

A PRELIMINARY SURVEY OF THE CRANE-FLIES OF DELAWARE COUNTY, OHIO (DIPTERA: TIPULOIDEA)

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Although several collections of Tipuloidea have been made in the states surrounding Ohio, no record dealing specifically with the Ohio fauna has been published. In a preliminary survey of the crane-fly fauna of "Neotoma", a wooded valley in Hocking County, Ohio, the late Dr. J. Speed Rogers collected many species, but his recent death interrupted that study before the list could be organized and published. The crane-fly fauna of Michigan is relatively well known thanks to the diligent and painstaking collecting efforts of Dr. Rogers and his students. His paper on the crane-flies of the George Reserve in southern Michigan lists 206 species (Rogers, 1942). Dickinson (1932) discusses 137 species occurring in the state of Wisconsin. Since the present paper covers the results of only three years collecting restricted to the spring and fall months the list of 153 species compares favorably with other local lists. Most of the specimens collected are on deposit in the Museum of Zoology, University of Michigan. A few of the more interesting specimens have been retained in the author's collection.

GENERAL FEATURES OF DELAWARE COUNTY

Delaware County is located in nearly the geographical center of Ohio. It is covered by the Delaware, Marengo, Dublin and Westerville topographic sheets. Excluding the stream valleys the county is a nearly level plain lying about 850 ft. above sea level. This upland plain obtains its only relief in the form of broad belts of gently rolling glacial moraines. The county lies within the drainage of the Scioto River and its three main tributaries. The larger streams all flow in a southerly direction with their beds lying either on the thick deposits of glacial till or on the underlying bedrock. The valley floors are from 20 to 140 ft. below the adjacent uplands and form a major feature of the relief. The county lies well within the till plain region of the Central Lowland Province and is covered with a mantle of varying thickness of glacial drift dropped by the Wisconsin ice sheet. The bedrock is locally exposed along the larger streams and may even form rather impressive cliffs. It is marine in origin and composed of nearly level strata of shales and limestones. The beds have a slight dip to the southeast and outcrop in bands across the county.

COLLECTING STATIONS

During the course of the study several favorite collecting sites within the county were visited repeatedly. An attempt was made to include as much diversity of habitats as possible. The six stations are briefly characterized below. (fig. 1).

Beggar Louse Hill (B.L.H.) is a rather extensive wooded area located along the south shore of Alum Creek approximately eight miles northeast of the city of Delaware. The land situated along the river is poorly drained and supports a floodplain forest of an elm-ash-soft maple association with admixtures of sycamore, willow and poplar. The north-facing valley wall is heavily wooded with sugar maple being the most abundant tree species. The wall is dissected by several deeply shaded ravines leading back into the adjacent highlands. The

upland till plain extending south from the river bluffs is partially pastured by cattle and is generally flat and poorly drained. A mosaic of plant associations is present according to the drainage conditions. The poorly drained depressions are covered with swamp forest communities while beech-maple and even oak-hickory associations occur on the slightly higher, better drained sites. A spring-fed, sluggish stream meanders across this upland area and a grass-sedge and cat-tail marsh has developed along its course. The herbaceous plants are not very abundant due to extensive grazing by livestock.

Case Farm Woods (C.F.W.) is a floodplain and valley wall woods located along the east shore of the Olentangy River three miles north of Delaware. The rather narrow floodplain is a mixture of an old field habitat and second growth swamp forest. Elm, willow, red maple and poplar are the commonest tree species. The vernal herbaceous flora is very well developed and is replaced as summer advances by dense growths of rank-growing composites. The valley wall is rather heavily wooded and is dissected by a few small, deeply shaded ravines.

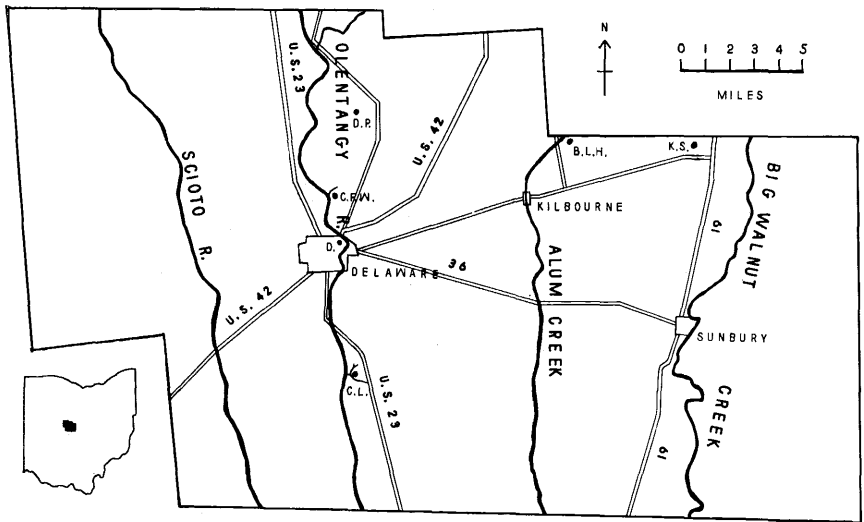


FIGURE 1. Map of Delaware County, Ohio showing location of collecting stations. B. L.H.—Beggan Louse Hill, C.F.W.—Case Farm Woods, C.L.—Camp Lazarus, D.—Delaware, D.P.—Dike Pond, K.S.—Kilbourne Swamp.

Camp Lazarus (C.L.) is a heavily wooded tract of land contained within the boundaries of a Boy Scout Reservation situated five miles south of Delaware between U.S. Route 23 and the Olentangy River. Three types of forest communities cover most of the area depending upon the drainage. Various phases of swamp forest occupy all of the stream valleys and much of the more poorly drained uplands. Beech-maple occurs regularly on the moderately drained uplands and north-facing slopes while oak-hickory is present on the dry bluffs and south-facing slopes. Many wooded ravines cut back into the surrounding uplands. These are moist throughout the year, but contain flowing water only during spring and early summer. All are heavily wooded. Rather high, moist cliffs of shale are exposed along the main west flowing stream and its largest tributary and a small outcrop of limestone is located along the main stream near its confluence with the Olentangy River.

Delaware (D.) is a city of about 11,000 population within which considerable collecting was done along the west shore of the Olentangy River. The stream is narrowly bordered with swamp forest tree species with willows, elm, cottonwood and red maple being the most abundant. At low water stage the river bottom supports dense growths of water willow (*Dianthera americana* L.). The land extending back from the river is generally flat and cultivated or pastured and is a relatively poor habitat for crane-flies. Some light trapping was done near the river in north Delaware.

Dike Pond (D.P.) is a relatively new marsh formed by the damming of a small stream by a dike of the Delaware Dam five miles north of Delaware and about one mile east of the Olentangy River. The central portion of the marsh is covered by a nearly pure stand of cat-tail and a grass-sedge community is well developed around the edges. Dense growths of young willow have invaded the western margin of the area and the whole marsh seems to be rapidly going over to a shrubby swamp stage. Standing water is present only during the spring and early summer.

Kilbourne Swamp (K.S.) is an excellent example of the once extensive upland swamps that were formerly abundant on the flat, poorly drained till plains of central Ohio. The swamp is located approximately twelve miles northeast of Delaware. Water up to a foot in depth covers most of the area during spring and early summer and the substrate is noticeably wet throughout the year. Many rotting logs and stumps litter the floor of the elm-ash-soft maple forest.

CRANE-FLY HABITATS

Throughout the course of the study an attempt was made to correlate crane-fly distribution with the various complexes of plant associations, drainage and topography existing with the county. Field notes on the exact localities of captures were made and information was obtained on the plant associations present in the area along with data on the various physical features of the environment. Since the distribution of the adult flies gives only an approximation of the larval habitat, larvae were taken and rearing data were obtained whenever possible. Preliminary survey seems to indicate the presence of at least eight general crane-fly habitats in the county. These are briefly discussed below.

Beech-Maple Forests

Remnants of this originally extensive climax association are found on well drained sites along the north-facing slopes of the larger streams and on the flat to gently rolling upland till plains. The shrub layer is well developed and fairly rich in species with saplings of sugar maple being the most abundant. The herb stratum is luxuriant only during the spring and early summer, becoming inconspicuous as the tree canopy closes. Fallen logs and partially decayed stumps litter the forest floor and thick accumulations of leaf litter are present. Many species of the crane-fly genus *Tipula* have their larval stages in the moist, friable, well aerated soil beneath the protecting mat of decaying leaves. Other species develop in the many logs and stumps or in the cushions of moss covering them.

Floodplain Swamp Forests

Floodplains along the larger streams support a swamp forest dominated by red maple, white ash and American elm. Deep shade and high humidity combine to make this forest type one of the richest habitats for species of crane-flies in the county. The shrub layer is poorly developed except where the tree canopy has been broken admitting light to the forest floor. The herb layer is also sparsely

developed during the summer, although the vernal flora is very luxuriant and rich in species. During late summer various species of shade-tolerant composites may grow so profusely as to make passage difficult. The continually moist to wet soil is the preferred habitat for the larvae of many species of crane-flies, especially of the genera *Tipula* and *Nephrotoma*.

Upland Swamp Forests

Scattered throughout the county on the flat, poorly drained till plains are areas of densely wooded swamps. The dominant tree species seem to be red maple and American elm with lesser numbers of white ash and swamp white oak. Water collects in shallow depressions, forming vernal pools of varying extent up to a foot or more in depth. Although these pools gradually decrease in extent and depth as summer advances and all open water usually disappears by mid-July, the substrate remains moist throughout the year. The central portion of the swamp floor is an open expanse of decaying leaf litter overlying a black, mucky soil. Many fallen limbs and branches are scattered over the ground and these may be thickly covered by cushions of moss. The drier margins of the vernal pools have well developed shrub and herb layers which provide shelter for the adults of many crane-flies having their larval stages in the wet soil of the swamp.

Oak-Hickory Forests

Oak-hickory is a successional stage that develops on the dry, overly drained bluffs and on south-facing slopes along the larger streams. As the result of intense radiation and excessive evaporation, the soil is dry and unsuitable for most crane-fly larvae. The undergrowth is generally open with little development of a shrub layer. Fallen trees and decaying limbs may be abundant, but are usually too dry for most crane-fly larvae. The herb layer is composed mostly of xeric grasses and sedges along with several species of composites. The ground surface is frequently covered with a dry crust of lichens and mosses. Only a few species of crane-flies were regularly taken in this habitat.

Grass-Sedge Marshes

Small areas of herbaceous marsh dominated by various species of grasses and sedges are found in open areas on very poorly drained soil. Standing water may be present during spring and early summer and the substrate is permanently moist. The dense expanses of grass and sedge clumps form an excellent habitat for several species of marsh-loving crane-flies. Many larvae are found in the wet mud and silt of the marsh area.

Cat-tail Marshes

Only scattered fragments of this marsh type are found in the county on poorly drained soil along sluggish streams. Once it invades an area cat-tail may form nearly pure stands of considerable extent. Locally, this type of marsh is less productive of large numbers of crane-flies than are the more abundant grass-sedge marshes. Many species may enter the cat-tail for shelter as adults, but have their larval stages elsewhere.

Wet, Shaded Cliffs

Along the larger streams are occasional exposures of the underlying bedrock; shales in the eastern half of county, limestones in the western part. Frequently the water table is intersected along these exposures and a more or less continual trickle of water flows over the rock surfaces. Various species of lichens, liverworts and mosses become established on the moist substrate and provide food and shelter for the larvae of several small species of crane-flies.

Rivers and Streams

This habitat includes all actively flowing water confined within a definite channel as opposed to marshy areas where flowing water is absent or of an intermittent nature. The shallow water of the larger streams supports dense stands of water willow that seems to be the preferred habitat of a few species of crane-flies. Larvae of many other species are found in the stream beneath accumulations of leaf litter, under rocks, in mats of algae or in the silt and mud of the stream bed.

ANNOTATED LIST

For each species in the annotated list a very brief summary of its abundance and habitat distribution is given along with the months and stations (abbreviated) in which adults were collected. Notes on biology, immature stages, distribution and taxonomic placement are added for certain species. The systematic position of families and genera follows closely the arrangement presented by Alexander in his very useful manual on the crane-flies of Connecticut (Alexander, 1942).

PTYCHOPTERIDAE

1. *Ptychoptera rufocincta* O.S.
Restricted to, but uncommon in, shaded grass-sedge marshes. Late May, early June. B.L.H.
2. *Bittacomorpha clavipes* (Fabr.)
Fairly common in shaded marshes and along sluggish streams. May, August, B.L.H., C.L.

TRICHOCERIDAE

3. *Trichocera fernaldi* Alex.
Common to abundant in woodlands during warm fall and winter days. October, November, December. B.L.H., C.L. Mating swarms over rotting logs and stumps.
4. *Trichocera garreti* Alex.
Uncommon in moist woodlands during warm fall and winter days. November, December. C.L.
5. *Trichocera saltator* (Harris)
Common to very abundant in woodlands, open fields and around piles of decaying organic matter. September, October, November, December, January. B.L.H., C.L., C.F.W.

ANISOPODIDAE

6. *Anisopus alternatus* (Say)
1 ♂ from shaded ravine of small woodland stream. April 8, 1952. C.F.W.
7. *Anisopus marginatus* (Say)
Common to occasionally abundant in moist, deeply shaded ravines. Late April, early May. C.F.W., C.L.

TIPULIDAE

8. *Dolichopeza (Dolichopeza) americana* Needham
3 ♂♂, 1 ♀ from moist, shaded ravines. Late May. C.L.
9. *Dolichopeza (Oropeza) carolus* Alex.
Fairly common in moist woodland ravines and on wet cliff faces. Late June. B.L.H., C.L.
10. *Dolichopeza (O.) polita* (Johnson)
1 ♂ from small woodland ravine. June 14, 1951. C.F.W.
11. *Dolichopeza (O.) sayi* (Johnson)
2 ♂♂ from moist upland woods. June 13, 1955. B.L.H.

12. *Dolichopeza (O.) tridenticulata* Alex.
Common to locally abundant in moist woodland ravines and around rotting logs and stumps. Late May, early June. C.F.W., C.L. Larvae taken February 9, 1952 from thin carpet of moss covering sodden, well-decayed elm logs lying on forest floor at Kilbourne Swamp. Adults emerged March 8 to 16.
13. *Dolichopeza (O.) walleyi* (Alex.)
1 ♂ from moist ravine. June 14, 1951. B.L.H.
14. *Ctenophora nubecula* (O.S.)
1 ♂ reared from larva taken on February 25, 1951 in fallen willow branch along Olentangy River in Delaware. Emergence on April 8.
15. *Prioncera fuscipennis* (Loew)
Fairly common in grass-sedge and cat-tail marshes. Late May. D.
16. *Nephrotoma eucera* (Loew)
2 ♂♂ from margin of wooded swamp. June 15, 1951. K.S.
17. *Neophrotoma euceroides* Alex.
Common to abundant in wet woodlands; less abundant along marshy streams. April, May. B.L.H., C.L.
18. *Nephrotoma ferruginea* (Fabr.)
Common to abundant in open woodlands, along rivers and in wet pastures; less common in drier situations. May, June, October. B.L.H., C.L., D., D.P. Many light trap records on warm, humid nights.
19. *Nephrotoma incurva* (Loew)
1 ♂ from grass-sedge marsh. June 13, 1951. D.
20. *Nephrotoma macrocera* (Say)
2 ♂♂ from shaded shores of Olentangy River. May 29, August 15, 1951. D.
21. *Nephrotoma polymera* (Loew)
2 ♂♂ from floodplain forest. Late May. C.L.
22. *Nephrotoma virescens* (Loew)
1 ♂, 1 ♀ from moist to wet upland elm-ash-maple forest. June, September, 1950. C.L.
23. *Tipula (Trichotipula) orepesoides* Johnson
Fairly common around shaded hillside seepage areas; less common in floodplain woods. Late May. B.L.H., C.L.
24. *Tipula (T.) unifasciata* (Loew)
2 ♂♂ from margins of small woodland stream. September 4, 1950. C.L.
25. *Tipula (Nobilotipula) collaris* Say
Fairly common around grassy hillside seepage areas. Late April, early May. B.L.H.
26. *Tipula (Nippotipula) abdominalis* (Say)
1 ♂ (dead) in spider web beneath culvert over a small stream. October 4, 1950. C.L. Larvae abundant in leaf-filled streams of Camp Lazarus.
27. *Tipula (Vestiplex) longiventris* Loew
Fairly common in beech-maple forests; rare to absent in other forest types. Early June. B.L.H., C.L.
28. *Tipula (Yamatotipula) caloptera* Loew
Common along rivers and larger streams; rare to absent along small brooks. May, September. C.F.W., C.L., D.
29. *Tipula (Y.) concava* Alex.
Common to abundant along rivers and streams of all sizes; rare in marshes. May, June, August, September. B.L.H., C.F.W., C.L., D.
30. *Tipula (Y.) dejecta* Walker
Abundant in open grass-sedge marshes and along sluggish streams; absent in heavily shaded swamps. Late April, early May. B.L.H., C.F.W., C.L., D., D.P.
31. *Tipula (Y.) furca* Walker
Common, occasionally abundant, along rivers and streams; less numerous in grass-sedge marshes; absent in wooded swamps. May, September. B.L.H., C.F.W., C.L., D., D.P.

32. *Tipula (Y.) jacobus* Alex.

1 ♂ from margin of heavily wooded swamp. June 15, 1951. K.S.

33. *Tipula (Y.) noveboracensis* Alex.

Few specimens from grassy margins of streams. Early to mid-May. B.L.H., C.L. Known range hereby extended about 100 miles southwestward from previous records in New England, New York, Michigan and eastern Canada. Adults later reared from larvae collected December 10, 1954 in small creek near Ithaca, New York. Adults emerged February 11, 1955.

34. *Tipula (Y.) sayi* Alex.

Common on grassy shores of rivers and streams. Late August, early September. B.L.H., C.L., D.

35. *Tipula (Y.) strepens* Loew

Fairly common in spring-fed grass-sedge marshes. Late May. B.L.H.

36. *Tipula (Y.) tephrocephala* Loew

1 ♂ from pastured, wet upland woods. June 4, 1950. B.L.H.

37. *Tipula (Y.) tricolor* Fabr.

Abundant in grass-sedge marshes; common along marshy streams and in open swamp woods. Late May. B.L.H., D. P.

38. *Tipula (Tipula) cunctans* Say

Abundant along marshy woodland streams; common in open grass-sedge marshes; rare to absent in drier situations. October. B.L.H., C.F.W., C.L., D.P.

39. *Tipula (T.) ultima* Alex.

Abundant in wet to mesic woodlands; common in grass-sedge marshes and along rivers; rare in dry woods. September, October. B.L.H., C.F.W., C.L., D.P.

40. *Tipula (Oreomyza) borealis* Walker

Common to locally abundant in open elm-ash-maple woods; rare to absent in better drained woodlands. Early September. B.L.H., C.L.

41. *Tipula (O.) fragilis* Loew

Fairly common in floodplain woods; less numerous in beech-maple forests; rare to absent in drier woodlands. Early October. B.L.H., C.L. Adults typically found flying up and down tree trunks a few inches from the bark.

42. *Tipula (O.) ignobilis* Loew

Few specimens from vicinity of limestone outcrop bordering small woodland stream. June 7, 1952. C.L.

43. *Tipula (O.) entomophthorae* Alex.

1 ♂ from elm-ash-maple floodplain woods. June 9, 1951. C.L.

44. *Tipula (O.) trivittata* Say

Few specimens from moist to mesic woodlands. May, early June. B.L.H., C.L. Larvae common under loose bark of well-decayed logs during winter and spring. Pupal period lasts eight to ten days.

45. *Tipula (Schummelia) hermannia* Alex.

Fairly common in beech-maple forest; less numerous in poorly drained elm-ash-maple woods; very rare to absent in dry woodlands. Late May, early June. B.L.H., C.L.

46. *Tipula (Lunatipula) bicornis* Forbes

Common to locally abundant in open grass-sedge marshes, poorly drained woods and along sluggish woodland streams; less numerous in densely wooded swamps; rare to absent in beech-maple and oak-hickory forests. May, early June. B.L.H., C.F.W., C.L., D., K. S.

47. *Tipula (L.) johnsoniana* Alex.

Several ♂♂ from elm-ash-maple floodplain woods. Late June. C.L.

48. *Tipula (L.) morrisoni* Alex.

Fairly common in wet upland woods. June. B.L.H.

49. *Tipula (L.) dorsimacula* Walker

1 ♂ from moist floodplain woods. April 27, 1951. C.L.

50. *Tipula (L.) duplex* Walker

1 ♀ from wet, upland pastured woods. September 1, 1950. B.L.H.

51. *Tipula (L.) flavoumbrosa* Alex.
Few specimens from elm-ash-maple floodplain woods. Early June. C.L.
52. *Tipula (L.) fuliginosa* (Say)
Common, occasionally abundant, within herb stratum of beech-maple forests; less numerous in both drier and wetter woodlands. Late May, early June. C.L.
53. *Tipula (L.) submaculata* Loew
Few ♂♂ from open floodplain woods. Late May, early June. B.L.H., C.L.
54. *Tipula (L.) submaculata-mallochi* intergrades
Common, occasionally abundant, in wet upland woods, less numerous in mesic forests. May, June. B.L.H., C.L. Hypogyial characters show that the Delaware County material is intermediate between the two recognized species.
55. *Tipula (L.) triplex* Walker
Common to locally abundant in wet elm-ash-maple woods; less numerous in open grass-sedge and cat-tail marshes. May, early June. B.L.H., C.L., D.P., K.S.
56. *Tipula (L.) triton* Alex.
1 ♂ near open grass-sedge-cat-tail marsh. May 25, 1952. B.L.H.
57. *Limonia (Limonia) fallax* (Johnson)
Uncommon and local along wooded margins of small streams. May, June. B.L.H., C.L., K.S.
58. *Limonia (L.) fusca* Meigen
1 ♂ from wet face of shaded shale cliff. May 29, 1951. C.L.
59. *Limonia (L.) indigena* O.S.
Uncommon and local in mesic woodlands. Early May. B.L.H., C.L. All specimens taken on trunks of standing trees.
60. *Limonia (L.) rara* (O.S.)
Several specimens taken from interior of hollow logs lying in floodplain woods. September, October. B.L.H., C.L. Few ♀♀ attracted to light.
61. *Limonia (L.) triocellata* (O.S.)
Typical of, but uncommon in, more open beech-maple forests. May, September, October. B.L.H., C.F.W., C.L.
62. *Limonia (L.) tristigma* (O.S.)
2 ♂♂ from margins of heavily wooded swamp. June 15, 1950, August 12, 1951. K.S.
63. *Limonia (Discobola) annulata* (Linn.)
Fairly common in hollow logs and in similar protected situations; occasional on tree trunks in wet mesic woodlands. May, June, September, October. B.L.H., C.L.
64. *Limonia (Dicranomyia) divisa* Alex.
Common to abundant in variety of habitats as grass-sedge and cat-tail marshes, wet elm-ash-maple woods, and mesic beech-maple forests; especially numerous in shaded woodland ravines having moist to wet banks. April, May, August, September, October. B.L.H., C.F.W., C.L., D., D.P., K.S. Many light records for both sexes.
65. *Limonia (D.) gladiator* (O.S.)
Uncommon in wet woodlands and in grass-sedge marshes. September, October. B.L.H., C.L.
66. *Limonia (D.) haeretica* O.S.
Several light trap records on warm, humid nights. October. D.
67. *Limonia (D.) humidicola* (O.S.)
Abundant at limestone outcrop in Camp Lazarus; common, occasionally abundant, along wet to moist banks of woodland ravines. April, May, June, September, October. B.L.H., C.L. Larvae numerous in wet moss and liverwort mats growing on moist shale and limestone cliffs.
68. *Limonia (D.) immodesta* (O.S.)
Fairly common in poorly drained floodplain forests; occasional in moist, shaded ravines. October. B.L.H., C.L., K.S.

69. *Limonia (D.) iowensis* (Rogers)

Common in poorly drained floodplain woods having rich undergrowth; fairly common in grass-sedge and cat-tail marshes; less common in better drained woodlands. May, September, October. B.L.H., C.F.W., C.L., D., D.P.

70. *Limonia (D.) liberta* (O.S.)

Common in moist floodplain woods and around hillside seepage areas; rare to absent in mesic woodlands. Late April, May, June, September, October. B.L.H., C.F.W., C.L.

71. *Limonia (D.) longipennis* (Schummel)

Fairly common in open grass-sedge and cat-tail marshes. Mid-May. D.P. Several light trap records on warm, humid nights.

72. *Limonia (D.) pudica* (O.S.)

Fairly common in poorly drained woodlands; less numerous in open marshes, unshaded ravines and along streams. Mid-May, early June. B.L.H., C.L., D., D.P.

73. *Limonia (D.) stulta* (O.S.)

Occasionally abundant on wet face of limestone outcrop in Camp Lazarus; not taken elsewhere. May, early June.

74. *Limonia (Rhipidia) domestica* (O.S.)

Common to abundant in wet floodplain woods; less numerous in beech-maple forests; rare in dry woodlands and in open marshes. May, June, September, October. B.L.H., C.F.W., C.L.

75. *Limonia (R.) fidelis* (O.S.)

Uncommon in moist and mesic woodlands having many fallen logs and stumps; rare to absent in drier situations. May, early June. B.L.H., C.L., K.S. Larvae taken November 15, 1951 from wet, decaying heartwood of standing beech trees. Adults emerged December 27. Larvae also found under loose bark of decaying elm logs and in moist, powdery material under bark of white oak stumps.

76. *Limonia (R.) maculata* (Meigen)

Uncommon in moist elm-ash-maple forests; very rare to absent elsewhere. Late May, October. B.L.H., C.L.

77. *Limonia (G.) canadensis* (Westwood)

Common, occasionally abundant, on wet shale and limestone cliffs and banks; rare elsewhere in moist woods. Late April, May, September, early October. B.L.H., C.F.W., C.L. Several specimens of both sexes taken on expanded flowers of white snake root (*Eupatorium album* L.)

78. *Limonia (G.) rostrata* (Say)

1 ♂ from open grass-sedge-cat-tail marsh. May 25, 1952. B.L.H.

79. *Helius flavipes* (Macquart)

Common, occasionally abundant, in unshaded grass-sedge and cat-tail marshes; less numerous in shaded marshy areas along sluggish streams; absent in wooded swamps. May, early June. B.L.H., D., D.P.

80. *Dicranoptycha megaphallus* Alex.

1 ♂ from margin of heavily wooded swamp. June 15, 1952. K.S.

81. *Dicranoptycha septemtrionis* Alex.

3 ♂♂ from beech-maple forest. October 9, 1952. C.L.

82. *Ula elegans* O.S.

1 ♂ from herb stratum of upland beech-maple forest. October 9, 1951. C.L.

83. *Pedicia (Pedicia) albivitta* Walker

Uncommon and apparently restricted to margins of rapidly flowing woodland streams. September, October. B.L.H., C.L.

84. *Pedicia (Tricyphona) inconstans* (O.S.)

Common to abundant in open grass-sedge marshes and along grassy margins of sluggish woodland streams; rare to absent in wooded swamps. May, September, October. B.L.H., C.L., D., D.P.

85. *Dicranota (Amalopina) flaveola* (O.S.)

Uncommon in moist, shaded woodland ravines; not taken elsewhere. Late September. B.L.H., C.L.

86. *Dicranota (Rhapidolabis) forceps* (Alex.)
Uncommon and apparently restricted to moist woodland ravines. May, September. B.L.H., C.L.
87. *Oxydiscus minutus* (Alex.)
Common to locally abundant on moist, shaded cliffs and banks along woodland ravines. Mid-May. B.L.H., C.L.
88. *Epiphragma fascipennis* (Say)
Common in floodplain woods and in wooded swamps; occasional in beech-maple forests. May. B.L.H., C.L., K.S.
89. *Epiphragma solatrix* (O.S.)
Fairly common in wooded swamps and in wet floodplain woods; less numerous to absent in drier woodlands. May, June, late August, September. B.L.H., C.L., K.S.
90. *Dactylolabis cubitalis* (O.S.)
Locally very abundant in herb layer of floodplain woods; rare to absent in beech-maple and oak-hickory communities. Mid to late May. C.L.
91. *Dactylolabis hudsonica* Alex.
1 ♀ taken on wet face of limestone exposure. May 3, 1951. C.L.
92. *Dactylolabis montana* (O.S.)
Common, occasionally very abundant, around limestone outcrop in Camp Lazarus. Late April, May. Larvae and pupae collected in wet mosses and liverworts growing on outcrop.
93. *Prolimmophila areolata* (O.S.)
1 ♂ from floodplain woods bordering small stream. May 28, 1951. C.L.
94. *Austrolimmophila toxoneura* (O.S.)
Fairly common in wooded swamps and in moist floodplain woods; rare to absent in drier woodlands. Late May, early June. B.L.H., C.F.W., C.L., K.S.
95. *Psuedolimmophila contempta* (O.S.)
Common in moist floodplain woods and around shaded hillside seepage areas; uncommon in beech-maple forests; rare in oak-hickory woodlands. May, June, late August, September. B.L.H., C.L.
96. *Psuedolimmophila luteipennis* (O.S.)
Common in grass-sedge marshes and in more open swamps; less common in poorly drained floodplain woods; rare in beech-maple forests. May, early June, September, October. B.L.H., C.L., D.P., K.S.
97. *Limnophila (Lasiomastix) macrocera* (Say)
3 ♂♂, 1 ♀ from open grass-sedge marshes. Late May, early June. C.L., D.P.
98. *Limnophila (L.) subtenuicornis* (Alex.)
Uncommon along grassy margins of partially shaded, sluggish, woodland streams. Late April, May. B.L.H., C.L.
99. *Limnophila (Dicranophragma) fuscovaria* O.S.
Fairly common in wooded swamps and along sluggish woodland streams; rare elsewhere. May, June. B.L.H., C.L., K.S.
100. *Limnophila (Idiolimmophila) emmelina* Alex.
1 ♂ from moist woodland ravine. May 15, 1952. C.L.
101. *Limnophila (Prionolabis) rufibasis* O.S.
2 ♂♂ from grassy margins of sluggish stream in floodplain woods. May 12, 1952. C.L.
102. *Limnophila (P.) walleyi* Alex.
2 ♂♂, 1 ♀ from floodplain woods. May 13, 1951. B.L.H.
103. *Limnophila (Phylidorea) auripennis* Alex.
Few specimens from grassy margins of sluggish streams in floodplain and wet upland woods. Late May. B.L.H.
104. *Limnophila (P.) fratria* (O.S.)
1 ♂ from wet upland elm-ash-maple woods. May 6, 1951. B.L.H.
105. *Limnophila (P.) subcostata* (Alex.)
1 ♂ from wet floodplain woods. May 29, 1951. C.L.

106. *Limnophila (Limnophila) brevifurca* O.S.

Common in herb stratum of floodplain woods, especially near streams and around seepage areas; uncommon in partially shaded and open marshes. May. B.L.H., C.F.W., C.L.

107. *Limnophila (L.) niveitarsis* O.S.

Locally common in shaded ravines and in herb layer of moist elm-ash-maple woods. May, early June. C.L.

108. *Shannomyia lenta* (O.S.)

Common in moist floodplain woods; less numerous in upland elm-ash-maple and beech-maple forests; occasional in dry oak-hickory woodlands. May, June, September, October. B.L.H., C.L.

109. *Pilaria imbecilla* (O.S.)

Occasional in floodplain woods. Late May, early June. B.L.H., C.L.

110. *Pilaria quadrata* (O.S.)

Occasional to fairly common in wet floodplain and upland woods; rare to absent in drier woodlands. May. B.L.H.

111. *Pilaria recondita* (O.S.)

1 ♂, 1 ♀ from floodplain woods. May 13, 1950, May 29, 1951. C.L.

112. *Pilaria tenuipes* (Say)

Frequently abundant along woodland streams; common in floodplain woods; infrequent to rare in mesic woodlands. May, June, August, September, October. B.L.H., C.F.W., C.L., K.S.

113. *Pilaria* sp.

2 ♂♂ from moist floodplain woods. May 15 and June 6, 1951. C.L. These specimens apparently differ from all described species.

114. *Ulomorpha pilosella* (O.S.)

3 ♂♂ from moist elm-ash-maple woods. Late May, early June. B.L.H., C.L.

115. *Hexatoma (Hexatoma) megacera* (O.S.)

Few specimens from rich vegetation bordering partially shaded woodland streams. Late April. C.F.W.

116. *Hexatoma (Eriocera) brachycera* (O.S.)

1 ♂ in spider web on vegetation along woodland stream. June 21, 1952. C.L.

117. *Hexatoma (E.) brevioricornis* Alex

2 ♀♀ reared from larvae collected in saturated soil bordering a small woodland pool at Camp Lazarus. Adults emerged May 15 and 18, 1952.

118. *Hexatoma (E.) fuliginosa* (O.S.)

5 ♂♂ from shaded margins of sluggish woodland streams. Late May. B.L.H.

119. *Hexatoma (E.) longicornis* (Walker)

Locally common along grassy margins of larger, fairly fast flowing streams, especially in wooded areas. Late April, May. B.L.H., C.F.W., C.L.

120. *Hexatoma (E.) wilsoni* (O.S.)

Locally abundant in open grass-sedge marshes; common along partially shaded sluggish streams; occasional around margins of wooded swamps. May, June. B.L.H., C.F.W., C.L., K.S. First Ohio record for this rather rare species.

121. *Elephantomyia westwoodi* O.S.

1 ♂, 1 ♀ from margins of dry, vernal ponds in upland woods. June 18, 1952. B.L.H.

122. *Cladura flavoferruginea* O.S.

Very abundant in elm-ash-maple and beech-maple forests; common in more mesic areas of oak-hickory woods; infrequent in drier woodlands. Late September, October. B.L.H., C.F.W., C.L., K.S.

123. *Neolimnophila ultima* (O.S.)

Common, occasionally abundant, in floodplain woods near seepage areas and along margins of sluggish streams; less numerous in beech-maple forests and in open marshes. Late April, September, October. B.L.H., C.L., D.P.

124. *Gnophomyia tristissima* O.S.

Locally numerous in moist floodplain woods; rare elsewhere in mesic to dry woodlands.

May, September. B.L.H., C.L. Many larvae collected from moist inner bark of recently fallen elm tree during April. Adults emerged one month later.

125. *Teucholabis immaculata* Alex.

2 ♂♂ from margin of upland swamp. May 15, June 6, 1951. K.S. Larvae collected in wet, powdery decayed heartwood of beech tree in Camp Lazarus on November 15, 1951. Adults emerged January 16 and 24, 1952.

126. *Gonomyia (Lipophleps) sulphurella* O.S.

Uncommon along grassy margins of small streams and rivers; rare in open marshes. Late May. C.L., D., D.P.

127. *Gonomyia (Gonomyia) currani* Alex.

1 ♂ from wooded margins of small stream. May 28, 1952. C.L.

128. *Gonomyia (G.) subcinerea* O.S.

Common in floodplain woods and in beech-maple forests having heavy undergrowth; especially numerous in moist ravines and along woodland streams. May, June, September, October. B.L.H., C.L., K.S.

129. *Erioptera (Gonempeda) nyctops* Alex.

2 ♂♂, 2 ♀♀ from moist, shaded ravines. May, early June. C.L.

130. *Erioptera (Symplecta) cana* (Walker)

Common and widespread; numerous records from open marshes, floodplain woods, wooded swamps and moist ravines; less abundant in drier woodlands. Late March, April, May, September. B.L.H., C.F.W., C.L., D.P., K.S.

131. *Erioptera (E.) chlorophylloides* Alex.

1 ♂ from partially shaded grass-sedge marsh. June 8, 1952. B.L.H.

132. *Erioptera (E.) septentrionis* O.S.

Fairly common in floodplain woods and in moist, shaded ravines; occasional in grass-sedge marshes. May, October. B.L.H., C.L., D.

133. *Erioptera (E.) straminea* O.S.

Rare and local in partially shaded grass-sedge marshes. June. B.L.H.

134. *Erioptera (E.) vespertina* O.S.

1 ♂, 1 ♀ from open grass-sedge seepage area. Late May. D.

135. *Erioptera (Mesocyphona) caloptera* Say

Common and widespread; abundant in floodplain woods, moist ravines and along woodland streams; common in both open and shaded marshes and in wooded swamps; less numerous in beech-maple forests; rare in oak-hickory woodlands. May, June, August, September. B.L.H., C.F.W., C.L., D., D.P., K.S.

136. *Erioptera (M.) needhami* Alex.

1 ♂ from shaded grass-sedge marsh. June 19, 1952. B.L.H.

137. *Erioptera (M.) parva* O.S.

Few specimens from open grass-sedge marshes. Late May. D., D.P.

138. *Erioptera (Hoplolabis) armata* O.S.

Fairly common along woodland streams and in moist, shaded ravines. April, May. B.L.H., C.F.W., C.L.

139. *Erioptera (Ilisia) venusta* O.S.

Common in grass-sedge marshes and along sluggish streams; less numerous in drier woodlands. May. B.L.H., C.L., D., D.P.

140. *Ormosia bilineata* Dietz

Common, occasionally abundant, in moist, shaded ravines and on wet faces of shale cliffs and banks. Late April, May. B.L.H., C.L.

141. *Ormosia carolinensis* Alex.

Typical of, and frequently abundant in, moist woodland ravines; rare elsewhere in wooded situations. April, May. B.L.H., C.L.

142. *Ormosia frisoni* Alex.

Abundant in moist, wooded ravines and about rotting logs in floodplain woods. Late April, May. B.L.H., C.L. Mating swarms over logs, stumps and in ravines.

143. *Ormosia holotrichia* (O.S.)

3 ♂♂ from moist, shaded ravines. October 19, 1951. C.L.

4. *14Ormosia ingloria* Alex.

Fairly common in moist, shaded ravines and on wet faces of shale banks. September, October. B.L.H., C.L.

145. *Ormosia meigenii* (O.S.)

3 ♂ from seepage area at foot of wooded slope. May 6, 1951. B.L.H.

146. *Ormosia nubila* (O.S.)

Abundant in moist, shaded ravines; common around decaying logs in floodplain woods; less numerous in beech-maple forests. Late April, May, September. B.L.H., C.L.

147. *Ormosia pygmaea* (Alex.)

Fairly common in moist, wooded ravines. May, September, October. B.L.H., C.L.

148. *Ormosia rubella* (O.S.)

Abundant in moist, shaded ravines; common in floodplain woods, less frequent in beech-maple forests. September, October. B.L.H., C.L., K.S.

149. *Molophilus cramptoni* Alex.

1 ♂ from moist, wooded ravines. June 15, 1952. B.L.H.

150. *Molophilus forcipulus* (O.S.)

1 ♂, 1 ♀ from wooded swamp. June 15, 1951. K.S.

151. *Molophilus hirtipennis* (O.S.)

Females fairly common in floodplain woods and in shaded ravines; less numerous in beech-maple forests. Late May, June. B.L.H., C.L. Males not collected.

152. *Molophilus pubipennis* (O.S.)

Several ♀ from floodplain woods and upland swamps. Late May, early June. B.L.H., C.L., K.S.

153. *Molophilus quadrispinosus* Alex.

1 ♂ from vegetation bordering woodland stream. May 12, 1952. C.L.

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