

# HUDSONIA HARLEM VALLEY BIODIVERSITY MANUAL SUPPLEMENT

## Rare Moths

### Habitats

Moths occur in most terrestrial habitats and some aquatic habitats. Forests typically have the highest moth density and diversity. Habitat for any species is determined by the presence of caterpillar host plant species. Most moths are generalists, utilizing a wide range of hosts, whereas most butterflies select plants of a single family or genus. Though adults may be found far from suitable habitat, they are more likely to be found in habitat containing larval host plant species. Rare moths in the study area are typically species with restricted host or habitat requirements, or species at the limits of their geographic ranges.

### Study Area Distribution

Tuliptree silk moth (*Callosamia angulifera*), at its northern range limit in Dutchess County (Opler 1995, Ferguson et al. 1999), occurs at least in the southern part of the study area in forests where tuliptree (*Liriodendron tulipifera*) is common. Imperial moth (*Eacles imperialis*) (NHP SU) and royal walnut moth (*C. regalis*) (NHP G4G5 S1) occurred in most of New York State, including the study area, before the use of DDT to control gypsy moth (*Lymantria dispar*) in the late 1950s and early 1960s (Tuskes et al. 2004). These species have not become re-established. Pine devil moth (*Citheronia sepulchralis*) (NHP G4 S1) occurred previously in the Albany Pine Bush in pitch pine barrens (Rittner et al. 1976), and may have occurred in ridgetop pine barrens habitat in the study area. Poecila sphinx (*Sphinx poecila*), a regionally rare resident of bogs, has been reported from Columbia County (Ferguson, et al. 1999). Silver-spotted ghost moth (*Sthenopis argenteomaculatus*) gathers in mating swarms at dusk in groves of alders (*Alnus* sp.); caterpillars bore in submerged alder shoots. Caterpillars of species of the genus *Papaipema* burrow in stalks of herbs. The genus contains several rarities, and none of the species is common. State-rare ostrich fern borer (*Papaipema* "sp. 2") (G3G4, S1?), may occur in large stands of ostrich fern (*Matteuccia struthiopteris*) on stream floodplains. Chain fern borer (*P. stenocelis*) (G4, S1) may occur in the region in cool swamps or bogs containing the host plant, Virginia chain fern (*Woodwardia virginiana*). The New York Natural Heritage Program lists 75 moth species as rare in New York. However, distribution data on most of these species are minimal or lacking, and many of these species may not be truly rare, but simply under-collected (T. McCabe, New York State Museum, personal communication).

### Other Relevant Aspects of Ecological Niche and Behavior

Flight times of many species are seasonally specific and as short as one to a few nights. The number of flights (generations) per year among moth species varies from one to three or more. More moths are collected in overcast or wet weather than in clear or dry weather. Though many moth species are restricted as caterpillars to particular host plants and habitats, adult moths may stray considerable distances from places of origin. Except for a few groups (e.g. giant silk moths [*Saturniidae*]) adult moths feed as butterflies do, on liquids high in sugar (flower nectar, tree sap) or dissolved salts (road puddles, urine, fecal matter, animal carcasses). Many night-blooming flowers are well adapted to the long feeding tubes of moths. Sphingids, for example, visit evening primrose, mountain laurel, bindweed, phlox, trumpet creeper, jewelweed; many noctuids nectar on milkweeds, asters, and other meadow plants.

### Description and Identification

Refer to standard works on moths: Holland 1920, Sargent 1976, Covell 1984, Tuskes et al. 1996, Wagner 2005, and internet sites (e.g. Ferguson et al. 1999), for specific life histories, descriptions, and illustrations. Many species are not illustrated in standard field guides; for these, identification by a qualified expert may be required. Collect unworn, undamaged specimens; worn specimens often cannot be determined even by an expert.

## Threats and Conservation

High reproductive capacity shields moth populations from losses by collecting. Habitat destruction and pesticide use are serious threats, especially to species with limited host plant ranges, specialized habitat requirements, or high sensitivity to chemicals (e.g. species that pupae in the soil, such as royal moths [*Citheroniinae*]). Other specific factors may deplete populations of sensitive species or species groups. For example, in recent years in the Northeast, giant silkworm moths have declined in some areas of New York from parasitism by non-native flies released to control the gypsy moth (Boettner, et al. 2000, McCabe, personal communication). Brightly lit areas have fewer moths, but because other threats are closely associated with lights (e.g. loss of vegetation, chemical pollution, traffic), it is not clear whether light is a significant factor in moth decline. New construction and renovation should use lighting with minimal attraction to insects, such as low-pressure sodium lights.

## Survey Technique Constraints

Moths are most often surveyed at night with light traps or by direct capture at a light placed in suitable habitat. A car battery or portable generator can supply power in remote areas with no available AC outlet. Positioning the light to shine on a sheet hung from a horizontal rope tied between two tree trunks allows moths attracted to the light to land on the sheet where they are more easily captured. Some groups of moths (e.g. underwings) are readily attracted to bait mixtures spread on tree trunks or large logs. Rotten fruit, brown sugar and stale beer is a standard mixture, but many formulas have been used. Timing of surveys is essential for documenting species with short flights. In some cases, a species will appear at a light on only one night of the season (John Yrizarry, personal communication). Backyard surveys conducted nightly during the overall moth flight season (March-November) tend to yield a more complete record of a local moth fauna than surveys at multiple locations with fewer sampling nights (McCabe, Yrizarry, pers. comms.). Adults of some species, such as ghost moths, are not attracted to light or bait, and must be sought in a specific habitat at a specific time of year and time of day. Females of many moth groups, such as giant silk moths, emit pheromones that attract males of the same, or closely related species. Males attracted to a caged female may confirm the presence of a moth species in a given location.

## References to Identification Literature

- Covell, C.M. 1984. A Field Guide to the moths of eastern North America: The Peterson Field Guide Series. Houghton-Mifflin Co. Boston. 496 p.
- Ferguson, D.C., C. E. Harp, P. A. Opler, R. S. Peigler, M. Pogue, J. A. Powell, and M. J. Smith. 1999. Moths of North America. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/distr/lepid/moths/mothsusa.htm> (Version 30DEC2002).
- Holland, W.B. 1920. The Moth Book. Doubleday, Page & Co. New York, New York. 479 p.
- Opler, P. A. 1995. Lepidoptera of North America 1. Distribution of Silkmoths (Saturniidae) and Hawkmoths (Sphingidae) of Eastern North America. Contributions of the C. P. Gillette Museum of Insect Biodiversity, Department of Entomology, Colorado State University, Fort Collins, Colorado.
- Rittner, D. 1976. Pine Bush: Albany's Last Frontier. Pine Bush Historic Preservation Project. Albany, NY. 263 p.
- Sargent, T.D. 1976. Legion of night: the underwing moths. University of Massachusetts Press. 222 p.
- Tuskes, P.M., J.P. Tuttle, M.M. Collins, and M.A. Tuttle. 1996. The wild silk moths of North America: A natural history of the Saturniidae of the United States and Canada. Cornell University Press. Ithaca, NY. 250 p.
- Wagner, D. L. 2005. Caterpillars of eastern North America: A guide to identification and natural history. Princeton University Press. Princeton, New Jersey. 512 p.

## References Cited

- Boettner, G.H., J. Elkinton and C. Boettner. 2000. Effects of a Biological Control Introduction on Three Nontarget Native Species of Saturniid Moths. *Conservation Biology* 14(6): 1798-1806.