

NOTA CIENTÍFICA

SINGHIELLA SIMPLEX (SINGH) (HEMIPTERA: ALEYRODIDAE), A NEW ALEYRODID INVASIVE SPECIES FOR COLOMBIA**Takumasa Kondo**

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Figure 1. Whitefly *Singhiella simplex* (Singh) (Hemiptera: Aleyrodidae) on leaf of *Ficus microcarpa*. Left. Nymph, 1 mm long. Notice reddish eyespots. Right. Adults. About 1.3 mm long. Notice dark bands on wings. Photos by T. Kondo.

Material studied. *Singhiella simplex* (Singh). Colombia: Valle del Cauca, Palmira, Corporación Colombiana de Investigación Agropecuaria (CORPOICA), Centro de Investigación Palmira, 03°30'47.6"N, 76°08'56.2"W, 1005 m, 30.v.2012, coll. T. Kondo, ex on leaves of *Ficus microcarpa* L. f. (Moraceae), 4 slides (2 slides each with 2 puparia + 1 slide with 1 adult female + 1 slide with 1 adult male) (USNM).

Specimen depository. USNM: United States National Museum of Natural History Aleyrodidae Collection, Beltsville, Maryland, U.S.A.

The world's described whitefly fauna currently comprises about 1560 species belonging to around 160 nominal genera (Martin & Mound 2007).

There are three extant (living) subfamilies of whiteflies, Aleurodicinae, Aleyrodinae and Udamoselinae, and a small number of whitefly taxa known from the fossil record, including one fossil subfamily, the Bernaeinae. The subfamily Udamoselinae only contains two South American species in one genus. The subfamily Aleurodicinae is primarily New World (Neotropical Region) in distribution and includes 133 species in 19 genera, and the subfamily Aleyrodinae is worldwide in distribution and includes all other described whiteflies (1424 species in 148 genera).

TK recently collected samples of nymphs and adults of a species of whitefly on the leaves of Cuban laurel *Ficus microcarpa* L. (F. Moraceae) in Palmira, in the State of Valle del Cauca, Colombia.

Nymphs were slide-mounted by GE by first placing the specimens in a watch glass containing 10% KOH which was then heated on a hot plate under low heat (100°C) for about 15 minutes. Gentle pressure was applied to the dorsum to pump out the internal contents. They were then placed in acid fuchsin double stain for 5 minutes and then washed in 75% ethanol for about five minutes to remove the excess stain and begin the process of dehydration. The specimens were transferred to 95% ethanol for about 15 minutes, and then placed in clove oil for 30 minutes to remove any excess water. They were then mounted in Canada balsam on microscope slides, labeled and placed in a drying oven.

The specimens were identified as the genus *Singhiella* using the key provided by Jensen (2001). The genus is primarily native to the Asian region with 27 of its 31 species described from Asia. The specimens were identified to species by comparing them with illustrations (published and unpublished) and reference specimens collected in Florida that were identified as *Singhiella simplex* by A. K. Dubey who had compared the Florida specimens with specimens collected in India, where it is native.

The body of the adult whitefly is yellow in color and the wings are white with a faint grey band towards the middle of the wing (Hodges 2007) (Figure 1, right). Immature stages (eggs, nymphs and pupae) can be found on the underside of the leaves; and disc-like pupae are small tan to light green with red eyes measuring about 1.3 mm long and 1 mm wide (Hodges 2007). In the present study, on *F. microcarpa*, the pupae (Figure 1, left) were found on both sides of the leaves (T. K., personal observation).

Singhiella simplex is native to the Oriental region, where it is known from Burma, China and India; and has been introduced to the USA (Florida) and Puerto Rico (Hodges 2007; Evans 2008; Mannion et al. 2008). More recently, *S. simplex* have been recorded also from Jamaica, Brazil, Cayman Islands (Jesus et al. 2010 and Velasco et al. 2011) and was observed in Israel in 2011 (unpublished). This is the first record of *S. simplex* from Colombia.

The fig whitefly, *S. simplex*, is known as a pest of *Ficus* spp. (Moraceae) in the USA (Florida), India (Hodges 2007; Mannion et al. 2008), Brazil (Sao Paulo) (Velasco et al. 2011) and Israel. Known

hosts include *F. altissima* Blume, *F. aurea* Nutt., *F. benghalensis* L., *F. benjamina* L., *F. lyrata* Warb., *F. maclellandi* King and *F. racemosa* L [= *F. glomerata* Roxb.] (Hodges 2007; Evans 2008; Velasco et al. 2011).

Known natural enemies include the parasitoids *Encarsia tricolor* Foerster (Hymenoptera: Aphelinidae) (Evans 2008, Hodges 2007); *Encarsia protransvena* Viggiani, *Amitus bennetti* Viggiani & Evans (Platygastridae); as predators the lacewings (Neuroptera: Chrysopidae): *Chrysopa* spp. and the ladybird beetles (Coleoptera: Coccinellidae): *Harmonia axyridis* (Pallas), *Olla-v-nigrum* (Mulsant), *Exochomus children* Mulsant, *Chilocorus nigritis* (F.), and *Curinus coeruleus* (Mulsant) (Mannion 2010). Various enzootic pathogenic fungi have also been isolated from *S. simplex* in Florida, namely *Isaria fumosorosea* Wize, *Paecilomyces lilacinus* Thorn (Samson), and *Lecanicillium* sp., *Fusarium* sp., and *Aspergillus* sp. (Avery et al. 2011).

The biology of *Singhiella simplex* has been recently studied. The total duration of the immature stages varies from 97.1 days at 15°C to 25.2 days at 30°C; the adults live 8 days at 15°C, 4.2 days at 25°C, and 2.5 days at 30°C (Legaspi et al. 2011). According to Hodges (2007), infestations of *S. simplex* are easy to find on *Ficus benjamina* since severely infested plants shed many of their leaves and appear defoliated. On the infested leaves, they appear as small clouds of tiny white, gnat-like adult whiteflies flying from the foliage (Hodges 2007). In the present study, *S. simplex* was found in fairly large populations on *F. microcarpa*, and the whiteflies can be easily seen flying when the infested branches are shaken. However, all six trees of *F. microcarpa* trees observed appear to tolerate high infestations of *S. simplex*, and do not show symptoms of defoliation nor chlorosis as reported by Hodges (2007) in Florida on *F. benjamina*. Besides infestations on *F. microcarpa*, specimens of *S. simplex* were observed on *F. benjamina*, a common tree along the streets of Cali and Palmira. Defoliation, chlorosis and sootymold normally associated with infestations of the fig whitefly have not been observed so far, suggesting that the whitefly may be under natural control in these areas or perhaps that the environmental conditions are not suited for its development. However, the fig whitefly has become a pest of *Ficus* spp. in most areas where it has been introduced, so there is a possibility that *S. simplex* could become a pest in Colombia in the future.

LITERATURE CITED

- Avery, P. B., C. M. Mannion, C. A. Powell, C. L. McKenzie & L. S. Osborne. 2011. Natural enemies managing the invasion of the fig whitefly, *Singhiella simplex* (Hemiptera: Aleyrodidae), infesting a *Ficus benjamina* Hedge. Florida Entomologist, 94(3): 696-698. <http://www.bioone.org/doi/full/10.1653/024.094.0338> (accessed on 20/vii/2012).
- Evans, G. A. 2008. The whiteflies (Hemiptera: Aleyrodidae) of the world and their host plants and natural enemies. 703 pp. <http://www.sel.barc.usda.gov:8080/1WF/World-Whitefly-Catalog.pdf> (accessed on 20/vii/2012).
- Hodges, G. 2007. The fig whitefly *Singhiella simplex* (Singh) (Hemiptera: Aleyrodidae): a new exotic whitefly found on *Ficus* species in south Florida. Division of Plant Industry, Florida Department of Agriculture and Consumer Services, <http://www.freshfromflorida.com/pi/pest-alerts/singhiella-simplex.html> (accessed on 20/vii/2012).
- Jensen, A. S. 2001. A cladistic analysis of *Dialeurodes*, *Massilieuodes* and *Singhiella*, with notes and keys to the Nearctic species and descriptions of four new *Massilieuodes* species (Homoptera: Aleyrodidae). Systematic Entomology, 26: 279-310.
- Jesus, L. F. M. De; T. D. Trindade, A. J. Ferreira Jr., F. Racca Filho & A. F. Lima. 2010. Registro de uma espécie exótica de mosca-branca-do-ficus (Hemiptera: Aleyrodidae) e sua disseminação no Brasil. Abstract. in: XXIII Congresso Brasileiro de Entomologia. Natal R-N, Brazil.
- Legaspi, J. S., C. Mannion, D. Amalin & B. C. Legaspi Jr. 2011. Life table analysis and development of *Singhiella simplex* (Hemiptera: Aleyrodidae) Under different constant temperatures. Annals of the Entomological Society of America, 104(3): 451-458.
- Mannion, C. 2010. Whiteflies in the landscape. University of Florida, IFAS Extension Bulletin, Nov., 2010. <http://trec.ifas.ufl.edu/mannion/pdfs/Whitefly%20in%20the%20Landscape%20%20Nov2010.pdf> (accessed on 20/vii/2012).
- Mannion, C., L. Osborne, A. Hunsberger, H. Mayer & G. Hodges. 2008. Ficus whitefly: A new pest in South Florida. University of Florida, IFAS Extension Bulletin, August 2008. [http://miami-dade.ifas.ufl.edu/pdfs/urban_hort/The%20Fig%20Whitefly%20\(AUG2008\)%20Fact%20Sheet.pdf](http://miami-dade.ifas.ufl.edu/pdfs/urban_hort/The%20Fig%20Whitefly%20(AUG2008)%20Fact%20Sheet.pdf) (accessed on 20/vii/2012).
- Martin, J. H & L. A. Mound. 2007. An annotated check list of the world's whiteflies (Insecta: Hemiptera: Aleyrodidae). Zootaxa, 1492: 1-84.
- Velasco, G. D. N., R.G. Moura, E. Berti Filho & H. T. Z. do Couto. 2011. Avaliação da infestação por *Singhiella simplex* (Hemiptera: Aleyrodidae) em *Ficus benjamina* no município de São Paulo, SP, Brasil. Revista de Agricultura, 86(2): 134-131.

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