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Life Table of *Aphis Gossypii* (Glover) *(*Homoptera - Aphididae) on Two Species of Cucurbits

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Abstract:

Melon aphid, *Aphis gossypii* (Glover) completed four nymphal instars on two species of cucurbits { Ridge -gourd : *Luffa acutangula* and Bottle -gourd : *Lagenaria vulgaris*} under laboratory condition. The total nymphal period of *Aphis gossypii* observed high (6.31 days) on Ridge- gourd as compare to (5.66 days) on Bottle- gourd. The average longevity of *Aphis gossypii* was 18 days on Ridge-gourd and 16 days on bottle- gourd. The average fecundity of *Aphis gossypii* was 28-74 on Ridge- gourd and 25-71 days on Bottle- gourd.

Keywords: - *Life table, cucurbits, Nymphal instars', Aphis gossypii*

Introduction:

Aphids are commonly called plant lice. The tiny creatures are injurious to various crops. They demage the crops by desapping virus inducing habits. *Aphis gossypii* (Glover) is a serious pest of many agricultural crops including cucurbits. Various studies have been carried out time to time on this aphid species. Rahman, et al., (2009) on Brinjal, Patel & Patil (2013) on life table of this aphid and panwar, et.al, (2014) on Bt cotton. In present paper an effort have been made to study life table of *Aphis gossypii* on two species of cucurbits viz., *Luffa acutangula* (Ridge - gourd) and *Lagenaria vulgaris* (Bottle- gourd).

Materials and Methods:

The present investigation were carried out in western Uttar Pradesh , during the year 2014-15. The biology of *Aphis gossypii* (Glover) were conducted under lab condition. The detailed methodologies followed during present investigation are given below.

Maintainence of culture of *Aphis gossypii:*

The culture of *Aphis gossypii* was maintainied on Lauki and Torai plant raised in pot. The aphid *Aphis gossypii* collected from the field were transferred to the plant and allowed to rear on it for maintaining the culture. The plant were covered with fine muslin cloth in the cage to prevent the entry of natural enemies and other insect pests.

Rearing of *Aphis gossypii*:

The seedling of Lauki and Torai plant were raised in earthen pots. Necessary care was taken to maintain seed healthy. The newly borned nymph were transferred individually with the help of fine camel hair brush in each potted plant. Such plant or leaf with tendril wrapped water soaked cotton were covered individually with glass chimney. The top end of chimney was covered with a piece of fine muslin cloth and secured in position with the help of rubber band. The nymph were observed daily to record the moulting in different instar till the formation of adult. The date of adult death was also recorded. The period of different nymphal instars and longevity of adult was also worked out.

Different stages of *Aphis gossypii* were examined under binocular microscope and critically observed for their colour, shape, and other morphological characters. The length and breadth of different nymphal instars and adult stage were measured using ocular and stage micrometer.

Varieties	Nymphal instar				Total nymphal period (Days)	Prereproductive period (days)	Reproductive period (days)	Post Reprpoductive (days)	Average longevity	Average life span	Average fecundity	
	I	II	III	IV							Per female	Per female per day
Ridge gourd	.21 ± .25	2.5 ± 1.15	2.0 ± 1.45	1.6 ± 1.45	6.31 ± 2.59	2 ± 1.09	10 ± 1.5	1 ± 0.02	12 ± 8.37	18- 29	28/ 74	2-6
Bottle gourd	.56 ± .41	2.0 ± 1.0	1.5 ± .07	1.6 ± .07	5.66 ± o.25	1.5± 0.07	12± 5.5	2 ± 0.03	13.25 ± 8.1	16-27	25/ 71	2-5

Table- 1:- Biology of Aphis Gossypii (Glover) on *Luffa actuangula* **and** *Laginaria vulgaris*

*Average based on ten observations

Result and Discussion:

The nymph were found to pass through four different nymphal instar when reared on cucurbits. Earlier Passlow and Roubieck (1967) Nayar, et al., (1981) also recorded four nymphal instars of this aphid on various host plants.

First Instar:

Freshly borned first instar nymph were oval in shape, dorsally convex, greenish brown / yellowish brown in colour with three pairs of legs. Antennae were six segmented short filliform and light black in colour. A pair of tube like structure (siphunculi / cornicles) was observed dorsally on the posterior region of the abdomen. Duration of first instar nymph was found 0.21± 0.25 on Ridge- gourd and 0.56 ± 0.41 days on Bottle- gourd plant. However, Patil and Patel (2013) observed duration of first instar nymph as 2.04 ± 0.16 days, while working on Isabgol plant.

The body length of first instar nymph measured from 0.44 to 0.56 mm with an average of (0.510 ± 0.007)mm and breadth 0.34 to 0.44 mm with an average of (0.380 ± 0.005) mm.

Second Instar:

Freshly moulted second instar nymph were oval in shape and greenish brown to willow green in colour. They were similar to the first instar nymph in their general appearance and morphological character, except in body size. In freshly moulted nymph, the exuvium of precending instar was seen near the posterior end of the abdomen. Duration of second instar was observed 2.5 ± 1.15 days on Ridge gourd and 2.0 ±1.00 days on bottle- gourd. However, Rajendra Singh and Kusum Singh (2015) while working on life history parameters of *Aphis gossypii* observed that the second instar was completed in 2.10± 0.31, 1.80 ± 0.41 and 2.07 ± 0.25 days on chilli, gourd and brinjal respectively.

The measurement of second instar nymph indicated that each nymph varied from 0.66 to 0.96 mm with an average of (0.47 ± 0.01) mm in length and 0.38 mm to 0.56 mm with an average of (0.470 ± 0.010) mm in breadth.

Third Instar:

Newly moulted third instar nymph were spinach in colour & oval in shape. Third instar nymph were distinguishable from that of previous nymphal instars. They possessed three pairs of well developed legs lateroventrally on three thoraeic segments while become more conspicuous. The antennae were well developed and black in colour. Duration of third instar nymph was observed 2.0 days on ridge gourd and 1.5 days on bottle -gourd. However, Elegbede, *et al*, (2014) while working on development of *Aphis gossypii* on cotton leaves observed 1.19 ± 0.04, 1.08± 0.05, 1.00 ± 0.02 and 1.11 ± 0.04 days respectively.

Fourth Instar:

Fourth instar nymph were emerald green in colour and similar to that of third instar nymph in their general appearance and morphological characteristics except in body size.

Duration of fourth instar was ranged from 1.6 days on both ridge- gourd and bottle- gourd plant. Measurment values for fourth instar nymph showed that it varied from 1.28 to 1.52 mm with an average of (1.39 ± 0.13) mm in length and 0.64 to 0.76 mm with an average of (0.71 ± 0.008) mm in breadth.

Total nymphal Period :

Total nymphal period was considered from birth of first instar nymph to the end of fourth instar. It is 6.31 days on ridge gourd and 5.66 days on bottle gourd.

However, Patil and Patel (2013) recorded first, second, third and fourth instar nymph as (2.04 ± 0.16), (1.68 ± 0.16), (2.00 ± 0.17) and (1.64 ± 0.13) days respectively on Isabgol plant.

Adult:

The adult were oval in shape and bottle green to dark green in colour. They were larger in body size than the nymphal stage and possened a pair of well developed conspicuous black coloured cornicles at posterior region of abdomen. Wings when present were in two pairs and transparent with black veins. The black coloured antennae were much large in size than the nymph stage.

The longevity of adult was recorded from 18 days- 29 days on ridge-gourd and 16-27 days on bottle- gourd. More or less similar life span of *Aphis gossypii* has been reported by Kersting, *et al*, (1999) and Desai(2000).

Pre reproduction, Reproduction and Post reproduction period:

Ten newly emerged adults were observed for their pre reproduction, reproduction and post reproduction periods. During the study period, the average temperature was 22^0C with relative humidity 52%.

The pre reproduction period was 2.00 ± 1.09 days on ridge-gourd while on bottle- gourd it was 1.5 ± 0.07 days.

The female aphid was observed to reproduce for a period of 10± 1.5 days on ridge- gourd and 12 ± 5.5 days on bottle-gourd.

The post reproduction period was observed 1 ± 0.02 days on ridge- gourd and 2± 0.03 on bottle-gourd plant.

However, Singh et al., 1988 observed the reproductive period of *Aphis gossypii* as 13.0 (G- 27) to 14.7 (LD- 230) days on different cotton cultivar.

Fecundity:

The reproductive potential of *Aphis gossypii* was studied by counting the number of individuals produced by each adult aphid during its reproductive period. The female had produced minimum of 28 and maximum of 74 with an average of 46 nymph per female. The fecundity of *Aphis gossypii* on cotton (21.32 nymph/ female) and okra (25-32 nymph / female) reproduced, Desai (2000).

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