

RECORDS OF INDIANA DRAGONFLIES, III. 1927-1928.

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During the years 1927-1928, about 3,040 specimens of dragonflies, representing 74 species were collected in Indiana. Although most of these have been collected by Mr. E. B. Williamson and the writer, one or both of whom were on almost every collecting trip contributing to this collection, many others have assisted; J. H. Williamson, Lloyd Cowens and Paul Cook accompanied Mr. Williamson frequently and made many captures; Robert F. Sazama, John Warrick Emerson, J. Byers Hunley, Robert W. Montgomery, Boner and Esther Barrett have each aided me on one or more collecting trips and Mr. Sazama made several excursions alone.

New county records, captures of rare species and notes on certain habitats and associations are recorded here. Field notes, which have been copied without change, are placed within quotation marks and are followed by the initials "E. W. B." or "B. E. M.", indicating whether Mr. Williamson or the writer made the observations.

Vanemon Swamp, near Bluffton, Wells County, has been under observation by Mr. Williamson for many years; the condition of the swamp, changes from year to year, and the dragonfly fauna have been noted in previous papers (1921), (1925), (1927). Mr. Williamson, accompanied by J. H. Williamson and Harry Dietz, visited the swamp June 9, 1927, and made the following notes.

"Visited Vanemon Swamp about 8:30-11:30 a. m. Day bright and warm—favorable. *Lestes* spp. (teneral, in great numbers), *Ischnura verticalis*, *I. posita*, *Agrion maculatum* (two females in brush, doubtless strays); *Erythemis simplicicollis*, *Pachydiplax longipennis*. *Leucorhinnia intacta*, numerous; *Libellula pulchella*, rarer; several male *Epiäeschna heros* soaring high over swamp (20-30 feet). *Tetragoneuria*, one male seen for a few beats back and forth, then disappeared and did not see again; doubtless a stray. Visited nearest gravel pit (McCleery's) and J. H. W. caught two *Tetragoneurias* (*cynosura* and *simulans*. B. E. M.) there. At Vanemon Swamp no *Tramea*, *Anax*, *Aeshna* or *Enallagma* seen. Water very high, many turtles and a few large frogs. Spatterdock greatly increased in area since 1926—due doubtless to several wet seasons it seems greatly on increase. Prothonotary warblers (at least two pairs) noticed for first time at swamp. Today is first record of a Corduline at the swamp—a *Tetragoneuria*, probably one with reduced black at wing base. At McCleery's pit saw *Tetragoneuria*, *Libellula luctuosa*, *L. pulchella*, *Tramea lacerata*, *Platthemis lydia*, *Ischnura verticalis*, *Enallagma antennatum*, and *E. civile*, (other species may have been there as we were at pit only a few minutes)."

I visited the swamp September 9, 1928. *Lestes congener*, males abundant, a few females; *L. rectangularis*, *L. unguiculatus* present in small numbers; *Ischnura posita*, *Anomalagrion hastatum*, one female of each; *Sympetrum rubicundulum*, common. Water was rather low, margin muddy.

J. Byers Hunley and the writer visited a water supply reservoir, near Oakland City, July 29, 1928. This reservoir which was constructed two years ago covers an area of 25 acres. The margin is very irregular and low hills surround the water on all sides except the south. Vegetation is sparse and low on the hill sides except for a few thickets of brambles. The shores are bare clay or rocky; a few small clumps of cattails were noted. Collecting was done on the north and west sides only. An attempt was made to secure all the species occurring and representatives of all seen, except *Epicordulia princeps*, were taken. *Enallagma civile* were rather numerous, *Ischnura verticalis* common, *Epicordulia princeps* were patrolling the shores; *Libellula luctuosa* was very common, many teneral; many *Perithemis tenera*, males and females, were taken on the hill sides back from the water, males were seen over the water; a female each of *Erythemis simplicicollis* and *Sympetrum vicinum* seen and captured; a few *Pachydiplax longipennis*, many *Celithemis elisa*, a few *C. eponina*; two very teneral *Tramea lacerata* were captured.

In former notes (1925), (1927), I have recorded captures at a body of water, which I called "Lotus Pond," near Decker, Knox County. This pond covers some seven or eight acres; it is located in a region of sandy soil. Except for a narrow strip in the center, extending the full length of the pond, and a shallow area at the south and separated from the remainder of the pond by a fence, there is a thick growth of water smartweed. Nelumbo plants are common, especially near the open water in the center of the pond. During July and August the greatest depth of water found during the four years that I have visited the pond was not more than thirty inches and most of the area filled with vegetation was covered with less than 10 inches of water. In April I have found the water about 10 to 12 inches higher and in very dry seasons about half of the area may be free from water. The east side of the pond is bordered with trees, chiefly willow. The field containing the pond is sometimes pastured but animals do not seem to invade the pond itself to any great extent; the shallow area at the south end is part of a barn lot. The water is very rich in invertebrate life; fish or other aquatic vertebrates have not been noted, although a careful search was never made. Twenty-two species have been recorded from this pond.

Lestes eurinus, *L. forcipatus*, *L. rectangularis*, *L. unguiculatus*, *Enallagma aspersum*, *E. civile*, *E. geminatum*, *E. hageni*, *E. signatum*, *Nehalennia irene*, *Ischnura posita*, *I. verticalis*, *Anomalagrion hastatum*, *Anax junius*, *Libellula luctuosa*, *L. pulchella*, *Plathemis lydia*, *Erythemis simplicicollis*, *Sympetrum vicinum*, *Pachydiplax longipennis*, *Tramea carolina*, *T. lacerata*, *T. onusta*.

Not all of these have been taken at one time; many of them have

been taken only once. This list is not at all complete and continued collecting will likely disclose several other species in favorable seasons, but this gives an idea of the species able to perpetuate themselves in an area under cultivation. *I. posita* and *P. longipennis* were the dominant species, both present literally by the thousands, but the latter was the more conspicuous. Many *E. simplicicollis* were present at all times during the summer of 1928, teneral resting in the vegetation, females ovipositing in the open water or in small pools of water contained in the center depression on the upper surface of Nelumbo leaves, males dashing at *P. longipennis* or, by twos, executing the peculiar evolutions described by Williamson (1899). Several individuals of *A. junius* were always seen, soaring over the pond at varying heights. The vegetation was usually filled with *I. posita*, *I. verticalis* and *Lestes* spp.; *A. hastatum* was sometimes associated with these. One or more species of Enallagma were usually found over or at the margin of open water, but individuals of this genus have not been numerous here at any time during the period of observation. *L. pulchella*, *L. luctuosa*, and *P. lydia* were common, especially near the south end of the pond; an individual seen here in 1924 was determined as *Libellula incesta* by S. W. Bromley and the writer, but no capture was made. *T. lacerata* has been present each year, at times in considerable numbers; *T. carolina* and *T. onusta* have been taken—one record for each.

Foot's Lake is a body of water about two miles long and 100-300 yards wide, in Gibson County, three miles from the Wabash River. At times of high water in the lower Wabash Valley this lake is reached by the overflow water; there is said to be a decided current in the lake at such times. One side of the lake is bordered by wooded "bottom-land" and brush grows to the water margin; the other shore is bordered, partly by cultivated fields separated from the lake by a narrow margin of trees and partly by high hills, wooded and somewhat rocky, rising directly from the lake. The bottom of the lake at the foot of the hills is rocky; at this point the water is quite deep (20 feet or more) but in other parts of the lake the depth is considerably less. Spatterdock beds are extensive.

Macromia taeniolata has been found here every year since 1924; *Nasiaeschna pentacantha* has been observed a number of times; *Dromogomphus spoliatus* is rather common at the foot of the hills; *Agria apicalis* and *A. tibialis* have been taken at the same place; *Gomphus submedianus* has been collected at the lake on three occasions and seen at other times. Other species, as follows, have been taken.

Lestes rectangularis, *Enallagma civile*, *E. exsulans*, *E. vesperum*, *E. signatum*, *E. traviatum*, *Ischnura posita*, *I. verticalis*, *Epicordulia princeps*, *Libellula incesta*, *L. luctuosa*, *L. pulchella*, *Plathemis lydia*, *Perithemis tenera*, *Erythemis simplicicollis*, *Pachydiplax longipennis*.

Byers (1928) has shown that dragonflies which are destroyed by automobiles are members of the strong-flying groups of "wanderers." Three species, all of this type, in the present collection were taken by this most modern insect collector; an *Anax junius* was taken when it flew or was carried by air currents into a car, a female *Epiaeschna*

heros alighted on the hood of a car in motion and remained until secured as noted below, a female *Pantala hymenaea* was secured from the radiator of a car and another of the same species was found dead in a car after a long drive.

Several species of dragonflies were represented in a small collection of insects which the writer saw at Benjamin Bosse High School, Evansville; these were said to have been collected at a small pond in Evansville during the summer of 1926 by Georgine Koser. Records from this collection are indicated by the initials "B. B. H. S."

The order and numbers used in Williamson's list (1917) are followed here.

3. *Agrion maculatum* Beauvois. Captured at several creeks in Knox Co., during July and August, 1928. A male taken July 21, is the smallest of this species which I have seen (abd. 32 mm., f. w. 25 mm., r. w. 24.5 mm.). Vanderburg Co. (B. B. H. S.)

4. *Hetaerina americana* Fabricius. Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; along Wabash River and creeks in Gibson and Posey counties, July and Aug., 1927; Wabash River and creeks in Knox Co., July and Aug., 1928; pond, three miles south of Pimento, Vigo Co., July 15, 1928.

6. *Lestes congener* Hagen. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927; Cedar Lake, Whitley Co., Sept. 5, 1928.

9. *Lestes forcipatus* Rambur. Pond about three miles north of Poseyville, Gibson Co., June 2, 1928.

11. *Lestes rectangularis* Say. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927.

13. *Lestes unguiculatus* Hagen. Swamp, near Cowan, Delaware Co., Aug. 22, 1927; Lotus Pond, Knox Co., Aug. 2, 13, 1928.

15. *Argia apicalis* Say. Bayou, near Wabash River, Vigo Co., Aug. 21, 1927; Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; Busseron Creek, near Paxton, Sullivan Co., July 15, 1928.

16. *Argia moesta* Hagen. Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; Wabash River, Gibson Co., July 27, Aug. 5, 1927; Pigeon River, west of Howe, Lagrange Co., Aug. 28, 1927; Wabash River, Posey Co., Aug. 10, 12, 1927.

17. *Argia sedula* Hagen. Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; creek, four miles south of Vincennes, July 18, 1928; Black River Creek, Posey Co., Aug. 7, 1927.

18. *Argia tibialis* Rambur. Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; creek about two miles north of Vincennes, July 21, 1928; Black River Creek, Posey Co., July 31, Aug. 7, 10, 1927.

20. *Argia violacea* Hagen. Black River Creek, Gibson Co., July 25, 1927; gravel pit, near Pennville, Jay Co., Aug. 22, 1927; swamp, three miles south of Wadesville, Posey Co., July 28, 1927.

21. *Enallagma antennatum* Say. Pond, three miles south of Pimento, Vigo Co., July 15, 1928.

22. *Enallagma aspersum* Hagen. Small ponds in several localities in Gibson Co., July 24, 1927, May 25, July 29, 1928; Lotus Pond, Knox Co., July 18, 1924, July 24, 1927, July 27, Aug. 3, 13, 22, 1928.

24. *Enallagma carunculatum* Morse. Wabash River, Gibson Co., Aug. 31, 1926.

25. *Enallagma civile* Hagen. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927; many localities in Posey Co., from July 28 to Sept. 3, 1927; Vanderburg Co. (B. B. H. D.)

29. *Enallagma exulans* Hagen. Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; gravel pit near Emison, 1928; creeks, Knox Co., July 18, 20, 21, Aug. 5, 1928.

30. *Enallagma geminatum* Kellicott. Reservoir, Oakland City, Gibson Co., May 26, 1927.

31. *Enallagma hageni* Walsh. Reservoir, Oakland City, July 29, 1928; Lotus Pond, Knox Co., July 28, 1928.

34. *Enallagma signatum* Hagen. Bayou near Wabash River, Vigo Co., Aug. 21, 1927.

36. *Nehalennia gracilis* Morse. This and the following species were objects of special search during the two seasons; although both are rare in Indiana they were taken on a number of occasions, usually associated with each other. At Case Lake, Lagrange Co., July 24, 1927, two males and one female of *gracilis* and eight males of *irene* were taken; one male of *gracilis* was captured along Pigeon River, west of Howe, Lagrange Co., Aug. 28, 1927. One male, five females of *gracilis* and two males, four females of *irene* were collected at Huffman Lake, Steuben Co., August 25, 1927; these were found within a limited area, probably 400 square feet, somewhat boggy. water about one to two inches deep and grown up with *Scirpus*, the common pitcher plant and other bog plants.

37. *Nehalennia irene* Hagen. In addition to the captures given under the preceding this species was found at two other localities, at Wall Lake, Lagrange Co., July 24, 1927, one male, and at Lotus Pond, Knox Co., July 27, four males, four females, July 28, seven males, nine females, Aug. 2, 1928, one male, one female. At the latter locality it was taken within a very limited area, about 30 feet in diameter, where the water was about six inches deep and the growth of water smartweeds reached a height of 20 to 25 inches; although these conditions of vegetation and water extended over several acres, and *Ischnura posita* and *I. verticalis*, with which it was associated, were numerous throughout, careful search disclosed none of this species elsewhere.

40. *Ischnura kellicotti* Williamson. Case Lake, Lagrange Co., Aug. 24, 1927.

41. *Ischnura posita* Hagen. Swamp, near Cowan, Delaware Co., Aug. 22, 1927; gravel pits, creeks and ponds in many parts of Knox Co., from June 20 to Aug. 29, 1928; pond in Evansville, Vanderburg Co., May 23, 1928; pond near Pimento and bayou along Wabash River, Vigo Co., Aug. 21, 1927. In southern Indiana I have found this almost as common and in many localities more numerous, than *I. verticalis* but in the northern counties I have not seen it in as many localities nor as numerous as the latter species, where it does occur.

43. *Ischnura verticalis* Say. Gravel pit, Pennville, Jay Co., Aug. 22, 1927; pond, Evansville, May 23, 1928; pond, Pimento, Aug. 21, 1927.

44. *Anomalagrion hastatum* Say. Lotus Pond, Knox Co., July 24, 1927, July 27, 28, 1928; Black River Creek, Posey Co., July 28, 1927; Huffman Lake, Steuben Co., Aug. 25, 1927; pond three miles south of Pimento, Vigo Co., July 15, 1928.

49. *Progomphus obscurus* Rambur. Black River Creek, four miles north of Poseyville, Gibson Co., July 23, 25, 1927; along Pigeon River, four miles above Mongo, Lagrange Co., July 3, 1927. "A male taken along stream south of Goshen, probably in Kosciusko County, July 10, 1927. Stream 12 to 20 feet wide, swift and deep. Several seen, resting on logs in stream. This individual flew along stream and alighted on vertical twig in a dead cornus bush—only time I ever saw *obscurus* on a twig." E. B. W.

50. *Hagenius brevistylus* Selys. Pigeon River, four miles above Mongo, July 3, 1927; Pigeon River, west of Howe, Lagrange Co., Aug. 28, 1927.

52. *Erpetogomphus designatus* Hagen. Wabash River, six miles below New Harmony, Posey Co., Aug. 12, 1927.

56. *Gomphus fraternus* Say. Pigeon River, four miles above Mongo, Lagrange Co., July 3, 1927.

63. *Gomphus submedianus* Williamson. This species was found again at Foote's Lake, Gibson Co., in 1927, a male was taken July 26 and a female July 31. "A number of this species seen, usually resting on leaves floating flat on surface of water. Now and then one would take a wide flight over the water or less frequently above the trees along the shore. They were very wary and exceedingly difficult to take; only one captured," July 26, 1927. B. E. M.

68. *Dromogomphus spinosus* Selys. Sand Lake, Noble Co., Aug 27, 1928. "On spatter-dock beds. Rare; only two seen in complete circle of lake." E. B. W.

70. *Boyeria vinosa* Say. Mississinewa River, west of Albany, Delaware Co., Aug. 22, 1927; Wabash River, three miles south of Griffin, Posey Co., Sept. 3, 1927; Vanderburg Co. (B. B. H. S.) The male taken along the Wabash was flying high and rather wildly, dashing in one direction for a short distance, then in another, when first seen. It finally came to rest on the trunk of a small tree, about 15 feet from the ground, in a willow thicket, several feet back from the water.

"A female taken in dense low woods, flying about like a *Gynacantha*; male about boats at landing after sundown flying about also like a *Gynacantha*." Sand Lake, Noble Co., Aug. 26, 1928. E. B. W.

72. *Anax junius* Drury. Wall Lake, Lagrange Co., July 24, 1927.

75. *Aeshna constricta* Say. Aboite River, three miles north of Aboite, Allen Co., August 7, 1927.

78. *Aeshna umbrosa* Walker. Over field, four p. m., near Sand Lake, Noble Co., Aug 26, 1928.

79. *Aeshna verticalis* Hagen. Mating pair taken at a marsh, one mile south of Mt. Pisgah, Lagrange Co., Sept. 4, 1928. During the latter part of August and the early part of September of both years special attention was given to hunting for Aeshnas, but only four individuals were taken and few others seen, in localities where many have been taken in former years.

80. *Nasiaeschna pentacantha* Rambur. Pigeon River, four miles above Mongo, Lagrange Co., July 3, 1927; Sand Lake, Noble Co., Aug. 25, 1928.

81. *Epiaeschna heros* Fabricius. Winslow, Pike Co., July 3, 1928. Alighted on hood of auto about dusk, remained until car was stopped and a jar in which to place the dragonfly was secured. Specimen and notes furnished by Claude Smith. Five individuals of this species were taken in houses in Bluffton, April 17, 23, 1927.

85. *Macromina taeniolata* Rambur. Footes' Lake, Gibson Co., July 26, three males, one female; July 31, one male; Sept 1, nine males, three females; Sand Lake, Noble Co., Aug. 28, 1928, three males; Black River Creek, three miles north of Poseyville, Posey Co., Aug. 7, 1927, six males; Hovey's Lake, Posey Co., Aug. 12, 1927, two males. "The female was ovipositing, flying about over the spatter-dock bed and occasionally dipping down between the leaves and striking her abdomen against the water." July 26, 1927. B. E. M. "Three altogether, patrolling north-west side along woods. Beats varied in length. Not wary but were difficult to catch from a boat; best way is to fasten boat at some far-projecting vegetation, drooping willow or vine-covered bush, and await the dragonflies." Aug. 28, 1928. E. B. W.

87. *Epicordulia princeps* Hagen. Lake south of Plato, Lagrange Co., July 22, 1928; Wabash River, Posey Co., August 10, 1927; Hovey's Lake, Posey Co., Aug. 12, 1927. Two females, each carrying a mass of eggs, were taken at Foote's Lake, Gibson Co., July 31, 1927. The posterior portion of the abdomen was curved upward and forward forming a semicircle and the eggs were held in place beneath the vulvar lamina at the highest point of this curve. The egg masses were spherical, about six or seven millimeters in diameter; when placed in water the masses absorbed water rapidly, soon assuming a flat disc shape, about 25 mm. in diameter and three millimeters thick. The masses were covered with a growth of green algae within a few days, but hatched at the end of 15 days.

99. *Libellula luctuosa* Burmeister. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927; pond, Pimento, Aug. 21, 1927; pond, three miles south of Pimento, Vigo Co., Aug. 21, 1927, July 15, 1928.

100. *Libellula pulchella* Drury. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927; pond, three miles south of Pimento, Vigo Co., Aug. 21, 1927.

104. *Platthemis lydia* Drury. Pokagon State Park, Steuben Co., July 24, 1927; Vanderburg Co. (B. B. H. S.); pond, three miles south of Pimento, Vigo Co., Aug. 21, 1927.

105. *Perithemis tenera* Say. Common along Wabash River and at ponds and marshes in Posey Co., captured on many dates between July 26, and Sept. 17; Hogback Lake, Steuben Co., Aug. 25, 1927; pond Pimento, Vigo Co., Aug. 21, 1927.

106. *Nannothemis bella* Uhler. A special search for this species was made in 1927, resulting in the capture of one female at Case Lake, Lagrange Co., July 24, and 14 males, five females at Huffman Lake, Steuben Co., Aug. 25, 26. At the latter locality the species was confined to the small area described above under No. 36, *Nehalennia gracilis*.

This area was examined carefully and I believe the 19 individuals taken made up the entire population of the species. They were difficult to see, usually resting on stalks of *Scirpus* and when disturbed flew quickly to another stalk never rising to the top of the vegetation.

107. *Erythemis simplicicollis* Say. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927; various localities in Lagrange Co., July 24, 1927, July 22, Sept. 4, 1928; pond, Pimento, Aug. 21, 1927, pond three miles south of Pimento, Vigo Co., July 15, 1928.

"Female was eating a still living *Sympetrum vicinum*, female, teneral, when captured," July 22, 1928. E. B. W.

108. *Sympetrum ambiguum* Rambur. This rare species was found in an orchard, far from water, at Pimento, Vigo Co., Sept. 1, 1928. Several individuals were seen, but were wary and quick in flight so that only two were taken.

112. *Sympetrum rubicundulum* Say. Swamp, near Cowan, Delaware Co., Aug. 22, 1927; gravel pit, near Pennville, Jay Co., Aug. 22, 1927; orchard, near Decker, Knox Co., July 10, 1928. The female taken July 10, 1928, was eating a tarnished plant bug (*Lygus pratensis* Linn.).

113. *Sympetrum semicinctum* Say. Several localities in Lagrange Co., July 24, Aug. 28, 1927, July 22, 29, Sept. 4, 1928, a total of 16 individuals; Pokagon State Park, Steuben Co., July 24, 1927; small lake north of Snow Lake, Steuben Co., Aug. 23, 1927.

114. *Sympetrum vicinum* Hagen. Reservoir, Oakland City, Gibson Co., July 29, 1928.

115. *Pachydiplax longipennis* Burmeister. Gravel pit, near Pennville, Jay Co., Aug. 22, 1927.

118. *Celithemis elisa* Hagen. Reservoir, Oakland City, Gibson Co., May 26, 1927, July 29, 1928; gravel pit, near Pennville, Jay Co., Aug. 22, 1927.

119. *Celithemis eponina* Drury. Reservoir, Oakland City, Gibson Co., July 29, 1928.

120. *Celithemis monomelaena* Williamson. Wall Lake and Case Lake, Lagrange Co., July 24, 1927. (At Case Lake). "In low vegetation back from the lake, beat down by wind. When flushed wind whipped them away." E. B. W.

122. *Pantala hymenaea* Say. Vanderburg Co., (B. B. H. S.); a female of this species was taken from the radiator of an automobile, which had just been driven from Rockville to Terre Haute, July 15, 1928.

123. *Tamea carolina* Linne. Lotus Pond, Knox Co., May 8, 1927.

124. *Tamea lacerata* Hagen. Reservoir, Oakland City, Gibson Co., July 29, 1928; Black River Creek, three miles north of Poseyville, Posey Co., July 23, 1927. This species was very abundant at Lotus Pond, Knox Co., July 28, 1928; many pairs were in copulation and oviposition was observed; the male releases the female and hovers above her while she strikes her abdomen against the surface of the water a few times, and recaptures her as she rises, first grasping her head with his feet, then bending the abdomen to regain hold with appendages. Forty-two males and 17 females were captured.

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