

The Great Lakes Entomologist

Volume 35
Number 1 - Spring/Summer 2002 *Number 1 -
Spring/Summer 2002*

Article 10

April 2002

Moths of the Douglas Lake Region (Emmet and Cheboygan Counties), Michigan: VI. Miscellaneous Small Families (Lepidoptera)

Edward G. Voss
University of Michigan

Follow this and additional works at: <https://scholar.valpo.edu/tgle>



Part of the [Entomology Commons](#)

Recommended Citation

Voss, Edward G. 2002. "Moths of the Douglas Lake Region (Emmet and Cheboygan Counties), Michigan: VI. Miscellaneous Small Families (Lepidoptera)," *The Great Lakes Entomologist*, vol 35 (1)
Available at: <https://scholar.valpo.edu/tgle/vol35/iss1/10>

This Peer-Review Article is brought to you for free and open access by the Department of Biology at ValpoScholar. It has been accepted for inclusion in *The Great Lakes Entomologist* by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.

**MOTHS OF THE DOUGLAS LAKE REGION
(EMMET AND CHEBOYGAN COUNTIES), MICHIGAN: VI.
MISCELLANEOUS SMALL FAMILIES (LEPIDOPTERA)**

Edward G. Voss¹

ABSTRACT

Forty-seven species in nine families of Lepidoptera (Hepialidae, Psychidae, Alucitidae, Sesiidae, Cossidae, Limacodidae, Thyrididae, Pterophoridae, Epipleminidae) are listed with earliest and latest recorded flight dates in Emmet and Cheboygan counties, which share the northern tip of the Lower Peninsula of Michigan. The records are from the principal institutional and private collections of Michigan moths and continue the documented listing of Lepidoptera in the region.

Emmet and Cheboygan counties share the northern tip of the Lower Peninsula of Michigan, the former bordered on the west by Lake Michigan and the latter, on the east by Lake Huron. The Straits of Mackinac connect these two Great Lakes; the village of Mackinaw City, on the Straits, is bisected by the county line. About 15 miles to the south, the University of Michigan Biological Station has its campus on the southeast shore of Douglas Lake, which is entirely in Cheboygan County although the west shore is very near the Emmet County line. Workers at the Biological Station (which has held regular summer teaching and research sessions since 1909) have generally taken the two counties to constitute the local "region" for many studies, although the boundaries are only partly natural.

Having spent at least a portion of each summer (save one) since 1930 in Mackinaw City and taught botany courses at the Biological Station for 35 seasons, my own interests have naturally also centered in the same region. My Lepidoptera collection (and library), which formally commenced in 1944, is in fact kept at Mackinaw City.

Checklists inevitably become soon out of date. But they do provide fixed records of information at a given time, and thus are useful as reference standards even long after various details are considered obsolete. (One must also remember that the very latest taxonomic opinions may not always be the best or most enduring ones.) Unlike previous installments of the present annotated list (Voss 1969, 1983, 1984, 1991; Scholtens 1996), this one does not include a single family or a block of families usually classified near one another in any checklist. (But the sequence of families presented thus far is no longer in accord with modern systems for the Lepidoptera anyway.) Nevertheless, the families presented below are in the same sequence as in the "MONA" (Moths of North America) checklist (Hodges et al. 1983) and within each family the species are similarly listed, preceded by the MONA number, for ease in checking synonymy. Scientific names and their authors, too, generally follow that list (any exceptions noted). Plant names are those employed in my *Michigan Flora* (Voss 1972, 1985, 1996).

Moths of the traditional "macrolepidoptera" were treated in the first four installments of this list and totaled 619 species (bringing to 700 the Douglas Lake region "macros" including 81 butterflies as itemized in Voss 1954 and Voss and Wagner 1956). The "macro" families appeared in the sequence of the then-familiar McDunnough checklist of 1938. Scholtens (1996) recorded 187

¹University of Michigan Herbarium, 3600 Varsity Dr., Ann Arbor, Michigan 48108-2287

species of Crambidae and Pyralidae. (All of these numbers are now slightly superseded.) The present installment lists 47 species in nine small families traditionally (except for Epiplemlidae) included in the "microlepidoptera." Some of these are considered to be among the most primitive Lepidoptera and overall they include generally larger, conspicuous, and/or distinctive species — "macro micros" one might say: Hepialidae, Psychidae, Alucitidae, Sesiidae, Cossidae, Limacodidae, Thyrididae, Pterophoridae, and Epiplemlidae. The families of "micros" that still await coverage can doubtless add a great many more species (and mostly of very small moths). Slightly over half of the pyraloids listed for Michigan (Nielsen 1998) are known from the Douglas Lake region (Scholtens 1996). Extrapolating to the remaining "micro" families, over 400 additional species may be expected, bringing the predicted total documented lepidopteran fauna to upwards of 1300 species for this two-county region.

For each species listed below, following the county or counties from which it has been recorded, are the earliest and latest dates for collection or observation of adults. For apparently rare species (known generally from a single collection) the year and more complete details, if known, are given. When only other collectors are mentioned, the species is not in my collection from the region (unless otherwise indicated).

Since Moore (1955) omitted all microlepidoptera in his list of Michigan moths and Welch (1915) listed only five species (three of them questionable) in the families treated here, there are very few previously published records of these families from the Douglas Lake region. All species included are listed for Michigan by Nielsen (1998) except for four Pterophoridae (6091.1, *Capperia* sp., 6149, and 6214). Of the listed species, 83% are in the collection of Brian G. Scholtens, 60% in my collection, 40% in the collection of the University of Michigan Biological Station [UMBS], 26% in the University of Michigan Museum of Zoology [UMMZ], and 11% in the Entomology Museum at Michigan State University [MSU]. These are the bases for the present account and institutional collections are cited by abbreviations as indicated in brackets.

Family Hepialidae

These primitive and interesting Lepidoptera are rarely seen (except at exactly the times of their nuptial flights), despite their large size.

18. *Sthenopsis argenteomaculatus* (Harr.). Cheboygan: 25 June–2 July. This species is known to fly about a month earlier than the next. Although Forbes (1923, p. 67) states that species of this genus do not come to light or sugar, Rings and Metzler (1990) list *S. argenteomaculatus* as collected at mercury vapor light. My specimen was collected by Gary R. Williams at carbon arc light at the Biological Station in 1964. Scholtens collected a specimen at light at the Station 2 July 1990.

Dirig (1993) reported females at light and described the brief synchronized evening flight near alders (*Alnus*), in the roots of which the larvae are said to bore. Handfield (1999) also discussed the habits of this ghostly species (and the next), including its life cycle, crepuscular flight, and attraction to light.

19. *Sthenopsis purpurascens* (Pack.). Emmet, Cheboygan: 14–22 July. My only specimen was resting on a street lamp-post in Mackinaw City on a morning in 1945, presumably attracted to the incandescent light during the night; it is a female and laid 27 eggs in captivity before being killed. There are three specimens at UMBS, presumably taken at light at Douglas Lake, in 1937, 1958, and 1959. One taken in Cheboygan County by J. H. Newman in 1943 is at MSU. All the specimens are the salmon form long separated as *S. quadriguttatus* (Grt.) (see E. S. Nielsen et al. 2000). I have four specimens (including both color forms) from the Thunder Bay and Algoma districts of

Ontario, where two of them were at gasoline lantern at the Neys Provincial Park campground and one on a post near windows in the town of White River; the years are 1967, 1972, 1981, and 1993. Schmidt and Lawrie (2000) comment on the biennial habit of this species, of which most Alberta adults occurred in odd-numbered years. The larvae bore in the roots of Salicaceae (poplars and willows) and take two years to mature. Handfield (1999) noted that (in Quebec) adults are found at light in all years but slightly more in even-numbered ones. The five Michigan specimens in UMMZ are from Alger, Mackinac, Marquette, Montmorency, and Schoolcraft counties, confirming the northern distribution of this species in the state and giving a somewhat longer range of flight dates (14 July–9 August). M. C. Nielsen collected both this species and *Hepialus gracilis* Grt. on 15 July 2000 in Otsego County (immediately south of Cheboygan Co.) (Ferge 2001).

Family Psychidae

437. *Psyche casta* (Pallas). Emmet, Cheboygan: 18 June–3 August. First noted in 1983 by David Cowan at the Biological Station. Collected in 1984 and identification confirmed by Donald Davis. Then new to Michigan, but now known from a number of counties, locally abundant at times. Needle fragments of white pine (*Pinus strobus*) seem to be favored in construction of cases, which may be found on diverse kinds of plants as well as man-made substrates. As noted by Davis (1964), this is an Old World species first discovered in North America in 1931 (Massachusetts). It apparently continues to spread westward.
438. *Apterona helix* (Siebold). Emmet. Cases only found by Scholtens on a building at the Pellston airport in June 2000. Another Eurasian species, periodically introduced at various places in North America (Davis 1964).
449. *Hyaloscotes pithopoera* (Dyar). Cheboygan: emerged 13 July 1990. Reared by Scholtens from a case found on a downed pine log near the Biological Station. A native species known from scattered localities in North America.

Family Alucitidae

2313. *Alucita hexadactyla* L. Emmet, Cheboygan: 30 July–13 August. My only specimen was given me by R. B. Schwab, who collected it 13 August 1965, at light at the Biological Station. A specimen in UMBS is labeled 7/30/35 E.N.W. [= Elton N. Woodbury] with no further data. The only Emmet County record is a specimen seen clearly by Gary R. Williams at light in Mackinaw City in late July, 2000; it evaded capture. The name used here applies to a European species. The American species are different, and a thorough study of the genus is in preparation (B. Landry, pers. comm.). Specimens of *Alucita* are seldom collected in Michigan. In the Timiskaming District of northern Ontario, it was reported as common in 1995, occurring as early as 1 April and as late as 30 October (Layberry 1996). In 1993 it was reported there 2–8 May and 1 August–21 October (Layberry 1994). These dates would indicate two broods or one brood that over-winters, as would dates on specimens in UMMZ and MSU (R. Beebe) from Montmorency County (immediately south of Cheboygan County), 13 & 15 May 1946 and 14 July 1943. The only other Michigan specimens known to me are from Dickinson County 20 May and 13 June 1983 (Adam Porter, MSU) and from Berrien County (E. Liljebld 7 July 1906, UMMZ).

Family Sesiidae

Three comprehensive treatments, well illustrated in color, of this family (clearwing moths or clearwing borers, also known as Aegeriidae) in North

America have been published (Beutenmüller 1901, Engelhardt 1946, Eichlin and Duckworth 1988), but particularly useful for this region is the work of Taft et al. (1991). Mr. Taft has determined the specimens in my own collection as well as those at MSU.

The larvae of these moths are all borers, in a great diversity of trees, shrubs, and herbaceous plants, attacking stems, bark, or underground parts. Some are serious pests of agricultural and ornamental plants. The works cited above include information on reported hosts, which are usually restricted to certain plant families or even genera. Adults of many species have relatively large transparent areas in the wings and mimic bees or wasps — or perhaps even large flies. Furthermore, the adults are diurnal, so the mimicry is thorough. Nevertheless, some do come to light, the source of most records noted here. Within the past three decades, much use has been made of synthetic pheromones (sex attractants) to attract adult males, but so far as I am aware, traps thus baited have seldom been employed in the Douglas Lake region. In July 1978, I saw a small sesiid working the flowers of a blunt-leaf orchid (*Habenaria obtusata*) at Grass Bay, east of Cheboygan. It bore two pollinia on its head, but eluded capture and hence identification (cf. Voss and Riefner 1983, where this observation was overlooked).

2513. *Pennisetia marginata* (Harr.). Cheboygan: 16 August 1962. One specimen from Mullett Creek, collected by R. E. Beer (UMBS). The larvae of this species, the raspberry crown borer, bore in the canes of blackberries, raspberries, and other species of *Rubus*.
2524. *Paranthrene tabaniformis* (Rott.). Cheboygan: 2–30 July. Collected on low dunes at Grass Bay, east of Cheboygan, both by me (in 1982) and by David Cowan (in 1988). Scholtens collected the species in 1989 about three miles west, in similar terrain near the Lake Huron shore. Willows (*Salix*) are the reported preferred larval host, and there are several species of this genus at Grass Bay.
2543. *Sesia tibialis* (Harr.). Emmet, Cheboygan: 3–30 July. Drawn to a pheromone trap and collected 3–5 July 1991 by Scholtens on the Wildwood jack pine plains south of Indian River. Apparently not common. Two additional specimens are in UMBS and one in MSU. The larval host, aspen (*Populus*), is abundant in the region — unlike the moth. Welch (1915) listed this species and an old, undated specimen in UMMZ labeled merely “Douglas Lake” is presumably his. Besides this species, Welch also listed *S. apiformis* (Cl.), which is not otherwise known from Michigan; if not a complete misidentification, the insect would, at best, more likely have been *S. spartani* Eichlin & Taft, recently described from the central Lower Peninsula of Michigan. Welch (1915) also listed “*Sesia rutilans* Hy. Edw. (?)”; this name is now placed in the synonymy of *Synanthedon bibionopennis* (Bdv.), but as that species is not known from Michigan or elsewhere in eastern North America and the identification was questioned, the report would seem safely ignored.
2549. *Synanthedon scitula* (Harr.). Emmet, Cheboygan: 30 June–17 August. The larvae have been reported from a wide range of hosts in eastern North America.
2550. *Synanthedon pictipes* (G. & R.). Emmet, Cheboygan: 30 June–22 July. The larvae attack species of *Prunus* (cherry, plum), of which there are several in the region.
2554. *Synanthedon acerni* (Clem.). Emmet, Cheboygan: 17 June–8 August. As noted by Covell (1984) and others, this is the only species in the family commonly attracted to light. Purrington and Horn (1997) reported a considerable number, of both sexes, at UV light in southern Ohio; Eichlin and Duckworth (1988) mention capture “regularly at black light.” I have also taken it at mercury vapor, carbon arc, and incandescent light. Maple (*Acer*)

- is the larval host, with red maple (*Acer rubrum*) apparently preferred — a common species in the Douglas Lake region.
2565. *Synanthedon pyri* (Harr.). Emmet: 14 July 1992. Collected by Scholtens at the Sturgeon Bay dunes. The larvae bore under the bark of woody plants in the family Rosaceae subfamily Maloideae (e.g., apple, pear, serviceberry, hawthorn).
2572. *Synanthedon proxima* (Hy. Edw.). Cheboygan: 23 July 1995. Collected by Scholtens at Grass Bay. The larvae bore in willows.
2583. *Synanthedon exitiosa* (Say). Emmet, Cheboygan: 26 June–9 August. Another species collected only by Scholtens, at several sites; some attracted by pheromone lure GPTB. This is the notorious “peachtree borer” (noted also for attacking other species of *Prunus*).
2585. *Synanthedon pini* (Kelicott). Emmet: 25 June 1991. Collected by Scholtens, using pheromone lure ZZOH/EZOH, near Van (north of Pellston). The larvae bore in pines and spruces.
2592. *Carmentia anthracipennis* (Bdv.). Cheboygan: 4 July 1991. Collected by Scholtens on the Wildwood jack pine plains south of Indian River — the only site known in the two-county region where there grows any native species of blazing-star (*Liatris cylindracea*), the genus in the underground corm of which the larvae of this species bore. Nielsen has collected the species 2–7 August in Otsego County, about 30 miles due south of the Cheboygan County site and in an area where *L. scariosa* occurs.
2608. *Carmentia pyralidiformis* (Wlk.). Emmet, Cheboygan: 30 June–10 August. One of my specimens was taken at the light of a gasoline lantern. An old undated specimen in UMMZ, labeled merely “Douglas Lake,” was presumably collected by Welch although he did not list this species (1915). The larva is reported as boring in the roots of the common boneset (*Eupatorium perfoliatum*) and allied species.
2623. *Alcathoe caudata* (Harr.). Emmet: 31 July–August. Two specimens in UMBS, the August one without day, the July one taken in 1958 three miles west of Carp Lake. The larvae are known to attack only *Clematis* vines. Males of this species are easily recognized by the long yellow “tail” abdominal appendage.

Family Cossidae

2675. *Acossus centerensis* (Lint.). Cheboygan: 21 June–8 August. Males are much more frequent than females at light, where the species is occasional, including incandescent, mercury vapor, ultraviolet, and carbon arc light. The larvae are reported elsewhere as borers principally in poplar (presumably, in our area, the abundant aspens: *Populus grandidentata* and *P. tremuloides*). Surprisingly, this relatively large moth, conspicuous (though scarcely common) at lights, receives no mention by Covell (1984).
2693. *Prionoxystus robiniae* (Peck). Emmet, Cheboygan: 17 June–17 July. In contrast to the preceding, females are more frequent than males at light, including incandescent and carbon arc. However, Munro and Fox (1934) observed that in North Dakota the “male is very active in flight,” while the female “appears to be very limited in her powers of flight,” remaining on the trunk of the tree where she emerged from the pupa, mating and ovipositing the same evening. Holland (1903) noted the species to be “exceedingly abundant” locally at electric lights.
2694. *Prionoxystus macmurtrei* (Guér.). 17 June 1991. One female taken at ultraviolet light at the Biological Station by David Cowan and in the Scholtens collection.

Family Limacodidae

4652. *Tortricidia testacea* Pack. Emmet, Cheboygan: 30 May–12 July. Taken at incandescent, ultraviolet, and mercury vapor light.
4654. *Tortricidia flexuosa* (Grt.). Emmet, Cheboygan: 21 June–27 July. Taken at incandescent, carbon arc, ultraviolet, and mercury vapor light. Apparently more common than the preceding, and often on the wing with it.
4659. *Packardia geminata* (Pack.). Cheboygan: 22 June–4 July. Apparently rare, taken at mercury vapor and ultraviolet light.
4665. *Lithacodes fasciola* (H.-S.). Cheboygan: 30 June–30 July. Not common; collected at fluorescent and ultraviolet light.
4669. *Apoda biguttata* (Pack.). Cheboygan: 24 June–20 July. Taken at carbon arc, mercury vapor, and ultraviolet light.
4697. *Euclea delphinii* (Bdv.). Cheboygan: 18 June–30 July. Taken at both mercury vapor and ultraviolet light.

Family Thyrididae

6076. *Thyris maculata* Harr. Emmet, Cheboygan: 26 June–20 July. This distinctive moth with black wings, spotted both white and yellow and scalloped along the margins, is generally considered uncommon. Scholtens has taken specimens mostly visiting wild parsnip (*Pastinaca sativa*) along the Hebron Mail Route Road in Hebron Township east of Dingman Marsh. Specimens in UMBS are from the Topinabee area. The Emmet County record is a single individual observed (but not captured) by Scholtens and Voss 20 July 2001; it was visiting fresh, black, glistening, amorphous dung (possibly bear) at Cecil Bay. *Clematis*, the presumed larval food plant here, is however quite widespread in the region.

Family Pterophoridae

The identifications in this difficult family, in which he has specialized, have all been checked (or made) by Reed A. Watkins, whose labors are deeply appreciated and were facilitated at the National Museum of Natural History by M. Alma Solis and Jon Lewis. While the numbers (with two intercalations) are from the MONA checklist, the generic assignments follow the determinations of Watkins, based on the work of Gielis (1993).

- 6091.1. *Geina sheppardi* B. Landry. Cheboygan: 29 June–11 July. Reared from *Vitis riparia* (river-bank grape) by Scholtens and also taken by him at UV light at the Biological Station. This recently described species (Landry 1989) has long masqueraded as *G. periscelidactyla* (Fitch). No specimen of the latter has been found to support the listing by Welch (1915, as *Oxyptilus periscelidactyla*), reported with a question-mark, from the Douglas Lake region.
6092. *Geina tenuidactyla* (Fitch). Cheboygan: 23 June–14 August. Sometimes stirred up in fields.
- [—]. *Capperia* sp. Cheboygan: 29 June 1956, Emmet: 4 August 1949. Two female specimens appearing to represent a species in this genus have not yet been definitely placed. The Cheboygan County specimen (June, Scholtens) is from the vicinity of Reese's Bog near the Biological Station.
6102. *Dejongia lobidactyla* (Fitch). Cheboygan: 15 July–3 August. At UV and mercury vapor light. The larva is reported (Barnes & Lindsey 1921) to feed on *Solidago* (goldenrod), of which there is no shortage in the region.
6105. *Cnaemidophorus rhododactylus* (D. & S.). Cheboygan: 30 June–21 July.

- Taken only by Scholtens at UV light.
6107. *Gillmeria pallidactyla* (Haw.). Emmet, Cheboygan: 18 June–30 July. Clearly our commonest species at light, including incandescent, UV, and gasoline lantern.
6109. *Platyptilia carduidactyla* (Riley). Cheboygan: 4–21 July. Collected only by Scholtens at UV light and reared from thistle by a Biological Station ecology class.
6149. *Stenoptilia coloradensis* Fern. Emmet: 28 June 1946. Two specimens (male & female) at incandescent light at Mackinaw City.
6157. *Adaina montana* (Wlsm.). Emmet: 5–6 August 1945. Two specimens at incandescent light at Mackinaw City.
6163. *Oidaematophorus cretidactylus* (Fitch). Emmet, Cheboygan: 30 June–13 August. Another rather common species, taken at incandescent light and gasoline lantern.
6168. *Oidaematophorus eupatorii* (Fern.). Cheboygan: 6–9 August. One female taken in 1996 by Scholtens at Colonial Point on Burt Lake and another female (UMMZ) by Peet at Burt Lake in 1932. The larvae are gregarious on *Eupatorium* (Barnes & Lindsey 1921), of which two species are abundant in the region, but this moth seems extremely rare here.
6203. *Hellinsia homodactyla* (Wlk.). Emmet, Cheboygan: 6 July–14 August. Taken at incandescent light, UV, and gasoline lantern.
6204. *Hellinsia elliottii* (Fern.). Emmet, Cheboygan: 31 July–19 August. One male taken (by me in 1950) at gasoline lantern light and one female netted (by Scholtens in 1994), both near the Biological Station. Also a female (UMMZ) taken at Burt Lake by Max M. Peet in 1932.
6205. *Hellinsia pectodactyla* (Stgr.). Emmet, Cheboygan: 5–14 August. This species includes what was formerly recognized as *Oidaematophorus stramineus*.
6214. *Hellinsia glenni* (Cashatt). Cheboygan: 29 June 1956. One specimen taken by Scholtens in the vicinity of Reese's Bog near the Biological Station.
6234. *Emmelina monodactyla* (L.). Emmet, Cheboygan: 18 June–18 July. Two specimens, both female, the former (June, Emmet) at incandescent light at Mackinaw City and the latter at mercury vapor light at the Biological Station.

Family Epiplemidæ

7650. *Callizzia amorata* Pack. Emmet, Cheboygan: 26 June–7 July. The only collections from the Douglas Lake region are by Scholtens, at ultraviolet light. The only Michigan specimens in UMMZ are from neighboring counties, Mackinac (St. Ignace) and Charlevoix (Beaver Islands) — as reported by Moore (1955). The only Michigan specimen in MSU is from Isle Royale (in 1957). Apparently a rare species in the state.
7653. *Calledapteryx dryopterata* Grt. Cheboygan: 5 July 1997. One specimen, taken by Scholtens at ultraviolet light at Colonial Point, on Burt Lake. Another rare (or overlooked) species. The only Michigan specimens in MSU are two from Livingston County (1966) and there are none in UMMZ.

ACKNOWLEDGMENTS

Brian Scholtens has been of tremendous help, especially with determinations of Sesiidae, suggestions, making available the UMBS collection, and supplying all records from his own collection. Without the immense help of Reed A. Watkins, who examined all Pterophoridae in the Scholtens, Voss, UMMZ, and UMBS collections, that family could have been treated only poorly if at all.

Mark O'Brien made available the UMMZ collection and facilitated loans. M.C. Nielsen did likewise for the MSU collections; he also read an early version of the manuscript, as did George Balogh, but neither could add any records from their own collections. William Taft examined my Sesiidae many years ago and Bernard Landry clarified the present situation with Alucitidae. My collecting at Mackinaw City over more than half a century has been encouraged by many friends, neighbors, and family members. I leave the remaining groups of microlepidoptera to others to write up.

LITERATURE CITED

- Barnes, W., and A. W. Lindsey. 1921. The Pterophoridae of America, north of Mexico. *Contr. Nat. Hist. Lepid. N. Am.* 4: 279–428 + pl. 41–54 + [4] pp. index.
- Beutenmüller, W. 1901. Monograph of the Sesiidae of America, North of Mexico. *Mem. Am. Mus. Nat. Hist.* 1(6): 215–352 + pl. 29–36.
- Covell, C. V., Jr. 1984. A Field Guide to the Moths of Eastern North America. Houghton Mifflin, Boston. 496 pp.
- Davis, D. R. 1964. Bagworm moths of the Western Hemisphere (Lepidoptera: Psychidae). *U. S. Natl. Mus. Bull.* 244. 233 pp.
- Dirig, R. 1993. McLean's mysterious ghost moths. *News Lepid. Soc.* 1993: 102–103.
- Eichlin, T. D., and W. D. Duckworth. 1988. Sesiioidea Sesiidae. *Moths Am. N. Mex.* Fasc. 5.1. 176 pp.
- Engelhardt, G. P. 1946. North American clear-wing moths of the family Aegeriidae. *U. S. Natl. Mus. Bull.* 190. 222 pp. + 32 pl.
- Ferge, L. A. 2001. Zone 8 Midwest. *News Lepid. Soc.* 43 (suppl. 1): 41–50.
- Forbes, W. T. M. 1923. Lepidoptera of New York and neighboring states. Primitive forms, Microlepidoptera, Pyraloids, Bombyces. *Cornell Agric. Exp. Sta. Mem.* 68. 729 pp.
- Gielis, C. 1993. Generic revision of the superfamily Pterophoroidea (Lepidoptera). *Zoologische Verhandlungen* 290. 139 pp.
- Handfield, L. 1999. Le Guide des Papillons du Québec. Vol. 1. Brocquet, Boucherville. 982 pp. + 125 pl. + map + corrections.
- Hodges, R. W., T. Dominick, D. R. Davis, D. C. Ferguson, J. G. Franclemont, E. G. Munroe, and J. A. Powell. 1983. Checklist of the Lepidoptera of America North of Mexico. E. W. Classey, London. 284 pp.
- Holland, W. J. 1903. The Moth Book. Doubleday, New York. 479 pp. + 48 pl. [Reprinted 1968 by Dover Publ., New York.]
- Landry, B. 1989. *Geina sheppardi*, a new species of grape-feeding Platyptylinae (Lepidoptera: Pterophoridae) from eastern North America, with notes on related species. *Can. Entomol.* 121: 763–770.
- Layberry, R. A. 1994. Zone 7: Ontario, Quebec. *News Lepid. Soc.* 1994(2): 37.
- Layberry, R. A. 1996. Zone 7 Ontario/Quebec. *News Lepid. Soc.* 38(3): 41–43.
- McDunnough, J. 1938. Check list of the Lepidoptera of Canada and the United States of America. Part 1 Macrolepidoptera. *Mem. So. Calif. Acad. Sci.* 1. 272 pp.
- Moore, S. 1955. An annotated list of the moths of Michigan exclusive of the Tineoidea (Lepidoptera). *Misc. Publ. Mus. Zool. Univ. Mich.* 88. 87 pp.
- Munro, J. A., and A. C. Fox. 1934. Carpenter worm biology and control. *North Dakota Agric. Exp. Sta. Bull.* 278. 23 pp.
- Nielsen, E. S., G. S. Robinson, and D. L. Wagner. 2000. Ghost-moths of the world: a global inventory and bibliography of the Exoporia (Mnesarchaeoidea and Hepialoidea) (Lepidoptera). *J. Nat. Hist.* 34: 823–878.

- Nielsen, M. C. 1998. Preliminary list of Michigan moths: the Microlepidoptera. *Newsl. Michigan Entomol. Soc.* 43(4): 1, 4–14.
- Purrrington, F. F., and D. J. Horn. 1997. Clearwing moths captured by ultraviolet light traps in southern Ohio (Lepidoptera: Sesiidae). *Great Lakes Entomol.* 29: 191–193.
- Rings, R. W., and E. H. Metzler. 1990. The Lepidoptera of Fowler Woods State Nature Preserve, Richland County, Ohio. *Great Lakes Entomol.* 23: 43–56.
- Schmidt, B. C., and D. D. Lawrie. 2000. Notes on the genus *Sthenopsis* (Hepialidae) in Alberta, Canada. *Jour. Lepid. Soc.* 53: 127–129.
- Scholtens, B. 1996. Moths of the Douglas Lake Region (Emmet and Cheboygan Counties), Michigan: V. Crambidae and Pyralidae (Lepidoptera). *Great Lakes Entomol.* 29: 141–160.
- Taft, W. H., D. Smitley, and J. W. Snow. 1991. A guide to the clearwing borers (Sesiidae) of the north central United States. USDA Forest Service North Central Regional Publ. 394. 30 pp.
- Voss, E. G. 1954. The butterflies of Emmet and Cheboygan counties, Michigan, with other notes on northern Michigan butterflies. *Am. Midl. Nat.* 51: 87–104.
- Voss, E. G., and W. H. Wagner, Jr. 1956. Notes on *Pieris virginiensis* and *Erora laeta* — two butterflies hitherto unreported from Michigan. *Lepid. News* 10: 18–24. 1956.
- Voss, E. G. 1969. Moths of the Douglas Lake region (Emmet and Cheboygan Counties), Michigan: I. Spingidae–Ctenuchidae (Lepidoptera). *Newsl. Michigan Entomol. Soc.* 2: 48–54.
- Voss, E. G. 1972. Michigan Flora. A Guide to the Identification and Occurrence of the Native and Naturalized Seed-plants of the State. Part I Gymnosperms and Monocots. *Cranbrook Inst. Sci. Bull.* 55 & *Univ. Michigan Herbarium.* xviii + 488 pp.
- Voss, E. G. 1981. Moths of the Douglas Lake region (Emmet and Cheboygan counties), Michigan: II. Noctuidae (Lepidoptera). *Great Lakes Entomol.* 14: 87–101.
- Voss, E. G., and R. E. Riefner, Jr. 1983. A Pyralid moth (Lepidoptera) as pollinator of blunt-leaf orchid. *Great Lakes Entomol.* 16: 57–60.
- Voss, E. G. 1983. Moths of the Douglas Lake region (Emmet and Cheboygan counties), Michigan: III. Thyatiridae, Drepanidae, Lasiocampidae, Notodontidae, Lymantriidae (Lepidoptera). *Great Lakes Entomol.* 16: 131–137.
- Voss, E. G. 1985. Michigan Flora. ... Part II Dicots (Saururaceae – Cornaceae). *Cranbrook Inst. Sci. Bull.* 59 & *Univ. Michigan Herbarium.* xx + 724 pp.
- Voss, E. G. 1991. Moths of the Douglas Lake Region (Emmet and Cheboygan Counties), Michigan: IV. Geometridae (Lepidoptera). *Great Lakes Entomol.* 24: 187–201.
- Voss, E. G. 1996. Michigan Flora. ... Part III Dicots (Pyrolaceae – Compositae). *Cranbrook Inst. Sci. Bull.* 61 & *Univ. Michigan Herbarium.* xii + 622 pp.
- Welch, P. S. 1915. The Lepidoptera of the Douglas Lake region, northern Michigan. *Entomol. News* 36: 115–119.