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Short Note

Biology and Morphology of Aonla Aphid, *Schoutedonia emblica*

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The fecundity, nymphal development and longevity of aonla aphid, *Schoutedonia emblica* were studied. The aphid was exclusively viviparous and parthenogenetic. The duration of first, second and third nymphal instars were 3.4±0.46, 2.5±0.55 and 3.0±0.74 days respectively with a total nymphal duration was 8.9 days. The average length and breadth of adult aphid was 1.60±0.01 and 0.79±0.02 mm respectively. The adult aphid lived upto 12.8±1.58 days and had a fecundity rate of 28.4±2.63.

Key Words: Biology, *Schoutedonia emblica, Emblica officinalis.*

Aonla or Indian gooseberry, *Emblica officinalis* Gaertn, is an important fruit crop of India. The fruit is a very rich source of vitamin C. Seeds are used for alleviating asthma and stomach disorders and its flowers, roots and bark of the tree are also used for medicinal purposes. Aonla is prone to the attack of more than a dozen of insect pests. The major pest is aphid, *Schoutedonia emblica* (Patel and Kulkarni) (Aphididae: Hemiptera). Damage occurs as a result of directly sucking the cell sap which leads to death of growing shoots and reduction in fruit setting. It attacks aonla leaves and young shoots from April to September in north India (Patel and Kulkarni, 1954). As there is very little work on the biology of *S. emblica,* the present study was undertaken.

Materials and Methods

Biology

Aonla aphids were collected from aonla shoots in field and released on 60 days old aonla grafts and the grafts were covered with mylar film cages. One day after release the adults were removed and the nymphs allowed to feed and grow. Ten newly emerged adults were released on fresh terminal shoots of aonla grafts and covered with mylar film cage. Following the occurrence of adults, number of nymphs laid by ten aphids was recorded at 24 hrs interval till laying stopped. The longevity of adult aphid was also recorded.

The newly emerged nymphs were observed daily for moulting. For instar fixing, after the first moult all the ten nymphs were collected and preserved. In the other grafts the moulted skins from nymphs were carefully removed without disturbance. Similarly, the nymphs were collected at each moult in other grafts and preserved for morphometric studies. Observations were recorded on nymphal duration, pre-reproductive and reproductive periods, fecundity and adult longevity by transferring a single aphid on fresh shoot in a separate cage till the death of the female.

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Mounting of nymphal instars and adults

The apterous form of aphids collected were processed separately and mounted on a glass slide as per method described by Blackman and Eastop (2000). Ten slides with single aphid mounted on each slide were prepared for measuring different body parts. The data on morphometrics, *viz.,* head capsule width, lengths of pro-thoracic, meso-thoracic and meta-thoracic legs, antenna, rostrum and cornicle were recorded with the aid of binacular microscope (Bioplus-XL) fitted with a ocular micrometer and expressed in millimeters.

Results and Discussion

The aphid was exclusively viviparous and parthenogenetic. Patel and Kulkarni (1954) reported that the aonla aphids were viviparous. It developed through three nymphal instars in 8.9 days. New born nymphs were tiny, pale green and pear shaped. The width of head capsule was 0.15±0.02 mm (Table 1). The antenna had a length of 0.27±0.02 mm with four segments.The length of the rostrum was 0.30±0.04 mm. The metathoracic legs had the maximum length of 0.65±0.01 mm compared to pro (0.62±0.02 mm) and meso (0.53±0.02 mm) thoracic legs. The cornicle was very small measuring 0.09±0.02 mm. The total length and width of the body was 0.61±0.06 mm and 0.33±0.05 mm. The mean duration of this instar was 3.4±0.46 days (Table 2).

The second instar nymphs were also green with body length and width of 0.84±0.05 and 0.43±0.03 mm respectively. The head capsule had a width of 0.18±0.01 mm. The antennae had four segments with a length of 0.30±0.02 mm. The metathoracic legs were the longest with a length of 0.78±0.01 mm, while pro and meso thoracic legs measured 0.71±0.02 and 0.68±0.02 mm. The length of cornicle

Table 1. Morphometrical observations of nymphs and adults of aonla aphid, *S. emblica*

Parameter	Measurements (mm)* (Mean ± SD)			
	I instar	II instar	III instar	Apterous adult
Length of body	0.61±0.06	0.84±0.05	1.49±0.01	1.60±0.01
Width of body	0.33±0.05	0.43±0.03	0.76±0.02	0.79±0.02
Width of head capsule	0.15±0.02	0.18±0.03	0.25±0.01	0.33±0.01
Length of antenna	0.27±0.02	0.30±0.02	0.71±0.02	0.96±0.03
Length of rostrum	0.30±0.04	0.37±0.02	0.76±0.02	1.01±0.05
Length of prothoracic leg	0.62±0.02	0.71±0.02	0.97±0.02	1.08±0.07
Length of mesothoracic leg	0.53±0.02	0.68±0.02	0.91±0.02	1.00±0.05
Length of metathoracic leg	0.65±0.01	0.78±0.01	1.04±0.06	1.26±0.03
Length of cornicle	0.09±0.02	0.15±0.01	0.21±0.01	0.30±0.01

(* Mean of ten observations)

increased to 0.15±0.01mm compared to first instar where it was 0.09±0.02 mm (Table 1). The second instar took 2.5±0.55 days to moult into third instar (Table 2).

The third and final instar nymphs were also green. The total length and width of the body were 1.49±0.01 mm and 0.76±0.02 respectively. The head capsule had a width of 0.25±0.01 mm. The antenna consisted of six segments, measuring 0.71±0.02
mm. The mean length of rostrum was 0.76±0.02 mm. As in the other two instars metathoracic leg was the longest with a length of 1.04±0.06 mm. The cornicle measured 0.21±0.01mm (Table 1). The mean duration of third instar nymph was 3.0±0.74 days (Table 2).

Table 2. Biology of *S. emblica* on aonla

Particulars	Developmental period (days)*	
	Range	Mean±SD
Nymphs		
First instar	3.00-4.0	3.4±0.46
Second instar	2.00-3.00	2.5±0.55
Third instar	2.00-3.00	3.0±0.74
Total nymphal period		8.9± 1.75
Adults		
Pre-reproductive period	0.5-2.00	1.1±0.54
Reproductive period	4.00-6.00	.4±1.14
Adult longevity	11.00-13.00	12.8±1.58
Fecundity	26.00-30.00 (Nos.)	28.4±2.63

(* Mean of ten observations)

The apterous adults were deep green.The average width of head capsule was 0.33±0.01 mm. The antennae had six segments with a total length of 0.96±0.03 mm. The rostrum of apterous form measured 1.01±0.05 mm. Length of pro, meso and metathoracic legs were 1.08±0.07, 1.00±0.05 and 1.26±0.03mm respectively. The length of cornicle was 0.30±0.01 mm (Table 1). Adults lived for about 12.8 days (Table 2).

The adults started laying young ones after a pre-reproductive period of 1.1±0.54 days. Single adult aphid produced 26.0 to 30.0 nymphs during the reproductive period of 4.4±1.14 days (Table 2). Almost similar observations were reported by Singh *et al.* (2005) on *Schoutedonia bougainvillae* with an average fecundity of 30.5 nymphs and nymphal period of 8.3 days. The adult longevity was 12.3 days.

Aphids were observed to congregate on the new flush at the growing points of aonla. The infested leaflets turned yellow and dried up. These observations are in line with the reports of Masarrat Haseeb (2005) and Rani *et al.* (2006). Dixon (1997).

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