

Alaskan snipe fly pests (*Symphoromyia*: Rhagionidae). Mosquito News 17:94-96.

———. 1959. Observations on Alaskan snipe fly pests (*Symphoromyia*: Rhagionidae). Mosquito News 19:172-178.

HENNIG, W. 1952. Die Larvenformen der Dipteren. 3 Teil.:11-18, Rhagionidae.

MALLOCH, J. R. 1917. A preliminary classification

of Diptera, Part 1. Bull. Ill. State Lab. 12 (3):362-367, Leptidae.

SEGUY, E. 1926. Diptera (Brachyceres). Faune de France 13:115-116, *Symphoromyia*.

SHEMANCHUK, J. A. and WEINTRAUB, J. 1961. Observations on the biting and swarming of snipe flies (Diptera: *Symphoromyia*) in the foothills of southern Alberta. Mosquito News 21:238-243.

WINTER MORTALITY IN LARVAE OF *Aedes trichurus* (DYAR)

H. G. JAMES

Entomology Research Institute for Biological Control, Research Branch,
Canada Department of Agriculture, Belleville, Ontario

In general, mosquito larvae in north temperate and subarctic regions are adapted to survive the low temperatures of their environment. Larvae of certain species can endure freezing without ill effect (Matheson, 1944; Gjullin *et al.*, 1961), though Bates (1949) pointed out that larvae of most species are killed when frozen.

The present note shows that larvae of snow-melt *Aedes* are killed under certain pool conditions when winter temperatures fluctuate abnormally. Evidence of winter mortality was obtained at Chatterton, near Belleville, Ontario, in 1961, following the earliest recorded hatching of mosquito eggs in that district. Newly-hatched larvae of *Aedes trichurus* (Dyar), *Aedes* sp. (probably *stimulans* (Walk.)), and the chaborine *Mochlonyx velutinus* (Ruthe) were collected from the narrow, thawed margins of semi-permanent pools of the swamp on March 3, about one month before their usual occurrence. The temperature subsequently dropped to -19.4°C . during March 10-18 and froze the thawed pool margins into solid ice.

The ice was not continuous to the bottom in the whole pool: a hole cut through five inches of ice on March 14 revealed a half-inch layer of water below the ice and above the frozen pool bottom. This water was at 0°C ., had a strong odour of hydrogen sulphide, and contained live though torpid larvae of *A.*

trichurus. When thawing resumed a week later, a three-litre sample of water from the reopened ice hole (Figure 1) contained 32 larvae of which 6 were dead; a similar water sample from the pool margin contained 6 dead out of 35 larvae. Some of the dead larvae were newly-hatched and of normal appearance, but four older first-stage larvae were contorted and partially flattened.

The possibility that freezing injured the larvae was further investigated by cutting sections of marginal ice that had frozen to the pool bottom and thawing them in the laboratory. Of a total of 21 larvae found in about one and one-half cubic feet of ice, all were dead, first-instar *A. trichurus*. Only one larva was not flattened or contorted (Figure 2, A). The others were compressed in various degrees, either dorso-ventrally or laterally (Figure 2, B) and in some larvae the head capsule was crushed and the thorax or the abdomen squeezed to from a third to a sixth of its normal width.

An explanation for this larval mortality is as follows. Mild weather in February resulted in early hatching of culicid eggs, first at the margin and then farther from shore beneath the thick accumulation of swamp ice. Low temperatures in mid-March refroze the marginal water solidly to the pool bottom and trapped many of the young larvae, but most of them escaped



FIG. 1.—Hole in ice from which dead, first-instar larvae of *Aedes trichurus* were obtained in water sample taken on March 21.

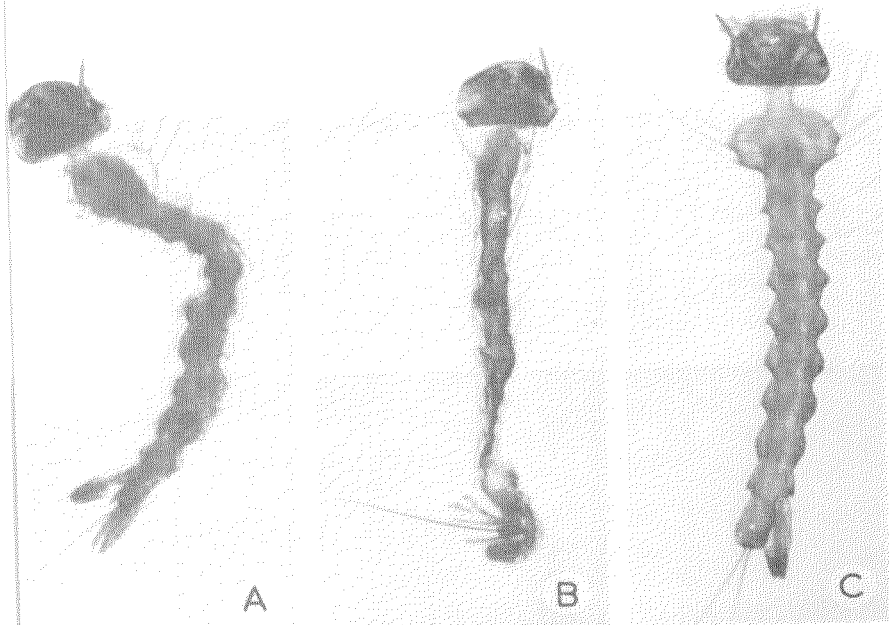


FIG. 2.—A, Contorted first-instar larva of *Aedes trichurus* from thawed ice sample. B, Laterally compressed first-instar larva from ice sample. C, Normal first-instar larva of *Aedes trichurus*.

jury by moving into the water layer under the thicker ice.

References

BATES, M. 1949. The natural history of mosquitoes. The Macmillan Co., New York, N. Y.

GJULLIN, C. M., SAILER, R. I., STONE, ALAN, and TRAVIS, B. V. 1961. The mosquitoes of Alaska. U.S.D.A. Agric. Res. Service, Agric. Handbook No. 182. Washington, D. C.

MATHESON, R. 1944. Handbook of mosquitoes of North America. Comstock Publ. Co. Inc., Ithaca, N. Y.