



Biology and host range of spiralling whitefly, *Aleurodicus dispersus* Russell

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ABSTRACT

Experiments on biology of spiralling whitefly, *Aleurodicus dispersus* Russell and its host range on guava were conducted. The studies on biology revealed that female laid on an average 44.60 eggs. The average duration of first, second, third, fourth instars were 5.6, 4.9, 6.0 and 6.5 days, respectively. Male adults were bigger than female. The adults survived for on an average of 12.7 days. The total life cycle completed in 41.2 to 55.7 days with an average of 47.7 days. In all 31 host plants belonging to 22 families were recorded in and around Dapoli, Dist Ratnagiri. Out of these, 21 plants were probably reported firstly from Maharashtra.

Keywords: spiralling whitefly, *Aleurodicus dispersus* Russell, guava, biology, host range

Received 11.07.2017

Revised 02.08.2017

Accepted 30.08.2017

INTRODUCTION

Spiralling white fly, *Aleurodicus dispersus* (Russell) has become a serious pest in recent years. Spiralling white fly, *A. dispersus* is native of Caribbean Island, Central America and was first noticed from coconut plantation in Florida (USA) during 1957 by Russell and described as *A. dispersus* in 1965. At the time of description he recorded 44 plant species as the host of Spiralling white fly from Florida central, South America and Caribbean Island.

Both adults and nymphs suck the sap from lower surface of leaves and secret honey dew which favours sooty mould development and there by inhibits photosynthetic activity (Douressamy *et al.*, 2002). Geetha (2000) reported premature leaf fall and yellowing of leaves in groundnut in Tamilnadu. Yellow speckling, crinkling and curling of leaves was noted when the infestation was severe on tapioca (Palaniswami *et al.*, 1995). The guava being major host of spiralling whitefly and relative scanty information on biology and host range of this pest in Maharashtra is present. As the absolutely no information is available on its biology and host range aspects in the Konkan region of Maharashtra, the research work has been aimed to find out biology and host range of this pest.

MATERIAL AND METHODS

Experiment was conducted during 2013-2014 in field and laboratory of the Department of Agriculture Entomology, college of Agriculture, Dapoli Dist. Ratnagiri.

Biology: Biology of spiralling whitefly was studied on potted plants of guava. The micro cage was prepared by using plastic container of size 4 cm diameter and 3.5 cm height. One side of the identity card holding clip glued to the container and another side glued to the lid of the container. The container and the lid was held in the position with the help of identity card clip, such a way that leaf placed in between lid and the container. The basal portion of the container removed and covered with muslin cloth and fastened with the cello tape. A newly emerged pair of male and female adult were released on the ventral surface of the leaf and confined with the micro cage which was fitted on underside of the leaf. Ten such pairs were kept for the observation. The total numbers of eggs laid were counted after death of the adults. Daily observations on the number of eggs hatched were recorded to determine the incubation period and hatching percentage. The nymphs emerged from eggs were used for studying the different nymphal periods. About 10 nymphs were enclosed in each micro cage and observations were made on the duration

of each stage with the help of 15x pocket lens. The morphometrics studies were made by using 'computerized micrometer'.

Host range: Regular survey was undertaken to record the host plants of spiralling whitefly. The cultivated crops, weed fauna as well as forest plants available in the vicinity of college of agriculture, Dapoli and also the college of Forestry, Dapoli Dist. Ratnagiri were inspected for the infestation of spiralling whitefly and the infested plants observed were considered as host plant of spiralling whitefly.

RESULT AND DISCUSSION

The morphometric parameters of different stages are listed in Table 1 and biology in Table 2. The eggs were smooth surfaced, elliptical, translucent, light yellowish in colour. Eggs were deposited mainly on adaxial surface of the leaves. Eggs were laid in loose spiral pattern covered with wax. There were four distinct nymphal instars. The first instar nymphs were translucent yellowish in colour, with a convex dorsum having functional legs. They were mostly found on the leaf surface parallel to veins and veinlets. The second instar nymphs were translucent and oval in shape. They had many marginal fringed of wax which covered the body on dorsum. A pair of mycetomes appeared clearly in the centre of the body.

Third instar nymphs were oval, having numerous evenly spaced glassy wax rods on the margin of the body produced from abdominal pore. The wax secretion was more totally covering the body. The body was entirely covered with copious amount of white waxy material. They secrete numerous number of glassy rod like filaments from the compound pores. The fourth instar, which are called as pupa, were differentiated by the presence of two red eye spots in the cephalic region. . The average duration of first, second, third, fourth instars were 5.6, 4.9, 6.0 and 6.5 days, respectively. The wings of newly emerged adult were clear after unfurling, later covered with a white waxy powder. The eyes were dark reddish brown and forewing each had two characteristic dark spot. Males were bigger than female. Male adult could be easily distinguished by elongated claspers, which were exposed from the distal end of the abdomen in between the wings. The adults were survived for 12.7 days. Adult males were 2.40 mm in length and 1.22 mm in breadth and the females were 1.86 mm in length and 1.09 mm in breadth. The result of present study are in conformity with Aishwariya *et al.* (2006); Muralikrishna *et al.* (2008); Mallappanavar (2000) and Douressamy (2000) regarding incubation period, size and duration of different stages.

Host range: spiralling whitefly, *A. dispersus* was found to infest 31 plants belongs to 22 families including fruit crops, ornamentals, field crops, spices, forest trees and weeds (Table 3). Out of these, ten plants *viz.*, banana, brinjal, chilli, rose, guava, mulberry, hibiscus and *cassia* have already been reported earlier from Maharashtra by Sathe (1999) and remaining 21 plants *viz.*, *Abelmoschus esculentus*, *Anacardium occidentale L.*, *Polyalthia longifolia (Sonnerat)*, *Thevetia peruviana*, *Nerium indicum L.*, *Calotropis gigantea (L.)R.Br.*, *Ageratum conyzoides L.*, *Impatiens glandulifera Royle*, *Chenopodium album L.*, *Terminalia catappa L.*, *Ricinus communis L.*, *Cajanus cajan (L) Millsp.*, *Acalypha wilkesiana M.Arg.*, *Magnolia champaca L.*, *Artocarpus heterophyllus Lam.*, *Ficus racemosa L.*, *Eugenia jambulana Lam.*, *Bougainvillea glabra*, *Ludwigia octovalvis*, *Piper nigrum L.*, *Grewia tiliifolia* were probably reported first time from Maharashtra as there was no evidence found in literature.

Earlier, Dubey and Sundararaj (2004) recorded 25 host plants from Western ghat, Aishwariya *et al.* (2006) recorded 99 host plants from Karnataka. Most of the presently reported host plants were already reported by above workers from respective locations. Only one host plant *i.e.* *Bougainvillea glabra* seems to be the first report as new host of spiralling whitefly, as was not found in referred literature. Host range of spiralling whitefly is increasing. The whitefly population on host plants serve as source of infestation that can be migrate to cultivated plants.

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Table 1. Biology of spiralling whitefly, *A dispersus*

Life stage of insect	Duration
Eggs (days)	6.4
First instar nymphs (days)	5.6
Second instar nymphs (days)	4.9
Third instar nymphs (days)	6.0
Fourth instar nymphs (days)	6.5
Adult longevity (days)	12.7
Total duration of life cycle (days)	47.7
Fecundity (eggs laid/female)	44.60
Hatching percentage (%)	95
Sex ratio (male: female)	1:1.33

Table 2. Morphometric parameters of different stages of *A. dispersus*

Stage of whitefly	Length (mm)	Breadth(mm)
Eggs	0.27-0.29 (0.28)	0.11-0.12 (0.11)
First instar nymph	0.31-0.35 (0.33)	0.13-0.15(0.14)
Second instar nymph	0.41-0.48 (0.44)	0.23-0.28 (0.25)
Third instar nymph	0.64-0.75 (0.69)	0.40-0.45 (0.42)
Fourth instar nymph	0.93-1.17(1.07)	0.61-0.79 (0.71)
Adult male	2.38-2.43 (2.40)	1.20-1.25 (1.22)
Adult female	1.80-1.90 (1.86)	1.06-1.12 (1.09)

Table 3. Host range of spiralling whitefly from Dapoli area

Sr. No	Common name	Scientific name	Family
1.	Cashew Nut	<i>Anacardium occidentale L.</i>	Anacardiaceae
2.	Ashoka	<i>Polyalthia longifolia (Sonnerat)</i>	Annonaceae
3.	Thevetia	<i>Thevetia peruviana</i>	Apocynaceae
4.	Nerium	<i>Nerium indicum L.</i>	Apocynaceae
5.	Rui	<i>Calotropis gigantea (L.)R.Br.</i>	Asclepiadaceae
6.	Osadi	<i>Ageratum conyzoides L.</i>	Asteraceae
7.	Himalayan Balsom	<i>Impatiens glandulifera Royle</i>	Balsaminaceae
8.	Vasant Vel	<i>Chenopodium album L.</i>	Chenopodiaceae
9.	Wild Almond	<i>Terminalia catappa L.</i>	Combretaceae
10.	Acalypha	<i>Acalypha wilkesiana M.Arg.</i>	Euphorbiaceae
Sr. No	Common name	Scientific name	Family
12.	Red gram	<i>Cajanus cajan (L) Millsp.</i>	Fabaceae
13.	Kashid	<i>Cassia siamea L.</i>	Leguminosae
15.	Hibiscus	<i>Hibiscus collinus L.</i>	Malveaceae
16.	Hibiscus	<i>Hibiscus rosasinensis L.</i>	Malveaceae
17.	Hibiscus	<i>Hibiscus schizopetalus L.</i>	Malveaceae
18.	Bhendi	<i>Abelmoschus esculentus</i>	Malveaceae
19.	Jack Fruit	<i>Artocarpus heterophyllus Lam.</i>	Moraceae
20.	Umbar	<i>Ficus racemosa L.</i>	Moraceae
21.	Mulberry	<i>Morus alba L.</i>	Moraceae
22.	Banana	<i>Musa paradisiaca L.</i>	Musaceae
23.	Guava	<i>Psidium gujava L.</i>	Myrtaceae
24.	Jambhul	<i>Eugenia jambulana Lam.</i>	Myrtaceae
25.	Bougainvillea	<i>Bougainvillea glabra</i>	Nyctaginaceae
26.	Kadu Chinch	<i>Ludwigia octovalvis</i>	Onagraceae
27.	Black Paper	<i>Piper nigrum L.</i>	Piperaceae
28.	Rose	<i>Rosa indica Lindl.</i>	Rosaceae
29.	Brinjal	<i>Solanum melongena</i>	Solanaceae
30.	Chilli	<i>Capsicum annum L.</i>	Solanaceae
31.	Dhaman	<i>Grewia tiliifolia</i>	Tiliaceae

CITATION OF THIS ARTICLE

S. S. Morde, S. K. Godase and M. S. Masal. Biology and host range of spiralling whitefly, *Aleurodicus disperses* Russell. Bull. Env. Pharmacol. Life Sci., Vol 6 Special issue 2, 2017: 151-153