PAN-PACIFIC ENTOMOLOGIST
July 1982, Vol. 58, No. 3, pp. 236–239
Published 16 December 1983

NOTES ON THE SUBGENUS *BOMBYLIUS* (*ZEPHYRECTES*) (DIPTERA: BOMBYLIIDAE)

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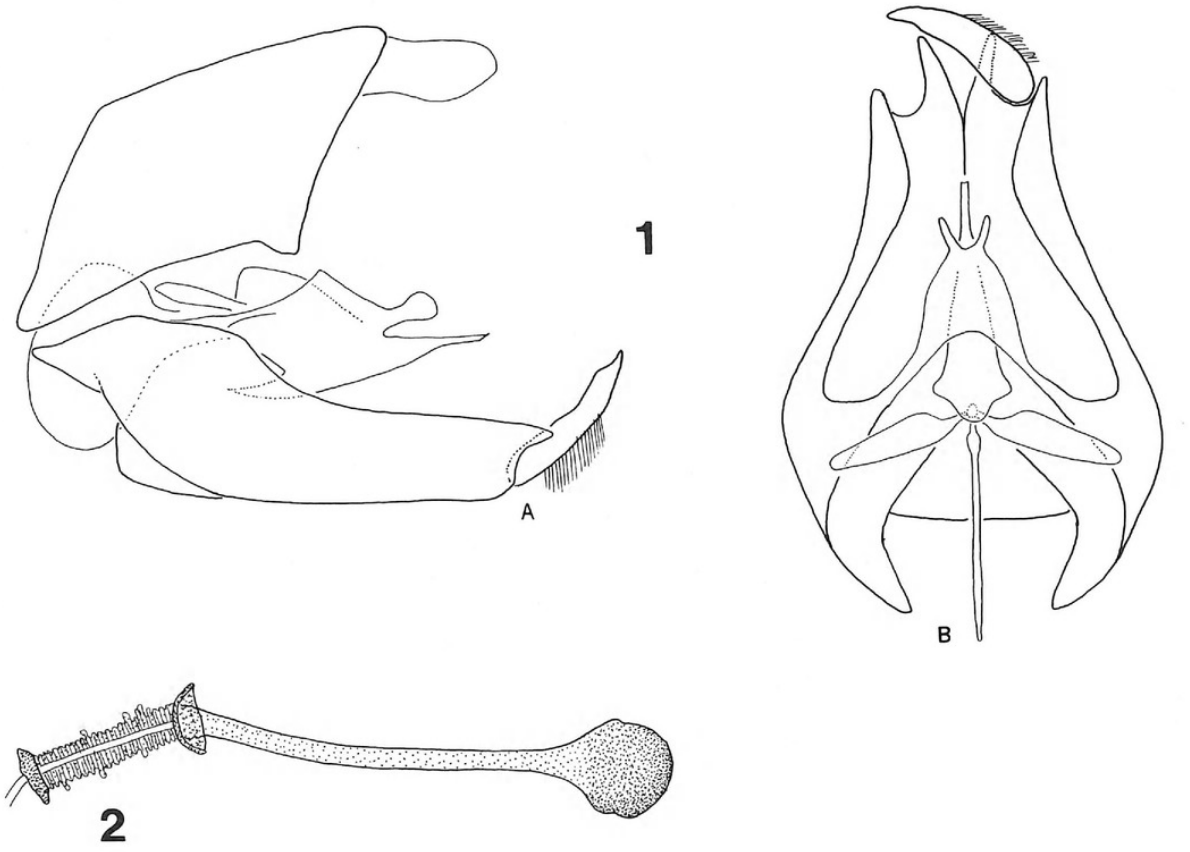
Since the erection of the subgenus *Bombylius* (*Zephyrectes*) by Evenhuis (1978), described to include the species *B. anthophoroides* Evenhuis and *B. montanus* Johnson and Johnson and since data on these two species were presented in Hall and Evenhuis (1980), new distributional data, ecological observations and systematic studies have been made on this unique group of flies. Four additional species of *Bombylius* (*B. incanus* Johnson, *B. ravus* Loew, *B. cruciatus* Fabricius, *B. nicholsonae* Hall and Evenhuis) are here relegated to this subgenus. The inclusion of one Palearctic species (*cruciatus*) now gives *Zephyrectes* a Holarctic distribution.

Bombylius (*Zephyrectes*) *incanus* Johnson

Types of this northeastern U.S. species deposited in the Museum of Comparative Zoology, Harvard University (MCZ) have been recently examined, with ♂ and ♀ genitalic studies made on paratypes. Data additional to those presented in Hall and Evenhuis (1980) are as follows: ♂—Antennal segments I and II with white scales intermixed with sparse black hairs. Mesonotum, post alar callus and mesopleura with orange macrochaetae. Genitalia (Fig. 1) in lateral view with basistylus linear-lanceolate, length 3.5× width, slightly clawed basally; dististylus length 4× width, linear, slightly tapering to pointed apex; epiphallus broadly tapering to aedeagal tip, dorsal surface with well pronounced club-shaped projection, projection larger than in *B. anthophoroides* or *B. montanus*; aedeagus long, thin, slightly tapering to truncate apex; basal apodeme large, rounded; epandrium subrhomboid, with slightly pronounced posterior process; anterior process weak; cercus long, length 2× width. ♀—Genitalia: similar to that of *B. anthophoroides.*

Bombylius (*Zephyrectes*) *ravus* Loew

The unique female holotype of *ravus* deposited in the MCZ has been recently examined and the following data additional to that presented in Hall and Evenhuis (1980) is noted: ♀—Antennal segments I and II with white scale-like hairs, basal ⅓ of antennal segment III with white scale-like hairs laterally and dorsally, bare mesally. Anterior thoracic spiracle with dark



Figs. 1, 2. Fig. 1. *Bombylius* (*Zephyrectes*) *incanus* Johnson, male genitalia: a) lateral view, b) dorsal view. Fig. 2. *B.* (*Z.*) *cruciatus* Fabricius, female spermatheca.

brown bristles; macrochaetae and bristles on mesonotum, postalar callus, mesopleuron and scutellum amber.

The "green pollinose" thorax mentioned in Hall and Evenhuis (1980) is actually grayish ground color on the pleura as well as the lateral and anterior portions of the mesonotum. The remainder of the thoracic ground color is dark brown.

Bombylius (*Zephyrectes*) *cruciatus* Fabricius

Examination of both males and females of this species show it to possess the characters typical of *Zephyrectes* (viz., white scale-like hairs on antennal segments I and II and presence of amber-colored macrochaetae on the thorax). The female genitalia (Fig. 2) is also consistent with that of other *Zephyrectes* species in having the apical spermathecal duct slightly sclerotized and the ejaculatory apparatus with many canaliculi.

It is very likely that other Palearctic species allied to *B. cruciatus* (e.g., *cinerarius* Pallas, *androgynus* Loew, *armeniacus* Paramonov, *vlasovi* Paramonov, *quadrifarius* Loew, *testaceiventris* Paramonov) may also belong to

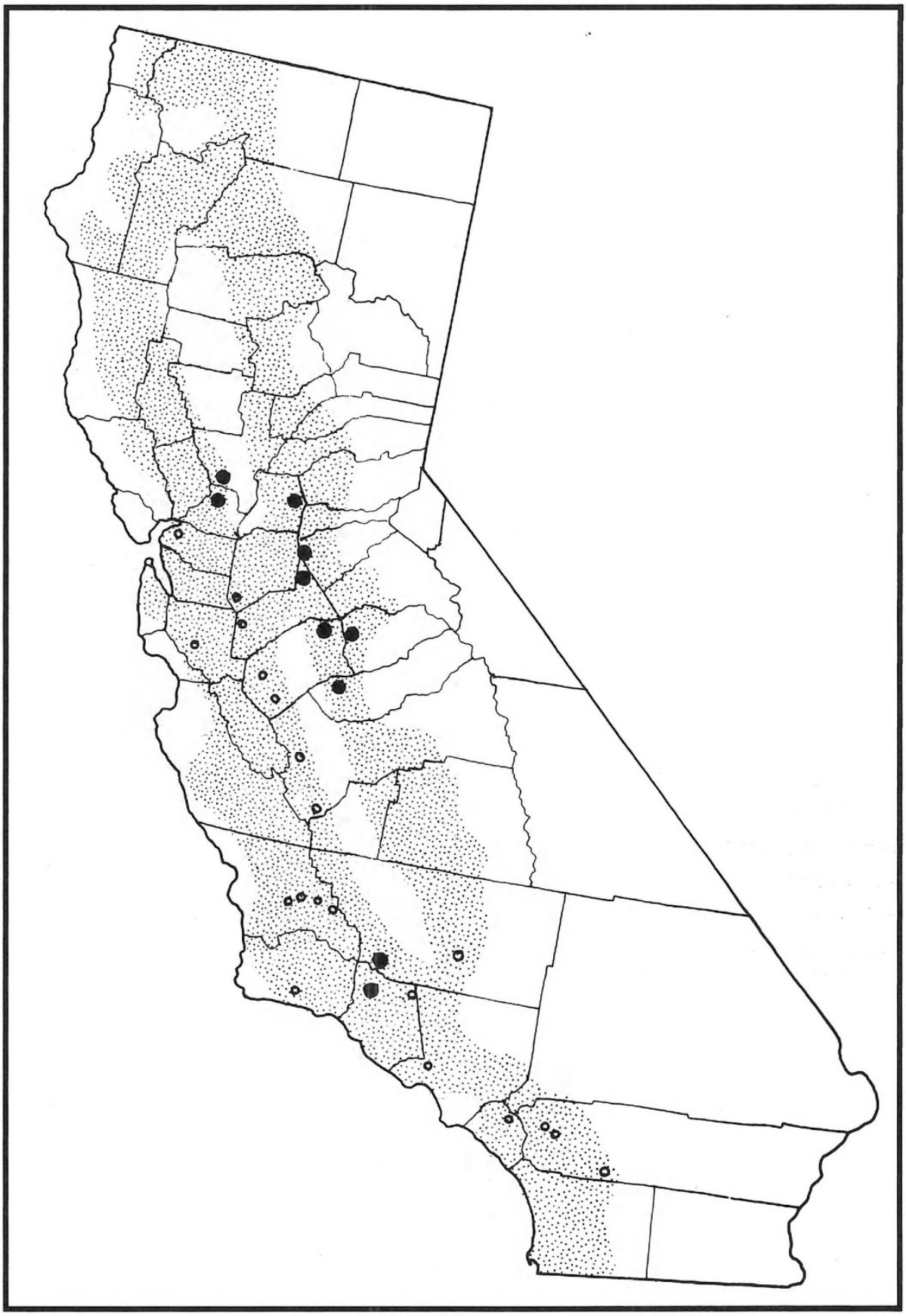


Fig. 3. Distribution of *Bombylius* (*Zephyrectes*) *anthophoroides* Evenhuis (small circles = previous collecting records; large dots = new collecting records) and the plant *Trichostema lanceolatum* Bentham (shading).

the subgenus *Zephyrectes*. Examination of both male and female genitalia of those species will be necessary before any conclusions can be made as to a subgeneric allocation. The male genitalia of those species listed above and figured in Zaitzev (1966) fit the characters exhibited in other species belonging to *Zephyrectes*.

Bombylius (*Zephyrectes*) *anthophoroides* Evenhuis

This species has previously been noted as a monolectic pollinator of the labiate plant *Trichostema lanceolatum* Bentham (Hall and Evenhuis, 1980). A collecting expedition in September 1980 was conducted by the author and Mr. Thomas Plichta in northern and central California in an attempt to extend the known distribution of this species which coincides remarkably with the distribution of *T. lanceolatum*. The results of the expedition are shown in Figure 3. New county records for *B.* (*Z.*) *anthophoroides* include Calaveras, Madera, Mariposa, Sacramento, Solano and Yolo. The northernmost extension of this species was found in Yolo County, 1.6 mi [2.8 km] west of Winters. The finding of this species on the eastern side of the central valley further emphasizes that *B.* (*Z.*) *anthophoroides* is restricted in distribution to locations where *Trichostema lanceolatum* is present. Evidence at hand strongly supports the theory that this species of *Bombylius* has co-evolved with, and restricted its distribution, emergence and flight period to coincide with the location and blooming of *T. lanceolatum*. Future collecting of this species will concentrate on more northern areas into Oregon and southerly locations into Baja California. A forthcoming paper will describe in detail the biological and ecological observations on this remarkable species of bee fly and will include a discussion on the co-evolution of *B. anthophoroides* and *T. lanceolatum*.

Bombylius (*Zephyrectes*) *nicholsonae* Hall and Evenhuis

The description of *B. nicholsonae* in Hall and Evenhuis (1980) failed to state the subgeneric allocation of this species. Dissection of the female genitalia and examination of other morphological characters show it to be a member of the subgenus *Zephyrectes*.

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