# A TECHNIQUE FOR CHECKING DEPOSITION OF AEROSOL FOGS

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Did the fog reach this point? How good is our coverage? All of us who work in mosquito control ask ourselves these and similar questions about our control operations. All too frequently we don't know the answers. Until recently the use of caged insects was our only method of checking the dispersal of aerosols, but it was both time-consuming and cumbersome. A new method has been developed that utilizes a fluorescent dye in the fog mix and a small portable ultraviolet light. This technique allows one to quickly determine whether or not fog has reached a given point.

If a qualitative study is desired, filter paper (Whatman #1) may be attached to stakes at various heights and at right angles to the wind direction to give an excellent picture of the aerosol dispersion (Figure 1). These discs may be held for several months in a lightproof box. Treated discs may be photographed if a permanent record is desired (Table 1). Since the fluorescent dye breaks down rapidly in the sunlight, there is no problem of stains on equipment, buildings or shrubbery.

Great care must be taken in handling the paper discs to prevent contamination from preceding runs. An easy method which eliminates most contamination is to handle the paper with forceps and then attach the disc to the stake by a spring clamp. When storing the treated filter paper, a clean sheet should be placed between each treated one.

The fluorescent dye used in the Winter Haven studies was Patent Yellow C–4 dye (Patent Chemical Company, Paterson, New Jersey). It was incorporated into the oils at the rate of a 0.1 percent by weight under heat 160–180° F). This mixture was filtered through coarse cloth to remove any large particles that could cause nozzle or line clogging. A dye concentrate could be made up using HAN as a solvent, then adding this to the oil, stirring the mixture to insure an even blend.

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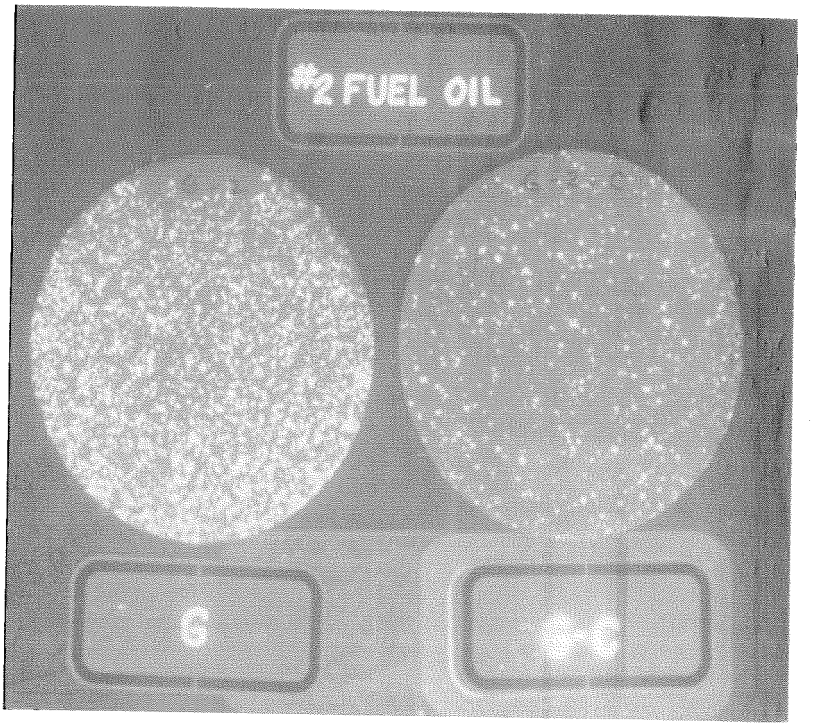


FIG. 1.—G is the typical pattern of the fuel oil at three hundred feet from the fogger. G-C was placed inside a 20 mesh wire cage at the same distance as G.

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<br>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)

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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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