

ATTRACTION OF *EUPHASIOPTERYX OCHRACEA*¹,
CORETHRELLA SP.² AND GRYLLIDS TO BROADCAST
SONGS OF THE SOUTHERN MOLE CRICKET^{3,4}

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ABSTRACT

Females of the parasitic tachinid *Euphasiopteryx ochracea* (Bigot), the culicid *Corethrella wirthi* Stone or ally, and 7 gryllid species were attracted to broadcast calling songs of the southern mole cricket, *Scapteriscus acletus* Rehn and Hebard, in Florida. A 14 month study of *E. ochracea* attraction to *S. acletus* calling song indicated *E. ochracea* was attracted from May through December, with greatest numbers attracted in September, October, and early November.

Soper (1974) and Soper et al. (1976) first showed that a parasite can find its host by sound; the sarcophagid *Colcodamyia auditrix* Shewell can locate its cicada host, *Okanagana rimosa* (Say), by the male cicada's song. The tachinid *Euphasiopteryx ochracea* (Bigot) has also been attracted to the calling song of males of its host, *Gryllus integer* Scudder (Cade 1975). Female flies of both species larviposit on their hosts, usually adult males.

On 29 May 1975 Dr. T. J. Walker, Department of Entomology and Nematology, University of Florida, collected an *E. ochracea* female 1 h after sunset from the speaker of a tape recorder broadcasting the calling song of *Scapteriscus acletus* Rehn and Hebard in Alachua Co., Florida. The host(s) of *E. ochracea* in Alachua Co., were unknown—i.e., Alachua Co. is outside the range of *Gryllus integer* (Nickle and Walker 1974). Also, no parasites of *S. acletus*, an important agricultural pest, are known; a similar fly, *E. depleta* (Wied.), has been reared from the Changa mole cricket, *S. vicinus* Scudder in Brazil (Wolcott 1940, 1948). A study was made to confirm auditory attraction and to determine the seasonal attraction of *E. ochracea* to *S. acletus* calling song.

METHODS AND MATERIALS

Recordings of the natural calling song of *S. acletus* males at 25°C soil temperature were broadcast using equipment like that described by Ulagaraj and Walker (1973). At this temperature *S. acletus* calling song has a pulse rate of 60 pulses/sec, a carrier frequency of 2.8 kHz, and an intensity range of 42-106 dB as measured 15 cm above the male burrow entrance (Ulagaraj and Walker 1973, Ulagaraj 1976).

¹Diptera: Tachinidae.

²Diptera: Culicidae, Chaoborinae.

³*Scapteriscus acletus* Rehn and Hebard (Orthoptera: Gryllidae, Gryllotalpinae).

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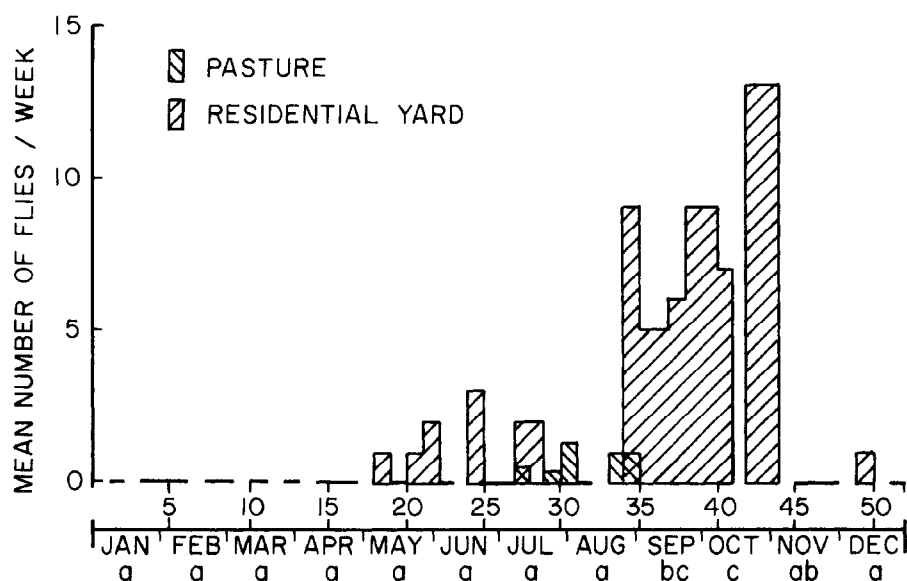


Fig. 1. Mean number of *Euphasiopteryx ochracea* females per week attracted to broadcast calling song of *Scapteriscus acletus*; breaks in the abscissa indicate weeks of no observations. Lack of significant monthly differences at the 5% level of error based on Duncan's multiple range test at site 2 are indicated by same letter underneath a month.

Two test locations were used: (1) from 9 July 1975 to 3 September 1975, a pasture surrounded by mesic hammock near Gainesville, NW 1/4, Sec. 31, T9S, R19E, the site of the fly captured by Walker, (site 1) and (2) from 16 September 1975 to 16 September 1976, SE 1/4, Sec. 23, T9S, R19E, 1.6 km NE of site 1 (site 2). The second site was a residential yard bordering mesic hammock; it was selected because more *E. ochracea* were collected here than at site 1.

To determine whether *E. ochracea* could be attracted to broadcast song, a 0.5 m × 0.5 m white cloth was placed under the speaker and a cylindrical electric grid, described by Mitchell et al. (1972), was placed over the speaker. An identical apparatus including a speaker was not connected to calling song output and served as a check. The electrical grid and speaker combination used to broadcast calling song was alternated with each successive test date. The speakers were modified by removal of the flared-horn end and were placed on their sides, 3 m apart. Broadcasts began ca. 30 min after sunset. Both grids and ground cloths were inspected with a flashlight for an equal length of time every 30 min for the first 1 and 1.5 h after sunset at sites 1 and 2, respectively. The intensity of the broadcast songs was maintained at ca. 96 dB and 105 dB as measured 15 cm from the speaker front, at sites 1 and 2, respectively, using a sound level meter (General Radio Model No. 1551-B). Broadcasts were made at least 3 times monthly, except for 2 observations in January. All broadcasts were made on evenings when the air temperature was > 14°C at 30 min after sunset. An analysis of variance was calculated to test for significant monthly differences in the 41 nights of

E. ochracea attraction observations to sound source at site 2; the data were transformed to $\sqrt{x + 0.5}$ for analysis.

RESULTS AND DISCUSSION

Euphasiopteryx ochracea—A total of 97 *E. ochracea* females was collected from the broadcasting apparatus. No *E. ochracea* were collected from the check. *E. ochracea* females were sometimes observed flying to the broadcasting speaker at the beginning of a broadcast. On some occasions these tachinids were collected on evenings when no Orthoptera were taken. *E. ochracea* were attracted in significantly greater numbers during September, October, and November than other months, although the number attracted in September was not significantly different from the number attracted in November (Fig. 1). These results agree with Sabrosky's (1953) report that *E. ochracea* adults apparently fly in late summer through fall. Lower temperatures at broadcast time during the winter probably did not contribute to an absence of attracted tachinids since Cade (1976) found *E. ochracea* in Texas flew to *Gryllus integer* calling song at temperatures as low as 10.6°C.

As a preliminary test of the host suitability of *S. acletus* and the southern field cricket, *Gryllus rubens* Scudder, for *E. ochracea* development, larvae dissected from a female *E. ochracea* abdomen were placed on males of these crickets by touching cricket abdomens to larvae.

E. ochracea successfully developed to adulthood on 1 of 5 *S. acletus* males and on the 1 *G. rubens* male artificially infested. Since there are numerous examples of parasites developing on factitious hosts (Simmonds 1944), the rearing of *E. ochracea* on *S. acletus* does not prove that the latter is a natural host. The rearing of 5 *E. ochracea* adults from an adult *Gryllus* sp. collected on 22 October 1976 (J. R. Mangold unpubl.) may indicate that *Gryllus* spp. are important hosts in the fall.

The reduction in *Gryllus* spp. calling song activity during the peak period of *E. ochracea* attraction to *S. acletus* calling song may indicate that the seasonal patterns of *Gryllus* calling songs in north central Florida are influenced through parasitism by *E. ochracea*. Directional or disruptive selection against *Gryllus* calling during September to November caused by *E. ochracea* parasitism may be partially responsible for reduced calling during this period. Calling by *G. rubens* males is most frequent during January to April in Alachua Co. (T. J. Walker unpubl.), but the greatest numbers of adults are found in the fall in north Florida (Veazy et al. 1976). Similarly, Veazy et al. (1976) found 2 peaks of *G. firmus* Scudder adults, June to mid-August and September to November, but calling males were present in peak numbers only during June to late August (T. J. Walker unpubl.). Calling males of *G. fultoni* (Alexander) are heard throughout the year except for October to mid-December (Walker 1974). Furthermore *G. ovisopis* Walker, the only *Gryllus* sp. known to lack a calling song, occurs as an adult from September to mid-December (Walker 1974) which is during the time *E. ochracea* is attracted to *S. acletus* calling song in greatest numbers.

Gryllidae—The following 7 species of crickets were collected from the broadcasting speaker apparatus: *Neonemobius* nr. *mormonius*, *N. cubensis* (Saussure), *Oecanthus niveus* (De Geer), *O. celerinictus* Walker, *S. acletus*,

S. vicinus, and *G. rubens*. Ulagaraj and Walker (1973) previously reported the latter 4 cricket species and *N. cubensis* have calling songs similar to *S. acletus* and were attracted to *S. acletus* calling song. Eighteen female and 12 male *O. niveus* and 2 female and 1 male *N. nr. mormonius* were found at the broadcasting speaker; 3 female and 3 male *O. niveus* were found at the check. *Neonemobius nr. mormonius* and *O. niveus* also have calling songs similar to *S. acletus* (T. J. Walker pers. comm.).

Corethrella Species—On 2 September 1975 I noticed small midges on and within 20 cm of a broadcasting speaker after the normal broadcast period. These flies were later identified as females of *Corethrella wirthi* Stone or ally, culicids of the subfamily Chaoborinae. On the following night and on 9, 17, 23, 31 July and 15 September 1976 ca. 4-30 midges were observed at the broadcasting speaker at 1.5 h after sunset, while no midges were observed at the check.

Recently, McKeever (1977) reported *Corethrella brakelyi* (Coquillett) and *C. wirthi* females feeding on 3 species of tree frog, *Hyla* spp. in Georgia and presented circumstantial evidence of their attraction to host (frog) calls. It seems plausible that *Corethrella* sp. were attracted to mole cricket calling song because of its similarity to tree frog calls.

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