

## OPERATIONAL AND SCIENTIFIC NOTES

## SUGARING FOR MOSQUITOES

C. BROOKE WORTH

Delmont, New Jersey 08314

Holland (1903) recommended a mixture of sugar, beer and rum for attracting moths. He painted trees with the syrup at nightfall and collected moths after dark in the beam of a lamp. For the past 2 years I have been collecting moths in wooded areas on my farm in Cape May County, New Jersey, using my own version of Holland's mixture as follows: dark brown sugar, 1 lb.; granulated white sugar, 2 lb.; 2 12-oz. cans of beer, 24 oz.; Meyer's dark Jamaican rum, 4 oz.

To collect moths I have worn a miner's battery-powered head lamp, thus freeing both hands for manipulating cyanide bottles. On an average night I would sugar 25 or 30 trees with the quantity of mixture specified above.

One edge of the woods abuts on the edge of a brackish tidal meadow. Numerous woodland pools form during winter and spring but dry up during summer. Very few permanent tree holes exist. The area can be classified as "fringe of the pine barrens," characterized by an oak-pine association.

The "sugared" stations were the site of much arthropod activity, some of the areas occasionally so dominated by ants that other organisms were unable to find uncontested feeding places. Even moths often disturbed one another. Under more ideal collecting conditions there was less congestion and the drinkers were able to settle down to serious imbibing. When well engorged, they sometimes became easy to observe and catch. One could see their proboscides probing the saturated bark in search of the delightful liquor.

After frost the number of moths declined, though on warm nights the population would suddenly approach summer densities. Nevertheless, it was now possible to take a more deliberate view of the activities. On November 21, 1973, I became aware that mosquitoes as well as moths were feeding on the syrup. Prior to that they were feeding repeatedly on me, and if I saw one on a baited tree, I assumed that it had merely settled there to rest. At any rate, I had not bothered to note what species were present. But the prevalent salt marsh mosquito, *Aedes sollicitans*, had now become less troublesome, and I realized also that I had not been bitten frequently of late. Moreover, the mosquitoes I now observed were probing the sugared spots as eagerly as the moths. Therefore I made parallel mosquito and moths collections beginning on that date. The results are shown in Table 1. As background, Table 2 presents a list of other mosquitoes recorded on the farm, and the sources of each species.

These data elicit the following comments:

1. *Culex restuans* females seem to have overwintered. Most females taken in late November and early December had distended abdomens of creamy appearance suggesting diapause, while those collected in March and April possessed greenish abdomens filled with developing eggs.

2. The mosquito species observed to date on my farm display striking differences in their response to the sugar-beer-rum bait, not at all in proportionate relationship to their real abundance. For example, during the same period in spring when *Aedes cantator* was a bait devotee, nearby woodland ground pools were producing a large population of the turtle-feeding *A. canadensis*. Yet not a single individual of the latter species was taken at the bait stations.

3. To repeat but underline a trite observation, the greatest number of collecting methods will detect the greatest number of species in a given

Table 1. Species of mosquitoes taken at sugar-beer-rum bait

Species	Date	Males	Females
<i>Culex restuans</i>			
Theobald	11-21-73	..	2
	11-23-73	1	1
	11-25-73	..	1
	11-26-73	1	7
	3-4-74	..	1
	4-20-74	..	1
	4-21-74	..	1
<i>Culex pipiens</i>			
Linnaeus	7-7-74	..	1
<i>Culex salinarius</i>			
Coquillett	7-7-74	..	2
<i>Culex territans</i>			
Walker	11-23-73	..	1
<i>Culex</i> spp.	4-21-74	..	1
	7-7-74	4	2
<i>Aedes sollicitans</i>			
(Walker)	6-17-74	..	1
<i>Aedes cantator</i>			
(Coquillett)	4-18-74	1	..
	4-21-74	4	2
	4-22-74	5	3
	4-28-74	2	2
	6-17-74	..	1
	7-7-74	1	..
<i>Anopheles quadrimaculatus</i> Say	11-26-73	..	1
<i>Anopheles punctipennis</i> (Say)	11-26-73	..	3
<i>Anopheles crucians</i> /bradleyi			
	12-4-73	..	2
	3-5-74	1	..
	7-7-74	..	3

Table 2. Species of mosquitoes taken at other sites

Species	Sites
<i>Aedes canadensis</i> (Theobald)	Forest pools (reared) Box turtles, <i>Terrapene carolina</i> (feeding)
<i>Aedes grossbecki</i> Dyar and Knab	Forest pools (reared)
<i>Aedes triseriatus</i> (Say)	Tree hole (reared) Spotted turtle, <i>Clemmys guttata</i> (probing)
<i>Aedes vexans</i> (Meigen)	Screened enclosure
<i>Culiseta inornata</i> (Williston)	Screened enclosure
<i>Coquillettidia perturbans</i> (Walker)	Screened enclosure
<i>Orthopodomyia signifera/alba</i>	Tree hole (reared)
<i>Toxorhynchites rutilus septentrionalis</i> (Dyar and Knab)	Tree hole (reared)

region. My single specimen of *Culex territans* was taken at a baited tree, and I would be un-

aware of its presence but for that collecting method. Likewise the syrupy bait attracted more over-wintering anophelines than I had realized were my neighbors. *Aedes triseriatus* (excepting one individual biting a spotted turtle), *Orthopodomyia signifera* and/or *alba*, and *Toxorhynchites rutilus septentrionalis* were reared only from water contained in a single tree-hole. *Coquillettidia perturbans* and the *Culex* species were encountered variously at lights or in enclosures where they had accidentally trapped themselves. Virtually the only man-baited captures have involved *Aedes cantator* and the superabundant *Aedes sollicitans*.

I have not yet tried every known trapping method by any means. But already "sugaring" has proved itself a revealing technique.

ACKNOWLEDGMENT. I am deeply indebted to Mr. Robert W. Lake, Research Associate, Department of Entomology and Applied Ecology, University of Delaware, for his encouragement, but more so for his critical examination and determination of most of the specimens included in this study.

#### Reference

- Holland, W. J. 1903. The Moth Book. Pp. 479. Doubleday, Page and Co. Reprinted 1968 by the Dover Press.