

New Tropical Fruit Hosts of *Scirtothrips dorsalis* (Thysanoptera: Thripidae) and Its Relative Abundance on them in South Florida

Author(s): Vivek Kumar, Dakshina R. Seal, Garima Kakkar, Cindy L. McKenzie and Lance S. Osborne

Source: Florida Entomologist, 95(1):205-207.

Published By: Florida Entomological Society

DOI: <http://dx.doi.org/10.1653/024.095.0134>

URL: <http://www.bioone.org/doi/full/10.1653/024.095.0134>

BioOne (www.bioone.org) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/page/terms_of_use.

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

NEW TROPICAL FRUIT HOSTS OF *SCIRTOTHRIPS DORSALIS* (THYSANOPTERA: THIRIPIDAE) AND ITS RELATIVE ABUNDANCE ON THEM IN SOUTH FLORIDA

VIVEK KUMAR^{1,*}, DAKSHINA R. SEAL¹, GARIMA KAKKAR², CINDY L. MCKENZIE³ AND LANCE S. OSBORNE⁴

¹Tropical Research and Education Center, University of Florida (UF),
Institute of Food and Agricultural Sciences (IFAS), 18905 SW 280 Street, Homestead, FL 33031

²Fort-Lauderdale Research and Education Center, University of Florida, 3205 College Ave, Davie, FL 33314

³U.S. Horticultural Research Laboratory, 2001 South Rock Road, Fort Pierce, FL 34945

⁴Mid-Florida Research & Education Center, UF, IFAS, 2725 S. Binion Road, Apopka, FL 32703-8504

The chilli thrips, *Scirtothrips dorsalis* Hood, has long been a pernicious pest of cotton and various ornamental, vegetable, and fruit crops including citrus in southern and eastern Asia, Africa, and Oceania (Amin 1979; Amin et al. 1981; Ananthakrishnan 1993) where it is known to kill newly emerged seedlings, severely distort leaves, scar the surface of fruits of its hosts, and also vector a number of major plant pathogens. *Scirtothrips dorsalis* has an extensive host range, and in recent decades has expanded its distribution from south Asia to Australia, the Middle East, Africa, the Caribbean and the Americas (EPPO/CAB 2003; Hodges et al. 2005). Worldwide it attacks more than 200 plant species, belonging to 70 different families (GPDD 2011).

In Florida since its establishment in 2005, *S. dorsalis* has been reported developing on 38 different ornamental crop species (Klassen et al. 2008; Osborne 2009; Seal & Kumar 2010) and on pepper. In Aug 2010 we discovered this pest infesting 11 different tropical fruit species at a commercial nursery in Homestead, Miami-Dade County, Florida. This is the first report of *S. dorsalis* damaging tropical fruit species on a significant scale in Florida.

We conducted studies to quantitatively characterize *S. dorsalis* infestations on a number of tropical fruit hosts at the commercial nursery. Both larvae and adults were found on 9 of 11 tropical fruit species several of which were not reported in the Global Pest and Disease Database (2011) as hosts of *S. dorsalis*, i.e., avocado (*Persea americana* Mill.), cashew nuts (*Anacardium occidentale* L.), canistel (*Pouteria campechiana* (Kunth) Baehni), dragon fruit (*Hylocereus undatus* (Haw.) Britton & Rose), guava (*Psidium guajava* L.), litchi (*Litchi chinensis* Sonn.), mango (*Mangifera indica* L.), miracle fruit (*Synsepalum dulcificum* (Schumach. & Thonn.) Daniell) and sapodilla (*Manilkara zapota* (L.) D. Royen), while *S. dorsalis* adults only were found on 2 species, i.e., guavaberry (*Eugenia floribunda* H. West ex Willd) and malay apple (*Spondias dulcis* Forst). The infestation of this pest was responsible for economic damage to these hosts. Interestingly,

some of these infested plant species have never been reported either as a feeding or breeding host of *S. dorsalis*. *Scirtothrips dorsalis* specimens collected from different host plants were identified using taxonomic characters elaborated by Hoddle et al. (2009) and Kumar et al. (2011). For verification of identification, thrips specimens were sent to the Florida Department of Agriculture and Consumer Services, Division of Plant Industry.

We determined the abundance of *S. dorsalis* on six species of tropical fruits: avocado, canistel, litchi, mango, miracle fruit, and sapodilla available at nursery, as well as on tea (*Camellia sinensis* [L.] Kuntze) and cotton (*Gossypium hirsutum* L.). The latter species were included as reference species, because the rapid population growth of *S. dorsalis* has been extensively studied on them (Ananthakrishnan 1993; Masui 2007; Seal et al. 2010). Host plants were set in 3.8 L plastic pots following standard cultural practices. Three young, insect-free plants of similar age with newly emerging foliage were selected for each plant species. These were arranged in a randomized complete block design with 3 replications. We counted thrips larvae and adults on the top 5 leaves of each plant with a 30X hand lens weekly for 8 wk during 24 Aug-25 Oct. Plants were scored visually for thrips damage (Kumar et al. 1996) weekly during the entire study period.

Data on abundance of *S. dorsalis* larvae and adults were analyzed using analysis of variance, and treatment means were separated using the Tukey's HSD test (SAS Institute Inc. 2003). During the study period, the seasonal mean for larval abundance was significantly higher on cotton (15.25) than on the other hosts (Table 1). Larval abundance on canistel was not significantly different from mango but it was higher than tea, sapodilla, miracle fruit, avocado and litchi with seasonal means of 5.53, 3.56, 1.70, 0.93, 0.33, 0.05 and 0.01 per 5 leaves of these seven plant species, respectively. A somewhat similar pattern of adult abundance was observed on different hosts (Table 1). Among the tropical fruit species, the highest abundance of *S. dorsalis* adults was recorded on canistel, followed by mango, sapodilla and mira-

TABLE 1. CHILLI THRIPS ABUNDANCE AND DAMAGE RATINGS ON VARIOUS HOSTS IN A COMMERCIAL NURSERY IN SOUTH FLORIDA.

Plant order	Plant Family	Scientific name ¹	Common or trade name	Seasonal mean no. of larvae	Seasonal mean no. of adults	Damage ratings ²
Ericales	Sapotaceae	<i>Pouteria campechiana</i> (Kunth) Baehni	Canistel ²	5.53 b	2.88 b	2.78 b
Ericales	Sapotaceae	<i>Synsepalum dulcificum</i> (Schumacher & Thonn.) Daniell	Miracle fruit ²	0.33 de	0.54 c	0.20 d
Ericales	Sapotaceae	<i>Manilkara zapota</i> (L.) D. Royen	Sapodilla ²	0.93 cde	0.57 c	0.79 c
Ericales	Theaceae	<i>Camellia sinensis</i> (L.) Kuntze	Tea	1.71 bcd	1.77 b	1.31 b
Laurales	Lauraceae	<i>Persea americana</i> Mill.	Avocado ²	0.05 e	0.42 c	0.0 d
Malvales	Malvaceae	<i>Gossypium hirsutum</i> L.	Cotton	15.25 a	6.77 a	4.45 a
Sapindales	Anacardiaceae	<i>Mangifera indica</i> L.	Mango	3.56 bc	2.09 b	2.67 b
Sapindales	Sapindaceae	<i>Litchi chinensis</i> Sonn.	Litchi, Lychee	0.01 e	0.27 c	0.0 d

Means within a column followed by the same letter do not differ ($P \geq 0.05$, Tukey's HSD).

¹Host plant common and scientific names according to Brako et al. 1995.

²Plants hosts not reported in Global Pest and Disease Database (2011).

³Damage rating score: (0) no symptoms, (1) terminal 3-4 leaves showing tiny eruptions in inter-veinal area, brown spots on leaf surface (2) terminal 3-4 leaves showing upward curling along leaf margins, irregular thickening of leaf surfaces (3) severe scarring of terminal and a few basal leaves, (4) stunted plants, leaves severely curled and leaf area greatly reduced, and (5) plants with no leaves and only stem remaining. Damage rating represents the damage reported on host plants at the last sampling date of the study.

cle fruit with seasonal means of 2.88, 2.09, 0.57 and 0.54 per 5 leaves, respectively. Maximum damage score ratings for two tropical fruit hosts, canistel and mango seemed to be alarming after 8 wk, with the highest rating reported on canistel at 2.78 and 2.67 on mango (Table 1). Litchi and avocado did not sustain any damage.

Results from this study are significant in that they identify new hosts of *S. dorsalis* in the United States. In addition, it is important that crops that have never been reported as hosts also be included when scouting and sampling of *S. dorsalis* infestation, as its host range appears to be continuing to widen in recently invaded regions. Furthermore, in order to minimize dispersion of *S. dorsalis* in the United States, intra or inter-state trade of potted nursery plants or retail garden products must be checked carefully for damage symptoms or presence of different life stages of the pest.

SUMMARY

During scouting and sampling various of plant species at different commercial nurseries in Miami-Dade County, Florida, 12 different crops were found to be economically affected by *S. dorsalis* in a commercial nursery. An open free choice host susceptibility test was conducted on 6 fruit hosts from the nursery. Canistel, mango, sapodilla and miracle fruit were found to be most affected among the fruit hosts with maximum damage ratings of 2.78, 2.67, 1.67 and 0.77 respectively. Since the host range of this pest is expanding, a careful monitoring and sampling protocols, especially of potted plants, should be diligently implemented to prevent and retard its distribution in different regions.

ACKNOWLEDGMENT

We thank various nursery personnel in Miami Dade County for their cooperation in conducting this study. We also thank Tamrat Wuletaw for contribution during data collection in the study. We appreciate Megha Kalsi and an anonymous reviewer for their constructive criticism and helpful comments, which was important in preparation of this manuscript.

REFERENCES CITED

- AMIN, P. W. 1979. Leaf curl disease of chili peppers in Maharashtra, India. PANS 25: 131-134.
- AMIN, P. W., REDDY, D. V. R., AND GHANEKAR, A. M. 1981. Transmission of tomato spotted wilt virus, the causal agent of bud necrosis of peanut, by *Scirtothrips dorsalis* and *Frankliniella schultzei*. Plant Disease 65: 663-665.
- ANANTHAKRISHNAN, T. N. 1993. Bionomics of thrips. Annu. Rev. Entomol. 38: 71-92.
- BRAKO, L., ROSSMAN, A. Y., AND FARR, D. F. 1995. Scientific and common names of 7,000 vascular plants in the United States. APS Press, St. Paul, MN. 295 pp.

- EPPO AND CABI. 2003. *Scirtothrips dorsalis*. Data Sheets on Quarantine Pests. Quarantine Pests for Europe. CAB International, Wallingford, UK. http://nc.eppo.org/QUARANTINE/insects/Scirtothrips_dorsalis/SCITDO_ds.pdf (Accessed Feb 24, 2011).
- GLOBAL PEST AND DISEASE DATABASE (GPDD). 2011. Report on GPDD Pest ID 1276 *Scirtothrips dorsalis* - Last Full Review, Jan 6, 2011. 1-15 pp.
- HODDLE, M. S., MOUND, L. A., AND PARIS, D. L. 2009. *Scirtothrips dorsalis*. Thrips of California. University of California, California. USA. http://keys.lucidcentral.org/keys/v3/thrips_of_california/data/key/thysanoptera/Media/Html/browse_species/Scirtothrips_dorsalis.htm (Accessed Mar 14, 2011).
- HODGES, G., EDWARDS, G. B., AND DIXON, W. 2005. Chilli thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae), a new pest thrips for Florida. Pest Alert. Florida Department of Agriculture and Consumer Service, Division of Plant Industry, Gainesville, Florida.
- KLASSEN, W., SEAL, D. R., CIOMPERLIK, M., AND FIESELMANN D. A. 2008. The chilli thrips, *Scirtothrips dorsalis*: current status in the Greater Caribbean Region. Proc. Caribbean Food Crops Soc. 44: 103-117.
- KUMAR, N. K. K., ARADYA, M., DESHPANDE, A. A., AND RAMACHANDAR, P. R. 1996. Initial screening of chilli and sweet pepper germplasm for resistance to chilli vthrips, *Scirtothrips dorsalis* Hood. Euphytica. 89: 319-324.
- KUMAR, V., SEAL, D. R., SCHUSTER, D., MCKENZIE, C. L., OSBORNE, L., MARUNIAK J., AND ZHANG, S. 2011. *Scirtothrips dorsalis* (Thysanoptera: Thripidae): Scanning electron micrographs of key taxonomic traits and a preliminary morphometric analysis of the general morphology of populations of different continents. Florida Entomol. 94: 941-955.
- MASUI, S. 2007. Oviposition time of overwintered adults of yellow tea thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae). Jpn. J. Appl. Entomol. Zool. 51: 289-291.
- OSBORNE, L. S. 2009. *Scirtothrips dorsalis* Hood. <http://mrec.ifas.ufl.edu/Iso/thripslinks.htm>. Updated May 19, 2009. (Accessed Feb 24, 2011).
- SAS INSTITUTE. 2003. SAS® system for Windows, version 9.1. SAS Institute, Inc., Cary, NC.
- SEAL D. R., AND KUMAR, V. 2010. Biological responses of chilli thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae), to various regimes of chemical and biorational insecticides. Crop Prot. 39: 1241-1247.
- SEAL, D. R., KLASSEN, W., AND KUMAR, V. 2010. Biological Parameters of *Scirtothrips dorsalis* (Thysanoptera: Thripidae) on selected hosts. Environ. Entomol. 39: 1389-1398.