FEEDING HABITS AND POSSIBLE PARASITISM OF THE LARVAE OF *CULICOIDES SANGUISUGA* (COQUILLETT) (DIPTERA: CERATOPOGONIDAE) [1]

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INTRODUCTION. Larvae of *C. sanguisuga* were collected from the water film between moist fallen leaves on the forest floor at Lac Serpent, a resort and farming community in the Laurentians of Quebec, during the summer of 1969 and 1970. Larvae were examined under a microscope for signs of feeding. The gut was visible owing to the transparent nature of the cuticle.

RESULTS AND DISCUSSION. The food of *C. sanguisuga* larvae was not clearly established. Jamnback and Wirth (1963) stated that, "Although the larvae were not observed feeding, whole dead leaves placed in a jar with large numbers of the larvae were quickly skeletonized." In the present study, no leaf tissue was skeletonized or observed to be ingested by *C. sanguisuga* larvae, although at least 20 percent of larvae collected from wet leaves were found to have brownish-colored gut contents, which may or may not indicate the ingestion of leaf material. On the other hand, three larvae were each observed to feed on a dead mite and two larvae were observed to feed on a dead nematode. In all cases, a stream of fluid and suspended particles was seen to flow from the mite and nematode into the gut of the larvae.

A small number of the third and fourth instar larvae of *C. sanguisuga* (Table 1) collected from wet leaves on the forest floor were dead and fully-extended with dark-brown patches on some of the thoracic and abdominal segments (Fig. 1). The nature of this "browning" was not determined. If due to parasitism, the use of parasites against the larval stages might conceivably offer a line of approach towards the control of *C. sanguisuga* and other biting midges. There appears to be no record in the literature of *C. sanguisuga* larvae being found parasitized.

Table 1.—Incidence of "browning" in third and fourth instar larvae of *C. sanguisuga* collected from wet leaves at Lac Serpent, Quebec.

Period	No. of larvae collected	% exhibiting "browning"
10/VII/69–7/VIII/69	969	2.1
20/V/70–20/VI/70	78	5.1
22/VII/70–5/VIII/70	1073	2.2

Fig. 1.—"Browning" exhibited by a fourth-instar larva of *C. sanguisuga* X 100.

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AEDES AEGYPTI IN SOUTHEASTERN NEW YORK STATE

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On June 27, 1972 five *Aedes aegypti* males and two females were found in a light trap collection taken at Croton Point, New York. Croton Point (41° 11′ 30″ N) a 1½ square mile peninsula extending into the Hudson River, is the site of a county-owned and operated park, camp, and sanitary landfill. Within one mile of the sites where these mosquitoes were found, there is a railroad station, with car and engine repair facilities. These facilities give rail connections to many parts of the United States.

Investigation of subsequent light trap catches revealed 13 males and 4 females in collections made during the first week in July. An additional light trap was installed at the adjacent train station but no *A. aegypti* were ever recovered from it.

In a larval survey made at Croton Point, 1,583 larvae were collected from artificial containers in the park and landfill areas. Of these, 482 were identified as *A. aegypti* and were all recovered from a discarded tire and a treehole in the park.

As many complaints were received regarding

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the presence of numerous mosquitoes inside buildings in the park, aspiration samples were taken. Thirteen female and six male *A. aegypti* were collected by this method.

Recognizing that a potentially large infestation was present, the following control measures were instituted:

1. Two consecutive fogging operations were conducted using 1 percent Vapona (DDVP) at a rate of 40 gallons per hour in the areas of the park, camp, buildings, landfill, and train station.

2. Discarded artificial containers were collected, taken to the landfill and buried. The sides of the landfill were regarded to cover any exposed tires and other artificial containers.

3. A spot spraying program was conducted using fuel oil #2 on treeholes and large artificial containers in the area included within a 3-mile radius of the point where the mosquitoes were originally found.

Since the completion of this comprehensive control program, no more *A. aegypti* have been recovered in light trap collections or in subsequent larval surveys. However, further surveillance has been indicated for next year as there is the possibility of overwintering individuals inside the many buildings within the park.

Although *A. aegypti* has been reported as far north as Boston 42° 27′ as well as in New York 45° 52′ N (Chandler, 1945), its occurrence has been sporadic and never permanent in these latitudes (Christophers, 1960). Therefore, it is concluded that this infestation is the result of recent accidental transport of either adult or eggs or both. The train station near Croton Point was perhaps the source of the initial infestation. With rail connections to many parts of the United States, including the south, it seems possible that *A. aegypti* adults could have been transported to the area by a northbound train.

Since the landfill receives solid waste from a rather large geographical area, it also seems possible that *A. aegypti* eggs may have been in an article (e.g. tire) discarded by a person who had returned from a recent trip to infested areas within the country or abroad.

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ASPIRATOR WITH PAPER CUP FOR COLLECTING MOSQUITOES AND OTHER INSECTS

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Paper cups covered with mosquito netting constitute very suitable and inexpensive small cages to hold and transport live mosquitoes and other insects. Such cages are widely used by entomologists both for laboratory and field work. The insects are usually collected with suction tubes and transferred to the paper cup through a hole in the mosquito netting. The aspirator described in the present note allows the collection of the insects directly in the paper cup which is inserted in the suction tube. This aspirator is designed as a mouth aspirator but it can be easily combined with hand-held vacuum cleaners or other electric suction devices whose utilization for mosquito collection has been described by various authors (Dell'Uomo, 1961, 1967; Bailey, 1966; Carver, 1967; Trpiš, 1968; Jackson and Grothaus, 1971).

DESCRIPTION OF THE ASPIRATOR. The design of the aspirator depends, of course, on the size of the paper cups which are available in the market. Our aspirator was developed for using small paper cups 53 mm high and with maximum and minimum external diameters of 56 and 43 mm respectively. The suction apparatus, made in plexiglass, is illustrated in Figure 1. It appears as a usual wide bore reservoir suction tube but with the paper cup working as a detachable collecting cage. The cylindrical chamber (A) has an anterior wider section to contain the paper cup and a posterior section to avoid the central strong aspiration which would damage the insects. The posterior wall (B) of the cylindrical chamber and its central tube (C) are fixed. The external end of tube C is connected with rubber (or flexible plastic) tubing ending with a mouth piece. The internal end of tube C is connected with a second tube (D) with lateral holes whose function is to disperse the aspiration on a wider surface. The anterior wall (E) of the cylindrical chamber is threaded while its central tube consists of an internal fixed part (F) and an external threaded one (G). The internal tube F is inserted into the paper cup, which has in its bottom a hole of corresponding size. After the insects are collected,

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