

SEASONALITY AND TWO NEW SPECIES OF PANAMANIAN
XESTOCEPHALUS (HOMOPTERA: CICADELLIDAE)

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Abstract.—Two new species of *Xestocephalus*, *vittanotus* and *bifasciatus*, from the cloudforest at Guadalupe Arriba, Panama are described and illustrated. Their distribution in Panama is discussed. Temporal abundance as recorded from light trap samples is presented for five species of *Xestocephalus*.

The Republic of Panama has a rich *Xestocephalus* fauna, both in terms of species diversity and number of individuals. Wolda (1982) listed xestocephalines as representing the third largest leafhopper subfamily in terms of number of individuals collected in both a disturbed area and in an undisturbed forest. Although the new world *Xestocephalus* fauna is far from being fully realized, Panama is unique in the number of endemic species. Of the 42 *Xestocephalus* species reviewed by Cwikla (in press) for North and Central America, 38 percent are endemic to Panama. The Panamanian species of this subfamily were reviewed recently by DeLong et al. (1980), with additional species described by DeLong et al. (1983).

In this paper we describe two new species of *Xestocephalus* from Guadalupe Arriba, Panama with notes on their distribution. In addition, we discuss the temporal phenology of the five *Xestocephalus* species collected from this locality in 1984.

Methods.—Populations of leafhoppers were monitored at Guadalupe Arriba (82°33'13"W, 8°52'26"N) in the southwestern province of Chiriquí. This site is a cloudforest at 2100 meters and lies just inside the Panamanian national park, Volcán Baru. Although reliable rainfall data are not available for the area, there is a distinct "dry" season from January to April in which less rainfall is observed. Collections were made at this site using a modified Pennsylvania light-trap as described by Wolda and Fisk (1981). The trap was installed in early December 1983 and the contents were collected weekly until the end of 1984. The xestocephalines were identified and two species of *Xestocephalus* were determined to be previously undescribed.

Xestocephalus vittanotus Cwikla and Wolda, NEW SPECIES

Figs. 1-4

Length.—Male 4.7-5.1 mm, female 5.2-5.9 mm.

Structural features.—Crown slightly produced, head distinctly narrower than pronotum. Other features characteristic of genus.

Color.—Variable. Crown white with irregular light brown markings, broken obliquely transverse dark brown band present or absent on anterior margin. Face brown or white, V-shaped brown patch present or absent under each ocellus. Pronotum white and heavily marked with irregular brown patches, light brown median vitta usually present. Scutellum white or cream, disc sometimes with small light brown patch, anterior margins light brown. Forewing light brown, irregular dark brown and white patches throughout wing. Lateral aspect of thorax, legs and abdomen brown.

Male genitalia.—Pygofer with posterior margin produced, internal tooth-like processes directed medially. Plates with apex truncate. Aedeagus in lateral aspect with posterior margin under gonopore slightly concave, two pair of processes present, ventral processes long, directed laterally then turning posteriorly in lateral aspect, pair of small spine-like processes present above ventral processes, directed laterally, apex of shaft acute. Gonopore subapical. Styler apex narrow and curved, slight serration on heel.

Type-series.—Holotype ♂, Panama, Chiriquí, Guadalupe Arriba, 2100 meters, 8°52'26"N, 82°33'13"W, 25–31 January 1984, H. Wolda coll. Paratypes: 4 ♀ and 3 ♂ with same data as holotype except for 1 ♀ 21–27-XII-1983, 1 ♂ 28-XII-1983 and 1 ♂ 2–8-V-1984. All types deposited in the DeLong Collection, Ohio State University, except for 1 ♂ (28-XII-1983) and 1 ♀ (25–31-I-1984) paratypes deposited in the H. Wolda Collection.

Variation.—Dark brown maculations on the crown, pronotum and forewings vary between individuals in the type-series. The coronal markings also vary from light brown to dark brown.

Etymology.—Latin vitta (band) and the Greek notum (back) refer to the band on the pronotum.

Diagnostic features.—The species is related to *artarus* DeLong, Wolda, and Estribí and can be separated from it by the posterior margin of the aedeagal shaft under the gonopore being slightly concave in lateral aspect and the short spine-like aedeagal processes situated above the long ventral processes.

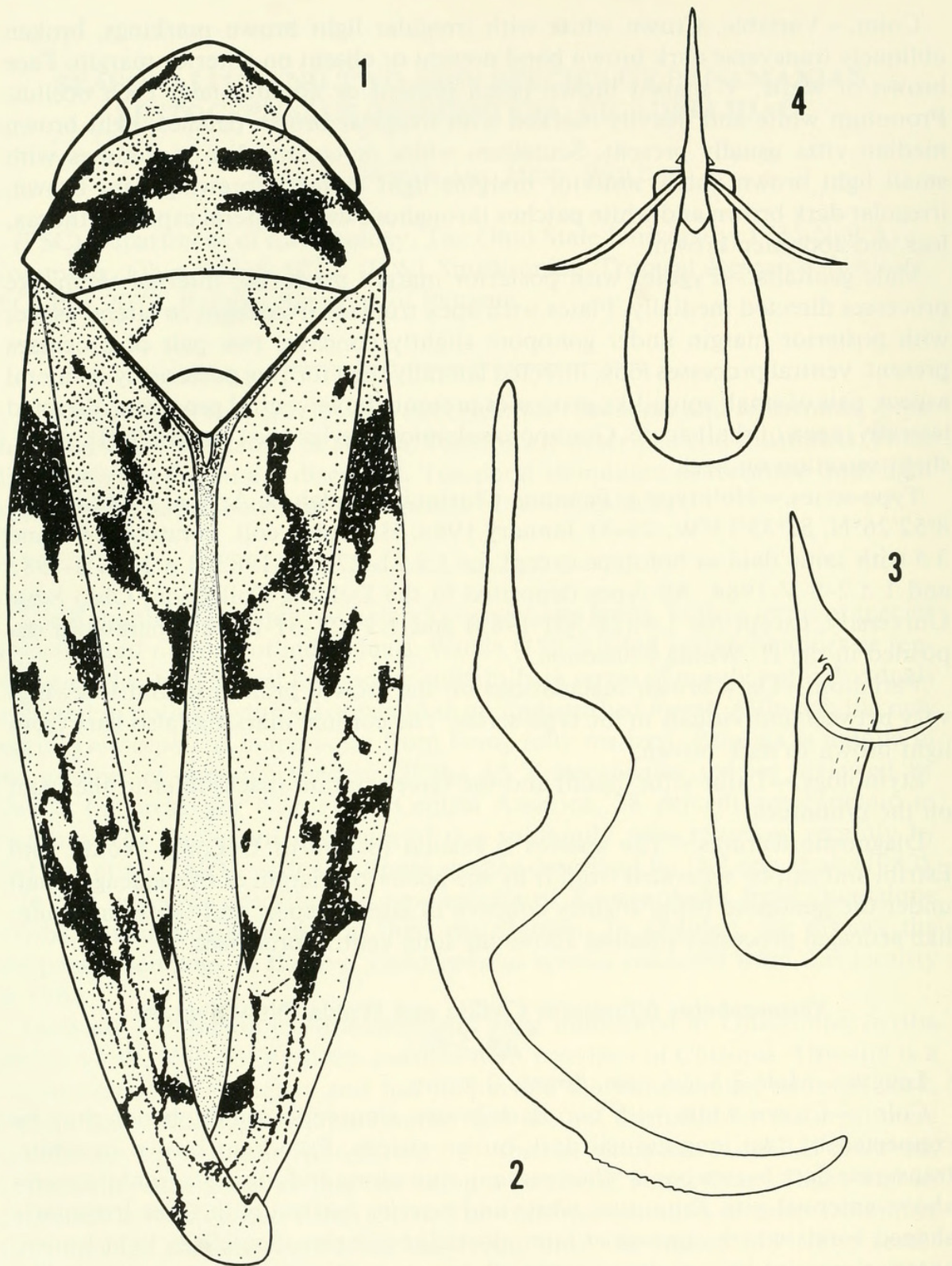
***Xestocephalus bifasciatus* Cwikla and Wolda, NEW SPECIES**

Figs. 5–8

Length.—Male 3.3–3.6 mm, female 3.8 mm.

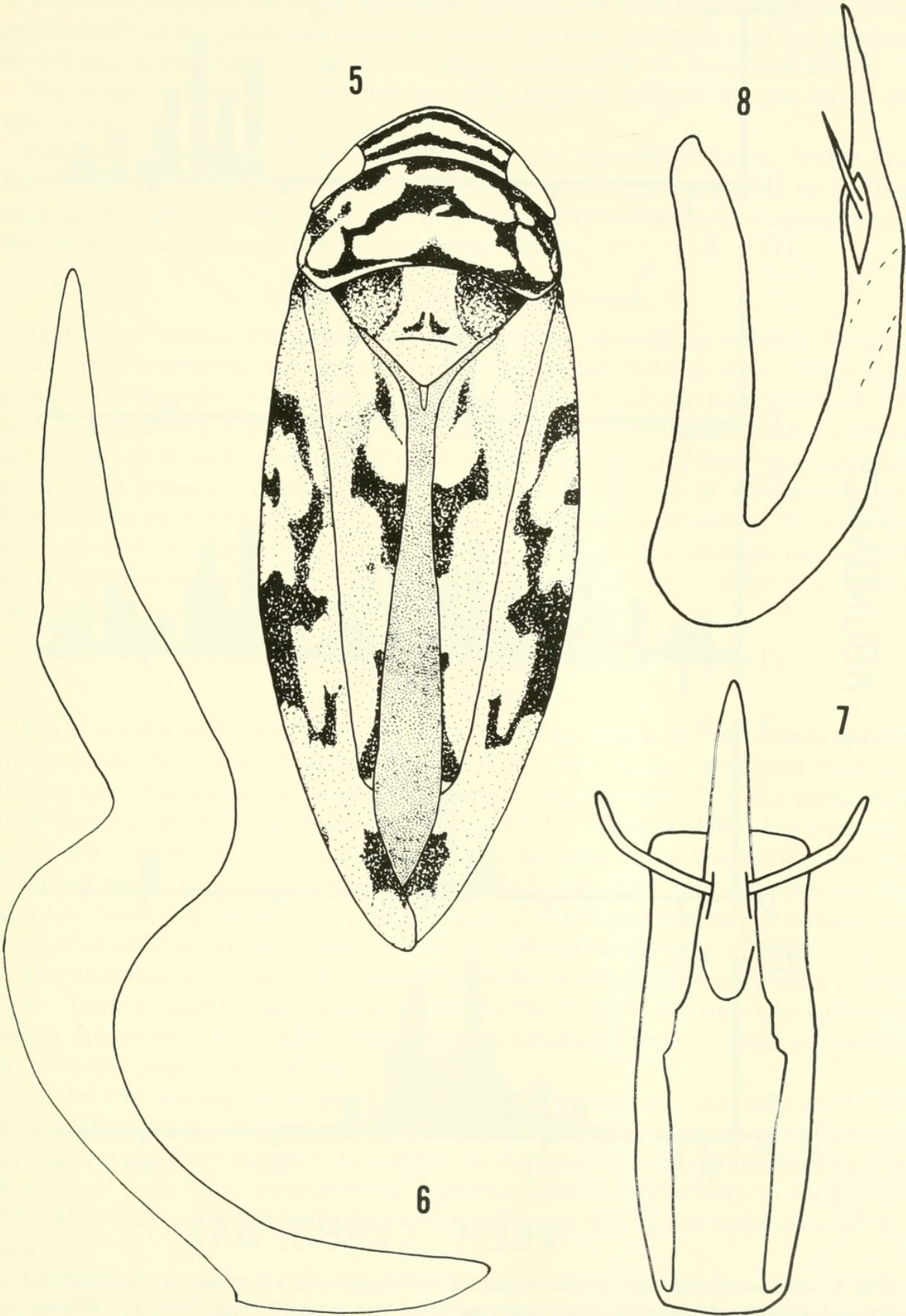
Color.—Crown white with two dark brown transverse bands, bands may be connected by two longitudinal dark brown stripes. Face light brown or white, transverse dark brown band, when present, runs along and connects frontal sutures above antennal pits. Pronotum white and heavily marked with three irregularly shaped bands which connect at lateroposterior margins. Scutellum light brown, anterior margins brown, discal area with brown spot or two brown crescent-like markings. Forewing light brown, irregular dark brown and white markings throughout wing. Lateral aspect of thorax, legs and abdomen light brown.

Male genitalia.—Pygofer with posterior margin produced, internal tooth-like processes directed medially. Plates with apex truncate. Aedeagus in lateral aspect V-shaped, margin of shaft with teeth in posterior aspect, pair of thin processes directed dorsally in posterior aspect, processes appearing to arise from large pit. Gonopore near middle of shaft. Styler apex enlarged, curved.



Figs. 1–4. *Xestocephalus vittanotus*. 1, Habitus, dorsal aspect. 2, Left style, lateral aspect. 3, Aedeagus, left lateral aspect. 4, Aedeagus, posterior aspect.

Type-series.—Holotype ♂ Panama, Chiriquí, Guadalupe Arriba, 2100 meters, 8°52'25"N, 82°33'13"W, 25-IV-1984, H. Wolda coll. Paratypes: one ♂ same data as holotype, one ♀ same data as holotype except for 16–22-V-1984. Holotype and ♀ paratype in DeLong Collection (OSUC) and ♂ paratype in the H. Wolda Collection.



Figs. 5–8. *Xestocephalus bifasciatus*. 5, Habitus, dorsal aspect. 6, Left style, lateral aspect. 7, Aedeagus, posterior aspect. 8, Aedeagus, left lateral aspect.

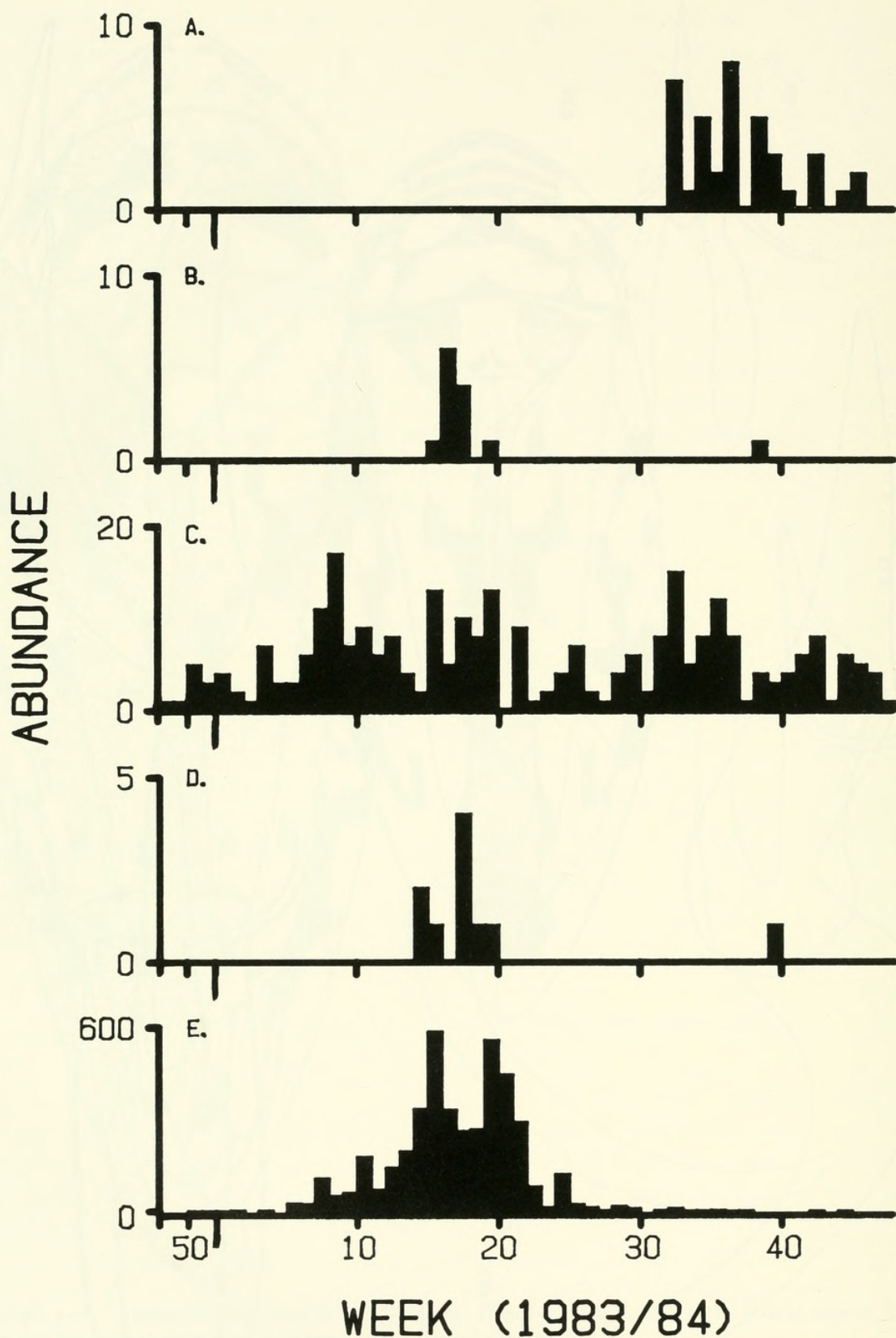


Fig. 9. Temporal abundance for five species of *Xestocephalus* in a light trap at Guadalupe Arriba (Chiriquí, Republic of Panama) from December 1983 through November 1984. The numbers of individuals per week of A) *X. artarus* DeLong, Wolda and Estribí; B) *X. bifasciatus* n. sp.; C) *X. vittanotus* n. sp.; D) *X. desertorum* (Berg); E) *X. fuscarius* DeLong, Wolda and Estribí.

Variation.—Minor variation was noted between the members of the type-series in the width of the transverse bands on the crown and pronotum and the presence or absence of two longitudinal brown bands connecting the transverse bands.

Etymology.—Latin, bi (two) and fasciatus (banded) refer to the two bands on the crown.

Diagnostic features.—This species is related to *fuscus* DeLong, Wolda and Estribí and can be separated from it and other *Xestocephalus* species by the two dark brown bands on the crown, the thin aedeagal processes in lateral aspect and the teeth on the aedeagal shaft in posterior aspect.

DISTRIBUTION OF THE NEW SPECIES

The junior author has extensively light trapped throughout western Panama and other Panamanian localities (for map of sites see DeLong et al., 1980). The localities of Boquete (1350 meters) and Fortuna (1050 meters) lie respectively 10 and 30 kilometers to the east of Guadalupe Arriba (2100 meters). All localities are contained within Cordillera Central. Light trapping from these two localities has not yet procured individuals of *X. bifasciatus* n. sp. and *X. vittanotus* n. sp. In addition, extensive light trap collecting at sea level in Miramar, Panama for one year and on other lowland areas of Bocas del Toro Province has not yielded these two new species. This suggests that *X. vittanotus* and *X. bifasciatus* might be restricted to the higher elevations of Cordillera Central.

PHENOLOGY OF *XESTOCEPHALUS* SPECIES AT GUADALUPE ARRIBA

While certain auchenorrhynchous Homoptera are active all year, others appear to have a distinct seasonal distribution (Wolda, 1982). Seasonal species from the tropics have a longer season and their seasonal peaks are usually more spread out than their temperate counterparts (Wolda, 1978b). Wolda (1978a) has hypothesized this seasonal activity is correlated with the start of the wet season and the resulting production of new plant growth. Although light trap data are not an absolute collecting method, they do give a good indication of seasonal abundance for nocturnally active adult insects such as leafhoppers (Wolda, 1978b).

The light trap at Guadalupe Arriba yielded five species of *Xestocephalus* during 1984. Their abundance per week is plotted in Fig. 9. Although only one light trap was in operation over a single season, the data obtained do give a rough indication on probable population trends.

Of the five species collected, *X. vittanotus* n. sp. was the only obvious non-seasonal species. Low numbers of individuals were found almost equally abundant throughout the year (Fig. 9C). *Xestocephalus fuscus* DeLong, Wolda and Estribí is seasonal with vast numbers being collected from mid-February to early June (Fig. 9E). Only scattered individuals were collected during the remainder of the year.

The three remaining species appear to be seasonal. *Xestocephalus bifasciatus* n. sp. and *X. desertorum* (Berg) both have all but one individual collected at the beginning of the rainy season (Fig. 9B, D). On the other hand, *X. artarus* DeLong, Wolda and Estribí, appears to be seasonal with adult abundance lasting between August through November (Fig. 9A). While the numbers of individuals are low

for some of the seasonal species, further collecting from a number of different light traps at Guadalupe Arriba should help to determine the exact nature of their seasonality.

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