

**LIGHT TRAP COLLECTIONS OF PUNKIES (FAMILY HELEIDAE, GENUS CULICOIDES) McMINN COUNTY, TENNESSEE, APRIL — SEPTEMBER, 1952**

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The results of a recent survey for mites, ticks, fleas, gnats, biting flies, domestic flies, and mosquitoes in the Chestuee Creek watershed area showed nothing significantly different than is already known for the general region except for a small group of biting gnats (Family Heleidae, genus *Culicoides*) which forms the subject of this paper.

The family Heleidae includes a large number of small flies which feed on insects and larger animals. Warm-blooded animals are readily attacked by representatives of several genera of which *Culicoides* is by far the most important. Members of this genus are commonly known as "punkies," "sand flies," or "no-see-ums," the latter name referring to their small pinhead size and ability to escape detection by feeding among hairy parts of the body. Although they are called "sand flies" in some states, this name is more frequently used in referring to another fly belonging to the genus *Phlebotomus* of the family Psychodidae.

STUDY AREA

The Chestuee Creek watershed, near Athens, Tennessee, comprises an area of 134 square miles located about midway between Chattanooga and Knoxville, Tennessee, in McMinn, Polk, and Monroe Counties. The topography ranges from shallow stream valley and rolling upland to steep wooded knobs forming the northwest and southeast watershed limits. The most conspicuous feature of the drainage system and its tributaries is the small carrying capacity of the silted channels due to excessive erosion of the upland. Overflows are frequent even when moderate rainstorms occur. Formerly cultivated bottomland has become marshy and is now used only to a limited extent for pasture. These marshy situations are a favorable habitat for a number of insect pests including punkies, mosquitoes, deer flies, and horse flies.

The New Jersey type light trap was employed to sample populations of mosquitoes and punkies during the majority of the 1952 growing season (April 19–September 30). The trap was located at the farm of Mrs. Etta Wilson on State Highway 30 where it crosses Chestuee Creek. The creek frequently overflows at this point and has helped to maintain an extensive marshy area adjacent to the left bank of the stream below the highway bridge. This area, covering 3-4 acres of cleared bottom-

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land adjacent to the light trap site, was comprised largely of *Scirpus cyperinus*, *Juncus effusus*, and a small grove of *Salix nigra* (Fig. 1). While it is believed that most of the species taken with the exception of tree hole breeders were produced in the marshy area, no field collections of immature heleids were made. Another trap was operated near Delano, Tennessee, near a marshy spring-fed area, but, since the mosquitoes were picked out and the rest of the material inadvertently destroyed, records in this paper are given only for the one trap.

#### CLIMATOLOGICAL DATA

The annual precipitation recorded for 1952 at Double Springs in the watershed about 4 miles from the trap site was 41.72 inches or 12.35 inches below the average of 54.17 inches for the past nine years. Monthly precipitation at Double Springs is given below for the period affecting the entomological field collections.

	Mar.	Apr.	May	June	July	Aug.	Sept.	Total
Precipitation	7.89	2.03	2.15	2.06	2.27	4.91	2.60	23.71
Normal	6.28	3.29	3.96	3.89	4.11	4.02	4.06	29.61
Departure	+1.61	-1.26	-1.81	-1.83	-1.84	+ .89	-1.46	-5.90

To our knowledge, no daily air temperature records were available for the watershed in 1952. At Loudon, Tennessee, approximately 30 miles northeast of the watershed, records kept by the U. S. Weather Bureau for the March through September period in 1952 are as follows:

#### Monthly Temperature Readings (°F.) at Loudon, Tennessee, March to September, 1952

	Mar.	Apr.	May	June	July	Aug.	Sept.
Average Temperature	49.4	59.0	67.6	79.6	80.5	76.7	69.5
Departure*	1.3	.8	.6	3.6	1.6	-1.0	-3.0
Absolute Maximum	77	87	91	100	106	94	91
Absolute Minimum	24	29	38	57	52	55	45
Average Maximum	62.3	72.7	81.6	92.3	94.1	86.5	82.9
Average Minimum	36.4	45.3	53.6	66.9	66.9	66.9	56.0

\*Departure from the normal based on 38 years of record.

June and July were exceptionally hot with temperatures generally over 90 from the third week in June to the end of July and frequently exceeding 100 in July.

#### RESULTS

The light trap collection of an estimated 37,883 in the Chestnut Creek Watershed from April 19 through September 30 in 1952 showed 13 species and one undetermined species of *Culicoides* to be present. The seasonal distribution of female and male *Culicoides* is indicated in Table 1. Six species, *C. baueri*,

TABLE 1. SEASONAL SUMMARY\* FOR MALE AND FEMALE *Culicoides* TAKEN BY LIGHT TRAP, CHESTUEE CREEK WATERSHED, ENGLEWOOD, TENNESSEE, APRIL 19—SEPTEMBER 30, 1952.

Month: Trap Nights Operated:	April 10		May 26		June 15		July 25		Aug. 21		Sept. 27	
	M	F	M	F	M	F	M	F	M	F	M	F
<i>Culicoides arboricola</i>							x					
<i>C. baueri</i>			3	26	x	7	1	4	x	4		2
<i>C. biguttatus</i>	6	77	1	237		10						
<i>C. crepuscularis</i>		7	1	14	x	27	x	69		6	x	6
<i>C. guttipennis</i>		1				x		x				x
<i>C. haematopotus</i>	1	15	1	8	2	15	5	11	1	3	x	2
<i>C. obsoletus</i>	2	21	2	13	x	5	x	1	x	2	x	9
<i>C. piliferus</i>				x								
<i>C. stellifer</i>	1	1	6	582	4	141	4	75	1	30		29
<i>C. travisi</i>		35		22		3						
<i>C. variipennis</i>				2								
<i>C. venustus</i>	1	48	x	12	x	29	x	30	x	12	x	10
<i>C. villosipennis</i>				1		x		1	x	x	x	
<i>C. sp. nr. spinosus</i>						x						

x indicates *Culicoides* collected, but average for the month was less than 0.5.

\* Figures represent monthly average collected per trap night.



Fig. 1. Marshy bottomland adjacent to the light trap site on Chestuee Creek near Etowah, Tennessee.

*C. crepuscularis*, *C. haematopotus*, *C. obsoletus*, *C. stellifer*, and *C. venustus*, were taken generally over the growing season. As males of these species were present during the majority of the season, two broods are probably present. A heavy concentration of adults of *C. biguttatus* and *C. travisi* during the spring suggests only one generation per year. While this is also apparently true for *C. variipennis*, which was poorly represented, recent records of the authors in Alabama indicate a fall brood is present in some years. The weak showing of *C. arboricola*, *C. guttipennis*, and *C. villosipennis* is probably due to restricted larval habitats in wet tree holes.

On the basis of light trap collections only two species were predominant (Table 2). Over half the number taken was *C. stellifer* (55.1%) while *C. biguttatus* (19.0%) comprised about one-fifth of the population sampled. In a recent study, Footé and Pratt (1954) have also found *C. stellifer* one of the most common species in the Eastern United States.

TABLE 2. SUMMARY OF MALE AND FEMALE *Culicoides*\* COLLECTED BY LIGHT TRAP, CHESTNUT WATERSHED, ENGLEWOOD, TENNESSEE, APRIL 19-SEPTEMBER 30, 1952.

Species	Total Number Collected	Per cent of Total	Average per Trap Night
<i>Culicoides stellifer</i>	20,877	55.1	168.4
<i>C. biguttatus</i>	7,184	19.0	57.9
<i>C. crepuscularis</i>	2,867	7.6	23.1
<i>C. venustus</i>	2,550	6.7	20.6
<i>C. haematopotus</i>	1,190	3.1	9.6
<i>C. baueri</i>	1,107	2.9	8.9
<i>C. obsoletus</i>	1,034	2.7	8.3
<i>C. travisi</i>	954	2.5	7.7
<i>C. variipennis</i>	44	0.1	0.4
<i>C. villosipennis</i>	44	0.1	0.4
<i>C. guttipennis</i>	19	0.0	0.2
<i>C. piliferus</i>	7	0.0	0.1
<i>C. sp. nr. spinosus</i>	5	0.0	0.0
<i>C. arboricola</i>	1	0.0	0.0
TOTAL	37,883	99.8	

\*Figures indicate totals from 124 trap-night collections.

Of the 13 described species taken, eight are known to bite man in the Tennessee Valley: *C. biguttatus*, *C. crepuscularis*, *C. guttipennis*, *C. haematopotus*, *C. obsoletus*, *C. stellifer*, *C. travisi*, and *C. variipennis*. Snow and Pickard (1954) have found *C. guttipennis*, *C. travisi*, and *C. haematopotus* to feed primarily at dusk, though feeding at cooler temperatures (50-55° F.) through the night hours was also observed at Reelfoot Lake, Tennessee. Our records of *C. biguttatus* and *C. stellifer* are mainly from forested areas during the day, while *C. variipennis* was collected biting about noon in an open field. In addition to feeding on man, *C. travisi* and *C. biguttatus* have been observed feeding heavily on horses in Kentucky Reservoir near Paris, Tennessee. They have been found engorged on the walls of chicken houses in an area where residents had previously reported heavy punkie feeding on chickens.

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