

TABLE 1.—Number of parous and nulliparous mosquitoes with parasitic mites attached at George Lake in 1966.

Species	Parous	Nulli- parous	Un- known	Total
<i>Culiseta inornata</i>	..	..	I	1
<i>Aedes cataphylla</i>	..	I	..	1
<i>A. communis</i>	..	2	..	2
<i>A. excrucians</i>	2	12	I	15
<i>A. fitchii</i>	1	3	..	4
<i>A. pionips</i>	2	I	..	3
<i>A. punctor</i>	5	4	2	11
<i>A. riparius</i>	..	3	..	3
<i>A. sticticus</i>	..	..	1	1
Unidentified	I	..	..	I
Total	11	26	5	42
No. examined	280	449	209	983
% with mites	3.9	5.8	2.4	4.3

the mosquito during oviposition. These mites are conspicuous and remain on dried specimens, and if they are a reliable indicator of nulliparity and infest a large proportion of nullipars, would provide the necessary technique.

During the summer of 1966, I recorded the presence or absence of mites on 983 mosquitoes of 28 species taken at George Lake, Alberta. The mites were not identified to species.

These results are shown in Table 1. Only 42 mosquitoes, belonging to 9 species, were found to be infested with mites, and 4 percent of the parous females were infested. This low rate of infestation and the presence of mites on parous females, confirms the findings of Detinova (1962), that the presence of parasitic mites was not a reliable indicator of nulliparity in Russia. Though mites would appear to be ruled out as indicators of nulliparity in Alberta, the work of Corbet (1963), in Africa shows that they might be useful in certain areas. Further work on this subject would be interesting, as very little work has been done on this in North America.

#### Literature Cited

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biting cycle of the mosquito *Taeniorhynchus (Mansonioides) africana* Theobald, based on the presence of parasitic mites. Ann. Trop. Med. Hyg., 51:151-158.

#### MALATHION RESISTANCE IN *Aedes sollicitans* (WALKER) FROM LANGLEY AIR FORCE BASE, VIRGINIA

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Malathion has been used for 10 consecutive years to provide satisfactory control of *Aedes sollicitans* (Walker) at Langley Air Force Base, Virginia. Each year malathion was applied by air from an Air Force UC-123 and C-47 aircraft at a dosage of 0.2-0.5 lb. technical insecticide per acre per application. The number of applications averaged about 10 per year. During the mosquito season of 1967, unsatisfactory control of *A. sollicitans* was observed after some of the spray applications. In July of the same year, Whitlaw (1967, personal communication) demonstrated resistance to malathion in both adult and larval forms of *A. sollicitans* at Langley Air Force Base.

In August 1967 and May 1968, collections of *A. sollicitans* made at Langley Air Force Base were brought to Gainesville, Florida to test the susceptibility of adults to malathion, naled, and fenthion. Adult mosquitoes from the Gainesville colony of *Aedes taeniorhynchus* (Wiedemann) which is not resistant to organophosphorus insecticides were used for comparison. Rogers and Rathburn (1958) showed that these two species were about equal in susceptibility to malathion.

PROCEDURE. The susceptibility of females of both species was determined by exposure of adults (25 per cage) in a wind tunnel to contact sprays containing various concentrations of the insecticides in deodorized kerosene. The procedures were those described by Davis and Gahan (1961). Mortality was recorded after 24 hours. Duplicate cages were used in each test at each concentration. The tests with malathion were replicated 3 times while those with naled and fenthion were conducted only once because of limited numbers of adult female *A. sollicitans*.

RESULTS. The mortality data in Table 1 show that *A. sollicitans* was highly resistant to malathion; the concentrations required to kill 90 percent of the P<sub>1</sub> and F<sub>1</sub> adult females of *A. sol-*

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TABLE I.—Mortality of adult female *A. sollicitans* (Langley AFB) and *A. taeniorhynchus* (Gainesville) exposed to contact sprays of malathion, naled, and fenthion.

Insecticide concentration (%)	Percent 24-hour mortality		
	<i>A. sollicitans</i>		<i>Aedes taeniorhynchus</i> <sup>c</sup>
	P <sub>1</sub> <sup>a</sup>	F <sub>1</sub> <sup>b</sup>	
	<u>Malathion</u>		
0.005	5	..	3
.01	27	..	36
.025	37	6	96
.05	20	4	100
.1	29	4	..
.25	41	12	..
.5	36	28	..
1	60	62	..
2.5	100	72	..
5	100	96	..
	<u>Naled</u>		
.005	65	..	20
.01	100	..	85
.025	100	..	100
	<u>Fenthion</u>		
0.0025	100	..	55
.005	100	..	80
.01	100	..	100
	<u>Check</u>		
0	17	0	3

<sup>a</sup> Adults reared from field-collected larvae.

<sup>b</sup> Adult progeny of field-collected adults.

<sup>c</sup> Laboratory colony susceptible to organophosphorus insecticides.

*licitans* were about 100X and 200X greater than the concentration required to kill 90 percent of the adult females of *A. taeniorhynchus*. Adults of *A. sollicitans* were at least as susceptible to naled and fenthion as *A. taeniorhynchus* adults.

**SUMMARY.** Contact spray tests were conducted to determine the susceptibility of adult females of *Aedes sollicitans* (Walker) from Langley Air Force Base, Virginia to malathion, naled, and fenthion. A laboratory colony of *Aedes taeniorhynchus* (Wiedemann) susceptible to organophosphorus insecticides was included in the tests for comparison. *A. sollicitans* was highly resistant to malathion (about 100X to 200X at the LC<sub>90</sub> level) and was at least as susceptible to naled and fenthion as *A. taeniorhynchus*.

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*Culiseta silvestris minnesotae* BAIRD AND *C. morsitans dyari* (COQUILLET) (DIPTERA: CULICIDAE)  
IN ALBERTA

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Pucat (1965), lists *C.m. dyari* but not *C.s. minnesotae* as being recorded from Alberta. In 1967 at the suggestion of Dr. J. McLintock, Canada Department of Agriculture, Saskatoon, I examined a series of supposed *C. morsitans* taken during the spring and summer of 1966 and during May 1967. All of those examined proved to be *C.s. minnesotae*. Later, on June 28 and 29, 1967, five specimens of *C.m. dyari* were taken.

*C.s. minnesotae* appears to be widespread over the Northern United States, but records from Canada are few (Stone, 1965). Curtis (1967), states that it has been taken close to the southern boundary of British Columbia, but that all the specimens he examined from that province were *C. morsitans*. *C.m. dyari* appears to be widely but sparsely distributed over the northern forest region of North America. In Alberta, there are specimens in the Strickland Museum, Dept. of Entomology, University of Alberta; from Flatbush, 100 miles north of Edmonton, Edmonton, and the Cypress hills, an isolated forested area in the southeast part of the province. This indicates that it probably occurs over the entire wooded parts of the province.

*C.s. minnesotae* appears to overwinter as an adult female, and in both 1966 and 1967 was one of the earliest mosquitoes to appear at George Lake. In both years, the population peak was in early May and they had almost completely disappeared by June. A second generation emerged in late June, but was not conspicuous; very few specimens were taken in 1966 and none in 1967.

The information on *C.m. dyari* is sparse. The European sub-species is known to overwinter as a larva (Bates, 1969), but information on this in North America is not available. The absence of this species in May, and its appearance at the end of June in 1967 at George Lake, indicates that it does not overwinter as an adult female.

In both years the majority of *C.s. minnesotae* were taken in Malaise traps, but a few were taken in Malaise traps baited with carbon dioxide. One

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