LEAFHOPPER POPULATIONS (HOMOPTERA: CICADELLIDAE) ON FIVE PASTURE GRASSES IN THE FLORIDA EVERGLADES[1]

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ABSTRACT

Eighteen cicadellid species in 13 genera were collected from five pasture grasses. Several of these leafhopper species are of suspected economic importance. Striking host differences, reflected in total populations as well as numbers of genera and species, were indicated. Paragrass and St. Augustinegrass were lowest in these catagories; Bermudagrass and pangolagrass highest. Highest populations occurred in late summer and fall. Population trends appeared influenced by meteorological conditions but indicated variable specific response thereto.

Leafhoppers are among the more conspicuous components of the insect fauna of grass pastures in the Florida Everglades. During seasons of heavy populations several ranchers expressed concern over possible damage by these insects to pasture grasses. Because of their abundance and suspected economic importance in some instances, it seemed desirable to determine the composition of the cicadellid fauna on certain of the more important commercial grasses in the area, the degree of host specificity, and their seasonal occurrence on these grass species. The investigations reported herein were consequently conducted.

METHODS

Five commonly used pasture grasses were selected for observations and leafhopper collections. The pastures were located at the Everglades Experiment Station, Belle Glade, on Everglades peaty muck soil containing about 90% organic matter and were typical of the better commercial pastures in the area. Each pasture was 20-21 acres except Bermudagrass which was 2 acres. Each pasture was being grazed during the study period. Sod in each case was reasonably pure although slight admixtures of other species, weed grasses, and forbs were noted in spots. Such areas were avoided in making collections. The grass species were: Bermudagrass, *Cynodon dactylon* L. (Pers.); St. Augustinegrass, *Stenotaphrum secundatum* Walt. (Kuntze); pangolagrass, *Digitaria decumbens* Stent.; caribgrass, *Eriochloa polystachya* H. B. K.; and paragrass, *Panicum purpurascens* Raddi.

Monthly collections were made on each grass species by making 10 sweeps with an insect sweeping net near the center of each pasture. The insects collected were separated from debris and stored for determination. Leafhopper identifications were made by the junior author.

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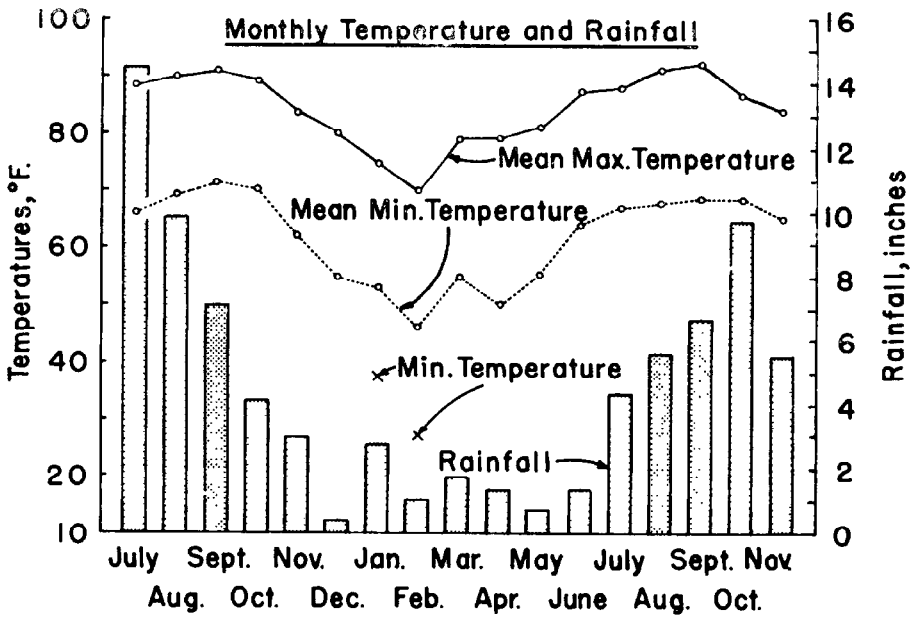

Fig. 1. Temperature and rainfall during the period July 1955 to November 1956. Everglades Experiment Station, Belle Glade, Florida.

Since weather conditions are important to the condition of the herbage and to the direct effects on the leafhopper population, temperatures and rainfall at the Everglades Experiment Station during the period of study are shown in Fig. 1.

Results

Composition of the Leafhopper Fauna:—Eighteen species of leafhoppers in 13 genera were identified from Everglades grass pastures. The species collected during this study were black-faced leafhopper, *Graminella nigrifrons* (Forbes), *G. villicus* (Crumb), *Deltocephalus flavicosta* (Stål)[2], *Hortensia similis* (Walker), *Carneocephala sagittifera* (Uhler), yellow-headed leafhopper, *C. flaviceps* (Riley), *Agallia constricta* Van Duzee, *Draeculacephala p. portola* Ball, *D. producta* (Walker), *Exitianus exitiosus* (Uhler), *Balclutha hebe* (Kirkaldy), *B. guajanae* (DeLong), *B. neglecta* (DeLong and Davidson), aster leafhopper, *Macrosteles fascifrons* (Stål), *Spangbergiella quadripunctata* Lawson, *Xestocephalus pulicarius* Van Duzee, *Paraphlepsius* sp., and *Empoasca* sp.

Host Relations:—A decided host differential was observed among the eight leafhopper species that occurred in large numbers or were regularly observed in smaller numbers. Comparative abundance of the six most regularly occurring are shown in Fig. 2-4. The black-faced leafhopper,

[2]*Deltocephalus sonorus* Ball has been taken occasionally in the Everglades on grasses and therefore should be mentioned even though it was lacking on all grasses used during this study.

Graminella nigrifrons, was common on all the grasses, but was much more plentiful on Bermudagrass, pangolagrass, and caribgrass than on the other species. *G. villicus* was found most abundantly on Bermudagrass and pan-

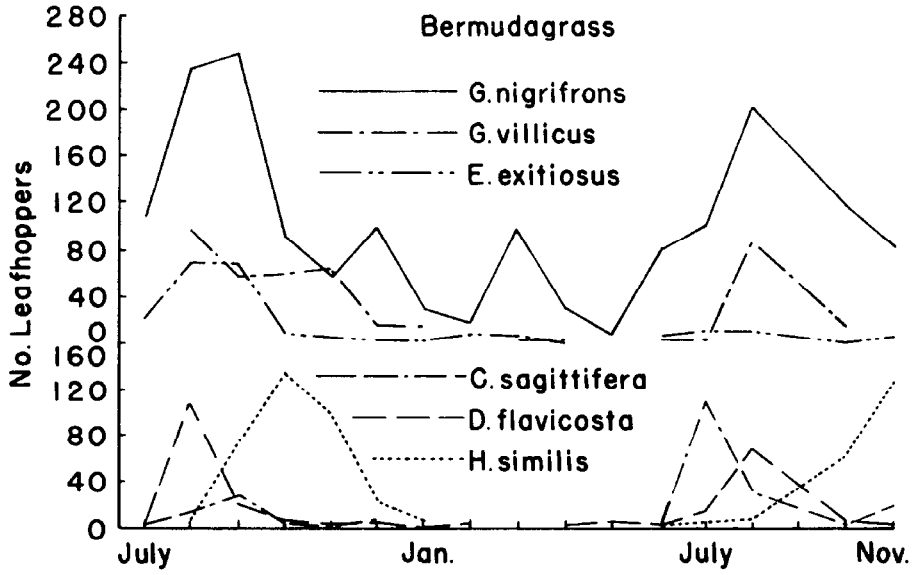

Fig. 2. Numbers of leafhoppers of dominant species on Bermudagrass, July 1955 to November 1956, on basis of 10 sweeps per monthly sample. Everglades Experiment Station, Belle Glade, Florida.

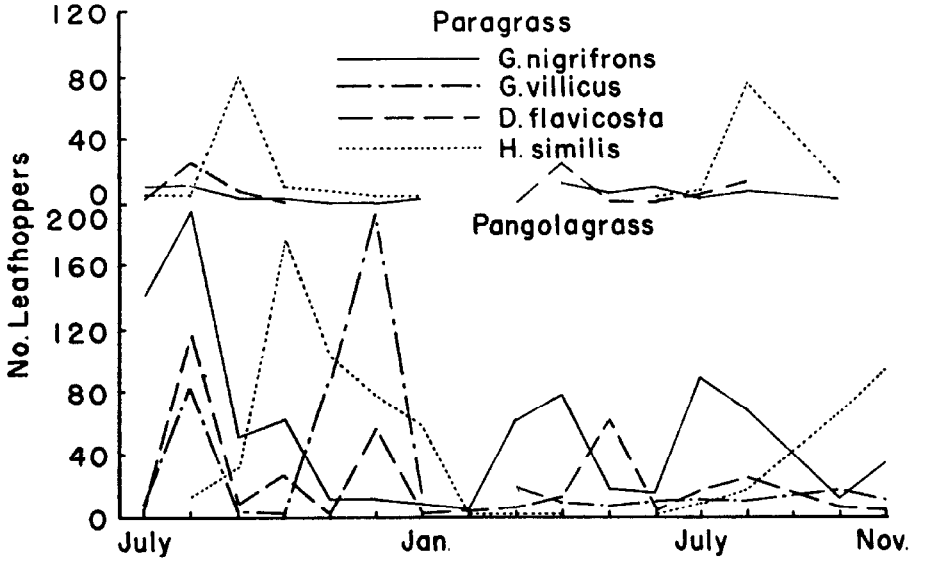

Fig. 3. Numbers of leafhoppers of dominant species on paragrass and pangolagrass, July 1955 to November 1956, on basis of 10 sweeps per monthly sample, Everglades Experiment Station, Belle Glade, Florida.

golagrass, was relatively scarce on caribgrass and St. Augustinegrass, and only one specimen was taken on paragrass. *Deltocephalus flavicosta* occurred in relatively moderate numbers on all the grasses and was the

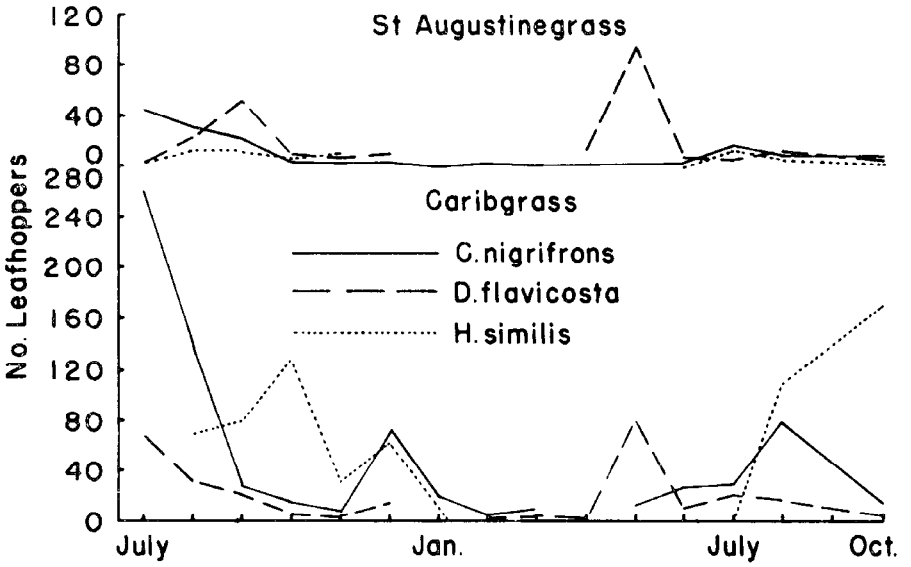

Fig. 4. Numbers of leafhoppers of dominant species on St. Augustinegrass and caribgrass, July 1955 to October 1956, on basis of 10 sweeps per monthly sample. Everglades Experiment Station, Belle Glade, Florida.

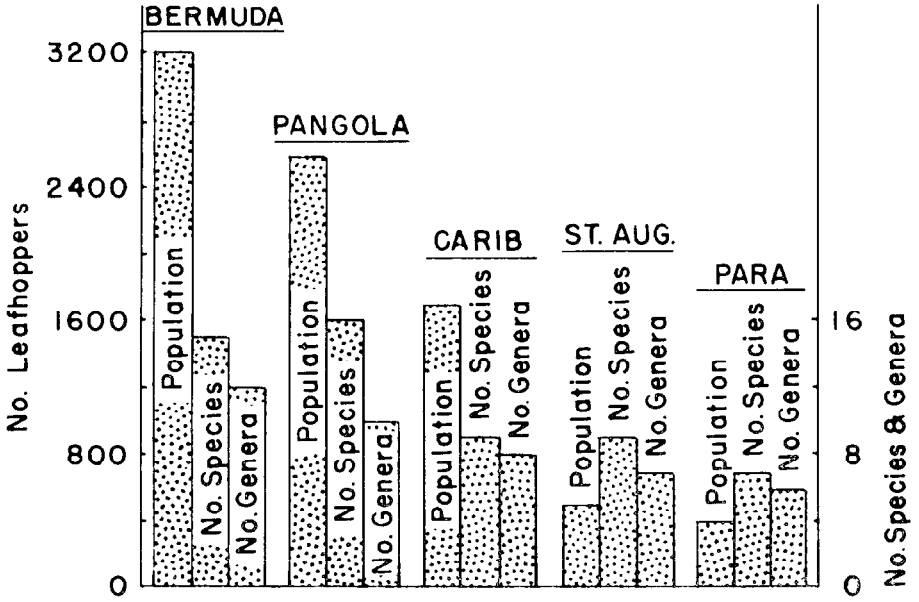

Fig. 5. Total number of leafhoppers, number of species, and number of genera from five pasture grasses. Everglades Experiment Station, Belle Glade, Florida.

dominant species on St. Augustinegrass, closely followed by *G. nigrifrons*. *G. nigrifrons* and *D. flavicosta* ranked just behind *H. similis* in abundance on paragrass. *H. similis* was almost equally plentiful on caribgrass, pangolagrass, and Bermudagrass and somewhat less plentiful on paragrass, while populations on St. Augustinegrass were regular but consistently low. *A. constricta* occurred lightly but fairly frequently on pangolagrass but was very scarce on Bermudagrass, St. Augustinegrass, and caribgrass, and was not taken on paragrass. *E. exitiosus* was of regular occurrence only on Bermudagrass and occurred very infrequently on the other grass species. *C. sagittifera* was generally present and fairly common on Bermudagrass but was scarce on pangolagrass and caribgrass, and was not collected on St. Augustine or paragrass. *D. portola* was often present but generally scarce on pangolagrass, paragrass, and caribgrass, and more infrequent on Bermudagrass and St. Augustinegrass. Other leafhoppers were very scarce throughout the period of study and were of too infrequent occurrence to make any conclusions regarding their host preferences. It appears that paragrass and St. Augustinegrass are much less subject to heavy leafhopper infestations than Bermudagrass, pangolagrass, or even caribgrass, on the basis of overall population as well as numbers of genera and species.[3] Fig. 5 shows these striking differences.

SEASONAL OCCURRENCE:—*Hortensia similis* appears to be a late summer and fall species. The other species were much more irregular in occurrence of peak populations but tended toward similar trends but with more pronounced fluctuations during spring and early summer. All species were usually scarce in midwinter.

DISCUSSION AND CONCLUSIONS

A large complex of leafhopper species, showing considerable host differential occurs in Everglades grass pastures. Six species occurred with sufficient regularity and in high enough numbers, alone or as a strong element of the complex, to be suspected of having economic importance during this study, Fig 2-4.

The data presented in Fig. 2-5 indicate that among the five pasture grasses investigated, paragrass and St. Augustinegrass are less liable to heavy infestation than the other three species. The differences between these grasses and Bermudagrass and pangolagrass are particularly striking both as to total leafhoppers and numbers of species and genera, Fig. 5. Reasons for the low preference for paragrass and St. Augustinegrass are not readily apparent except that paragrass is slightly more hairy than all other grasses used. This physical factor might possibly impede some of the smaller species.

The low populations of all these leafhoppers during mid-winter was probably due in part to poor host conditions caused by low temperatures as well as direct effects of freezing temperatures on some species. *Hortensia similis* is a neo-tropical species that has penetrated into the nearctic

[3]Since the completion of this study bahiagrass, *Paspalum notatum* Flugge has come into some favor as a pasture grass in the Everglades area. Many observations have shown that it also is heavily attacked by leafhoppers including *H. similis, D. flavicosta,* and *G. nigrifrons.*

region and therefore may be more cold susceptible than the more truly nearctic species. This may account for its virtual absence for long periods following freezes, Fig. 2-4. However, according to Wolcott (1948) rainfall and humidity have a great effect on abundance of *H. similis* in Puerto Rico where it becomes scarce in dry weather, except in wet meadows. Since mid-winter and early spring are usually the driest periods of the year in south Florida this condition may also contribute to the low populations in the Everglades at that time, Fig. 1.

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