

NOTES ON THE DRAGONFLIES OF REELFOOT LAKE, TENNESSEE¹

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Although the primary object of these investigations on the Odonata of the Reelfoot Lake area has centered on the ecology of nymphs, the author has collected and made observations on large numbers of adult dragonflies. The purpose of this paper is to add to our existing knowledge of adult dragonflies of this area as based on observations made from July 6 to August 10, 1937.

To the odonatologist, Reelfoot Lake is probably the most interesting lake in the South. Our knowledge of the Odonata of this region is based mainly on the excellent investigation by Koen (1937). In Koen's paper thirty-one species were listed and notes on their distribution and habitats given. This writer realizes that this paper is but a supplement, and that much more study is necessary on this vast and heterogeneous area before its dragonfly population will be fully understood.

NEW ADDITIONS TO THE DRAGONFLIES OF REELFOOT LAKE

Gomphus pallidus Rambur. Collected: Washout, near junction with Reelfoot Lake; Islands in southwestern portion of lake; Green Cypress, southeastern end of lake near entrance to Washout. No adults were taken by the collector at or in the vicinity of Reelfoot Lake. Numerous exuviae, however, were found on the cypress trees and stumps at the islands and at Green Cypress, and a single immature nymph was taken from the muck at the bottom of a saw grass (*Zizaniopsis miliacea*) patch in the Washout. The Green Cypress area was composed of a large stand of live cypress trees, interspersed with stumps, which extended out from the swampy lake shore a hundred or so yards into the lake proper. The depth of the water varied from several inches at the lake shore to seven or eight feet farther out. On every third or fourth tree or stump, exuviae of this species were found with exuviae of *Perithemis tenera* Say and *Epicordulia princeps* Hagen. The greatest number of *Gomphus pallidus* collected from any one tree was seven, but the normal "take" varied from one to three exuviae per tree. Several hours were spent in dredging the

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muddy bottom of this area without the reward of even a single nymph.

When several *Gomphus pallidus* exuviae were shown to natives of the region, the writer was told that such "bugs" were common throughout that area. One native also described a transformation which he had observed several weeks previously. The nymph crawled up one of the cypress trees forming the support of the wharf where the adult emerged normally.

Dromogomphus spoliatus Hagen. Three specimens, all males, of this species were collected by M. V. Parker, along the Washout, during the latter part of August, 1937, and sent to the writer for identification. The author wishes to take this opportunity to thank Mr. Parker for the collection of these specimens and for his kind permission to retain them.

Libellula pulchella Drury. No individuals of the "ten spot" were collected at Reelfoot Lake or in its vicinity. However, on August 5 and 6, 1937, the observer saw, and identified on the wing, several *L. pulchella* along the Bayou du Chien and in Johnson's Basin. Mr. Compton Crook reported seeing individuals of this species at Reelfoot Lake during the summer of 1934.

Enallagma vesperum Calvert. Collected: Southeastern end of Reelfoot Lake; Washout; Lake Center (several miles north of Samburg). This beautiful lemon-colored damselfly was common in shaded areas in the localities listed above. At Lake Center they were the constant companions of *Enallagma signatum* Hagen in the tall shrubs and grasses growing in dense patches between the trees at the edge of the water. When disturbed *Enallagma vesperum* gracefully flew several feet and "reseeded" themselves. Along the Washout where there were areas of dense overhanging trees and other areas well exposed to the sunlight, these damselflies were found in large numbers perching in the shaded areas and flying into the exposed areas to oviposit and mate. When in tandem they sometimes flew aimlessly about, but more often they perched on various objects in the water or on the shore.

NOTES ON CERTAIN SPECIES

Libellula luctuosa Burmeister. Koen (1937) records this species only from the fields in the vicinity of the Biological Station, at the canal along the levee at the southwestern end of the lake, and the lake proper at Walnut Log. This observer collected and saw specimens of the "widow" along the entire length of Bayou du Chien, at Johnson's Basin, Lake Center, Samburg, Washout, and at the southeastern end of the lake. Thus it can be seen that this species is widely distributed throughout the entire area. *Libellula luctuosa* was a fast and active flier. It would perch for irregular periods on the tops of the saw grass at the edge of the water and, when disturbed, would fly back and forth along a seemingly prescribed area of the lake shore. After

a period of such maneuvering, it usually would perch on or very near its former position.

The author saw many hundreds of males of this species during the investigation but whereas five or six females were seen, only two were netted. A number of exuviae were found on cypress trees at Samburg and at the Washout, and several nymphs were taken from the masses of algae and "moss" at the water's edge near these cypress trees and stumps.

***Lestes inaequalis* Walsh.** This beautiful metallic-green lestine was one of the rarest species found at Reelfoot Lake. Koen records it from Bayou du Chien and from the saw grass area of the boat canal of Walnut Log. This writer collected five specimens, all females, at Lake Center. They were found only in the dense shaded areas of tall grasses and shrubs bordering the lake at this locality. When flushed from their hiding place they rapidly flew for a short distance and then settled down in the shrubs and grasses. If the collector did not look very carefully, he was unable to see the individual as its natural coloration made it almost invisible. Although several hours were spent on each trip to this locality, the author was never able to find or capture more than a single specimen per trip. Further collecting along the lake in suitable localities should disclose that *Lestes inaequalis* is rather widespread but somewhat rare throughout Reelfoot Lake.

***Lestes rectangularis* Say.** Koen states that "A more detailed study of the *Lestes* of the Reelfoot Lake area probably would show them to be present in greater numbers than indicated by the specimens secured in this investigation." He records specimens of *Lestes rectangularis* from Bayou du Chien and from the canal at Walnut Log.

The present investigation showed this species to be a very widespread and not uncommon inhabitant of the Reelfoot Lake area. Collections of *Lestes rectangularis* were made at various times during the course of study along Bayou du Chien, at Center Lake, lake and canal at Walnut Log, Washout, southeastern end of lake, and on the islands in the southwestern portion of the lake. These specimens were taken usually in the heavily shaded areas bordering the water at the above localities, although several specimens were secured an eighth-mile or so from the water in the Bayou du Chien area. They perched on the stems of the dense and luxuriant shrub-grass areas. In flight they resembled *Lestes inaequalis*, but flew only short distances at a time. They, also, were hard to detect unless a sharp observation was made of their flight and their new hiding place thus disclosed. The author considered it a very successful day when, after three hours of searching, he managed to net eight individuals of this species.

***Argia tibialis* Rambur.** This was one of the rarest species observed at Reelfoot Lake. Koen lists but one locality, Gladly Creek. From the present study it was possible to extend the range of *Argia*

tibialis so as to include the Washout and the islands in the southwestern area of the lake.

Argia apicalis Say. This very attractive and easily recognized damselfly was one of the most common members of this group found at the southern end of Reelfoot Lake. They were, however, surprisingly rare in the region of the Biological Station and northern end of the lake. Along the canal bordering the road to the Washout, they were found in vast numbers. When one walked along the edge of the canal large numbers of teneral of both sexes would fly awkwardly out of the way. These juveniles were easily recognized by their light brown, rather drab-colored bodies and their glistening wings which, when in flight, reflected the sun's rays with a brilliant effect. The members of the genus *Argia* found at Reelfoot Lake were seen usually in sunny areas where they perched or darted after gnats or other available food.

Enallagma signatum Hagen. This species was one of the two most common and most wide-spread damselflies of the area studied. Individuals were found at every locality visited on the lake proper. Their lemon-colored thorax and yellow-tipped abdomen made them easily recognized in the field. *Enallagma signatum* seemed to prefer shaded areas well provided with shrubs, upon which they perched. While rowing along the eastern shore of the Washout, large numbers of this species were observed perching upon floating bits of leaves, bark or twigs, and upon the branches of the over-hanging trees. Occasionally several individuals would dart out into the sunny areas where they mated or oviposited. The nymphs were taken in almost every dip of the net throughout the lake. They were found in greatest numbers in the *Ceratophyllum* beds and at the bottom of the saw grass. The author succeeded in rearing through five nymphs of this species and thus was able to check the nymphal identification.

While checking over the individuals of the species from Reelfoot Lake, the author was impressed with two color variations. These observations are presented herein in some detail since the writer believes that the most important problem confronting the taxonomist in the study of this genus is the careful study and comparison of series of individuals of each species from all possible localities so as finally to establish constant characters for identification. By this method only will the taxonomist be able to definitely state which are true species and which—like *Hetaerina titia* and *Hetaerina tricolor* (Williamson, 1912)—are color variations due to regional distribution.

Table 1 shows the variations of one of these characters in the Reelfoot Lake specimens. Byers (1930) states that the dorsum of abdominal segment ten of the male is metallic black, and that both male and female have a single median pale spot on the dorsum of the middle lobe of the prothorax. From this table it is seen that the dorsum of

²The yellow and black combination was composed usually of a basal and an apical black band connected by a mid-dorsal black stripe of varying thickness, thus forming two yellow spots of varying sizes.

the tenth abdominal segment of the male may be one of three color types: entirely black (5 individuals), yellow and black² (10 individuals), or entirely yellow (4 individuals).

All individuals of both sexes studied show two linear spots instead of a single median pale spot on the dorsum of the middle lobe of the prothorax. In addition, it was noticed on the live male specimens that the color of the dorsum of the ninth abdominal segment varied from yellow to orange and pinkish-orange. All other characteristics checked with Byers' description.

TABLE 1. *Color variations of Enallagma signatum*

SPECIMEN No.	COLOR OF DORSUM OF ABDOMINAL SEGMENT 9 (MALE)	SPECIMEN No.	COLOR OF DORSUM OF ABDOMINAL SEGMENT 9 (MALE)
1	black	11	black
2	black	12	yellow
3	yellow and black	13	yellow
4	yellow and black	14	yellow and black
5	yellow	15	black
6	yellow and black	16	yellow and black
7	yellow and black	17	yellow
8	black	18	yellow and black
9	yellow and black	19	yellow and black
10	yellow and black		

Enallagma exsulans Hagen. Field notes show this species to be locally common but rare in the general areas of Reelfoot Lake. The greatest numbers were found at the Washout. They were seen sparingly in shady areas along the Washout during the morning and early afternoon. At five or six o'clock, when it had cooled somewhat, they were numerous throughout this entire area. Many were seen in tandem and others were ovipositing in the algal pads along the shore.

Ischnura posita Hagen. On several occasions beautiful metallic-blue males of this species were taken along the Bayou du Chien and at Lake Center. As this writer was unable to find a mention of such a color phase in the available literature, a brief description is given below.

Adult male: Pale antehumeral stripe complete, not interrupted to form an exclamation-like mark; all pale areas of thorax bright blue; sides of abdominal segment one blue; a blue stripe on each side of second abdominal segment; a basal round blue spot on sides of abdominal segment three; dorsa of abdominal segments eight and nine entirely blue; remainder of abdomen black.

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