

RECORDS OF INDIANA DRAGONFLIES—VII. 1932-1933

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This is the eighth of a series of papers,¹ giving additions to the state list of species of Odonata, new county records, or captures of rare species already known from Indiana and important and interesting ecological or descriptive notes on the species concerned, since Williamson's annotated list of 1917.²

The present paper contains not only records from 1932 and 1933 but also many from specimens collected in former years—some of them as long ago as 1905—which were laid aside for later study because they could not be identified. Most of these were females of species of which both sexes had not been adequately described or associated. The gradual accumulation of material, including mating pairs, and the preparation of generic revisions in the meantime have made it possible to positively identify almost all of this material now. Two species not previously recorded from the state (*starred in the list of species) are listed, making a total of 135 species known from Indiana.

More than 2500 specimens, representing 90 species, were included in the collections studied for this paper. This material included all specimens of Odonata collected in Indiana by Mr. E. B. Williamson and his associates in 1932 (340 to 370), and by Esther Barrett Montgomery and the author in 1932 and 1933 (3219 to 3375). In addition to these rather large lots of specimens, there were available for study several small collections, including a few specimens from Zionsville and Indianapolis furnished by R. A. Ragains, a small collection made in Delaware County in 1931 by W. B. Ely and furnished without further data, collections from Mishawaka made by A. W. Trippel (11), from Lake Maxinkuckee by Howard North and M. K. Williamson many years ago but undated, from Morgan County by L. I. Musgrave (10), from Kosciusko County by G. E. Gould, from St. Joseph and other counties by G. Walker Daubenspeck (1-4), and specimens collected at Lafayette and Henryville by students of Purdue University as a part of their class work (P. U.).

Mr. E. B. Williamson furnished the following general notes on his collecting activities in 1932.

"In 1932 E. B. Williamson was assisted in collecting in Indiana by R. G. Blodgett, Eli Captain, Miss Margaret Ann Clippinger, Mark Decker, Mr. and Mrs. W. H. Ditzler, Mrs. H. K. Gloyd, K. M. Kunkel, Nathan Linn, Dr. Z. E. Malcolm, J. Ross McCulloch, Dr. Lyman T. Rawles, Mr. and Mrs. Norman Shufelt, Misses Mary and Jane Williamson.

"At the Monument City bog in Huntington County on June 12, Eli Captain and I saw two females of *Tachopteryx thoreyi* each ovipositing in a scant cup full of water. Mr. Captain saw a *thoreyi* catch a *Calopteryx maculata*.

¹ Proc. Ind. Acad. Sci., 29:99; 34:383; 36:287; 38:335; 39:304; 40:347; 41:449.

² Uni. Mich., Mus. Zool., Misc. Publ. No. 2, 1917.

"At Vanemon's Swamp on June 28, Norman Shufelt and I saw two or three males of *Aeshna mutata* ranging widely over the extensive and increasing spatter-dock beds, and much bothered by the numerous and irritating males of *Neotetrum pulchellum*. The same day we went to Chalfant's gravel pit where many females of several species of *Enallagma* and of *Ischnura verticalis* were ovipositing, the *Enallagmas* always accompanied by males, the *Ischnuras* always alone. Males of *I. verticalis* are devoid of gallantry under every circumstance and several times I have seen them deliberately knock resting females from their perches.

"On June 30 I saw a male *Nasiaeschna pentacantha* flying a short beat on Pigeon River. At the time many bits of willow cotton were falling into the river, and the dragonfly, apparently in a spirit of play, attacked many of these, dispersing them, like an explosion into smaller fragments. The legs, well trained in the capture of prey, made short work of the slowly drifting bits of cotton. Later the dragonfly flew around a bend in the river, and almost at once, from the direction in which it had disappeared, a male *Hagenius brevistylus* high in the air, flew over my head. It was struggling with a large dragonfly which I thought at first was a female of its own species, but I soon saw that this was not the case. It flew to the top of a tall willow which overhung the river, selecting a perch indiscernible to me. I waded to a point in the river as nearly as possible under its assumed position and in a few seconds the head of a male *N. pentacantha* plumped in the water near me. I watched for wings, but saw none—probably the wind carried them to a distance. Later in the day, I saw a female *H. brevistylus* ovipositing, and every drop of water she threw with her abdomen fell on the river bank, in close proximity to the water—but always on the bank.

"On July 24 there were no *Enallagma divagans* or *exsulans* among the lizard-tail through which Flat Creek has a narrow channel and where the species were common in 1930."

In order to present the data within as small a space as possible, collector's numbers, referred to above, are listed here with the locality, date and such other details (including quotations from field notes) as seem desirable, and these numbers with the county only instead of the complete data are quoted in the list of species.

1. Boy Scout Camp, South Bend, June 13, 1932.
2. Stream and swamp nine miles west of Connersville.
3. Lake at Lakeville, June 13, 1932.
4. "Old gravel pit, small pond, about five miles north of Rochester, east side of Road 31. Noon. Sunny. Very dense dragonfly population," June 13, 1932.
10. Pond and stream, Green Township, Morgan County.
11. St. Joseph River at Mishawaka.
340. Monument City bog, 9 a. m. to 3 p. m., June 12, 1932.
341. Salamonie River, Monument City, June 12, 1932.
344. Case Lake (Lane Lake), east of Howe, June 17, 1932.
345. Pigeon River, near Road 9, Howe, June 17, 1932.
346. Same locality as 345, June 18, 1932.
348. Pigeon River, below Howe, June 22, 1932.

349. Eel River, near Hoover, June 26, 1932.
350. Twelve Mile Creek, west of Hoover, June 26, 1932.
351. Mud Creek, west of Hoover, June 26, 1932.
352. Vanemon Swamp near Bluffton, June 28, 1932.
354. Pigeon River below Howe, June 30, 1932.
356. Flat Creek in Wells County, near Huntington County line, July 9, 1932. "The creek was still in flood from heavy rain July 7, and two or three times its normal width. Two or three *Neotetrum pulchellum* and several *Calopteryx maculata* were seen. Somatochloras were apparently still flustered and disturbed by abnormal condition of the stream. They followed the stream a short distance, then breezed away over the field; the females seemed bewildered by the lack of suitable places to oviposit."
357. Creek in woods, west of Markle, July 10, 1932.
359. Same as locality 356, July 10, 1932. "About 4-5 p. m. Creek still swollen to about twice its normal size. Flight of Somatochlora was wild and irregular."
360. Lake Garrett (Franz Fish Pond), Liberty Center, July 11, 1932.
362. Same as locality 360, July 13, 1932.
363. Same as locality 356 and 359, July 14, 1932. "Day cloudless, maximum temperature 94° F.; previous night hot, making today a good Somatochlora day. Arrived at creek about 7:00 a. m.; Somatochloras very active at time of arrival. Left creek at 11:30 a. m.; by that time both species were doing a lot of hanging up—*ensigera* on immediate creek bank on bluegrass and very slender weeds, *linearis* on dead twigs of bushes overhanging creek, at height of two to ten feet, usually between four and eight feet. Never saw *ensigera* hang up before—believe it was due to excessive heat. At a large pool in full sun in creek (pool 1-15 x 30-40 feet) took *linearis* patrolling pool exactly like a *Macromia* or *Epicordulia princeps*. A mating pair of *ensigera* taken in grass along creek. As observed before Somatochloras seem to catch only small insects."
364. Creek near Murray, July 15, 1932.
367. Flat Creek, same locality as above, July 24, 1932. "Cloudy, but no wind. Arrived at creek about 3:30 p.m., and stayed until 5:30 p.m. As to be expected because of clouds and time of day few Somatochloras were seen. Creek has almost ceased to flow—water yellow-green with algal bloom."
368. Flat Creek, same locality as above, July 31, 1932. "Only three or four Somatochloras seen. Creek has ceased to flow."
370. Lake Garrett (same as 360 and 362), July 31, 1932.
3219. Wild Cat Creek, about three miles east of Lafayette, July 4, 1932. At this point the creek flows within vertical clay banks, six to ten feet high. Within the stream bed, however, there are gravel and sand bars, partly bare and partly overgrown by willows, shallow and deep flowing water and extensive pools of still water.
3220. Freeman Lake, a few miles south of Monticello, August 3, 1932.

3316. State Forest, at Henryville, June 12-14, 1933. "A few *Somatochloras* were seen—one was seen hawking along a water course in the early afternoon. I threw small stones into the air as it came toward me; it followed one of the falling stones almost to the ground, being only three or four inches above it when it struck the ground."

3357. Wild Cat Creek, same locality as 3219, August 20, 1933.

3361. Sugar Creek at Crawfordsville, August 30, 1933.

3363. Birch Creek near Prairie City, August 30, 1933.

3364. Pond at Howesville, August 30, 1933. "A long, narrow pond—formerly a stream bed—with a good growth of yellow and white water lilies in the water and smartweeds, grass, etc., along the margin. The sun was not shining and few dragonflies were seen."

3365. Dredged ditch, six miles south of Linton, on Road 59, August 30, 1933. "The water was about knee deep at the bridge, but there was no current, and this was apparently only a long pool in an otherwise dry stream bed. The margins and little islands here and there were grown up with grass."

3366. Old water supply lake, Oakland City, Aug. 31, 1933. "I spent about two hours (2:45-4:30 p. m.) at the old lake. A complete circuit of the lake was made. *Lestes*, almost all females of *rectangularis*, *Anomalagrion hastatum*, mostly teneral, and *Erythemis simplicicollis* were present in great numbers."

3367. New water supply reservoir, Oakland City, Aug. 31, 1933.

3368. Lake, formerly water supply reservoir now turned into park for swimming, Boonville, Sept. 1, 1933. "Only a small portion of the shore line is devoted to the bathing beach, the greater part is grown up with the cat-tails and plants of similar habitat; in places the ground is marshy for some distance back from the shore line. Dragonflies numerous in both species and individuals."

3369. Water supply reservoir, Boonville, Sept. 1, 1933.

3370. Pool along Road 62 about three miles south of Dale, Sept. 1, 1933. A ditch along the road contained a pool of muddy water a few feet wide and from a few inches to a foot in depth, extending for almost a half mile.

3371. Water supply lakes, Huntingburg, Sept. 1, 1933.

3373. Little Pine Creek, east of Independence, Sept. 17, 1933.

3374. Kate's Pond, northwest of Independence, Sept. 17, 1933.

3375. Pine Creek, near Templeton, Sept. 17, 1933.

LIST OF SPECIES

3.³ *Agrion maculatum* Beauvais. Clark⁴ (3316); Huntington (357); Marion, Indianapolis, June 25, 1930; St. Joseph (11), July 11.

4. *Hetaerina americana* Fabricius. Benton (3375).

6. *Lestes congener* Hagen. Lagrange, Mt. Pisgah, Sept. 4, 1928.

11. *Lestes rectangularis* Say. Fayette (2); Lake, dry marsh, three miles east of Merrillville, Aug. 12, 1931 (Daubenspeck).

13. *Lestes unguiculatus* Hagen. Gibson, old lake, Oakland City, July 28, 1929; Posey, pond north of Poseyville, July 4, 1924.

³ The numbers of Williamson's 1917 list are used.

⁴ Names in bold face refer to counties.

15. *Argia apicalis* Say. Clay (3363); Dubois (3371); Marshall, Lake Maxinkuckee; Spencer (3370) Tippecanoe (3357).

16. *Argia moesta* Hagen. Tippecanoe (3219).

17. *Argia sedula* Hagen. Benton (3375); Montgomery (3361) Tippecanoe (3357).

18. *Argia tibialis* Rambur. Lagrange (348, 354); Sullivan, Busseron Creek, near Paxton, July 15, 1928; Tippecanoe (3219, 3357).

20. *Argia violacea* Hagen. Clay (3363); Greene (3365); Huntington (357); Marshall, Lake Maxinkuckee; Tippecanoe (3219); Warrick (3368).

22. *Enallagma aspersum* Hagen. Fountain, Veedersburg, June 4, 1905 (Deam).

22a. *Enallagma basidens* Calvert. Dubois (3371) 2 ♀; Gibson, water supply reservoir, Oakland City, July 1, 1930, and June 14, 1931, one female each date, (3366) 3 ♂ 4 ♀, (3367) 29 ♂ 14 ♀; Greene (3365) 5 ♀; Knox, gravel pit, Emison, Aug. 9, 1929, 1 ♂ 1 ♀; Lawrence, stream, near Bedford, Aug. 18, 1931, 1 ♂; Vigo, pond three miles south of Pimento, July 4, 1929, 1 ♂; Warrick (3368) 30 ♂ 24 ♀, (3369) 9 ♂ 7 ♀; Wells (360) 13 ♂ 8 ♀, (362) 10 ♂ 4 ♀, (370) 7 ♂ 2 ♀. The occurrence of this species in increasing numbers since its discovery in the state in 1929, indicates that it has probably spread into our territory only recently.

25. *Enallagma civile* Hagen. Dubois (3371); Spencer (3370); Warrick (3368, 3369).

28. *Enallagma ebrium* Hagen. Kosciusko, Webster Lake, May 29, 1932 (Gould); St. Joseph (3).

29. *Enallagma exsulans* Hagen. Greene (3365); Montgomery (3361); Spencer (3370); St. Joseph (11) June 15 and July 25, 1932; Tippecanoe (3219, 3357).

33. *Enallagma vesperum* Calvert. Laporte, pond, June 11, 1932 (Trippel); St. Joseph (11), July 12, 1932, (3).

34. *Enallagma signatum* Hagen. Dubois (3371); Spencer (3370); Warrick (3369); White (3220).

36. *Nehalennia gracilis* Morse. Miami (351), 3 ♂ 1 ♀.

38. *Amphiagrion saucum* Burmeister. Delaware (Ely); Miami (351).

41. *Ischnura posita* Hagen. Clay (3364); Dubois (3371); Spencer (3370); Warren (3374); Warrick (3368).

43. *Ischnura verticalis* Say. Benton (3375); Clay (3363, 3364); Dubois (3371); Greene (3365); Spencer (3370); Warren (3373, 3374); Warrick (3368, 3369).

45. *Tachopteryx thoreyi* Hagen. Huntington (340), 10 ♂ 2 ♀.

46. *Cordulegaster diastatops* Selys. Huntington (340), 3 ♂.

49. *Progomphus obscurus* Rambur. Cass (350) 2 ♂.

50. *Hagenius brevistylus* Selys. Lagrange (348) 3 ♂ 4 ♀, (354) 6 ♂ 3 ♀.

51. *Ophiogomphus rupinsulensis* Walsh. Lagrange (346) 1 ♂ 1 ♀, (348) 1 ♂ 1 ♀, (354) 2 ♂.

*52b. *Gomphus cornutus* Tough. Fulton (4) 1 ♂. Although Mr. Williamson quoted the original description of this species in the Pro-

ceedings of this Academy for 1900 with the statement, "This species will very probably be found to inhabit Indiana," it had not been taken within the state until Mr. Daubenspeck, who has collected several specimens of it in northern Illinois and southern Wisconsin for me, captured the specimen here recorded, last year.

54. *Gomphus lineatifrons* Calvert. **Lagrange** (345) 3 ♂, (346) 27 ♂ 3 ♀, (348) 31 ♂ 11 ♀, (354) 2 ♂ 6 ♀.

55. *Gomphus exilis* Selys. **Lagrange** (344) 1 ♂.

56. *Gomphus fraternus* Say. **Huntington** (341) 2 ♂; **Lagrange** (346) 3 ♂ 3 ♀, (348) 4 ♂ 1 ♀, (354) 3 ♂ 1 ♀.

58. *Gomphus graslinellus* Walsh. **Cass** (350) 8 ♂ 1 ♀; **Wells** (352) 1 ♀, (360) 1 ♀.

59. *Gomphus lividus* Selys. **Cass** (350) 2 ♂ 2 ♀; **Lagrange** (348) 2 ♀.

59a. *Gomphus notatus* Rambur. **Jefferson**, Walker's Beach, Ohio River, Hanover, July 7, 1930. Exuvia and adult, reared by Prof. J. Speed Rogers.

60. *Gomphus quadricolor* Walsh. **Lagrange** (348) 1 ♂ 3 ♀.

*62a. *Gomphus subapicalis* Williamson. **Vigo**, pond, Pimento, June, 1929, (Donald Endicott) 1 ♀, July 4, 1929, 4 ♂; pond, three miles south of Pimento, July 4, 1929, 4 ♂. This is probably the most interesting and surprising capture in Indiana for several years as this species has been taken previously only in southern Texas.

63. *Gomphus submedianus* Williamson. **Gibson**, Foote's Lake, July 7, 1930, 2 ♀ and July 18, 1931, 2 ♂ 1 ♀. Both females captured in 1930 were ovipositing, hovering above floating pieces of partly decayed spatter dock stems and striking the abdomen against the stem. A mating pair was taken in 1931; they were flushed from a growth of low weeds near the lake and flew to a small bush where they were captured; the other male was noted to fly out over the lake with its prey (*Argia* sp. ♀) and was watched until it returned to the shore where it was captured.

64. *Gomphus vastus* Walsh. **Lagrange** (348) 1 ♂ 2 ♀; **Miami** (349) 1 ♀.

65. *Gomphus ventricosus* Walsh. **Lagrange** (348) 1 ♂.

66. *Gomphus villosipes* Selys. **Lagrange** (346) 1 ♂.

66a. *Gomphus viridifrons* Hine. **Lagrange** (346) 1 ♀, (348) 1 ♂ 1 ♀.

68. *Dromogomphus spinosus* Selys. **Cass** (350) 1 ♂ 1 ♀; **Lagrange** (346) 1 ♂, (348) 6 ♂ 1 ♀, (354) 8 ♂.

69. *Dromogomphus spoliatus* Hagen. **Dubois** (3371) 2 ♂.

70. *Boyeria vinosa* Say. **Morgan** (10), June 22, 1931; **Tippecanoe**, woods, five miles east of Lafayette, Sept. 5, 1932.

72. *Anax junius* Drury. **Delaware** (Ely); **Porter**, Dunes Beach, June 25, 1932 (Ely).

74. *Aeshna clepsydra* Say. **Steuben**, Lake James, Aug. 17, 1915, 1 ♂ 1 ♀.

76. *Aeshna mutata* Hagen. **Wells** (352) 1 ♂.

78. *Aeshna umbrosa* Walker. **Boone**, Zionsville, 1931; **Lawrence**, quarry pool, Moses Fell Annex Farm, July 24, 1931.

80. *Nasiaeschna pentacantha* Rambur. **Lagrange** (348) 1 ♂.

84. *Macromia pacifica* Hagen. Boone, Zionsville, 1931.
89. *Tetragoneuria cynosura* Say. Kosciusko, Webster Lake, May 29, 1932, 1 ♂ (Gould).
93. *Somatochlora ensigera* Martin. Wells (356) 2 ♂, (359) 1 ♂, (363) 17 ♂ 6 ♀, (357) 1 ♀.
94. *Somatochlora linearis* Hagen. Huntington (357) 7 ♂; Wells (356) 3 ♀, (359) 1 ♂, (363) 28 ♂ 2 ♀, (364) 1 ♂, (367) 1 ♂ 1 ♀, (368) 1 ♀; Clark, State Forest, Henryville, 4 ♂ 3 ♀, July 11-28, 1932 (P. U.), (3316) 1 ♀.
96. *Libellula cyanea* Fabricius. Clark, State Forest, Henryville, July 4, 1932 (P. U.); Tippecanoe, swamp, Lafayette, May 21, 1933 (P. U.).
99. *Libellula luctuosa* Burmeister. Dubois (3371); Greene (3365); Marion, Indianapolis, June 25 and July 21, 1930 (Ragains); Morgan (10), June 15, 1931; Tippecanoe, Lafayette, June 12, 1933 (Musgrave); Warrick (3368).
100. *Libellula pulchella* Drury. Morgan (10), June 15 and 20, 1931; Spencer (3370); St. Joseph, Mishawaka, June 25, July 8 and 11, 1932 (Trippel) (1); Warrick (3368).
101. *Libellula quadrimaculata* Linnaeus. St. Joseph (1).
104. *Plathemis lydia* Drury. Boone, Zionsville, 1931; Delaware (Ely); Dubois (3371); Morgan (10), June 15, 1931; White (3220).
105. *Perithemis tenera* Say. Clay (3364); Dubois (3371); Greene (3365); Spencer (3370); Warrick (3368); White (3220).
106. *Nannothemis bella* Uhler. St. Joseph (1).
107. *Erythemis simplicicollis* Say. Boone, Zionsville, 1931; Delaware (Ely); Dubois (3371); Tippecanoe, swamp, Lafayette, May 27, 1933 (P. U.); Warrick (3368); White (3220).
108. *Sympetrum ambiguum* Rambur. Clay (3363) 1 ♀; Gibson (3366) 1 ♂; Warrick (3368, 3369) 3 ♂.
112. *Sympetrum rubicundulum* Say. Marion, Indianapolis, June 25, July 28, 1930 (Ragains).
114. *Sympetrum vicinum* Hagen. Warren (3374).
115. *Pachydiplax longipennis* Burmeister. Warrick (3368).
117. *Leucorrhinia intacta* Hagen. Tippecanoe, Lafayette, May 13-29, 1933, 15 ♂, 2 ♀, almost all indicated from swamp (P. U.).
118. *Celithemis elisa* Hagen. Clark, State Forest, Henryville, July 4, 1932 (P. U.); Warrick (3368, 3369).
119. *Celithemis eponina* Drury. Warrick (3368).
121. *Pantala flavescens* Fabricius. Morgan (10), June 15 and July 8, 1931.
123. *Tramea carolina* Linnaeus. Tippecanoe, Lafayette, May 17-27, 1933, 7 ♂ (P. U.); Washington, carried into car as I was driving along road near Livonia, June 12, 1933.
124. *Tramea lacerata* Hagen. Marion, Indianapolis, June 25 and July 28, 1930 (Ragains); Warrick (3368).
125. *Tramea onusta* Hagen. Huntington, pond near Salamonie west of New Lancaster, June 30, 1929; Morgan (10), July 8, 1931.