LEAFHOPPERS (HOMOPTERA: CICADELLIDAE) AND PLANTHOPPERS (HOMOPTERA: DELPHACIDAE) IN SOUTHERN FLORIDA RICE FIELDS

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ABSTRACT

Leafhoppers (Homoptera: Cicadellidae) and planthoppers (Homoptera: Delphacidae) were collected with sweep nets in southern Florida rice fields during 1983 and 1984. The most abundant leafhopper was *Graminella nigrifrons* (Forbes) and the most abundant planthopper was *Delphacodes propinqua* (Fieber). Total numbers of leafhoppers in rice fields rose quickly after spring plantings and remained relatively constant from May to October. In contrast, individual leafhopper species were more variable in seasonal population trends. *Sogatodes oryzicola* (Muir), a vector of hoja blanca was also detected.

RESUMEN

Salta hojas (Homoptera: Cicadellidae) y salta plantas (Homoptera: Delphacidae) se recogieron con Jabecas en campos arroceros del sur de la Florida durante 1983 y 1984. Se discuten las distintas especies de importancia ecónomica que se encontraron. El salta hojas más abundante fue el *Graminella nigrifrons* (Forbes) y el salta plantas más abundante fue el *Delphacodes propinqua* (Fieber). El número total de salta hojas en los compos arroceros aumentó rápidamente despúes de las siembras de primavera, manteníendos relativamente constante de Mayo a Octubre. Sin embargo, las poblaciones de algunas especies de salta hojas mostraron cambios estacionales dramaticos. También se decectó a *Sogatodes orizicola* (Muir), un vector dela hoja blanca.

Rice was grown for grain in the Everglades agricultural area of southern Florida during the 1950's. Commercial production was stopped in 1957 by the United States Federal Government after the hoja blanca (white leaf) disease was found in the area. The lifting of controls on production by the Federal Government in 1974 made it possible again to harvest Florida rice for grain (Alvarez 1978). Since 1977 rice production in the area has grown to nearly 4,000 ha and drying and milling facilities have been established (Rohrmann & Alvarez 1984). Currently, ca. 85% of Florida rice is grown in the Everglades agricultural area.

Several species of leafhoppers and planthoppers are serious pests of rice in different areas of the world and frequently occur in numbers large enough to cause complete drying of the crops. In addition to the damage resulting from direct feeding, leafhoppers and planthoppers are vectors of most presently known rice virus diseases (Pathak 1968). Other than a brief description of leafhoppers and planthoppers in Everglades rice fields

by Genung et al. (1979), little is known of the species composition or seasonal population dynamics of leafhoppers and planthoppers occurring in Florida rice. In this study, we describe the relative abundance of leafhoppers (Cicadellidae) and planthoppers (Delphacidae) occurring in southern Florida rice fields.

Materials and Methods

Eight commercial rice fields in the Everglades agricultural area of southern Florida were sampled with 38.1-cm-diameter sweep nets each year during the 1983 and 1984 growing seasons. During much of the growing season, these rice fields were kept flooded and were underlain with soft muck. Sweep nets were thus used because they are light and portable. Southwood (1978) discusses advantages and limitations of sweep net sampling for insects. Each field was ca. 16 ha and fields were located throughout the Everglades agricultural area to obtain a representative sample of insect populations. All fields were subject to normal rice production practices including planting dates that ranged from March 1 through May 12. Each field was sampled weekly by making 100 consecutive sweeps (180°) taken about 50 meters into the field to avoid possible edge effects. Sweeping began 6 weeks after planting and continued through harvest. Eight fields were removed from production after one harvest during August to September and eight fields were removed from production after one ratoon crop during October to November. After collection, insects were frozen for later counting. Only adults of the leafhoppers and planthoppers were counted because of the large number of insects collected and to facilitate taxonomic identification. An overall survey of the relative abundance of the leafhopper and planthopper species was determined from 42 random samples containing 6060 leafhoppers and planthoppers identified by F. W. Mead. Thereafter, the seasonal abundance of the total number of leafhoppers and 3 most abundant leafhopper species was determined. These latter 3 species were ca. 97% of all leafhoppers collected. Delphacid seasonal abundance was not determined because of the low numbers of these insects collected.

Results and Discussion

The relative abundance of leafhoppers and planthoppers in sweep net samples in Florida rice fields is shown in Table 1. Leafhoppers outnumbered planthoppers ca. 41 to 1. Genung et al. (1979) also reported that leafhoppers were more abundant on Everglades rice than planthoppers. Generally, leafhoppers feed on the leaves and upper parts of rice plants, whereas planthoppers confine themselves to the basal parts (Pathek 1968). Thus, our sweep net samples probably overestimated leafhoppers relative to planthoppers present in the rice. The most abundant leafhopper was the blackfaced leafhopper, *Graminella nigrifrons* (Forbes). This species has a wide distribution on grasses in the eastern United States and breeds on rice (Stoner & Gustin 1967). This species is also a vector of several corn stunting pathogens (Nault & Bradfute 1979). The second most abundant leafhopper was *Draeculacephala portola* Ball which is the most common *Draculacephala* in eastern and central United States and has been reported in Cuban rice fields (Young & Davidson 1959). Since this insect is common on sugarcane in the southern United States (Pemberton & Charpentier 1969) and is a recognized sugarcane pest in Florida (Strayer 1975), some *D. portola* probably immigrated into the rice fields from the numerous sugarcane fields in the Everglades area. Abbott & Ingram (1942) reported the transmission of chlorotic streak of sugarcane by *D. portola* but, Pemberton & Charpentier (1969) thought that the insect transmission of chlorotic streak had not been adequately demonstrated in light of more recent studies. The most abundant planthopper was *Delphacodes propinqua* (Fieber) which is also a vector of maize

TABLE 1. RELATIVE ABUNDANCE[1] OF LEAFHOPPERS AND PLANTHOPPERS IN FLORIDA RICE FIELDS.

Cicadellidae	Number	% of Total
Graminella nigrifrons (Forbes)	3891	65.8
Draeculacephala portola Ball	988	16.7
Balclutha incisa (Matsumara)	884	14.9
Draeculacephala producta (Walker)	51	0.9
Balclutha hebe Kirkaldy	40	0.7
Other species[2]	61	1.0
	5915	100.0
Delphacidae	**Number**	**% of Total**
Delphacodes propinqua (Fieber)	79	54.5
Perkinsiella saccharicida Kirkaldy	20	13.8
Saccharosydne saccharivora (Westwood)	12	8.3
Sogatella kolophon (Bmr.)	12	8.3
Sogatodes molinus Fennah	12	8.3
Other species[3]	10	6.9
	145	100.1

[1]Based on random samples identified by F. W. Mead (see text).
[2]*B. guajanae* (DeLong), *Exitianus exitiosus* (Uhler), *Hortensia similis* (Walker), *Macrosteles fascifrons* (Stal), *Planicephalus flavicosta* (Stal).
[3]*Delphacodes puella* (Van Duzee), *Pissonotus piceus* Van Duzee, *Sogatodes orizicola* (Muir).

rough dwarf virus (Brcak 1979). The second most abundant planthopper was the sugarcane delphacid, *Perkinsiella saccharicida* Kirkaldy. This species is a serious sugarcane pest of Australian origin. Besides direct damage to sugarcane by feeding and ovipositional activities, the insect is also a vector of the virus that causes Fiji disease in sugarcane. The first North American record of *P. saccharicida* was reported in 1982 in Palm Beach County, Florida. Subsequent surveys revealed the delphacid throughout southern Florida (Sosa 1983). Another delphacid detected in this study is *Sogatodes oryzicola* (Muir). This insect is a vector of hoja blanca which is one of the most destructive rice diseases in the Western Hemisphere (Harris 1979). Fortunately, hoja blanca currently is not known to exist in the United States. Detection of *S. oryzicola* in this study is the first report of the insect in the United States in more than a decade.

The seasonal population trends of leafhoppers in the sweep net samples are shown in Fig. 1. Total numbers of leafhoppers rose quickly in April and remained relatively constant (Range = 44 to 78 adults/100 sweeps) from May until October, decreasing to 26 adults/100 sweeps in November. In contrast to the total leafhopper numbers, the 3 most abundant leafhopper species showed more variable seasonal trends. The early increase of leafhoppers in rice fields during April and May was almost wholly (> 97%) due to *G. nigrifrons*. During June to August, *G. nigrifrons* remained> 75% of all leafhoppers, and then declined to lower levels during September to November. Genung & Mead (1969) also found a decline in *G. nigrifrons* populations after August in pasture grasses in southern Florida. *D. portola* populations increased slowly during April to June and remained somewhat constant (Range = 8 to 23 adults/100 sweeps) thereafter. In contrast to *G. nigrifrons* or *D. portola, Balclutha incisa* (Matsumara) increased rapidly during the late summer to fall period and during October was the most abundant leafhopper species. Reasons for this October increase in *B. incisa* are not known, but

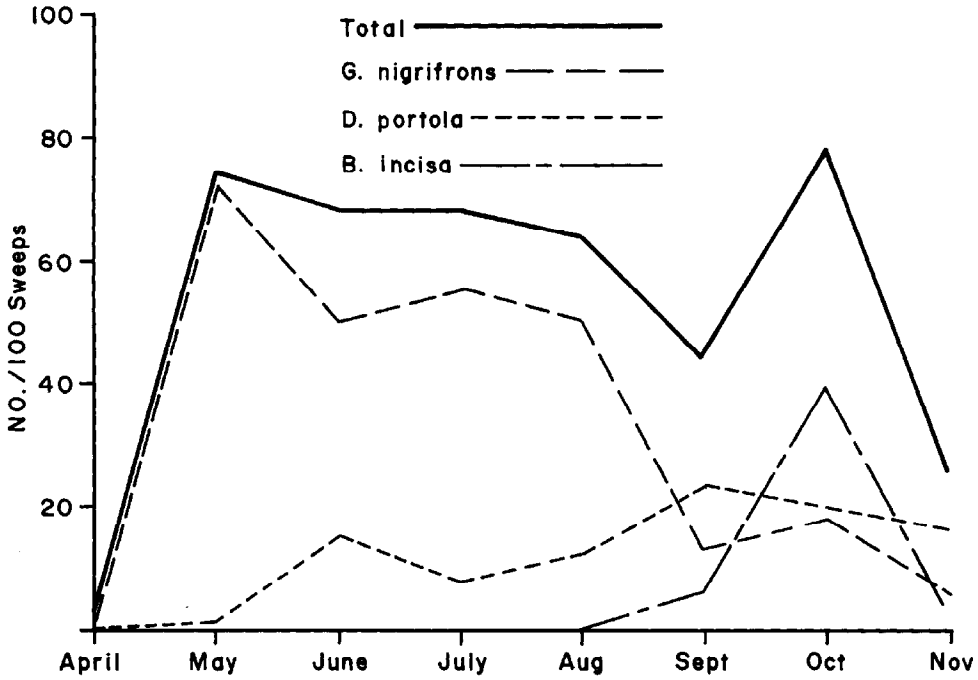

Fig. 1. Mean adult leafhoppers per 100 sweeps in eight Florida rice fields sampled each year during 1983 and 1984. Each field was sampled weekly with 100 continuous 180° sweeps with a 38.1 cm diameter sweep net. Fields were located throughout the Everglades agricultural area of southern Florida.

may be related to the weedy condition of a few of the ratooned rice fields.

In conclusion, Genung et al. (1979) have noted that leafhoppers are often very abundant on southern Florida rice and may contribute to the unthrifty appearance and discoloration often observed in the rice. Currently, southern Florida rice growers have expressed no concern for leafhopper or planthopper populations in their rice fields and *S. orizicola* was the only rice disease vector detected in our survey. However, several economically important leafhopper and planthopper species including potential disease vectors are present in the fields and may increase rapidly in numbers. Presently, we have little understanding of the impact of leafhoppers and planthoppers on southern Florida rice production or how these insects are interacting with other local crops such as corn and sugarcane. These above subjects warrant future research, especially if rice acreage continues to increase in southern Florida.

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ARTHROPODS ON BRAZILIAN PEPPERTREE, *SCHINUS TEREBINTHIFOLIUS* (ANACARDIACEAE), IN SOUTH FLORIDA

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ABSTRACT

Arthropods on *Schinus terebinthifolius* Raddi were collected by hand and with a sweep net every other week between 8 May 1979 and 29 July 1980 at three sites in Lee County, Florida. Of the 115 arthropod species identified, 46 (40.0%) were phytophagous, 59 (51.3%) predatory, and 10 (8.7%) miscellaneous. The six most frequently occurring species belonged to either the Formicidae or Araneae. The most frequently (65.5%) occurring phytophagous sp. was a bush cricket (*Cyrtoxipha* sp.). The phytophagous