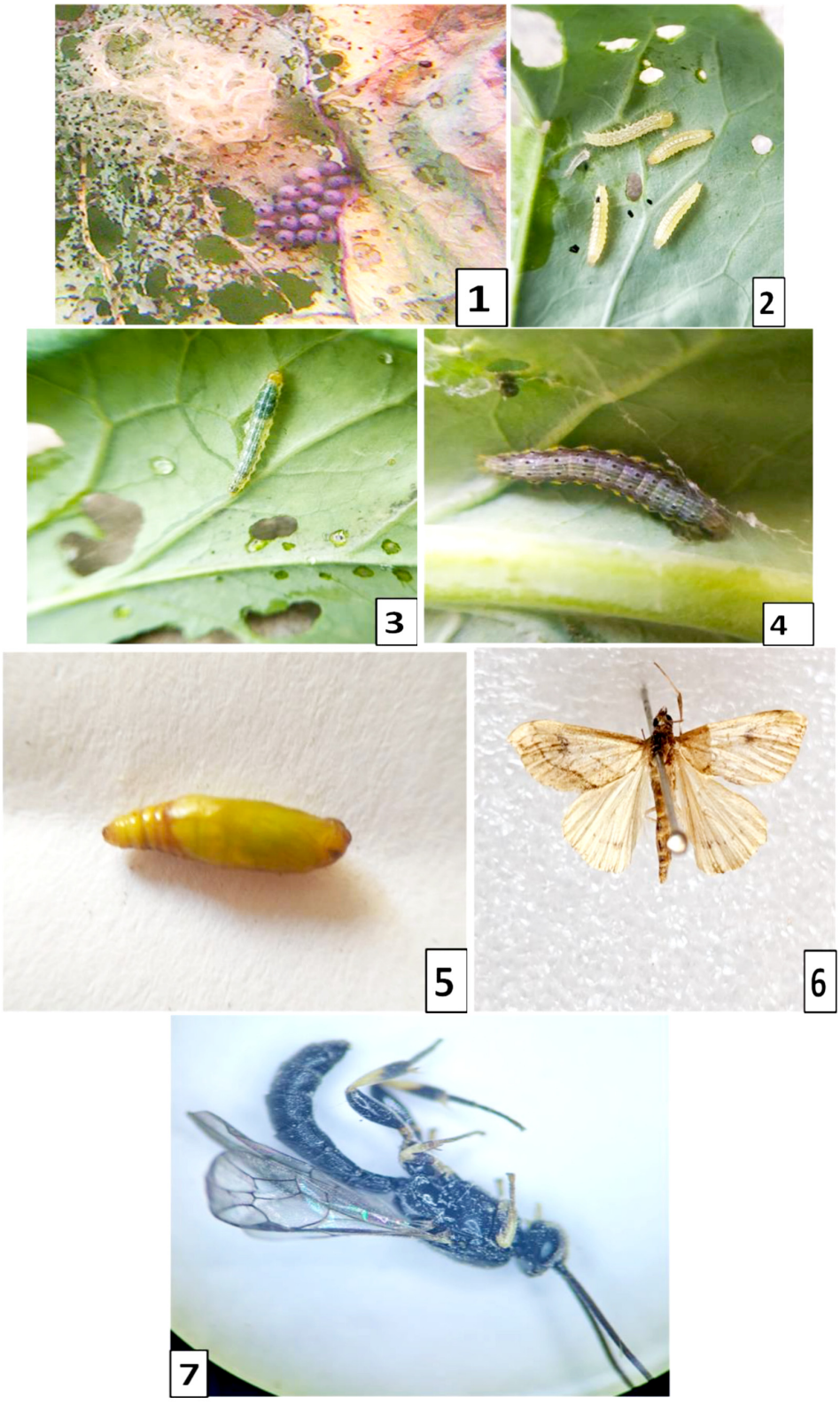

Fig. 1 Egg stage of *E. forficalis,* Fig. 2-4 larval stage of *E. forficalis,* Fig. 5 Pupal stage of *E. forficalis* Fig. 6 Adult stage of *E. forficalis*, Fig.7 Parasitoid, *Chorinaeus* sp. recorded on *E. forficalis*

excreta were regularly removed from rearing jars. In order to reduce the congestion, only 4-5 larvae were reared in one container. The bottoms of the rearing containers were filled with dry soil, so that, the final instars could get substratum for undergoing pupation. The adult moths emerged were preserved and identified (Hampson, 1896; https://www.mothsofindia.org/evergestis-forficalis). Similarly, the parasitoids (natural enemies) recovered during rearing were preserved and identified.

Adult moths (Fig. 6) were 10 to 14 mm long and brown with dark eyes and blotched markings on the tips of the wings with wingspan of around 25 mm. Forewings were straw-colored with olive to purplish-brown markings and transverse lines and hind wings were whitish with a dark margin.

The eggs were light pinkish and were laid in small clusters (10-28) on the under surface of leaves and were 1.5 mm x 1.00 mm each (Fig.1).The first instars after hatching were cream in color (Fig. 2), with subsequent instars turning greenish (Fig. 3). The fully grown caterpillars were having purple and white stripes across the body, two dots on each segment of the abdomen, and yellow lines that extend the length of the body on both sides (Fig. 4). Larvae developed through 4 instars. The last instar was around 18-20 mm long and had a bluish-gray coloring along the back with numerous transverse black bands.

During the present study, only 1-2 generation of the pest were observed in a year. Under the rearing conditions at room temperature (30^{o}C), the duration time from egg to adult was around 40 days. The egg took 4-8 days to hatch. Larval development was around 20-22 days (with fist and second instars 5-7 days, third instar 5-6 days and fourth instar 10-12 days). The pupal stage lasted 10-13 days. In the present study, the pupation was observed underneath leaves or in soil at the bottom of rearing containers. Pupae were brownish in colour and around 12 mm long (Fig. 5). The newly emerged adults upon emergence died within 5-6 days (under rearing conditions).

The young larvae after hatching from eggs scratched soft parts of leaves and fed gregariously. The later instars dispersed and fed in isolation, punching holes or causing more extensive defoliation of young and mature leaves. Caterpillars created irregular- shaped holes in leaves when feeding leaving only the veins causing skeltonization symptoms in the leaves. Under severe infestation, 3-4 leaves of each plant were found to be heavily skeltonized.

In Kashmir, the infestation of the host plants was recorded from the month of July to September, with highest activity in the month of August as observed during the study. The pest was observed feeding on some Brassicaceae plants and mostly infesting Kale (*Brassica oleracea* var. *acephala*), knol-khol (*B. o.* var. *gongylodes*), turnip (*Brassica rapa*) and cabbage (*B. o.*var. *capitata*).

One species of parasitoid *Chorinaeus* sp. (Ichneuomonidae) was recovered during rearing of *E. forficalis* larvae. However, the percentage of the parasitisation was very low, (1-2 %). The colour of the parasitoid was black (Fig 7). Face, clypeus, malar space, mandible, palpi, ventral part of scape, tegula, fore and mid legs, hind trochanters, and hind tibia to tarsus yellow. Antenna with 29 flagellomeres.

The observations recorded, during the present study on the host plants, nature and extent of damage and biology of *E. forficaluis*, are in line with the observations made by Meyrick, (1895), Thunisen *et al*. (1985), Gupta (1994), Gratwick (1992), Bhat *et al.* (2011) and Chandra *et al.* (2019). Moreover, the parasitoid, *Chorinaeus* sp. (Ichneuomonidae) is the first report on *E. forficalis.*

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