

The Distribution and Relative Seasonal Abundance of the Indiana Species of Lestidae (Odonata: Zygoptera)

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This is the fifth and final paper of a series indicating the relative seasonal abundance of the adults of the Indiana species of Odonata. The preceding papers (Montgomery 1942-1947) have included all of the species known from Indiana except those of the Lestidae which are the subject of the present discussion. These studies of relative abundance are based upon the frequency of collection and observation of the several species during the 41-year period of 1900 to 1940 inclusive.

Tabulations were made from records preserved in the collecting notebooks of the late E. B. Williamson and of the author. The chart (Fig. 1) accompanying this paper consists of a time-frequency graph for each of the ten species of the Lestidae from Indiana. The graphs were constructed by tabulating the records for the entire 41 years by thirds of months and plotting the resulting frequencies at the midpoints (5th, 15th and 25th respectively) of these thirds.

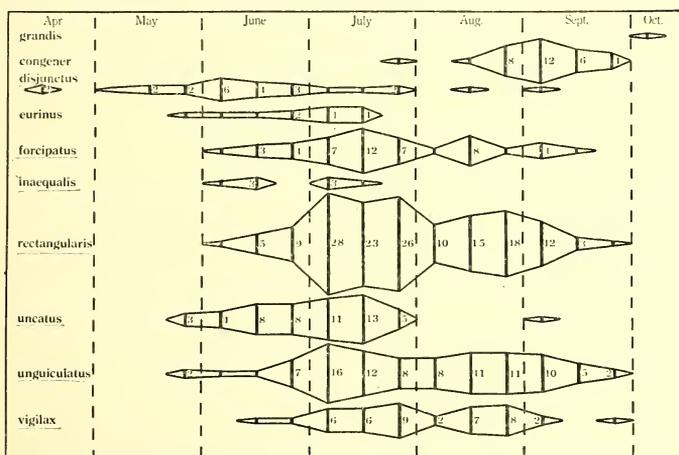


Fig. 1. The range of the flight season (or period of adult life) and the relative seasonal abundance of the species of the Lestidae (genera *Archilestes* and *Lestes*) in Indiana. Numbers near each bar indicate the number of collections of each species in each third of a month during the period of 1900 to 1940 inclusive; where no number is given the number of collections is one.

List of species with notes on distribution and an indication of the number of years each species was collected from 1900 to 1940 inclusive

Archilestes grandis (Rambur)—1. Northern South America through Central America, Mexico, Utah and Texas to Pennsylvania.

- Lester congener* Hagen—17. Throughout southern Canada and the United States except the southeastern and Gulf states.
- L. disjunctus* Selys—16. California and Alaska to the Carolinas and the Maritime Provinces.
- L. eurinus* Say—10. Northeastern-Iowa to New England and eastern Canada.
- L. forcipatus* Rambur—25. Oklahoma and Saskatchewan to Florida, Maine and Quebec. Although *forcipatus* and *disjunctus* have been confused in the past and many of the published records for *forcipatus* should be transferred to *disjunctus*, it seems probable that the recorded general distribution of the two species is approximately correct.
- L. inaequalis* Walsh.—6. Oklahoma and North Carolina to New England and Quebec.
- L. rectangularis* Say—35. Oklahoma and Minnesota to Georgia and the Maritime Provinces.
- L. uncutus* Kirby—23. Transcontinental—California and British Columbia to Maryland, the Maritime Provinces and Quebec. Cowley has indicated that *uncutus* is identical with the European *dryas* Kirby and has selected the latter name for the species.
- L. unguiculatus* Hagen—23. Distribution almost identical with that of the preceding species.
- L. vigilax* Hagen—19. Iowa to Florida and Quebec.

Of the ten species of Lestidae known from Indiana, *L. rectangularis* is the most common. This species was recorded for 35 of the 41 years covered by the records upon which these studies are based, and the frequency of records for it, especially during July and August, indicates that it is one of the more common species of the entire order in the state. *Archilestes grandis* has been reported for the state but once, near Liberty, in October, 1940, when a single specimen was taken along a creek bed (Montgomery 1941). A colony of this species seems to be well established at Oxford, Ohio, only about 12 miles away from the Indiana station. However, the local character of the known distribution of this species in Ohio, Kentucky and Missouri supports the view that the relative abundance shown in the chart for this species is likely correct, even if *grandis* is permanently established in the state. *Lestes inaequalis* and *L. eurinus*, taken in six and ten years respectively from 1900 to 1940, may be ranked as comparatively rare species within the state. The other six species are all moderately abundant, at least seasonally, although the season for *congener* is short. The indicated abundance for *disjunctus* is probably too low and that for *forcipatus* too high. These species have been confused in the past (Montgomery 1941) and it was necessary to re-examine specimens to properly tabulate the records. Many specimens reported as *forcipatus* were found, upon restudy, to be *disjunctus*, but not all of the specimens recorded in the notebooks could be located for re-examination. Also,

the only large and permanent colony of *forcipatus* in the state known to the author is at the Vanemon Swamp. This swamp was the object of continued study and frequent visits by Mr. Williamson throughout the years of his work with Indiana Odonata.

In some of the groups considered in the earlier studies of this series (Agrionidae, Cordulidae and Libellulidae) traces of correlation between the seasonal range, or abundance, of the species in Indiana and their geographical range, or their evolutionary level, were noted. No evidence of such correlation can be found in the species of the Lestidae. The Lestidae have become adapted to conditions not generally favorable to Odonate life, although this adaptation does not exclude them from more favorable conditions and localities. In most species the winter is passed in the egg stage, concealed and protected in plant tissue. The eggs hatch at the beginning of the warm season and the nymphs develop with astonishing rapidity, becoming fully mature within a few weeks. Because of this mode of life, the species of Lestidae are frequently very abundant in localities where other Odonata are very scarce. Most of the Indiana Lestidae are lake or pond species; some are very abundant late in the summer around pools left in dried-up stream beds. Certain species frequently occur in great numbers around dried-up ponds in the late summer where no other dragonflies are found. Their development appears to be rather well correlated with conditions for life in such waters as they reach the adult stage just before the ponds or pools become dry.

Literature Cited

- Montgomery, B. Elwood. 1941. Records of Indiana Dragonflies, X. 1937-1940. Proc. Ind. Acad. Sci., 50:229-241.
- 1942-1947. [The distribution and relative seasonal abundance of the Indiana species of Odonata.] Proc. Ind. Acad. Sci., 51:273-278 (Enallagma); 53:179-185 (Agrionidae); 54:217-224 (Cordulidae and Libellulidae); 56:163-169 (Calopterygidae, Pelaturidae, Cordulegasteridae, Gomphidae and Aeshnidae).