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NEW WISCONSIN RECORDS FOR A *HEMILEUCA*
(LEPIDOPTERA: SATURNIIDAE) USING *MENYANTHES TRIFOLIATA*
(SOLANALES: MENYANTHACEAE) AND *BETULA PUMILA* (BETULACEAE)

James J. Kruse¹

ABSTRACT

A population of *Hemileuca maia* species complex was observed feeding on *Menyanthes trifoliata* and *Betula pumila*. This confirms the presence of a second population of these moths using *M. trifoliata* in Wisconsin, and is only the fourth known locality for such populations. This is the first report of *Hemileuca* feeding on *B. pumila* in Wisconsin. The *Hemileuca* populations of the Great Lakes region are discussed, and the first map of the distribution of *Hemileuca* in Wisconsin is provided.

The *Hemileuca maia* (Drury) species complex in the Great Lakes region consists of two species, *H. maia* and *H. nevadensis* (Stretch). Both are considered good species, but are recognized by sparse or unreliable morphological and inconsistent ecological criteria (Ferguson 1971, Covell 1984, Scholtens & Wagner 1994, Legge et al. 1996, Tuskes et al. 1996). In the Great Lakes region, these species come together to produce a confusing array of morphological, ecological, and behavioral traits. In addition, Great Lakes populations have not yet been differentiated using molecular techniques (Legge et al. 1996).

Hemileuca in the Great Lakes region that demonstrate unique food plant associations are considered important for two reasons. First, these populations may contain an unnamed sibling species (Tuskes et al. 1996), or are otherwise phylogenetically distinct and therefore have conservation potential (Legge et al. 1996). Second, allopatric and parapatric juxtaposition of these populations with each other and with nominate *H. nevadensis* and *H. maia*, coupled with the recent glaciation of the region, pose several challenging opportunities for studies in biogeography, gene flow, and evolution. With these prospects in mind, a survey of known and potential *Hemileuca* sites was undertaken in order to confirm previously known populations and to discover new populations in Wisconsin, a state previously not included in recent Great Lakes *Hemileuca* complex research projects.

MATERIALS AND METHODS

To identify known populations of *Hemileuca* in Wisconsin, specimens and collection records were examined at the University of Wisconsin Insect Re-

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search Collection, the Wisconsin Entomological Society (WES), and personal collections. Known Wisconsin localities (Dane, Douglas, Jackson, Jefferson, Juneau, Marquette, Monroe, Ozaukee, and Portage counties) and suspected localities (Forest, Lincoln, and Marinette counties) were surveyed for *Hemileuca* during 1995 for adults, and/or in spring 1996 for larvae. Localities that were suspected of supporting *Hemileuca* populations contained vast acreage of suitable upland willow (*Salix*), wetland willow, or swamp birch (*Betula pumila* L.) wetlands.

RESULTS

On 9 June 1996, a population of *H. maia* species complex was discovered feeding on *B. pumila* and the aquatic herb *Menyanthes trifoliata* (L.) at a small, privately owned bog in Northwestern Marquette Co., Wisconsin. Greater than 100 larval clusters were concentrated at the southern edge of the bog. The majority of larvae were in the first instar, and were feeding in equal proportions on *M. trifoliata* and *B. pumila*. This is only the fourth locality for *Hemileuca* known to feed on *M. trifoliata*. The only other population known in Wisconsin is found at Cedarburg Bog, Ozaukee Co. (Season Summary 1991). Additional populations feeding on *M. trifoliata* are previously known from Ottawa, Ontario and the southeast shore of Lake Ontario in New York (Season Summary 1985, Legge et al. 1996, Tuskes et al. 1996). Populations feeding on *B. pumila* are previously known from Northwestern New Jersey, Michigan, and Ottawa, Ontario (Season Summary 1985, Scholtens & Wagner 1994, Tuskes et al. 1996). This is the first report of *Hemileuca* feeding on *B. pumila* in Wisconsin.

Three larval clusters were collected from the Marquette Co. site. Larvae were easily transferred from *M. trifoliata* to *Salix exigua* (Nutt.) and reared to adulthood. Voucher specimens have been deposited in the University of Wisconsin Insect Research Collection, with additional specimens retained in the author's collection.

The presence of *Hemileuca* populations was confirmed in Douglas and Marquette counties during the survey period, and populations in Juneau, Monroe, Ozaukee, Portage, and Washburn counties have been confirmed within the last five years according to WES records and personal collection data. No previous records of *Hemileuca* exist, nor was any evidence of *Hemileuca* populations found in Forest, Lincoln, and Marinette counties, despite extensive tracts of apparently suitable habitat.

DISCUSSION

Reticulation events and genetic introgression between *Hemileuca* species in the Great Lakes region may be a source of confounding phylogenetic characters (Tuskes et al. 1996). Evidence of intermediacy that is attributable to hybridization already exists in the literature for these moths. For example, Legge et al. (1996) found that an Ohio population fed equivalently on oak (*Quercus*) and willow (*Salix*). Scholtens & Wagner (1997) found that much of Michigan is a clinal zone between *H. maia* in Ohio and Great Lakes populations to the north. Further study may reveal a hybrid zone through significant portions of the entire Great Lakes region.

A variety of observations, including food plant (*Salix*) and the association with wetland habitats, are consistent with the inference that the Great Lakes populations are derived from *H. nevadensis* (Tuskes et al. 1996). How-

ever, host plants and habitats are not distinctive and do not, as once thought, serve to identify populations (Scholtens & Wagner 1997). Scholtens & Wagner (1994) found that populations in Michigan fed upon plants spanning the entire range of all Northeastern *Hemileuca* species. Of particular interest, food plants such as *M. trifoliata* and *B. pumila* used in the Great Lakes region are unique to all recognized members of the *H. maia* species group.

The uniqueness of *M. trifoliata* as a food plant of some *Hemileuca* populations was reported by Legge et al. (1996) as an ecologically significant difference between those populations that feed upon it during early larval development and those that do not. Only larvae adapted to *M. trifoliata* can survive on that plant (Legge et al. 1996), yet populations that feed on *M. trifoliata* have been found in the wild concurrently feeding on *B. pumila*, *Spiraea alba* (Duroi), and *Salix* sp. in Ottawa (Season Summary 1985), *Salix candida* (Fluegge) in Ozaukee County, WI (L. Ferge, pers. comm.), and *B. pumila* in Marquette County, WI, even in the early instars. The ability of a Great Lakes population to feed on an introduced weed, purple loosestrife (*Lythrum salicaria* L.) in Jefferson Co., WI (R. Henderson, pers. comm.), demonstrates an adaptive ability or plasticity of Great Lakes *Hemileuca*, and ultimately of the complex. Indeed, *Hemileuca* must have been able to take advantage of novel feeding opportunities to survive and spread into interglacial and the post-glacial Great Lakes region.

Most Wisconsin populations are clustered in the lake bed of old Glacial Lake Wisconsin near the center of the state (Fig. 1). Wetland drainage by humans has probably caused further population contraction in most populations over the last 200 years. Conservation of this group would best be realized by more widespread and general wetland preservation efforts. Protecting peatlands as well as other wetlands where Great Lakes *Hemileuca* occur would help conserve not only the environmental systems, but the evolutionary processes that are likely to generate future evolutionary diversity.

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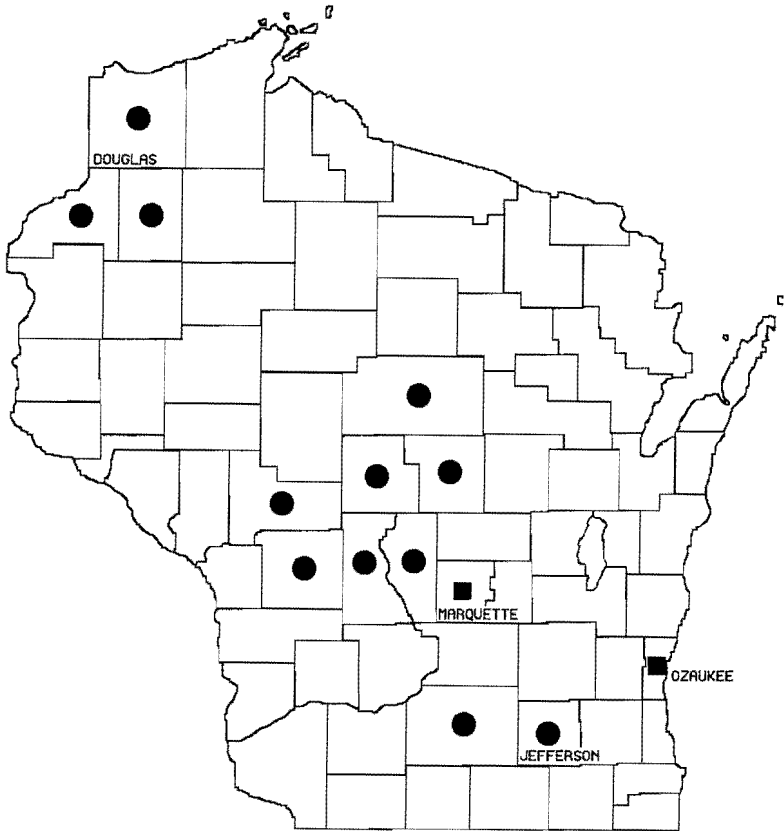


Figure 1. Distribution of *Hemileuca* in Wisconsin. Circles denote counties containing *Hemileuca* populations, squares denote *Hemileuca* populations that are known to feed on *Menyanthes trifoliata*.

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