This same technique can be used for oil emulsion sprays. However, since the C–4 dye has a lifetime of only approximately one hour under sunlight conditions, the samples have to be taken immediately following daytime application and held in lightproof containers until they can be examined with the ultraviolet light. (The light used was: Mineral Light Ultraviolet Lamp, M–14, Ultraviolet Products Inc., San Gabriel, California 91778.)

TABLE 1.—Technique Used to Photograph Fluoresced Oils

Camera:	Exakta with F–2 Lens
Shutter Speed:	Time exposure, 3–5 minutes
f Stop:	4
Film:	Tri-X Pan 400
UV Light:	Short Wave 2537A
Height of Lamp from Subject:	Front—5 inches Rear—3 inches
Camera Subject Distance:	16½ inches
Filter:	Wratten Yellow K–2
Magnification:	Twin adapter for magnification
Film Development:	Fast developer (Bowmann, diafine two bath film developer or standard Microdol fine film development) with fine dye that increases f speed to 2400
Paper:	Soft F–2 (Kodak developed in dektol)
Exposure Time:	15 seconds

The photo techniques were developed with the assistance of Mrs. Harriet Long and Dr. Kenneth Trammel, Citrus Experiment Station, Lake Alfred, Florida.

MERMITHID-INDUCED INTERSEXUALITY IN *Culicoides stellifer* (COQUILLETT)

WILLIAM W. SMITH [1]

Welch's (1965) review reported that several workers have observed mermithid parasitism to cause the appearance of intersexual characters in chironomids (Wülker, 1961), (Rempel, Naylor, Rothfels, and Ottonen, 1962) and in simuliids (Rubtsov, 1958). Callot (1959) described specimens of *Culicoides albicans* Winn., from France parasitized by mermithid nematodes of the genus *Agamomermis* in which a gynandromorph-like appearance of males was produced. The flagellum of the antenna was changed from the typical male type consisting of ten sub-globular segments bearing very long hairs and three elongate distal segments to the female type with eight sub-globular segments having short hairs and five elongate distal segments. Similar parasitism did not produce noticeable morphological changes in females of *C. albicans*. Whitsel (1965) reported the occurrence of a mermithid in a related ceratopogonid, *Leptoconops kerteszi* Kieffer, from Baja California, Mexico. The worm was in a female and no morphological changes were seen. In India, Sen and Das Gupta (1958) observed that *Mermis* nematodes in *Culicoides alatus* Das Gupta and Ghosh did not affect its flight range, although mermithid nematodes are known to cause sterility, and death of their hosts upon emergence according to Welch (1965).

This paper and the accompanying photographs report the occurrence of an intersexual gynandromorph-like specimen of *Culicoides stellifer* (Coq.) parasitized by one and possibly two mermithid nematodes. The genitalia are masculine (Figure 1), while the head and head appendages appear to be feminine (Figure 2). The flagella of the antennae are composed of eight sub-globular segments and five elongate distal segments as described for a parasitized *C. albicans* male by Callot (1959). The mouthparts resemble those of the female though less strongly developed. Mandibular teeth (14) may be counted under high magnification with some difficulty. The wing pattern is typically that of *C. stellifer* except for

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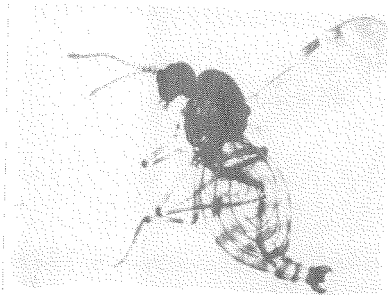

FIG. 1.—Merthid-parasitized male *Culicoides stellifer* showing female-like antennae, male genitalia, and worms coiled in abdomen.

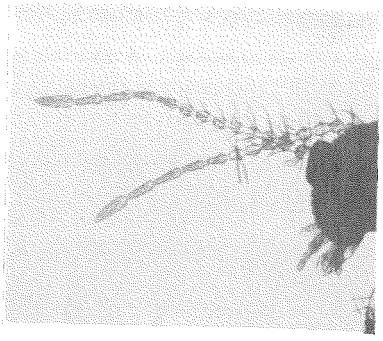

FIG. 2.—Enlarged view of head of *C. stellifer* male showing female-like antennae.

the missing arculus connecting the larger light spot in cell R_5 with the smaller distal spot. The absence of this arculus is frequent in specimens from the area. Internal organs could not be observed due to the distention of the abdomen by the parasites.

The specimen described was captured in a New Jersey mosquito light trap located in the southern residential area of Gainesville, Florida, on Oct. 20, 1965. The trap was located near the crest of a wooded ridge above a small spring-fed pool and its spillway ditch. Additional *Culicoides* taken in the same light trap catch consisted of 5 *C. insignis* Lutz (2 ♂, 3 ♀), 17 *C. haematopotus* Malloch (3 ♂, 14 ♀), 18 *C. stellifer* (4 ♂, 14 ♀) and 1 female of the *C. debilipalpis* Lutz group.

The rate of natural parasitism of *Culicoides* by mermithids is apparently very low in Alachua County, Florida, since only this specimen has been found in one year's observations and examinations of thousands of specimens. However, the possible culture and dissemination of arthropod-parasitic nematodes is considered by Welch (1965) to be a promising method of biological control for certain pestiferous insects.

Acknowledgment is made to Dr. Vernon G. Perry, Professor of Nematology, for identification of the parasitic nematodes and to Mr. Charles C. Russell, graduate student in Entomology, for making the photomicrographs. This finding resulted from studies of the bionomics of inland species of *Culicoides* supported by NIH grant GM 12322.

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A NOTE ON *PISTIA* CONTROL

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Pistia stratiotes is commonly found growing in borrow pits in Northern Nigeria and interferes to a considerable extent with larval control measures. Borrow pits are found in considerable numbers in all the large towns (in Kano there are at present over 550 pits varying in size from 80,000 square feet to 600 square feet) and present a considerable surface of water available for mosquito breeding. The growth of *Pistia* weed renders the control of mosquito larvae by oiling nearly impossible and makes the action of DDT larviciding solutions much less effective as it is extremely difficult to ensure that the larviciding agent reaches all the water available for mosquito breeding.

Clearance of *Pistia* by hand, using long-handled rakes as noted by Service (1960) either from the side of the pit or from a home-made raft, is time-consuming and expensive in labour costs. The *Pistia* regenerates and has to be regularly