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LIBURNIA PSEUDOSEMINIGRA (DELPHACIDAE: HOMOPTERA), A NEW AND UNUSUAL PEST OF ST. AUGUSTINEGRASS

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ABSTRACT

No publications have reported delphacid planthoppers (Family Delphacidae) to be turf pests in the United States. In March 2005, a large infestation of the delphacid planthopper, *Liburnia pseudoseminigra* (Muir & Gifford), was found infesting St. Augustinegrass, *Stenotaphrum secundatum* (Walt.) Kuntze, in a commercial sod farm in southern Florida. Thereafter, a survey was conducted in commercial sod farms in southern Florida to determine the extent of the planthopper infestation in different St. Augustinegrass varieties. The planthoppers were found in low numbers in Floratam, Palmetto, and Seville and were moderately abundant in Bitterblue. However, Classic was clearly the variety supporting large numbers of the planthopper. *Liburnia pseudoseminigra* was described from Florida and apparently is a native species. Virtually nothing was known about its biology prior to its appearance as a pest of St. Augustinegrass in this study.

Key Words: Delphacidae, *Liburnia*, turf, St. Augustinegrass

RESUMEN

No se ha reportado publicaciones de delfacidos saltadores de plantas (Family Delphacidae) como plagas de césped en los Estados Unidos. En marzo del 2005, se encontró una infestación grande del delfacido saltador de plantas, *Liburnia pseudoseminigra* (Muir y Gifford), infestando el césped de San Augustín, *Stenotaphrum secundatum* (Walt.) Kuntze, en una finca comercial de césped en el sur del estado de Florida. Por ello, se realizó un muestreo en fincas comerciales de césped en el sur de la Florida para determinar el alcanze de la infestación del saltador de plantas en variedades diferentes de césped de San Augustín. Se encontraron los saltadores de plantas en números bajos en Floratam, Palmetto y Seville y fueron moderadamente abundante en Bitterblue. Sin embargo, la variedad Classic fue claramente la que apoyo el número mayor de saltadores de plantas. *Liburnia pseudoseminigra* fue descrito del estado de Florida y aparentemente es una especie nativa. Prácticamente no se sabia nada acerca de su biología antes de que apareciera como plaga de césped de San Augustín en este estudio.

St. Augustinegrass, *Stenotaphrum secundatum* (Walt.) Kuntze lawns are grown throughout the southern United States because of their climatic adaptation and ability to tolerate full sun to moderate shade. Sod production in Florida is a large industry with 37,180 ha (92,950 acres) grown in 2003. Sixty-four percent of the Florida sod acreage was St. Augustinegrass (Haydu et al. 2005). Numerous insects are pests of St. Augustinegrass (Potter 1998; Vittum et al. 1999). However, no publications have reported delphacid planthoppers (Family Delphacidae) to be turf pests on St. Augustinegrass or any other turfgrass in the United States. In March 2005, a sod producer located near Belle Glade, Florida, requested help from the Everglades Research and Education Center (U. of Florida, IFAS) at Belle Glade, Florida in identifying and controlling insect pests in his St. Augustinegrass fields. Upon visiting these fields, large numbers of insects of an unknown type were observed in fields of Classic St. Augustinegrass. Sweep net collections were made and insects sent to Susan Halbert who identified them as a planthopper, *Liburnia pseudoseminigra* (Muir and Gifford) in the family Delphacidae. The identification was confirmed by Dr. Stephen W. Wilson, Central Missouri State University. Specimens are deposited at the Florida State Collection of Arthropods (FSCA) in Gainesville, FL (FSCA# E2005-1134). In 2003, a similar infestation of the planthopper was found in Gainesville, FL in a lawn planted to Classic St. Augustinegrass (FSCA# E2003-1394). However, further study of the insect was not conducted at

that time. Because of the novelty of a delphacid as a turf pest, we pursued research to determine the extent of the infestation in different St. Augustinegrass varieties.

Materials and Methods

The majority of sod production in Florida occurs in southern Florida (Haydu et al. 2005). Our survey was conducted in 2005 at 8 different sod farms in 5 counties (Collier, Desoto, Hendry, Highlands, Palm Beach) in southern Florida to obtain representative samples. Different varieties also were sampled in different areas to determine if the planthoppers were responding to varietal differences. Five fields of Bitterblue, 8 fields of Classic, 10 fields of Floratam, 5 fields of Palmetto, and 4 fields of Seville were sampled. All fields were sampled within a 77-d interval (21 Mar to 6 Jun) to reduce the possibility of seasonal variation affecting planthopper populations. Only fields that had not been treated with an insecticide for at least 1 month and had large numbers of live arthropods present were sampled.

Samples were taken in 5 transects in random locations in each field. Each transect sample consisted of 100 sweeps in a straight line with a 38-cm diam. net. After sweeping, arthropods in nets were bagged and later frozen. Adult and nymphal *L. pseudoseminigra* in samples were counted by microscope examination in a laboratory. Adult and nymphal leafhoppers (Cicadellidae) also were counted, since these are known general turf pests (Potter 1998; Vittum et al. 1999) and this allowed comparisons of the planthopper versus leafhopper abundance in the different varieties. Mean numbers of planthoppers and leafhoppers in the different St. Augustinegrass varieties were compared by the Least Significant Difference (LSD) test (SAS 2005).

Preliminary field observations indicated that planthopper population densities varied among St. Augustinegrass varieties, especially between Classic, with high populations and Floratam, with low populations. Thus, a laboratory study was conducted to determine if population growth on Classic and Floratam corresponded to field observations. Evaluations were conducted with potted Floratam and Classic St. Augustinegrass as a no choice test. Turfgrasses were grown in pots ($6.5 \times 6.5 \times 9.0$ cm deep) filled with a 1:1 mixture by volume of sand and Fafard #2 potting medium (Conrad Fafard, Agawam, MA). All test plants were started from a single double node cutting and all plants were 8 weeks old at the start of the experiment on 9 May, 2005.

Individual plants were placed into a holding cage constructed from two 1 L polypropylene food storage containers. The containers were held together top to top by a coupler made from the lids of the container. The center of the lids was removed and the remaining ring was glued together to form the coupler. The bottom of the top container was removed and replaced with a screen mesh for ventilation. Ten adult *L. pseudoseminigra* were placed in each cage and maintained in a plant growth room. After 38 d, adult planthoppers and nymphs were counted. The 4 treatments were Classic with and without planthoppers and Floratam with and without planthoppers. Five replications (individual plants) were tested. The mean number of planthoppers (nymphs + adults) alive after 38 d in the treatments was separated by using LSD analysis (SAS 2005).

Results and Discussion

Abundance of *L. pseudoseminigra* in different St. Augustinegrass varieties is shown in Table 1. The planthoppers were found in all varieties, but in low numbers in Floratam, Palmetto, and Seville. Planthoppers were moderately abundant in Bitterblue, but not significantly different from the former 3 varieties. This lack of statistical separation from those varieties is partly due to very large variation in planthopper numbers between the 5 Bitterblue fields. Planthoppers averaged < 10/sample in 3 fields and > 100/sample in 2 fields. Examination of morphological characteristics for Bitterblue from the fields showed that the Bitterblue was not a homogenous group. Differences in stigma colors were observed. Preliminary obser-

Table 1. Abundance of *L. pseudoseminigra* in different St. Augustinegrass varieties in southern Florida sod fields.

	Nymphs	Adults	Total
Variety	Mean ± SD	Mean ± SD	Mean ± SD
Bitterblue	66.9 ± 98.8 b	28.4 ± 49.0 b	95.3 ± 145.2 b
Classic	259.2 ± 289.0 a	121.3 ± 208.0 a	380.5 ± 478.3 a
Floratam	0.2 ± 0.8 b	1.5 ± 4.7 b	1.7 ± 5.3 b
Palmetto	13.4 ± 20.8 b	3.5 ± 5.3 b	16.9 ± 25.7 b
Seville	0 ± 0 b	0.4 ± 0.9 b	0.4 ± 0.9 b

Means in a column are not significantly different ($P > 0.05$) when followed by the same letter based on the LSD test (SAS 2005).

TABLE 2. ABUNDANCE OF LEAFHOPPERS IN DIFFERENT ST. AUGUSTINEGRASS VARIETIES IN SOUTHERN FLORIDA SOD FIELDS.

	Nymphs	Adults	Total
Variety	Mean ± SD	Mean ± SD	Mean ± SD
Bitterblue	10.7 ± 16.9 b	124.6 ± 189.2 a	135.2 ± 204.4 a
Classic	22.2 ± 38.7 a	72.7 ± 80.0 b	94.9 ± 107.3 ab
Floratam	10.3 ± 12.6 b	54.0 ± 38.5 bc	64.4 ± 49.3 bc
Palmetto	4.7 ± 4.3 b	28.2 ± 21.8 c	32.8 ± 24.4 c
Seville	2.8 ± 4.0 b	55.0 ± 50.3 bc	57.8 ± 52.5 bc

Means in a column are not significantly different ($P > 0.05$) when followed by the same letter based on the LSD test (SAS 2005).

vations indicated that the Bitterblue with white stigma supported more planthoppers than Bitterblue with lavender stigma (data not shown). However, Classic was clearly the variety supporting large numbers of the planthopper with significantly more nymphs, adults, and total numbers than any other variety.

Field data are corroborated by our potted plant studies. The mean total number of planthoppers/plant after 38 days was 375.8 on Classic initiated with 10 adults versus 0 for the other 3 treatments. Obviously, the 375.8 mean was significantly different ($P < 0.05$) from the other means and shows the high potential population growth of the planthoppers on Classic. These data also show the lack of population growth on Floratam which corresponds to field observations (Table 1).

In field samples, planthopper nymphs of all sizes were found in 4 of the varieties with especially large numbers in Classic and Bitterblue (Table 1). These data show that the planthoppers were reproducing in the fields and not just immigrating into the fields as adults. The planthoppers were found in all 5 counties sampled indicating widespread distribution in southern Florida sod fields.

Abundance of leafhoppers in different St. Augustinegrass varieties is shown in Table 2. As expected, some leafhoppers were found in all varieties. Interestingly, Bitterblue and Classic had the most leafhoppers. These 2 varieties also had the most planthoppers (Table 1). The presence of leafhopper nymphs indicates that reproduction was taking place in the fields and not just adults immigrating into the fields.

Superimposing data from the 2 tables shows that the planthoppers were much more responsive to the different varieties than leafhoppers. For example, planthoppers were 951 times more abundant in Classic than in Seville. In contrast, the maximum variation in leafhoppers occurred between Bitterblue and Palmetto where the former had only 4 times as many leafhoppers as the latter variety. Also, superimposing data from the 2 tables shows that more leafhoppers than the planthoppers were found in every variety except Classic. These data again emphasize that Classic is the variety we tested which is most likely to have problems with the planthoppers. Lastly, as noted earlier, leafhoppers are known pests in turf (Potter 1998; Vittum et al. 1999). Our data show that 4 times as many *L. pseudoseminigra* as leafhoppers were found in Classic, showing that *L. pseudoseminigra* is potentially a greater pest than the known leafhopper pests in at least 1 St. Augustinegrass variety.

Liburnia pseudoseminigra was described (Muir & Gifford 1924) from Florida and apparently is a native species. Virtually nothing was known about its biology prior to its appearance as a pest of St. Augustinegrass in this study.

We thank Dr. Stephen W. Wilson, Central Missouri State University, for confirming the identity of our delphacid and advising us on its proper current generic placement.

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