

been recorded it is important to those interested in fish culture."

A not-very-closely-related report, also by Mrs. Aaron on page 47 of the Lamborn Prize Essays and quoting other authors (Biro 1884, Riley 1888), gives data on the destruction of fish by dragonflies: "Biro states that nearly 50,000 young fish were destroyed by a species of Libellulinae in Hungary. Riley and Howard mention a case where the larvae of *Anax junius* Drury were found feeding on young carp."

The Lamborn Prize Essays particularly, and the Howard book also, give a number of most interesting additional items. These references are fully worth rereading, in the light of the advanced technology that has been evolved in nearly a hundred years since.

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#### APPENDIX

In response to the above note, Willis W. Wirth, Systematic Entomology Laboratory, USDA, c/o National Museum of Natural History, Washington, DC 20560, has provided the following commentary which is published with his permission:

"As long as the subject has been raised and the question asked: Do mosquitoes feed on trout? I would like to comment that this is probably unlikely.

"I do not question the accuracy of Mr. Murray's observations: An insect similar to a mosquito, which he took to be mosquitoes, fed on hatchling trout in Tumichie Creek, Colorado. I raise the possibility that another nematoceros dipteran, similar in size and appearance to a mosquito, with well known and adapted predaceous habits was the predator.

"Very common predaceous midges about the same size as a large mosquito at such elevations

in mountain creeks are the Blephariceridae. Their predaceous habits on small adult insects are well known. The literature should be checked for any report of their preying on invertebrates and other small animals at the water surface.

"Empidid flies are less similar to adult mosquitoes but their predaceous habits on aquatic insects are well known. Most of them capture adult insect prey in flight. Antony Downes at Ottawa has published notes on such habits and has many more unpublished observations. He has also kept records on blepharicerids. I myself have seen empidid flies of the subfamily Clinocerinae feeding on blackfly larvae at the water margin of rocky streams in Inyo County, California.

"The larger midges of predaceous Ceratopogonidae such as *Palpomyia* or some genera of Sphaeromiini also prey on adult midges over the surface of mountain streams in the west. Larger species of *Atrichopogon* midges are very abundant resting and swarming at the margins of mountain streams: their adult feeding habits are various, some take insect carrion, others take blood from beetles and other adult insects. There is one report of their feeding on earthworms. Their size, habitat and habits make them prime suspects in the instance observed by Mr. Murray.

"All this points out the need for present workers to actually make new observations in similar situations to verify Murray's observations, or to find out definitely what insects are involved in feeding on trout hatchlings."

#### ROCK HOLE BREEDING HAEMAGOGUS MOSQUITOES ON MONOS ISLAND, TRINIDAD, WEST INDIES

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The mosquito genus *Haemagogus* is represented on Monos Island, Trinidad, West Indies by 3 species, *Hg. janthinomys* Dyar, *Hg. celeste* Dyar and Nunez Tovar and *Hg. equinus* Theobald (Heinemann et al. 1980). These species are known to breed primarily in tree holes

<sup>1</sup>Published with approval from the Ministry of Health and Environment, Trinidad and Tobago, W.I.

and in cut or damaged bamboo internodes (Arnell 1973). The genus plays an important role in the transmission of sylvan or jungle yellow fever in neotropical America (Arnell 1973).

During September, 1982 an extensive mosquito survey was conducted on Monos Island, one of the several islands situated off the northwestern peninsula of Trinidad. Larvae and pupae of all 3 species of *Haemagogus* were collected from a rock hole. In addition, larvae of *Hg. celeste* were taken from water in an abandoned tire. These represent the first records of these species from such habitats. All immature specimens were transported to the Insect Vector Control Division Laboratory, St. Joseph, where they were reared to adults and identified. The results are as follows: *Haemagogus janthinomys*: two 4th instar larvae and 3 pupae, *Hg. celeste*: two 3rd instar larvae and *Hg. equinus*: two 4th instar larvae were collected from a rock hole at Grand Fond Valley on September 19, 1982. Associated with these were larvae of *Limatus durhamii* Theobald and *Culex originator* Gordon and Evans.

*Haemagogus celeste*: two 4th instar larvae were collected from an abandoned tire at Morris Bay Valley on September 17, 1982. Associated with these were ten 3rd instar larvae of *Aedes aegypti* (Linn).

The collection of these 3 *Haemagogus* species on Monos Island does not represent new records (see Manuel 1965, Heinemann et al. 1980), but unexpected was the aquatic source of the immature stages. Previously, Chadee et al. (1981) had reported the finding of *Hg. equinus* breeding in abandoned tires and in household containers on Tobago, W.I. and now we find that *Hg. celeste* may use the tire habitat.

It should be noted, however, that no tree hole collections were made on September 19, 1982, so that transference of larvae from tree hole to rock hole through contaminated equipment was not possible.

In addition to the aquatic collections, adults of the 3 *Haemagogus* species were readily taken during human-bait captures at points close to Morris Bay, Grand Fond Valley, Dumas Bay, Balmoral Bay and at Biscayne Bay. Specimens of *Hg. janthinomys*, *Hg. celeste* and *Hg. equinus* have been deposited in the Insect Reference Collection at the Caribbean Epidemiology Centre (CAREC).

The author wishes to thank Dr. E. S. Tikasingh, Entomologist/Parasitologist at the Caribbean Epidemiology Centre, P. O. Box 164, Port of Spain, Trinidad for confirming the *Haemagogus* identifications. In addition, I thank Messrs. R. C. Perad, N. Andalcie, E. C. Peru, W. Ramdath and R. Manwah for field assistance. Special thanks are also due to Dr. Eugene Lau-

rent, Principal Medical Officer, (Environment Health) for his help and encouragement during this study.

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### PSOROPHORA HOWARDII, AN ADDITION TO THE CHECKLIST OF NEW JERSEY MOSQUITOES<sup>1</sup>

JAMES MCNELLY<sup>2</sup> AND WAYNE J. CRANS<sup>3</sup>

*Psorophora howardii* Coquillett is a mosquito of the southeastern U.S. that has been reported as far north as Delaware in the eastern portion of its range (Darsie and Ward 1981). Larvae of *Ps. howardii* are most often found in temporary rainpools and are predacious on the immature stages of other mosquitoes utilizing the habitat (Carpenter and LaCasse 1955). Development is rapid and several generations are possible when rainfall is abundant during the breeding season (Sively 1972).

On June 4, 1982, approximately twenty 3rd instar *Ps. howardii* were collected from a shaded rainpool in the Fishing Creek area of southern Cape May County, New Jersey by Cape May County Mosquito Commission personnel. The exact site is several miles east of the town of Villas and is south of the Delaware record of *Ps. howardii* reported by Lake (1963). Several

<sup>1</sup> New Jersey Agricultural Experiment Station, Publication No. D-40101-1-83. Supported by U.S. Hatch Act.

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