

A STUDY OF THE DISTRIBUTIONS OF *PHYSOCARPUS*
OPULIFOLIUS AND TWO GEOMETRIDS
FEEDING ON IT

W. C. MCGUFFIN¹

Biosystematics Research Institute, Ottawa, Ontario K1A 0C6 Canada

This study deals with the distributions of *Physocarpus opulifolius* (L.) Maxim. and two geometrids feeding on this shrub: *Itame abruptata* (Walker) and *Eulithis molliculata* (Walker).

In a discussion of the distribution of Lepidoptera in Ontario, Munroe (1968) notes that new distributional information may be obtained by (1) planned surveys carried out over wide areas and (2) intensive studies conducted in supposedly well-investigated localities. To these may be added the method employed in this study, namely, the sampling of a host that has been neglected in other surveys. It is helpful if this host can be sampled periodically throughout the season and at various points throughout as large an area as convenient.

The shrub, *Physocarpus opulifolius*, commonly called ninebark, was selected for sampling. This host was sampled at various points in the southern part of Ontario from 1968 until 1975. Apparently *I. abruptata* and *E. molliculata* feed on *P. opulifolius* exclusively.

DISTRIBUTIONS

Ninebark is found in Ontario south from James Bay west to Lake Nipigon and the Thunder Bay region, and south in the U.S.A. to Arkansas. Eastwards from James Bay the range extends through western and central Quebec, south to western New York and western Pennsylvania and southwest to Arkansas (Figs. 1, 2) (Fernald, 1950; Marie-Victorin, 1935; Baldwin, 1958; unpublished records of the National Museum of Canada; the Department of Agriculture, Ottawa, Canada; and the Department of Biology, Lakehead University, Thunder Bay, Ontario).

Fernald (1950) mentions outliers in South Carolina and in Colorado. A specimen in the National Museum of Canada was collected at St. George, New Brunswick, about 50 mi. SE of St. Johns. Muller (1965) lists *E. molliculata* for New Jersey, which suggests that ninebark is found in that state.

¹ Seconded from the Canadian Forestry Service, Department of the Environment, Ottawa.

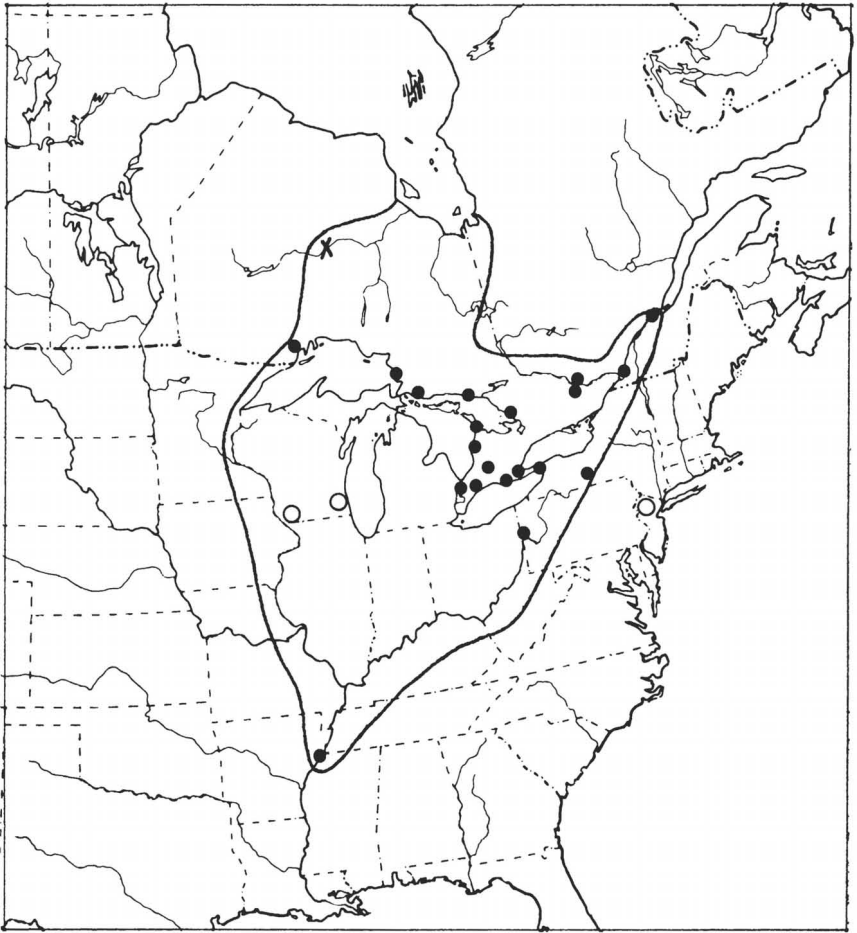


Fig. 1. Distributions of *Physocarpus opulifolius* (solid line) and *Eulithis molliculata* (closed circles = collections; open circles = recorded in literature; X = type locality).

Locally ninebark occurs on wet, rocky shores of rivers and lakes (Baldwin, 1958), in river bank thickets, along sandy lakeshores, in sandy soil at the edge of woods, and near Delhi, Ontario, in a swamp (Mr. C. E. Garton, unpublished list of *Physocarpus opulifolius* collections in herbarium of Lakehead University).

Of the two geometrid species, *E. molliculata* apparently has the wider range in Canada (Fig. 1). It occurs from Thunder Bay to western Quebec, east to Ste. Foy, Quebec, and south to New Jersey (Muller,

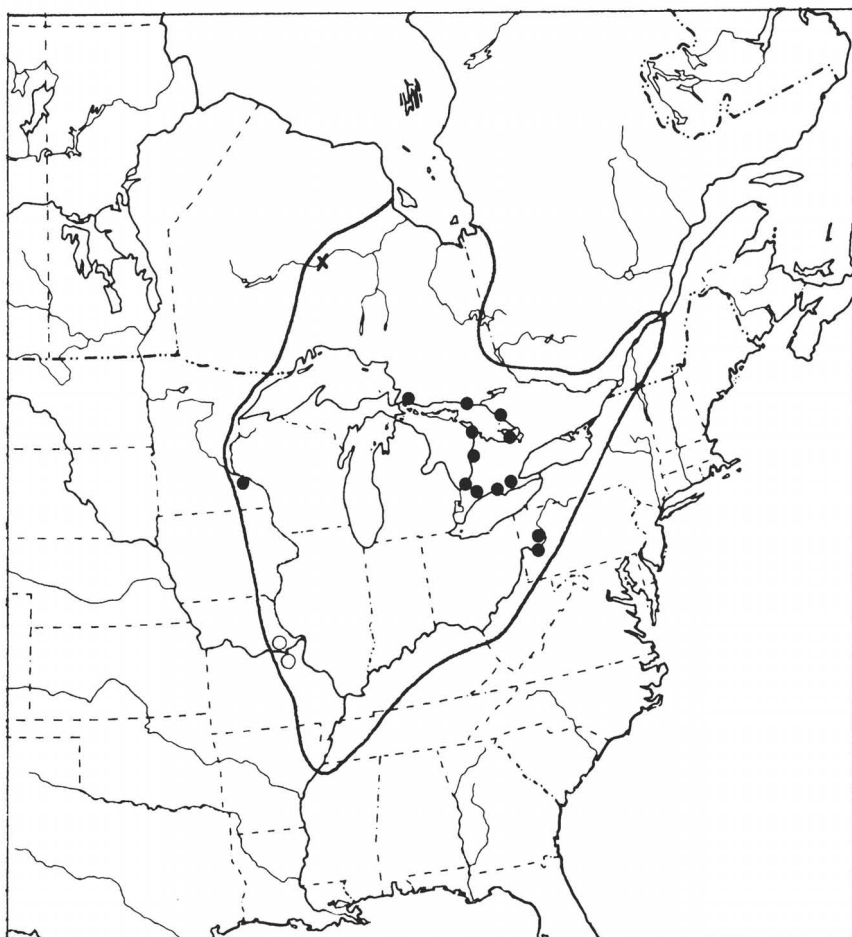


Fig. 2. Distributions of *Physocarpus opulifolius* (solid line) and *Itame abruptata* (closed circles = collections; open circles = recorded in literature; X = type locality).

1965), Michigan (Moore, 1955) and Wisconsin (Covell, 1970). *E. molliculata* is present from Pennsylvania (New Brighton and Adamstown) and Arkansas (Eureka Springs) in the American Museum of Natural History, New York, N.Y., and from New Brighton, Pennsylvania, in the U.S. National Museum, Washington, D.C.

I. abruptata (Fig. 2) occurs in the vicinity of Lakes Huron and Erie in southern and central Ontario and south to Pennsylvania (Rindge, 1961), Michigan (Moore, 1955) and Missouri (Heitzman, 1973). Min-

nesota is represented in the American Museum of Natural History by a specimen from Todd County.

The types of both geometrid species were described from St. Martin's Falls, Albany River, Ontario (Walker, 1862) (Figs. 1, 2). Until 1961 *I. abruptata* had been placed as a species of *Semiothisa* in the recent literature (McDunnough, 1938; Forbes, 1948). Rindge (1961) gave the reasons for placing this species in *Itame* and briefly outlined the distribution as southern Ontario and western Pennsylvania. McGuffin (1972) described the adult, larva and pupa and listed a few of the collection points in Ontario. According to Herbulot (1964) and Fletcher (1966) *Eulithis* Hübner has priority over *Lygris* Hübner. Forbes (1948) briefly described the adult of *E. molliculata* and McGuffin (1971) described the larva. The adult is dimorphic: the male was described as *remotata* by Walker (1862:1388) and the female as *molliculata* by Walker (1862:1390). Although *remotata* has page priority, the writer, on the advice of Dr. F. H. Rindge, of the American Museum of Natural History, retains the name *molliculata* which through common usage is considered the acceptable name.

DISCUSSION

The distribution of *P. opulifolius* differs from that of many other plants found in the Great Lakes region; this distribution extends north and south of the Great Lakes from James Bay to the lower part of the Mississippi River valley traversing as it goes the Hudsonian, Canadian, Transition, and Upper Austral Zones. In an east-west direction the distribution extends from about Long. 71° W to Long. 93° W in the vicinity of Lat. 45°–46° N; north and south the range is constricted (Figs. 1, 2). The distributions of the two geometrids as shown by the dots on these maps indicates that *E. molliculata* is more widespread than *I. abruptata*. At present the reason for this is unknown but as the answer may be found in some aspect of the biology, a brief summary of the biology of each species has been added.

Both species overwinter in the egg stage. In spring the eggs hatch and the larvae feed in June. The larvae of *E. molliculata* are twig mimics; those of *I. abruptata* rest flat along the leaf or twig. The pupal period of *I. abruptata* is from 9–20 days and of *E. molliculata* from 14–30 days. The adult of *I. abruptata* flies in July and of *E. molliculata* from the middle of July to the middle of August. The number of eggs laid by two females of *E. molliculata* which were mated in captivity were 121 and 330. The number of eggs laid by *I. abruptata* is unknown.

The sex ratio of *I. abruptata* is about 1:1 based on reared material (22 males and 25 females); the sex ratio of *E. molliculata* is approximately 2:1 based on reared material (41 males and 25 females).

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LITERATURE CITED

- BALDWIN, W. K. W. 1958. Plants of the Clay Belt of northern Ontario and Quebec. Nat. Mus. Can., Bull. No. 156.
- COVELL, C. V., JR. 1970. An annotated check list of the Geometridae (Lepidoptera) of Wisconsin. Wisc. Acad. Sci., Arts & Lett. 58: 167-183.
- FERNALD, M. L. 1950. Gray's manual of botany. 8th ed. American Book Co., New York.
- FLETCHER, D. S. 1966. Some changes in the nomenclature of British Lepidoptera. Ent. Gaz. 17: 9-18.
- FORBES, W. T. M. 1948. Lepidoptera of New York and neighboring states. Pt. 2. Cornell Univ. Agric. Exp. Sta., Mem. 274.
- HEITZMAN, R. L. 1973. An annotated check list of the Missouri Geometridae (Lepidoptera). J. Res. Lep. 12: 169-179.
- HERBULOT, C. 1964. Corrections à ma mise à jour de la liste des Geometridae de France. Alexanor 3: 376-377.
- MARIE-VICTORIN, FR. 1935. Flore Laurentienne. Montréal.
- MCDUNNOUGH, J. H. 1938. Check list of the Lepidoptera of Canada and the United States of America. 1. Macrolepidoptera. Mem. So. Calif. Acad. Sci. Vol. 1.
- MCGUFFIN, W. C. 1971. Descriptions of larvae of two eastern species of *Lygris* (Geometridae). J. Lepid. Soc. 25: 262-264.
- . 1972. Guide to the Geometridae of Canada (Lepidoptera). II. Subfamily Ennominae. 1. Mem. Ent. Soc. Can., No. 86.
- MOORE, S. 1955. An annotated list of the moths of Michigan exclusive of the Tineoidea (Lepidoptera). Univ. Mich., Mus. Zool., Misc. Publ. No. 88.
- MULLER, J. 1965. Supplemental list of Macrolepidoptera of New Jersey. J. N.Y. Ent. Soc. 73: 63-77.
- MUNROE, E. 1968. Insects of Ontario: geographical distribution and postglacial origin. Proc. Ent. Soc. Ont. 99: 43-50.

- RINDGE, F. H. 1961. Descriptions and notes on North American Geometridae (Lepidoptera), No. 5. Amer. Mus. Nov., No. 2065.
- WALKER, F. 1862. List of the specimens of lepidopterous insects in the collection of the British Museum. Pt. 25, Geometrites. London.
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AUSTIN P. PLATT
Department of Biological Sciences
University of Maryland Baltimore County
5401 Wilkens Avenue
Catonsville, Maryland 21228