

## Notes on the Biology and Distribution of *Trichobius* in Northwest Oklahoma (Diptera, Streblidae)

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The Streblidae or "Bat Flies," belonging to the order Diptera, sub-order Pupipara, are small, light brown flies varying from 1.2 to 3.7 mm. in length and are almost always parasitic on bats (Plate 1). Both males and females are blood feeders. These Diptera are widespread in distribution, but are rare in museum collections.

The family Streblidae was established by Kolenati (1863) and the genus *Trichobius* was erected by Gervais (1844). Collection of these flies has occurred in Oklahoma from time to time, but little information has been published. Jobling (1938), in his excellent revision of the genus *Trichobius*, gives information in regard to distribution and host-parasite relationships. Additional distribution records of these parasites in Oklahoma are recorded by Kessel (1952) and Kohls (1954).

The Streblidae are viviparous and the larvae are retained within the female until fully developed. Only one larva matures at a time and it is deposited on the wall or ceiling of a cave where it remains immobile. Within a few moments the larva develops into a pupa.

For the past year the author has been working on both the external and internal morphology and biology of *Trichobius major* (Coquillett). This problem necessitated the collecting of large numbers of this species. Many specimens of *T. major* and other species were obtained from several known bat caves in northwestern Oklahoma.

The location of these caves follows:

**Conner's Cave:** Five miles south, two miles east of junction of U.S. Highway 281 and Oklahoma State Highway 15, Major County.

**Griever Creek Cave:** Three miles east, four miles south of junction of U. S. Highway 281 and Oklahoma State Highway 15, Major County.

**Icebox Cave:** Six miles south, seven and one-half miles west of Freedom, Woodward County.

**Lake Cave:** Two hundred yards east of Conner's Cave.

**Marehew Cave:** Thirteen miles north, three miles east of Camp Houston, Woods County.

**Selman's Cave:** Four miles south, seven miles west of Freedom on Trader's Creek, Woodward County.

Vickery Caves: Numbers 1 and 2. Two and one-half miles west of junction of U.S. Highway 281 and Oklahoma State Highway 15, Major County.

For a more detailed location of these caves see Glass (1959).

With the aid of a head lamp and a large flashlight, the walls and ceilings of caves were inspected for streblids and bats. Bats were netted with a long-handled insect net, placed in a screen-wire cage, taken to the entrance of the cave and inspected for streblids. Specimens were collected from bats with forceps and from cave walls and ceilings with an aspirating tube. In general, flies in association with *Myotis velifer incautus* (Allen) and *Corynorhinus rafinesquei pallescens* (Miller) were easily acquired from their hosts. This was not true of *Tadarida brasiliensis mexicana* (Saussure). Very few specimens were taken directly from this host, but walls and ceilings in the areas where these bats roost yielded large numbers of flies. Pupae were removed from cave walls and ceilings as a further method for obtaining adult flies. These pupae were placed in gauze-covered ice cream cartons and kept in a shallow pan of water held at approximately 82°F. A total of 182 flies were collected in this manner. Identifications of materials collected were made from both mounted and unmounted specimens.

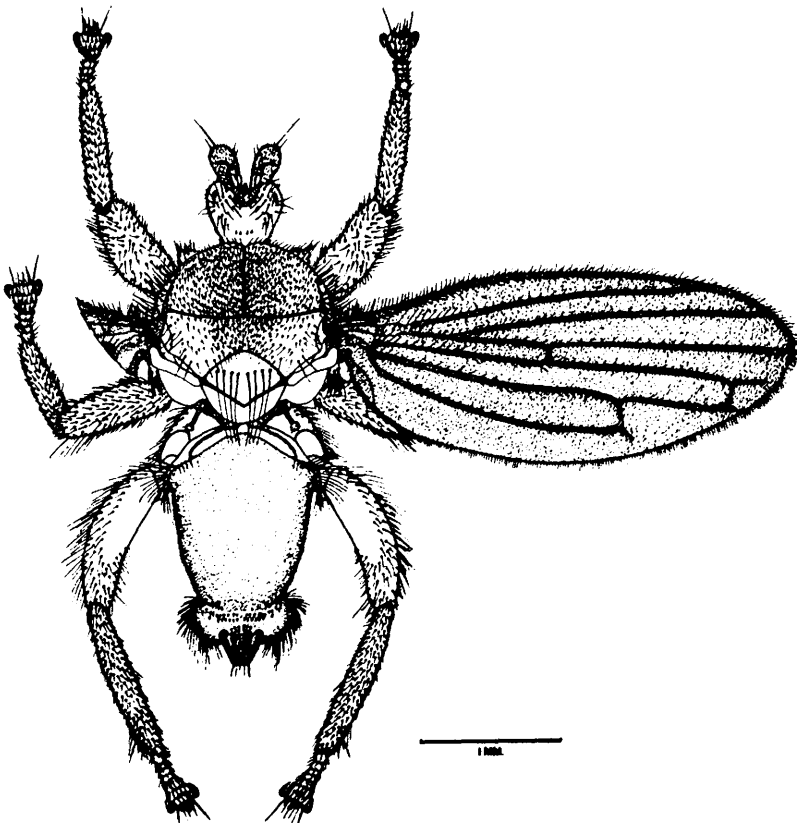


PLATE I. *Trichobius major* (Coquillet), female.

Table I. The species of bats found in each cave and the species of *Trichobius* found in association with them.

Hosts	*T.c.	T.m.	T.s.	Caves
<i>Corynorhinus rafinesquei</i>	X			Lake Cave
<i>pallescens</i> (Miller)	X			Marehew Cave
<i>Myotis velifer</i>		X		Griever Creek Cave
<i>incautus</i> (Allen)		X		Icebox Cave
		X		Vickery Cave 2
<i>Tadarida brasiliensis</i>		X	X	Conner's Cave
<i>mexicana</i> (Saussure)		X	X	Selman's Cave
		X		Vickery Cave 1

\*T.c. - *T. corynorhini*, T.m. - *T. major*, T.s. - *T. sphaeronotus*

Three species of *Trichobius*: *major* (Coquillet), *corynorhini* (Cockrell), and *sphaeronotus* (Jobling) were found to inhabit the caves. Table I indicates the bats found in each cave and the species of *Trichobius* found in association with them.

Little information is available concerning the winter adaptations of the Streblidae. Jobling (1951) states, "The Streblidae cannot exist on hibernating bats." Observations of *T. major* during January, February and March indicate that this species over-winters as an adult on hibernating *M. velifer incautus*, as over 500 were removed from the outer ears of this host in Vickery 2 and Griever Creek caves. Because these caves have two openings, they are well aerated and greatly affected by outside weather factors. The presence of continuous standing water maintains high humidities. Temperatures of 30° F. and relative humidities of 98 percent were not uncommon. The presence of bat blood in serial sections of the gut reveals that these populations of *T. major* continue feeding during this period. No matings of flies were observed nor were any pupae found.

Variations in important taxonomic characters were studied intensively. The number of scutellar setae, used in most keys to separate *T. major* from other species of the genus, showed a surprising variation. In the population found in Selman's cave, inhabited largely by *Tadarida brasiliensis mexicana*, 10 percent of the individuals had 6 scutellar setae, 22 percent had 7, 59 percent had 8, 7 percent had 9 and 2 percent had 10. In Vickery cave 2, where only *M. velifer incautus* was found, the variations were as follows. Seven percent of the flies had 6 scutellar setae, 12 percent had 7, 76 percent had 8, 4 percent had 9 and 1 percent had 10. The arrangement of these setae was not always bilaterally symmetrical. Variations in the number of facets in the eyes were less extensive, but still of importance. No differences were noted between flies collected as adults in caves and those reared from pupae. These data are shown in Figure 1 and Table II.

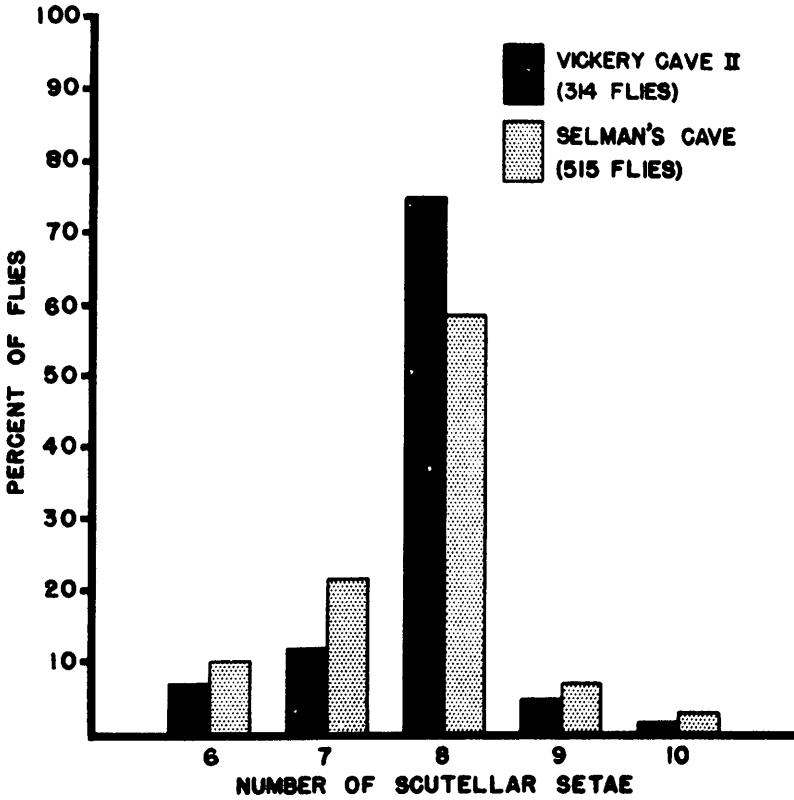


FIGURE I. Variations in the number of scutellar setae in two populations of *Trichobius major*.

Table II. The variations in the number of eye facets in two populations of *Trichobius major*.

NUMBER OF FACETS IN EYES		SELMAN'S CAVE		VICKERY CAVE 2	
Right	Left	Percent	No. of Flies	Percent	No. of Flies
11	9	.194	1	0	0
10	10	.194	1	0	0
9	9	.970	5	.636	2
9	8	.776	4	.636	2
8	10	1.165	6	0	0
8	9	.776	4	1.273	4
8	8	92.621	477	96.496	303
8	7	.194	1	0	0
8	6	.194	1	.318	1
8	5	.388	2	0	0
7	9	.388	2	0	0
7	8	.582	3	.636	2
7	7	.388	2	0	0
6	8	.388	2	0	0
6	7	.388	2	0	0
5	8	.194	1	0	0

## SUMMARY

Three species of *Trichobius*: *corynorhini*, *major* and *sphaeronotus*. were collected from bat caves in northwestern Oklahoma. *Trichobius major* was taken from hibernating and active *Myotis velifer incautus* in caves with air in free circulation. In caves without free air circulation, and housing *Tadarida brasiliensis mexicana*, *T. major* was found almost exclusively on the walls and ceilings. Data are presented to show the morphological variations of over 800 individuals of two populations. These data suggest that existing keys and descriptions should be used with caution.

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