

THE MAYFLIES (EPHEMEROPTERA) OF MAINE:
A FAUNAL SURVEY, PART 1 AND
TAXONOMY OF THE LEPTOPHLEBIIDAE, POTAMANTHIDAE,
POLYMITARCYIDAE, AND EPHEMERIDAE, PART 2

By Steven Kenneth Burian

Thesis Advisor, K. Elizabeth Gibbs, Ph.D.

An Abstract of the Thesis Presented in
Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy (in Biological Sciences)
May, 1990

An extensive survey of the composition and distribution of the mayflies (Ephemeroptera) of Maine was conducted from 1985-87. Approximately 12,000 new specimens were systematically collected from six different geographic regions of the State. Ecological data on aquatic habitats of nymphs and notes on mating behavior of adults were also recorded. On the basis of these specimens and those existing at the start of this study in the collection of the Department of Entomology at the University of Maine, 44 genera and 162 species were recorded. Among these, 48 represent new State records and one represents a new record for the United States.

Species distributions were plotted and analyzed in relation to the fauna of adjacent States and Provinces. Probable post-glacial dispersal routes were estimated using data from dispersal of freshwater fish. Current mayfly distributions were delineated into six types; Northern Mountain (NM), North-Central (NC), North/West-East (NW-E), Coastal-East (CLE), Central-Southern (CS), and Central-South-East (CSE). Patterns were discussed with regards to regional physiography and post-glacial recolonization. Among the patterns the

NW-E distribution indicated a disjunction between taxa on the Moosehead Plateau and the hilly coastal area of eastern Maine. The CS pattern was composed mostly of species that are closely associated with the southeastern Appalachian Mountain fauna and seem to be limited by climatic conditions in the southern part of the State.

The taxonomy of genera and species of Leptophlebiidae, Potamanthidae, Polymitarcyidae, and Ephemeridae occurring in Maine were studied. Keys to mature nymphs and male imagoes were developed. The nymph of Choroterpes (C.) fusca was described and illustrated for the first time. Types of all three northeastern species of Choroterpes were examined and discussed. New nymph characters were described and illustrated for Leptophlebia cupdia, L. intermedia, L. johnsoni, and L. nebulosa. Analysis of the variable species L. cupida and L. intermedia showed them to each contain several distinct intraspecific forms. Preliminary keys to the male imagoes of these subgroups were developed. Analysis of Paraleptophlebia showed that Maine species could be divided into two distinct groups that may represent possible subgenera.

The nymph of Potamanthus distinctus was redescribed and completely illustrated. Regional variation in primary diagnostic characters of the ephemerids was discussed. A new character relating to the dorsal color pattern of the abdomen was presented for distinguishing between nymphs and adults of Ephemera (E) varia and E. (E.) simulans.