NEW RECORDS OF *CULICOIDES* (DIPTERA: CERATOPOGONIDAE) FOR NEW YORK STATE AND SUFFOLK COUNTY, LONG ISLAND, NY

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ABSTRACT. During the summer of 1979, *Culicoides* specimens were separated from the catch of 22 New Jersey light traps in Suffolk County, Long Island, New York. Nineteen of the species identified are new records for the county and 6 for the state. Diagnostic features are given for the adults of the new state species (*C. footei, C. hinmani, C. variipennis australis, C. mulrennani, C. nanus* and *C. snowi*) as observed from material collected.

INTRODUCTION

During 1979, a study was initiated to investigate the species composition and the seasonal abundance of the *Culicoides* taken in New Jersey light traps operated by Suffolk County Bureau of Vector Control. Suffolk County is the easternmost county in New York State. It is a peninsula, ca. 125 km long and 30 km wide (ca. two-thirds of Long Island), with vast wetlands, marshes and tidal flats which breed salt and brackish *Culicoides* species. Inland, numerous ponds, streams, swamps and tree holes afford breeding sites for freshwater species.

The importance of *Culicoides* as serious pests, together with the ability of certain species to act as vectors of some viruses, protozoa and filarial worms, have been discussed by several workers, such as Blanton and Wirth (1979).

The *Culicoides* fauna of the northeastern states received some attention from Johannsen (1952), Coher et al. (1955), Lewis (1959), Burbutis and Jobbins (1964) and Das Gupta and Hansens (1965). Jamnback (1965), in his monograph on the *Culicoides* of New York State gave the description, distribution and bionomics of 37 species, of which 18 were recorded from Suffolk County. Later, Cochrane (1974a, 1974b) added 4 more species to the state list.

This paper lists the species recorded from Suffolk County and New York State. It also gives the morphological characters to separate the new state species from other related ones as observed from material collected in this study.

MATERIALS AND METHODS

Twenty-two New Jersey light traps, each provided with an electric timer, were installed throughout the country (Fig. 1). Traps were operated daily from 1900 to 0700 hr the next day during the period May 7–September 28, 1979. *Culicoides* were separated from larger insects using appropriate sieves and from smaller insects with a stereoscopic binocular microscope. Specimens were stored in 70% ethanol for further identification.

Most specimens were examined as wet preparations in a mixture of equal parts of pure phenol and 70% ethanol. Some had to be soaked overnight in 5% potassium hydroxide solution for clearing. Permanent mounts were prepared in euparol or phenol-balsam as described by Wirth and Marston (1968). Taxonomic terminology and abbreviations used in this paper follow those of Jamnback (1956) and Blanton and Wirth (1979). Species identification was confirmed by Dr. W. W. Wirth who retained specimens of the different species as voucher material for the U.S. National Museum collection.

RESULTS AND DISCUSSION

During summer of 1979, over 65,000 adult *Culicoides* were taken in the light traps. Thirty-seven species were identified, of which 18 were previously reported from Suffolk County by Jamnback (1965). The new county records are: *C. alexanderi* Wirth and Hubert, *C. arboricola* Root and Hoffman, *C. baueri* Hoffman, *C. chiopterus* (Meigen), *C. denticulatus* Wirth and Hubert, *C. footei* Wirth and Jones, *C. furensoides* Williams, *C. hinmani* Khalaf, *C. loisae* Jamnback, *C. mulrennani* Beck, *C. nanus* Root and Hoffman, *C. obsoletus* (Meigen), *C. sanguisuga* (Coquillett), *C. snowi* Wirth and Jones, *C. spinosus* Root and Hoffman, *C. testudinalis* Wirth and Hubert, *C. travisi* Vargas and *C. variipennis australis* Wirth and Jones. Of these species, *C. footei, C. hinmani, C. mulrennani, C. nanus, C. snowi* and *C. v. australis* are new for the state. These additions brought the total number of *Culicoides* species in the state to 47 (Table 1.).

About 4.5% of the specimens collected were males; the rest were females. Most of the species were represented by both sexes except for 5 (*C. bermudensis* Williams, *C. niger* Root and Hoffman, *C. baueri, C. hinmani* and *C. mulrennani*) were taken only as females and 2 (*C. loisae* and *C. furensoides*) as males. Males of the *piliferus*

Table 1. Subgenera, species group, and species of genus *Culicoides* recorded in New York State and Suffolk County, Long Island, NY.

		Reference	
		State	County
subgenus	*Avaritia* Fox		
	chiopterus (Meigen)	*	+
	juddi Cochrane	**	–
	obsoletus (Meigen)	*	+
	pechumani Cochrane	**	–
	sanguisuga (Coquillett)	*	+
subgenus	*Beltranmyia* Vargas		
	bermudensis Williams	*	*,+
	crepuscularis Malloch	*	*,+
	hollensis Melander and Brues	*	*,+
	sphagnumensis Williams	*	*,+
	wisconsinensis Jones	*	–
subgenus	*Diphaeomyia* Vargas		
	baueri Hoffman	*	+
	bergi Cochrane	**	–
	footei Wirth and Jones	+	+
	haematopotus Malloch	*	*,+
subgenus	*Drymodesmyia* Vargas		
	hinmani Khalaf	+	+
subgenus	*Hoffmania* Fox		
	venustus Hoffman	*	+
subgenus	*Monoculicoides* Khalaf		
	v. variipennis (Coquillett)	*	*,+
	v. australis Wirth and Jones	+	+
subgenus	*Oecacta* (Poey)		
	Furens Group		
	dickei Jones	*	–
	furens (Poey)	*	*,+
	furensoides Williams	*	+
	stellifer (Coquillett)	*	*,+
	Piliferus Group		
	alexanderi Wirth and Humbert	*	+
	bickley Wirth and Hubert	*	*,+
	denticulatus Wirth and Hubert	*	+
	downesi Wirth and Hubert	*	–
	franclemonti Cochrane	**	–
	jamnbacki Wirth and Hubert	*	*,+
	parapiliferus Wirth and Blanton	*	*,+
	piliferus Root and Hoffman	*	*,+
	scanloni Wirth and Hubert	*	*,+
	snowi Wirth and Jones	+	+
	testudinalis Wirth and Hubert	*	+
	utowana Jamnback	+	–
	Biguttatus Group		
	biguttatus (Coquillett)	*	*,+
	loisae Jamnback	*	+
	melleus (Coquillett)	*	*,+
	mulrennani Beck	+	+
	nanus Root and Hoffman	+	+
	niger Root and Hoffman	*	*,+
	spinosus Root and Hoffman	*	+
	travisi Vargas	*	+
	Guttipennis Group		
	arboricola Root and Hoffman	*	+
	flukei Jones	*	–
	guttipennis (Coquillett)	*	*,+
	villosipennis Root and Hoffman	*	*,+
	Segnis Group		
	stilobezzoides Foote and Pratt	*	–

* Listed in Jamnback (1965).
** Listed in Cochrane (1974a, 1974b).
\+ New record.

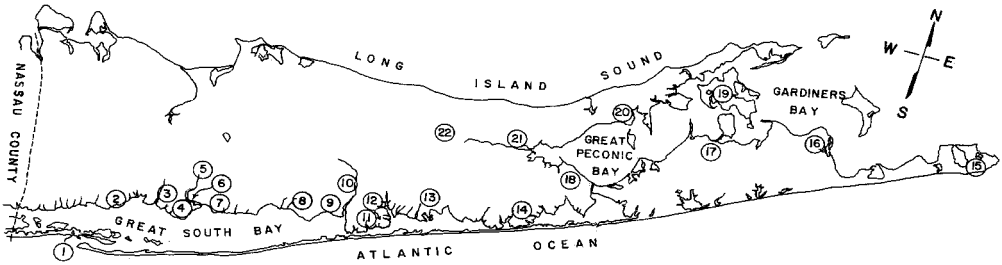

Fig. 1. Map of Suffolk County, Long Island, NY, showing locations of New Jersey light traps. 1. Oak Beach. 2. West Bay Shore. 3. Heckscher State Park. 4. Timber Point. 5. Connetquot State Park. 6. Oakdale. 7. West Sayville. 8. East Patchogue. 9. Brookhaven. 10. Southhaven Park. 11. Mastic Beach. 12. Park Drive. 13. East Moriches. 14. Quogue. 15. Montauk. 16. Springs. 17. Sag Harbor. 18. Flanders. 19. Shelter Island. 20. Southold. 21. Riverhead. 22. Manorville.

group were not identified to species since it is very difficult to separate them on basis of size, color, wing pattern or terminalia.

Culicoides footei, C. hinmani and *C. v. australis* were previously known only from the southeastern states, from Florida north to Virginia and Maryland. Their presence in Suffolk County, NY, shows evidence of a more northern distribution. The other 3 new species for New York State were previously recorded throughout the eastern states, from Florida to Massachusetts (*C. mulrennani*) or to Ontario and Quebec (*C. nanus* and *C. snowi*). These 3 species probably have a wider distribution within New York but have not been encountered by previous workers.

Culicoides footei Wirth and Jones:

Springs, 1 ♀ Jun. 25; Manorville, 1 ♂ Jul. 2 and Aug. 13.

Culicoides footei females share the 3–10 antennal sensory pattern and the greatly swollen 3rd palpal segment with *C. stilobezzoides* Foote and Pratt, some *C. baurei* and some *C. v. australis*. Wings of *C. footei* have an indistinct pale spot on distal portion of cell R_5, none on cell M_1, 1 pale spot on distal portion of cells M_2, M_4 and anal. Identification of *C. footei* can also be based on the deep, internally convoluted sensory pit with narrow opening on the 3rd palpal segment.

Similar to *C. haematopotus* Malloch, *C. bergi* Cochrane and *C. baueri,* the male terminalia of *C. footei* are characterized by basistyle with foot-shaped ventral root, paramere with broad tip bearing a row of well developed spines and aedeagal arch with submedian process on each side. These processes have bifid tips only in *C. footei*.

Culicoides hinmani Khalaf:

Heckscher State Park, Islip, 1 ♀ Jul. 27.

Culicoides hinmani females together with New York species of the subgenera *Hoffmania* and *Avaritia* have contiguous eyes and 3,11–15 antennal sensory pattern. However, *C. hinmani* can be differentiated by the presence of the superior transverse suture between the eyes. Its wing pattern is very characteristic: cell R_2 dark to tip, distal portion of cells R_5, M_2, M_4 and anal each with 1 pale spot while that of cell M_1 with 2 pale spots.

Culicoides mulrennani Beck:

Connetquot Park, Oakdale, 1 ♀ Jun. 20; West Sayville, 5 ♀♀ Jul. 9; East Patchogue, 1 ♀ Jun. 4, Jun. 20 and Jul. 13, 3 ♀♀ Jul. 12; Montauk, 1 ♀ Jun. 20, 3 ♀♀ Jul. 20; Springs, 1 ♀Jul. 26; Sag Harbor, 1 ♀ Jun. 11, Jun. 27 and Jun. 29; Riverhead, 1 ♀ Jun. 20 and Jul. 12.

Culicoides mulrennani females are similar to *C. spinosus, C. loisae* and some *C. biguttatus* (Coquillett) in having poorly marked wing and 3,11–15 antennal sensory pattern. *Culicoides biguttatus* can be separated by the presence of the sclerotized ring and *C. loisae* by the absence of the mandibular teeth. Wings of *C. spinosus* have faint pale areas on cells M_2, M_4 and anal and numerous macrotrichia extending to the base, whereas wings of *C. mulrennani* have no pale spots and the sparse macrotrichia cover the distal portion only.

Culicoides nanus Root and Hoffman:

West Bay Shore, 1 ♂ Jun 29; Oakdale, 1♀ Jun. 28 and Jul. 26; East Patchogue, 1 ♀ Aug. 6; Springs, 1 ♂ and 1 ♀ Jun. 20, 1 ♀ Jun. 30 and Aug. 24, 1 ♂ Jul. 25; Shelter Island, 1 ♀ Sep. 3.

Culicoides nanus females resemble *C. travisi* in having a 3–15 antennal sensory pattern and several pale spots only around the wing margin. *Culicoides nanus* can be differentiated by its short proboscis (P/H ratio[a] ca. 0.50), the

[a] P/H ratio is the proboscis/head ratio or the ratio between the distance from the end of the labrum-epipharynx to the tormae and the distance from the tormae to the interocular seta base.

greatly swollen 3rd palpal segment (PR[b] 1.63), the dark brown thorax, the more distinctly banded legs and the presence of short parallel-sided spermathecal necks.

Terminalia of male *C. nanus* are similar to those of *C. biguttatus* in having the basistyle with long tapering or parallel-sided roots and the slender parameres ending distally in simple pointed tips. *Culicoides nanus* can be separated by the long and slender apicolateral processes and the spiculate membrane of the ninth sternum.

Culicoides snowi Wirth and Jones:

Heckscher State Park, Islip, 2 ♀♀ May 29, Manorville, 2 ♀♀ May 25, 1 ♀ May 28.

Culicoides snowi, C. jamnbacki Wirth and Hubert, *C. testudinalis* Wirth and Hubert, *C. utowana* Jamnback, *C. denticulatus*, and *C. franclemonti* Cochrane are the only 6 members of the *piliferus* group that have faintly marked or unmarked wings. In these species, the antennal sensory pattern is the main differentiating character. It is 3,5,7,9,11–15 in *C. snowi*, 3,5,7,9,13–15 and occasionally on 11 in *C. jamnbacki* and *C. testudinalis*, and 3,11–15 in the last 3 species.

Culicoides variipennis australis Wirth and Jones:

Timber Point, Islip, 5 ♀♀ Jun. 14, 2 ♀♀ Jul. 9, 1 ♀ Jun. 15, Jun. 19, Jun. 21, Jul. 9, Jul. 10, Jul. 14 and Jul. 17.

There is some indication of intergradation within the total series of the 2 subspecies *C. v. variipennis* (Coquillett) and *C. v. australis* (W. W. Wirth, personal communication). However, the characters of the specimens collected in this study fit the description of Battle and Turner (1971) for Virginia specimens and Blanton and Wirth (1979) for material from the southeastern states. *Culicoides v. australis* has a variable antennal sensory pattern (3–10, 3,5–10, 3,6–10 or 3,6–11) and 10 or 11 mandibular teeth, whereas, *C. v. variipennis* has a constant sensory pattern of 3,8–10 and 13–16 mandibular teeth.

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[b] PR is the palpal ratio or the ratio between the length of the third palpal segment and its greatest width.

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