observed considerable variations in several of their features.

Burton (1953) observed variation in the inner clypeal hair of *Anopheles quadrimaculatus* larvae. An abnormal specimen was found having three inner clypeal hairs instead of two. Mosquito larvae with abnormal gills, siphon and siphonal hairs were also reported by him previously.

Barr (1954) during identification of *Aedes vexans* larvae from Minnesota noticed a great deal of variability in the branching of the upper and lower head hairs.

White (1956) also observed variation in the number of branches in the head hairs. Fourth instar larvae collected from the field were examined for structural variation and compared with larvae reared in the laboratory.

According to Barr (1954) the amount of branching may not be rigidly determined genetically but environmental factors such as temperature may alter the expression of such a genetic trait.

But it was observed during the present investigation that the frequency of occurrence of variations in the larval chaetotaxy in the mosquito population was very low. Only four specimens of *Anopheles* mosquitoes were found with variations in their larval hairs out of thousands examined. The characters of larval chaetotaxy in *Anopheles* mosquitoes therefore appear to be quite normal in nature, and isolated samples which may exhibit variations are not statistically significant. Moreover these larvae were collected from all over the Province of East Pakistan from different types of breeding places.

It is therefore considered that the variations occurring in case of some of the larvae in the mosquito population may be just a freak of nature.

It is not possible to establish any correlation between the presence of variations in the larval chaetotaxy and any change in the environmental conditions such as temperature and types of breeding places.

Before any definite conclusion is made on environmental factors, experimental work will have to be done. The experiments should be done under different constant temperatures in the laboratory, with different types and quantities of food supplied to the growing larvae to observe their effect on variations in larval chaetotaxy. Comparison should also be made between the larvae bred in the laboratory and those occurring in nature.

References

** 1. YATES, W. W. 1943. Variations noted in anatomical larvae structures of *Culex tarsalis*. Proc. Ent. Soc. Washington.

2. BURTON, GEORGE J. 1953. An *Anopheles quadrimaculatus* larva with three inner clypeal hairs. Mosq. News 13:144.

3. BARR, A. RALPH. 1954. A note on the chaetotaxy of *Aedes vexans* (Meigen 1830). Mosq. News, 14:24–25.

4. PURI, I. M. 1954. Synoptic tables for the identification of the full-grown larvae of the Indian anopheline mosquitoes. Health Bulletin No. 16. Manager of Publications, Delhi.

5. WHITE, JOHN M. 1956. Variation of structures of taxonomic significance in fourth instar *Culex tarsalis* Coq.-larvae. Mosq. News 16:287–88.

** This was not seen in original.

FURTHER RECORDS OF MERMITHID PARASITES OF MOSQUITO LARVAE *

MARION E. SMITH
University of Massachusetts, Amherst

The occurrence of mermithid nematode parasites in mosquito larvae was reviewed in 1954 by Jenkins and West, who reported finding high infestation by the worms (subsequently described as *Hydromermis churchillensis* by Welch, 1960a) in larvae of *Aedes communis* (DeG.) in northern Canada, with light incidence in two other species of *Aedes*. In 1956 Laird reviewed world records, and later Welch (1960b) summarized mermithid parasitism in North American species of mosquitoes. In 1953 and 1955 Frohne also reported the presence of mermithids in *Aedes* larvae in Alaska, with heavy infestations in *A. communis*, and added several species to the list of known mosquito hosts given by the preceding authors.

In 1959 two instances of parasitism were observed by the author in *Aedes* larvae collected in the vicinity of the Rocky Mountain Biological Laboratory in Gothic, Colorado, at elevations of about 10,000 feet.

On July 3, a last instar larva of *Aedes pullatus* (Coq.), collected at the Gothic Picnic Area of the Gunnison National Forest, was observed exhibiting abnormal body thrashings. Upon examining the specimen, a mermithid worm was seen in the process of emerging from a large hole on the side of the thorax of the larva; a second one followed shortly. The two parasites differed markedly in length and diameter, the first being about 17 mm. long and the second one about 7.5 mm. Parasitism of this species of mosquito by mermithids had not previously been reported.

On July 15, 138 living nematodes, along with many dead culicid larvae, were taken from the bottom of a rearing jar which had contained larvae of *A. pullatus* and *A. communis* collected earlier in Elko Park (White River National Forest). Many of these parasites were larger than those found emerging from the *pullatus* larva, some attaining a length of about 22 mm. It was not determined whether only one or both of the species had served as host.

Dr. H. E. Welch, to whom the specimens were sent for examination, reported that the parasites were larval mermithids, which lack characters for

* Entomological contribution number 1346 from the Department of Entomology and Plant Pathology, University of Massachusetts.

positive identification, but were close to or identical with larval specimens of *Hydromermis churchillensis* Welch, a mermithid reported from several species and genera of mosquitoes, including *Aedes communis*. Only one species of parasite was represented in the Colorado material.

In his discussion of the life cycle and bionomics of *H. churchillensis*, Welch (1960a) pointed out that parasitized mosquito larvae "are arrested in their development and fail to pupate, a condition which results in the accumulation of parasitized larvae in the pools" and tends to produce artificially high rates of parasitism. The Colorado specimens bear out this statement, for the parasites were discovered at the end of the breeding season, after all healthy larvae in the culture and in the original places of collection had completed their development.

References Cited

FROHNE, W. C. 1953. Mosquito breeding in Alaskan salt marshes, with especial reference to *Aedes punctodes* Dyar. Mosq. News 13(2):96–103. 1955a. *In* "News and Notes," Mosq. News 15(1):53. 1955b. *In* "News and Notes," Mosq. News 15(2):125.

JENKINS, D. W. and WEST, A. S. 1954. Mermithid nematode parasites in mosquitoes. Mosq. News 14(3):138–143.

LAIRD, M. 1956. Studies of mosquitoes and freshwater ecology in the South Pacific. Roy. Soc. New Zealand Bull. 6. 213 pp.

WELCH, H. E. 1960a. *Hydromermis churchillensis* n. sp. (Nematoda: Mermithidae) a parasite of *Aedes communis* (DeG.) from Churchill, Manitoba, with observations on its incidence and bionomics. Can J. Zool. 38:465–474. 1960b. Notes on the identities of mermithid parasites of North American mosquitoes, and a redescription of *Agamomermis culicis* Stiles, 1903. Proc. Helminth. Soc. Wash. 27(2):203–206.

The Annual Meeting of the **NEW JERSEY MOSQUITO EXTERMINATION ASSOCIATION** will be held at the Hotel Haddon Hall, Atlantic City on March 21st, 22d and 23d, 1962. The four-session program will include reports and exhibits of scientific and popular interest pertaining to mosquitoes and their control. Along with the announcement of this meeting came the information that the color film "The New Jersey Mosquito Story" is now available through the New Jersey Association at $225.00 a copy.