

## NEW RECORD OF THRIPS SPECIES ASSOCIATED WITH SOYBEANS IN PUERTO RICO

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This is the first record of *Caliothrips phaseoli* Hood, *Frankliniella gossypiana* Hood and, *Echinothrips americanus* (Morgan) attacking soybean, *Glycine max* (L.) Merrill, in Puerto Rico. These species have not been reported previously in the island (Matorell 1976; Medina 2003). Thrips are important pests in many soybean production areas due to the feeding injury caused by larvae and adults and the indirect damage caused by transmission of tospoviruses (Almeida et al. 2003; Gent et al. 2004). Soybeans are mainly grown in winter nurseries in Puerto Rico with approximately 1,000 acres. During the 2006-2007 seasons, 3 replicated sentinel plots of soybeans were monitored for arthropods in Adjuntas, Isabela, and Juana Diaz, and soybean seedlings were evaluated in greenhouse conditions at Rio Piedras. Thrips were abundant in leaves and flowers in the 4 locations, but the new species record came from Juana Diaz and Rio Piedras. Soybean line 2053A was sampled every 7 d in V2 to R5 growth stage in 2 consecutive plantings in the sentinel plot. Thrips were collected from the plant tissue and placed in bottles with 70% ethyl alcohol. The insects were clarified with 5% potassium hydroxide for 30 s and mounted on slides with Canada balsam. Slides were dried at 30°C for 24 h. A Taxonomic Key for Thysanoptera was used for species identification and determination of sex for each specimen (Moritz et al. 2004; Mound & Marullo 1996).

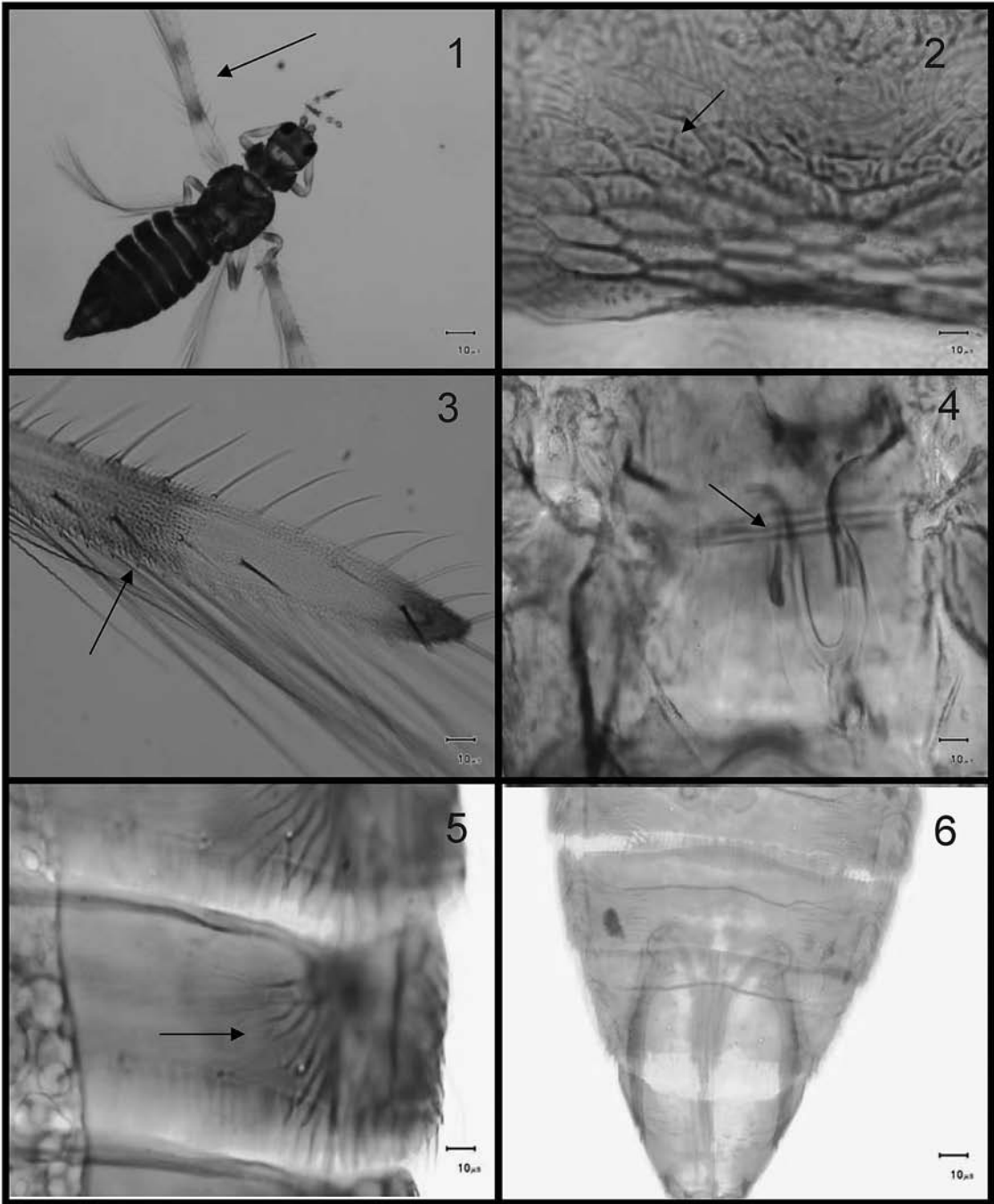
Five females of American bean thrips, *Caliothrips phaseoli*, were identified on soybean leaves at Juana Diaz in Nov 2006 and 2007. Adults were dark brown with 8 antennal segments (Fig. 1). Antennal segments III-V were yellow with brown shading apically. The head and pronotum have internal sculptured markings (Fig. 2). The pronotum has no long setae. Forewing brown with 3 subapically transverse bands and a subbasally white band. The medially band was light brown (Fig. 1). Forewing color at extreme apex dark. Forewing second vein with 6 setae (Fig. 3). Metanotum without campaniform sensilla. Metathoracic endofurca elongate and lyre shape (Fig. 4). Sculpture on lateral thirds of tergites III-VI comprised mainly of transverse parallel lines (Fig. 5). Tergite VIII with craspedum medially (Fig. 6). *Caliothrips phaseoli* has been reported as an economically important pest of soybean in Mexico and of dry beans in the United States and in Central and South America (Irwin et al. 1979; Mound & Marullo 1996).

*Echinothrips americanus* was collected on soybean leaves from a greenhouse at Rio Piedras Experimental Station in 2007. Altogether, 20 specimens were collected with a sex ratio of 1 male per 3 females. The adults were dark brown with 8 antennal segments. The head was prolonged in front of the compound eyes (Fig. 7). Head and pronotum with internal sculptured markings (Fig. 8). Metanotum reticulate, with median small setae that arise near to the anterior margin. Tergites II-VIII with pair of long setae medially (Fig. 9). Tergite VIII with a complete comb of slender microtrichia (Fig. 10). Sternites III-VIII on males each with small circular glandular areas (Fig. 11). *Echinothrips americanus* caused leaf chlorosis and bronzing when the population average was 16 adults per trifoliolate (Fig. 12). *Echinothrips americanus* is a polyphagous leaf feeder reported as a pest in ornamental crops (Oetting et al. 1993). In Florida hosts included the beggar weed *Desmodium tortuosum* (Sul.) (Childers & Nakahara 2006).

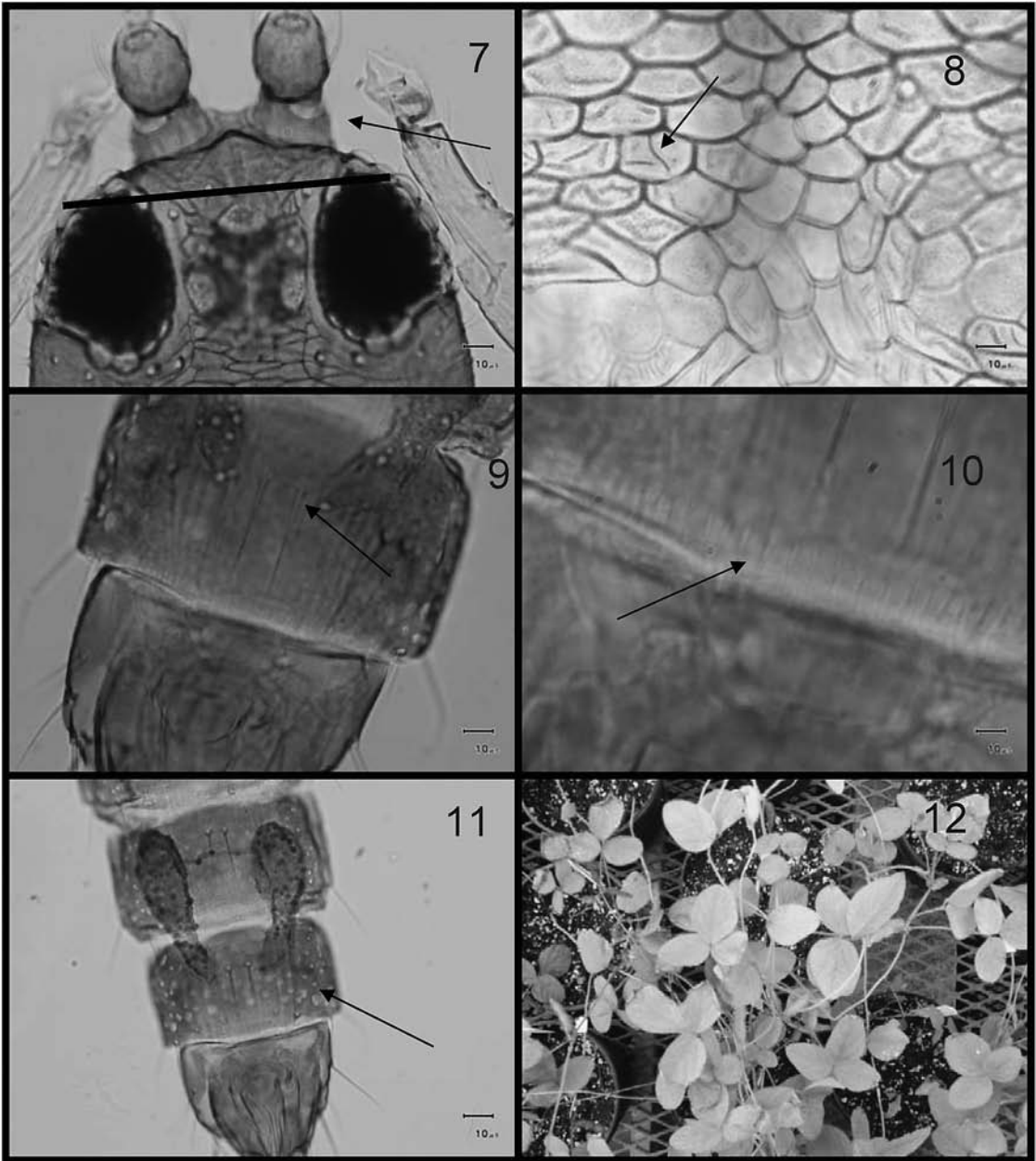
*Frankliniella gossypiana* was identified in soybean sentinel plots in Juana Diaz in Oct 2007. A total of 9 specimens (4♀ 5♂) were collected from leaves and flowers. The adults were yellow with 8 antennal segments (Fig. 13). Antennal segment III pedicel simple (Fig. 14). Antennal VIII was 12 µm length and 4 µm width. Ocellar setae III arising within ocellar triangle (Fig. 15). Postocular setae IV large (Fig. 16). Pronotum was 162.5 µm length and anteromarginal setae was 50 µm length (Fig. 17). Tergite VIII with posteromarginal comb of microtrichia complete (Fig. 18). On the tergite X, B1 and B2 setae were 80 and 95 µm length, respectively. *Frankliniella gossypiana* is reported as a feeding on *Phaseolus* sp. and *Pisum* sp., in USA, Mexico, Nicaragua, and Peru (Maes 2007).

### MATERIAL STUDIED

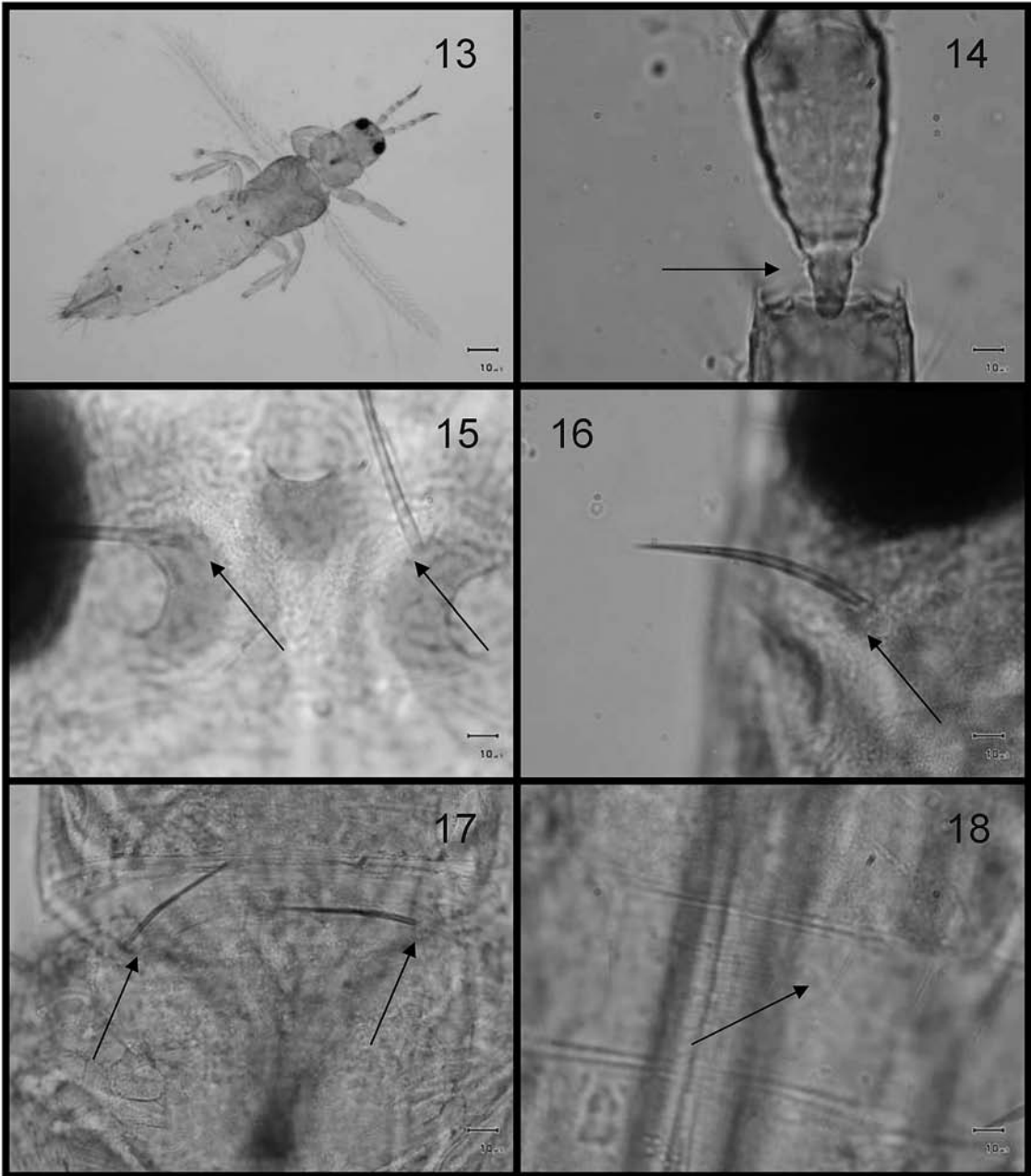
Two females of *Caliothrips phaseoli* on leaves of *G. max*, from Juana Diaz, P.R. 31.x.2006 and 24.x.2007 (D. Viteri), deposited in Museum of Entomology and Tropical Biodiversity (METB) Agricultural Experiment Station, University of Puerto Rico, Rio Piedras, Puerto Rico (PR. Acc. No. 01-2008) and (PR. Acc. No. 02-2008). Two males of *Echinothrips americanus* on leaves of *G. max*, from Rio Piedras, P.R. 9.ix.2007 and 2.xi.2007 (D.Viteri), in METB (PR. Acc. No. 03-2008) and (PR. Acc. No. 04-2008). And two females of *Frankliniella gossypiana* on flower of *G. max* from Juana Diaz P.R. 24.x.2007 (D. Viteri) in METB (PR. Acc. No. 05-2008).



Figs. 1-6 *Caliothrips phaseoli*. 1, Forewing (10X); 2, Pronotum sculpture markings (40X); 3, Forewing second vein (40X); 4, Metathoracic endofurca (40X); 5, Sculpture on lateral thirds tergites (40X); 6, Tergite VIII shape (20X).



Figs. 7-12 *Echinothrips americanus*. 7, Head shape (40X); 8, Pronotum sculpture markings (40X); 9, Tergites long setae medially (40X); 10, Comb with slender microtrichia (100X); 11, Male circular glandular areas (20X); 12, Mechanical injury caused on soybean leaves.



Figs. 13-18 *Frankliniella gossypiana*. 13, Female (10X); 14, Antennal segment III pedicel simple (40X); 15, Ocular setae III position (40X); 16, Postocular setae IV (40X); 17, Pronotum anteromarginal setae; 18, Tergite VIII posteromarginal comb of microtrichia (100X).

#### SUMMARY

Thrips identified as *Caliothrips phaseoli* Hood, *Frankliniella gossypiana* Hood, and *Echinothrips americanus* (Morgan) were observed using soy-

bean as a host in Puerto Rico for the first time. Natural enemies and economic impact are unknown.

Supplemental Material: Color photographs online at <http://www.fcla.edu/FlaEnt/fe921.htm>

## REFERENCES CITED

- ALMEIDA, A. M. R., AND CORSO, I. 1991. Effect of sowing time on the incidence of bud blight in soybean (*Glycine max* L. Merr). *J. Phytopath.* 132: 251-257.
- CHILDERS, C., AND NAKAHARA, S. 2006. Thysanoptera (thrips) within citrus orchards in Florida: Species distribution, relative and seasonal abundance within trees, and species on vines and ground clovers. *J. Insect Sci.* 6(45): 1-17.
- GENT, D. H., SCHWARTZ, H. R., AND KHOSLA, R. 2004. Distribution and incidence of IYSV in Colorado and its relation to onion plant population and yield. *Plant Dis.* 88: 446-425.
- HIGLEY, L. G., AND BOETHEL, D. 1994. Handbook of Soybean Insect Pests. 1994. The Entomological Society of America. 9301 Annapolis road, Lanham, MD 207006-3115, USA. pp. 82-83.
- IRWIN, M., YEARGAN, K., AND MARSTON, N. 1979. Spatial and seasonal patterns of phytophagous thrips in soybean fields with comments on sampling techniques. *Environ. Entomol.* 8: 131-140.
- MAES, J. M. 2007. Fauna Entomológica de Nicaragua. Orden Thysanoptera. <http://www.bio-nica.info/Ento/Homop/THYSANOPTERA.htm>
- MATORELL, L. F. 1976. Annotated Food. Plant Catalog of the Insects of Puerto Rico. Universidad de Puerto Rico. Río Piedras. 303 p.
- MEDINA, G. S. 2003. The Thysanoptera of Puerto Rico. University of Puerto Rico, Agricultural Exp. Sta., Río Piedras, Puerto Rico. 159 p.
- MORITZ, G., MOUND, L. A., MORRIS, D. C., AND GOLD-ARAZENA, A. 2004. Pest Thrips of the World: Visual and Molecular Identification of Pest Thrips. CD. Centre for Biological Information Technology.
- MOUND, L. A. 2002. So many thrips-so few tospovirus? pp. 15-18 *In* Thrips and Tospovirus. Proc. 7<sup>th</sup> Intl. Symp.on Thysanoptera. Australian National Insect Collection, Canberra.
- MOUND, L. A., AND MARULLO, R. 1996. The Thrips of Central and South America: An Introduction (Insecta: Thysanoptera). *Mem. Entomol. Intl.* 6:1- 487 p.
- OETTING, R. D., BESHEAR, R. J., LIU, T. X., BRAMAN, S. K., AND BAKER, J. R. 1993. Biology and Identification of Thrips on Greenhouse Ornamentals. University of Georgia, Georgia Agricultural Experimental Station Research Bulletin 414.