

Table 1. The frequency distribution of adult mosquitoes hosting a given number of hydrodromid mites, Saratoga County, N.Y., 1979.

Mosquitoes	Number of Mites Attached						Total Mi	% of Total Mi
	1	2	3	4	5 or more but < 10	> 10	Total Mo	% of Total Mo
<i>Aedes canadensis</i>	12	8	3		3	2	$\frac{95}{28}$	$\frac{28.70}{27.19}$
<i>Aedes stimulans</i>	9	6	5	1	2	1	$\frac{65}{24}$	$\frac{19.64}{23.30}$
<i>Aedes communis</i>	6	3	2		1		$\frac{23}{12}$	$\frac{6.95}{11.65}$
<i>Aedes vexans</i>	4	4	2	1			$\frac{22}{11}$	$\frac{6.65}{10.68}$
<i>Aedes trivittatus</i>	1						$\frac{1}{1}$	$\frac{.30}{.97}$
<i>Coquillettidia perturbans</i>	6	7	4	4	1	4	$\frac{124}{26}$	$\frac{37.46}{25.24}$
<i>Culiseta</i> sp.	1						$\frac{1}{1}$	$\frac{.30}{.97}$
Total Mi	39	56	48	24	46	118	331	
Total Mo	39	28	16	6	7	7	103	
% of Total Mi	11.78	16.92	14.50	7.25	13.90	35.65		
% of Total Mo	37.86	27.18	15.53	5.83	6.80	6.80		

Mi=Mites.

Mo=Mosquitoes.

of *Coquillettidia perturbans* contained the greatest percentage (37.46%) of mites per population of those mosquitoes with mites (Table 1). The overall mite infested mosquito population of 103 specimens may be compared (Table 1) with the total mite population (331) distribution and their occurrence on individual specimens in each population.

At the present time, little is known of

mosquito-hydrodromid, host-parasite relationships or the microecology of hydrodromid populations.

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#### FEEDING BY THE ADULT MIDGE *CHIRONOMUS THUMMI* ON DRY SUGAR SIGNIFICANTLY INCREASES MEDIAN LONGEVITY IN BOTH SEXES

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It was shown by Goff (1972) that adults of *Chironomus riparius* will feed on sucrose-water

syrup in captivity. After adding food coloring to the syrup, he could demonstrate feeding in

individual insects by noting the coloration of the thorax and abdomen. Goff also observed that adults lived longer and laid more fertile eggs when they were offered sucrose-water. However, no statistical data were presented to support the latter observations. *C. riparius* appeared to feed on dried deposits of syrup as well, but this could not be substantiated by the food coloring technique. In the present note we give data showing that both sexes of *C. thummi* (Kieffer) feed readily on dry sucrose (as confirmed by a chemical test), and that the longevity of each sex is significantly increased by sugar feeding.

A laboratory colony of *C. thummi* was maintained at  $22.0 \pm 0.5^\circ\text{C}$ , 80–90% R.H. and a 15:9 hr L:D photoperiod.<sup>1</sup> Larvae were reared in enamel pans filled with fine sand and aerated water, and fed powdered Hartz Mountain Dog Kisses (Biever 1965). Each day emerged adults were placed in a screen and plexiglass cage (40 × 30 cm base, 25 cm ht.) provided with a pan of water for oviposition. During the photophase the midges rested on the walls of the cage. Sometimes, after the first 5 min of scotophase, dim illumination would be turned on for an hour, simulating a crepuscular period, in order to induce swarming. It was then noticed that some of the midges which did not join the swarm would walk erratically on the floor of the cage, head down, dragging their maxillary palps over the surface. If a few dozen grains of table sugar were placed in one spot, eventually several of these midges congregated there, with their mouthparts resting on the sugar. Apparently this "searching" behavior can also proceed in total darkness. Sugar was put on the cage floor before the light-dark change, and during the following scotophase dim illumination was omitted. After an hour of scotophase a light was turned on, revealing a crowd of midges clustered about the sugar.

The anthrone test (Van Handel 1972) was used to establish that the midges were truly feeding. Shortly before the scotophase, midges which emerged during the previous 24 hr were collected from the screen-covered larval rearing pans and sorted by sex into 2–1 Erlenmeyer flasks. (Since these insects could not swarm in the confined space of the rearing pans, and mating was only observed in swarms,

it was probable that these insects had not mated. Also, the females were too young to have oviposited.) Table sugar was sprinkled on the bottom of some flasks, while other flasks received no sugar (controls). After 24 hr the insects were collected into clean flasks and killed by freezing, then stored at  $-40^\circ\text{C}$  until tested with anthrone reagent. It can be seen from Table 1 that a high percentage of midges fed. As a preliminary precaution in administering the anthrone test, a dozen midges from

Table 1. Percentage of adult *Chironomus thummi* showing a positive anthrone reaction after 1 day exposure to sucrose.

	Male		Female	
	No.	% positive	No.	% positive
Control*	52	0	65	0
Sugar	68	71	63	95

\* Most control readings showed a barely perceptible blue-gray tinge, so this was taken to be a zero reading.

the sugar treatment had their heads, legs, and wings removed, and these parts were pooled in one test tube for a separate assay. The latter gave a negative reading, even though 10 out of 12 of the bodies to which the parts belonged tested positive. Moreover, 9 other whole insects which were pre-rinsed in distilled water gave positive readings. Hence it was clear that there were no false positives from sugar adhering to the insect cuticles.

To see if sugar feeding would increase adult longevity, midges of age  $\leq 24$  hr were collected shortly before the scotophase and put singly in clear plastic vials (dia. × ht., 2.5 × 8 cm) with punctured caps. The midges emerging from a given pan were distributed equally into control vials and vials containing dry sugar ( $\approx 10\text{mg}/\text{vial}$ ). Each day at the light-dark change the

Table 2. Survival by sex for adult *Chironomus thummi* held in vials with or without sucrose at  $22.0 \pm 0.5^\circ\text{C}$  and 80–90% R.H.

Treatment	No. of individuals	Survival time (days)			
		Min	Max	Median	
Male	Control	20	4	9	7
	Sugar	22	4	16	12
Female	Control	36	2	10	8
	Sugar	32	2	13	11

<sup>1</sup> Colony material obtained through the courtesy of Dr. Hans Laufer, Biological Sciences Group, University of Connecticut, Storrs 06268. For more details on rearing techniques, see senior author's Master's Thesis, University of Massachusetts at Amherst, 1979.

vials were inspected, and those containing a dead midge were recorded. By this method the survival time from emergence was known to  $\pm 24$  hr for any individual midge. Sugar feeding increased median longevity by 5 days in males and by 3 days in females (Table 2). These differences were highly significant ( $P < 0.001$ ) according to a nonparametric test for equality of medians (Conover 1971).

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