NEW RECORDS AND DISTRIBUTIONS OF THE BITING FLIES OF MT. DESERT ISLAND, MAINE [1]

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During 1955 and 1956 the author spent parts of the summers on Mt. Desert Island. During these visits he made extensive collections of the insects with the purpose of continuing the survey, initiated by Dr. William Procter, of the fauna of the Island.

The present paper considers the biting flies which were given particular attention for several reasons. The importance of many of these insects as pests, together with the ability of certain ones to act as disease vectors, makes it essential that we know what species are present, when they occur and where they are abundant. In addition the author wished to obtain specimens for use in classes.

The biting flies which were collected included five families, the Simuliidae, the Culicidae, the Heleidae, the Tabanidae and the Muscidae.

The family Simuliidae was not particularly abundant during either year. This undoubtedly is related to the time of the year since these insects are reported to be common and troublesome on the Island in May. In 1955 two specimens of *Prosimulium hirtipes* (Fries) represented the total catch. These were collected on the trail to Beach Cliff on July 9. In 1956 specimens of *Simulium venustum* Say were collected from the following localities: Oak Hill (8) VI-4–56. Seawall (5) VI-5–56. Seal Harbor (6) VI-5–56. Western Mountain (5) VI-4–55. *Prosimulium hirtipes* (Fries) was recorded from the following localities: Beach Cliff (2) VI-4–56. Oak Hill (3) VI-4–56, Seal Cove (5) VI-5–56. Seawall (2) VI-5–56. Seal Harbor (7) VI-5–56. Western Mountain (6) VI-4–56.

The family Heleidae, while present in some numbers, was not found to be rich in species. In 1955, a single species *Culicoides canithorax* Hoff. was a common and troublesome pest about dusk at Seawall and also at Ship Harbor. In 1956, in addition to a large series (187) of *C. canithorax*, a few specimens of *C. melleus* (Coq.) and *C. obsoletus* (Meig.) were taken.

The family Culicidae was well represented. Five genera including 18 species were secured. In 1955 the emphasis was placed on adult collections, while in 1956 the survey was continued primarily by larval dippings. Their distribution is indicated in the accompanying summary.

Aedes: abserratus (F. & Y.) Seawall (1) VII-8–55. Seawall Bog (110) VI-3–56; — *atropalpus* (Coq.) Thunder Hole (5) VII-1–55; (24) VII-12–55; (175) VI-3–56; (2) V-12–56; (2) X-22–56. Ship Harbor (2) VII-19–55. Seawall (1) VII-13–55. Anemone Cove (6) VII-1–55; (30) VII-12–56; (25) VII-25–56; (4) X-2–56. Otter Cliff (10) VI-30–56; (40) VII-25–56. Bass Harbor (30) VII-25–56. Sand Beach vicinity (60) VI-3–56; — *aurifer* (Coq.) Seawall (1) VII-9–55; — *canadensis* (Theo.) Ship Harbor (4) VII-2, 10–55. Seawall (2) VII-8, 10–55; (70) VI-4–56. Echo Lake (4) VI-4–56. Seal Harbor (20) VI-5–56. Cadillac Mt. (50) VI-6–56; — *cantator* (Coq.) Seawall (29) VII-3, 18–55. Ship Harbor (10) VII-2, 10, 11–55. Tremont (300) VII-2, 27–55; (90) VI-3–56. Sand Beach (10) VI-4–56. Bernard (50) VI-6–56; — *cinereus* Meig. Seawall (6) VI-3–56. Echo Lake (4) VI-4–56; — *communis* (Deg.) Seawall (3) VII-3, 9–55; — *decticus* H. D. & K. Seawall (1) VII-8–55; — *diantaeus* H. D. & K. Seawall

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(2) VII-4, 6–55; — *excrucians* (Walk.) Tremont (1) VII-2–55. Seawall (3) VII-2, 8, 13–55; (30) VI-4–56. Otter Creek (5) VI-6–56; — *fitchii* (F. & Y.) Seawall (1) VII-18–55; (2) VI-3–56; — *intrudens* Dyar Ship Harbor (1) VII-10–55; — *punctor* (Kby.) Seawall (15) VII-3, 9–55; (23) VI-3–56. Tremont (58) VI-5–56. Echo Lake (45) VI-4–56; — *sollicitans* (Wlk.) Seawall (2) VII-9, 18–55. Ship Harbor (9) VII-2, 19–55. Tremont (12) VII-2, 27–55. Bernard (5) VII-25–56.

Culex restuans (Theo.) Sand Beach vicinity (5) VII-25–56.

Culiseta morsitans (Theo.) Seawall (7) VI-3–56.

Mansonia perturbans (Wlk.) Ship Harbor (8) VII-3–55. Tremont (3) VII-2, 4, 27–55.

Wyeomyia smithii (Coq.) Seawall VII-4–55. Seal Cove Pond VII-6–55. Common in *Sarracenia purpurea.*

The family Tabanidae was abundant both in species and numbers. Five genera including 22 species were obtained. The records of their distribution follow.

Chrysops: carbonaria (Wlk.) Bernard (1) VII-2–56; — *celeris* O.S. Ship Harbor (1) VII-2–55; — *excitans* (Wlk.) Cadillac Mt. (1) VII-9–55. Great Heath (3) VII-8–55. Parkman Mt. (4) VII-12–55. Seawall (1) VII-24–55. Ship Harbor (2) VII-2, 15–55. Somesville (2) VII-1–55. Acadia Mt. (1) VII-15–56; — *frigida* O.S. Great Heath (1) VII-8–55. Ship Harbor (1) VII-15–55. Seawall (1) VII-26–56; — *fuliginosa* (Wied.) Ship Harbor (1) VII-2–55. Tremont (1) VII-2–55; — *lateralis* (Wied.) Western Mt. (1) VII-6–55; — *mitis* O.S. Duck Pond (1) VII-5–55. Seawall (1) VII-4–55; — *montana* O.S. Carter's Nubble (1) VII-10–55; — *nigra* (Macq.) Ship Harbor (2) VII-1–55. Somesville (1) VII-2–55. Tremont (1) VII-2–55; (1) VII-2–56; — *vittata* (Wied.) Carter's Nubble (1) VII-10–55. Otter Creek (1) VII-17–55. Western Mt. (1) VII-6–55.

Atylotus thoracicus (Hine) Ship Harbor (1) VII-20–56. Seawall (1) VII-26–56. Great Head (1) VII-27–56.

Hybomitra: affinis (Kirby) Cadillac Mt. (1) VII-9–55; — *aurilimba* (Stone) Sargent Mt. (1) VII-16–56; — *frontalis* (Wlk.) Sargent Mt. (5) VII-26–55. Tremont (4) VII-13–55; (1) VII-11–56; — *illota* (O.S.) Tremont (2) VII-11–56. Seawall (1) VII-26–56. Great Head (1) VII-27–56; — *minusculus* (Hine) Duck Pond (2) VII-3–55; — *trispila* (Wied) Sargent Mt. (1) VII-26–55. Seawall (1) VII-28–56; — *zonalis* (Kirby) Seawall (1) VI-30–55.

Merycomyia whitneyi (Johns.) Sargent Mt. (1) VII-26–55.

Tabanus: lineola scutellaris (Wlk.) Tremont (1) VII-29–55; — *nigrovittatus* Macq. Seawall (2) VII-24–55. Tremont (5) VII-27–55; (1) VII-11–56; — *nivosus* (O.S.) Seawall (1) VII-24–55.

Two species of biting muscid flies were taken. The horn fly *Siphona irritans* (L.) was observed in Somesville and on the road to Beach Cliff. *Stomoxys calcitrans* L. was a common and annoying pest in many locations along the shore.

SUMMARY

Data are presented concerning the prevalence and occurrence of biting flies collected during the summers of 1955 and 1956 on Mt. Desert Island.

Blackflies (Simuliidae) represented by two genera were not particularly abundant or troublesome although they are recorded to be common and annoying earlier in the season.

The family Heleidae was represented by *Culicoides canithorax, C. melleus* and *C. obsoletus* with *canithorax* being the most abundant. Of these *C. melleus* and *C. canithorax* have not been recorded previously from Mt. Desert (Procter, 1946). *C. obsoletus* has been reported from Long Pond as *C. ranguisuga* (Coq.).

The Culicidae included five genera and 18 species. Of these *Aedes abserratus, A.*

decticus and *Culiseta morsitans* had not been reported from the area according to Procter 1946. *Aedes atropalpus* previously reported from Bar Harbor was found to occur quite commonly wherever there are rocky ledges extending above the high tide level.

The Tabanidae are represented by 22 species and five genera. *Chrysops montana, Hybomitra frontalis, Merycomyia whitneyi* and *Tabanus nivosus* are new records both for Mt. Desert Island and for Maine. *Hybomitra aurilimba* is a new record for the Island.

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References

JOHNSON, C. W. 1925. List of the Diptera or two-winged flies. Fauna of New England 15. Occ. Pprs. Boston Soc. Natl. Hist. VII:3–326.

PHILIPS, C. B. 1947. A catalog of the blood-sucking fly family Tabanidae (horse flies and deer flies) of the Nearctic Region north of Mexico. Am. Mid. Natl. 37:257–324.

PROCTER, W. 1946. Biological survey of the Mt. Desert region. VII. Wistar Inst. Anat. & Biol. 506 pp., illus.

NOTES ON THE TECHNIQUES OF HANDLING MOSQUITOES IN THE LABORATORY [1]

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In the laboratory, techniques are often a matter of personal preference. However, a communication of this nature may nevertheless be very useful. For extensive information on mosquito culture techniques and experimental procedures, Trembley's paper (1955) should be consulted. Reported here are some experiments and techniques which either are not covered by Trembley or are considered improvements by the author.

CAGE. For the conventional screen-type of mosquito cage, nylon is the most desirable, because it is lighter than wire, more durable than cheesecloth, and above all, offers better visibility than either. Since adequate humidity is essential for the survival of the adult mosquitoes, ordinarily it is supplied to this type of cage by providing wet toweling or by putting the cage in a specially humidified room. Frequently the cage becomes moldy and difficult to clean.

In our laboratory, cages with favorable humidity but with no mold contamination have been maintained in their original condition for the past five years.

The cage is very simply constructed. It is composed of a plywood top and bottom, four corner bars, and an extra horizontal bar to square off a lower opening for the nylon sleeve. The rest of the framed area is walled with "Clear Acetate" sheet, a plastic that is transparent, durable, non-inflammable and easily cleaned by a damp sponge.

Moisture inside the cage is supplied from a piece of cheesecloth drawn out from a water bottle. The cloth is spread and hung over a glass rod resting on two hooks screwed on the corner bars of the cage. In such a closed cage, the relative humidity

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