



RESEARCH ARTICLE

STUDY OF INCUBATION PERIOD AND HATCHING OF *CHRYSOCORIS STOLLI* WOLF
(HETEROPTERA -PENTATOMIDAE-SCUTELLERANE)

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ABSTRACT

Insecta is the largest class of phylum arthropoda and members of this class are characterized by the presence of three pairs of legs; hence, called Hexapoda, Besides, these tracheate organism have usually one or two pairs of wings. Insects always have been associated with mankind in one way or the other as some of them are beneficial other are pests of crops and house hold articles. *Chrysocoris stollii* Wolf (Heteroptera- Pentatomidae-Scutellerinae) is a phytosuecivorous bug, which infests *Cassia occidentalis*, *Croton sparisiflorum*, *Pennisetum typhoides*, (Bajra) and *Litchi chinensis* at Saharanpur in good number and by its desapping habit causes considerable loss to these plants of economic value. The incubation period varies according to temperature and humidity of the environment, table-1. It ranges from 7 to 14 days with an average 9 days. During summer months, April to September 7 to 10 days are required for hatching while during winter months, October and November, it takes 12 to 14 days. There is no true operculum and at eclosion, a circular part towards cephalic end off the egg containing micropylar processes ruptures and separates of from the rest of the egg shell and opens just like a lid.

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INTRODUCTION

The incubation period varies according to temperature and humidity of the environment, table-14. It ranges from 7 to 14 days with an average 9 days. During summer months, April to September 7 to 10 days are required for hatching while during winter months, October and November, it takes 12 to 14 days. There is no true operculum and at eclosion, a circular part towards cephalic end off the egg containing micropylar processes ruptures and separates of from the rest of the egg shell and opens just like a lid. This lid may be connected at one point to the egg shell or it may completely separates off. During hatching, the nymph protrudes out through the slit its head first and antennae, rostrum legs, thorax and abdomen afterwards. It was further observed that during hatching, the nymph protrudes out in inverted position and on exposure to air it turns to real normal position. A few nymphs (5%) were failed to emerge as they could not free their appendage from the egg shell and died later. The entire process of the emergence of nymph takes 10-30 minutes, with an average of 20 minutes table-2 After hatching the egg shell along with exuvium of the post natal moult is left attached which appears like a transparent membrane.

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The newly emerged nymph rests for a while to dry its appendages and body and then moves forward and starts feeding on water soaked seed of Bajra and tender leaves of *Croton sprisiflorum*, *Litchi chinensies* etc.

MATERIALS AND METHODS

The present study deals with *Chrysocoris stollii*, a pest of *Cassia occidentalis*, *Croton* and Bajra and Litchi etc. Regarding this, the method of collection of bugs, biology, ecology, population dynamics, studies, rearing techniques and mounting methods are described here-A. Rearing of *Chrysocoris stollii*: For the study purpose, district Saharanpur was divided in 5 regions, in, Saharanpur proper, Nakur, Behat, Sarsawa and Nagal. Plantsware selected randomly in these regions and bugs were pickedup from *Cassia occidentalis* and *Croton sparisiflorum* and Bajra by hand picking method. In this experiment various shades of lights, viz;- red, blue, green, yellow and orange wear taken into consideration by using zero watt bulbs for attraction of bugs. For this purpose a big cage of the size (60x40x30xcm) was taken and it was divided into six compartments leaving a small gap (2½ x 2½ cm) in each septum toward lower side. In this way all these six chambers were internally connected to each other so that bugs may move freely in each one without any interference. Now, in each chamber zero watt bulb of various shades of light, viz;-red,

green, blue, yellow and orange were provided except a central chamber which was kept dark. In this chamber bugs were released and the bulbs were switched on during the night and observations were recorded. It was noticed that not even a single bug moved to other lighted chambers from central dark one. To ascertain further, 10 bugs were released in each chamber except central dark one and the bulbs were lighted. It was observed that the bugs migrated to darker chamber within half an hour. This indicates negative attitude of the bug towards light. During strong illumination, the pest showed active movements and hides in dark places, as during mid summer day. Thus, to *Chrysocoris stollii* any phototactic response cannot be assigned from control point of view. The important point which was noticed that the fourth and fifth nymphal instars moult in presence of sun lights during the day on dorsal surface of the host while younger instars moult usually on the ventral side of the leaf.

RESULTS

Incubation period and hatching: The incubation period varies according to temperature and humidity of the environment,

Table 1. Observation on hatching period of *Chrysocoris stollii* Wolf

S. No. of egg examined for hatching	Hatching		
	Started at	Finished	Duration in minutes
1	6.10Am	6.23Am	13
2	5.40 Am	5.55Am	15
3	7.45Am	7.57 Am	12
4	8.40 Am	8.55Am	15
5	9.00Am	9.30Am	30
6	10.30Am	10.40Am	10
7	6.00Am	6.12Am	12
8	5.00Am	5.10Am	10
9	3.00Am	3.10AM	10
10	6.00Am	6.15Am	15
11	7.30Am	7.44Am	14
12	9.45Pm	9.59Pm	14
13	11.00Am	11.13Am	13
14	6.00Pm	6.15Pm	15
15	9.00Am	9.20Am	10
16	10.20Am	10.32Am	12
17	11.30Am	11.43Am	13
18	12.30Pm	12.44Pm	14
19	8.30Am	8.45Am	15
20	5.00Pm	5.15Pm	15
21	6.00Am	6.20Am	20

Average has been taken for the 100 observation = 20 minute; Min = 10 minute; Maxi = 30 minute

It ranges from 7 to 14 days with an average 9 days. During summer months, April to September 7 to 10 days is required for hatching while during winter months, October and November; it takes 12 to 14 days. There is no true operculum and at eclosion, a circular part towards cephalic end off the egg containing micropylar processes ruptures and separates off from the rest of the egg shell and opens just like a lid. This lid may be connected at one point to the egg shell or it may completely separate off (Fig-7 E and F). During hatching, the nymph protrudes out through the slit its head first and antennae, rostrum legs, thorax and abdomen afterwards. It was further observed that during hatching, the nymph protrudes out in inverted position and on exposure to air it turns to real normal position. A few nymphs (5%) were failed to emerge as they could not free their appendage from the egg shell and died later. The entire process of the emergence of nymph takes 10-30 minutes, with an average of 20 minutes

Table 2. Observation on Incubation Period of *Chrysocoris stollii*. Wolf

Number of observation	Date of egg laying	Date hatching	Incubation period (in days)	Temp – 0°C	R.H. M - %
1	05-03-04	12-03-04	7	32°C	85%
2	29-04-05	05-05-04	7	32.5°C	71%
3	06-05-04	14-05-04	8	43.30°C	57%
4	09-05-04	17-05-04	8	43.30°C	57%
5	11-05-04	21-05-04	10	43.30°C	57%
6	03-05-04	17-06-04	14	44.30°C	83%
7	18-06-04	30-06-04	11	44.30°C	83%
8	28-02-05	12-03-05	12	28.97°C	92%
9	01-03-05	13-03-05	12	32.33°C	83%
10	20-03-05	30-03-05	10	32.33°C	83%
11	29-04-05	05-05-05	7	38.16°C	68%
12	06-05-05	14-05-05	8	42.40°C	63%
13	09-05-05	17-05-05	8	42.40°C	62%
14	11-05-05	21-05-05	10	42.40°C	62%
15	03-06-05	17-06-05	14	44.40°C	77%
16	18-06-05	31-06-05	11	44.40°C	78%
17	01-07-05	10-07-05	9	36.01°C	88%
18	03-07-05	11-07-05	8	36.02°C	88%
19	31-07-05	07-08-05	7	36.11°C	89%
20	02-08-05	11-08-05	9	34.11°C	91%
21	18-08-05	26-08-05	8	34.10°C	91%
22	31-08-05	28-09-05	8	33.25°C	92%
23	12-09-05	21-09-05	9	35.26°C	92%
24	30-09-05	09-10-05	9	30.04°C	93%
25	18-10-05	26-10-05	8	30.04°C	93%

Average in cubation period of 200 egg = 9 days; Mini=7 days; Maxi=14 days

After hatching the egg shell along with exuvium of the post natal moult is left attached which appears like a transparent membrane? The newly emerged nymph rests for a while to dry its appendages and body and then moves forward and starts feeding on water soaked seed of Bajra and tender leaves of *Croton sprisiflorum*, *Litchi chinensies* etc.

Nymphal period

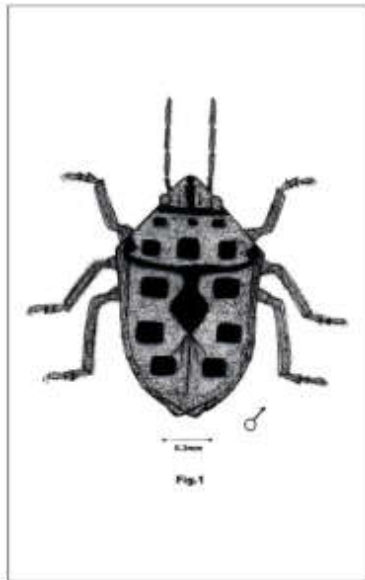
Nymphs of *Chrysocoris stollii* develop gradually and nymphal period starts soon after emergence. The 1st instar nymph after hatching undergoes five moults before emerging into adult. It has been noticed that all the nymphs are active feeder 27 and feed gregariously on the water soaked *Bajra* seeds and leaves of *Cassia occidentalis*, *Litchi* and *Croton*, etc in laboratory while in field on the host plant only. The duration of nymphal periods varies from 37 to 48 days with an average of 39 days depending upon the temperature, R.H., food and other climatic factors.

Table 3. Minimum and Maximum Nymphal Period longevity of adults, Pre-copulation, Copulation, Pre-oviposition and incubation Period (in days and hrs)

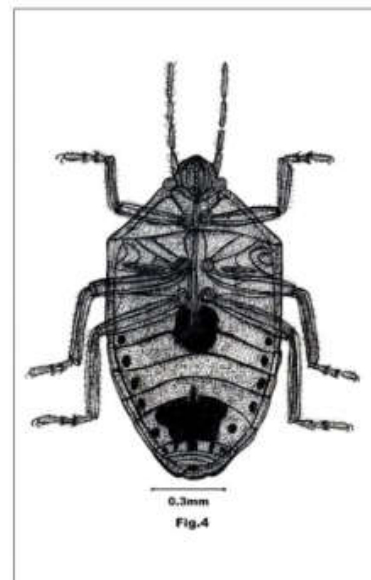
Particulars	Minimum Period D/H	Maximum Period D/H	Average Period D/H	No. of observation
First instar	5d	11d	8.05d	150
Second instar	7d	13d	9.08d	150
Third instar	7d	13d	10d	150
Fourth instar	8d	15d	12d	150
Fifth instar	9d	16d	13d	150
Longevity of male	24d	49d	37d	150
Longevity of female	32d	58d	48d	150
Pre-copulation period	16d	37d	27.54d	150
Copulation period	2h	5h	4h	150
Pre-oviposition	44h	70h	55h	150
Oviposition period	14h	21h	19h	150
Incubation period	7d	14d	9d	150

Maximum duration in rainy season d = days, h=hours.

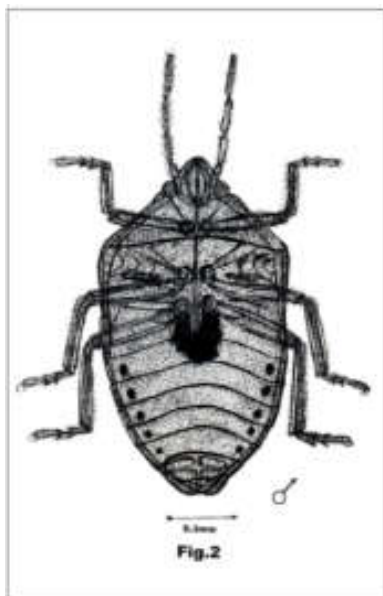
The maximum length of time for first nymphal instar is of 11 days and the minimum 5 days. The average period for 150 individuals is calculated as 8.05 days.



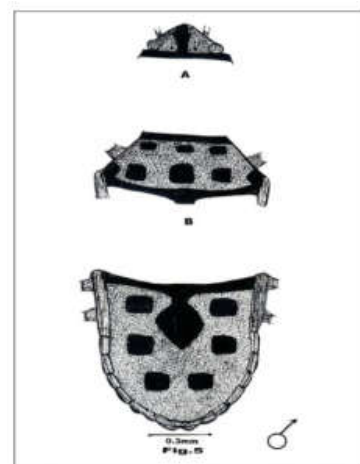
Dorsal view of male *Chrysocoris stollii* Wolf



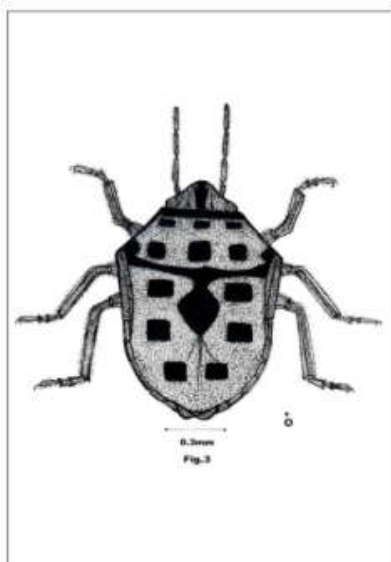
Ventral view of female *Chrysocoris stollii* Wolf



Ventral view of male *Chrysocoris stollii* Wolf



Head, thorax and abdomen of the male *C.stollii*



Dorsal view of female *Chrysocoris stollii* Wolf



Fig.6. *Cassia Occidentalis*, a food plant of *Chrysocoris stollii*



Fig.7. Eggs of *Chrysocoris stollii* Wolf in groups

Seven days are required as minimum period and 13 days as maximum period for IInd in star nymphs. Average period being 9.08 days for 150 individuals. A minimum of 7 days and maximum 13 days are required for 3rd instar to moult. An average ecdysis period of 10 days is calculated for 150 individuals. The 4th instar required 8 days as minimum and 15 days, as maximum period in rainy season and 11 days as an average period for 150 individuals. The fifth instar takes 9 days as minimum period and 16 days as maximum period with 13 days as an average moulting period for 150 specimens.

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