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A Preliminary List of the Odonata of Dallas County Texas¹

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Although advances have been made in past years in the study of many groups of Texas animals, little has been published on the Odonata. The "Monographie des Gomphines" of Selys and Hagen (1857) gave a few species for this state. In Hagen's "Synopsis of the Neuroptera of North America", thirty-four species were listed from Texas; twenty-six collected by Captain John Pope and two by Otto Friedrich of New Braunfels. In 1904 Professor J. G. Needham published descriptions of nymphs collected by F. G. Schaupp near Shovel Mount, Texas. Subsequent to 1883, Schaupp also collected dragonflies for Professor Hagen near Carrizo Springs, Dimmit County. Williamson (1914) published a list of Odonata in the "Entomological News" (sixty-one species) from material collected along the southern part of the Texas coast. He also published papers in 1908, 1909, 1912, 1914, and in 1911 collaborated with Muttkowski on material from the above collection. Kennedy, in 1921, published a paper on some Odonate nymphs from Victoria, Texas, which were collected by J. D. Mitchell. Mrs. H. K. Gloyd (1932) lists two Texas species as new records for the United States. In 1934 Tinkham published a paper on the dragonfly fauna of Presidio and Jeff Davis Counties. Scattered records of one or more species may be found in papers by F. Ris and E. M. Walker.

This paper concerns the Odonate imagoes of Dallas County. It is based on field notes and specimens taken mostly from April to September, 1937, and June to August,

¹Contribution from the Biology Laboratory of Southern Methodist University.

1938. A few additional records from the Southern Methodist University collection, and from scattered trips made at periods other than those mentioned above are given. For identifications, Needham and Heywood *Handbook of the Dragonflies of North America* was used and identifications were made or verified by Professor Needham and Mrs. H. K. Gloyd.

Collecting Stations

Collections were made from nineteen stations. Several of these proved to be more interesting than others, and were visited more often. The stations (Fig. 1) are given their respective numbers in the following account, and are described below.

1. SANDPIT LAKE (called gravel pit on the small map of Dallas County, 1920). This lake, located on Trinity Clay soil, is one of the most interesting habitats studied. It was formed, as the name implies, by water filling an old sand-pit. The main lake is about one-fourth of a mile long and half as wide. Adjoining this are several small sedge-filled pits containing clear water rich in plankton, favorite habitats for nymphs.

2. WHITE ROCK LAKE. This is an unused reservoir covering 1.400 acres with a maximum depth of thirty-two feet. Collections were made along the lake margin which contained abundant *Typha*.

3. WHITE ROCK FISH HATCHERY. This consists of twenty-six ponds, each margined with vegetation. All ponds are fed by seepage from White Rock Lake.

4. COCKRELL HILL POND. This is a small body of water in the Houston Chalk area. In 1937 the water was turbid, but unusually rich in plant and animal life. *Sagittaria* grew along the edges and served as shelter for many Odonate nymphs. In the late summer of 1937 the pond became practically dry; the plants were killed, causing it to be a poor habitat for the 1938 collecting.

5. CEDAR HILL POND. This pond is directly comparable to Station 4. The area comprises the same type soil, and the two places exhibit a striking correlation in their plant and animal life. However, at Cedar Hill Pond the water level was stable throughout the period of collecting.

6. BACHMAN'S DAM. This is a 140 acre reservoir, similar to White Rock Lake. The most interesting collecting was done at the base of the spillway where there was much vegetation in clear, shallow water.

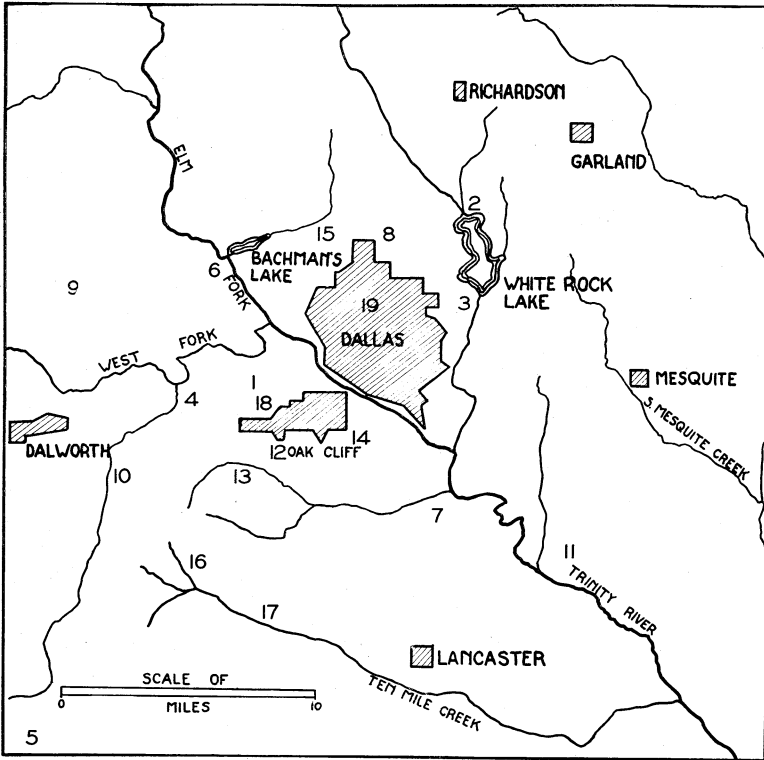


Fig. 1. Dallas County Collecting Stations.

7. TRINITY ROD AND GUN CLUB LAKE. This is a privately owned, artificial lake similar in size to Bachman's. Collections were made over a relatively shallow bay containing many semi-aquatic plants. Logs covered with sponges and Bryozoa were common in this habitat. The lake is in a wooded area of sandy soil.

8. GLEN LAKES. This is a group of very small artificial lakes of clear water in a limestone region. Nymphs of *Sympetrum corruptum* Hagen were abundant here in the spring of 1937; since then few specimens have been

taken from this habitat although it has been visited frequently.

9. IRVING POND. This pond is in sandy soil several miles west of Dallas. Only a few trips were made to this habitat.

10. LEDBETTER POND. This pond, used chiefly as a watering place for cattle, is near Mountain Creek Lake. There is much *Chara* in the water with a small amount of *Typha* bordering the pool.

11. ELAM SPRINGS. This interesting habitat is unusual in that there is a stream fed by cold water springs. The stream bed is composed primarily of shifting sand and gravel. The current is so swift in places that the banks are undermined, resulting in submergence of dense mats of plant roots.

12. CEDAR CREEK AT ELMWOOD. Cedar Creek is a stream that flows rather slowly over a limestone substratum. At the Elmwood habitat the stream is about two feet wide and is bordered by sedges growing in sedimentary soil.

13. KIEST PARK STREAM. This stream has cut a deep ravine about twenty-five feet wide that is bordered by shrubs and large trees. The creek bed is of limestone.

14. CEDAR CREEK AT BECKLEY. At this location there is an old leaky dam which retains some water. Most of the collecting was done downstream from the dam where there is a high limestone cliff and very little plant life except a few clumps of grass.

15. BLUFF VIEW CREEK. This drains into Bachman's lake about two miles downstream from the habitat studied. It is in a silted limestone area, with abundant vegetation bordering the stream.

16. WHEATLAND ROAD CREEK. This is a tributary of Ten Mile Creek which has cut a ravine with a wall about ten feet high. The area is shaded by large trees, and shrubs grow along the ravine. Only a few pools of water, which contained much silt and little vegetation, were scattered along the stream bed.

17. FIVE MILE CREEK EAST OF WHEATLAND ROAD. This habitat differs from that of Cedar Creek in that there is more water present and a few large boulders.

18. STEVEN'S CREEK. This stream is much like Cedar Creek.

19. TURTLE CREEK LAKE. This is a portion of Turtle Creek that is restrained by a dam. The habitat yielded few records.

ANNOTATED LIST OF SPECIES²

ANISOPTERA

1. *Progomphus obscurus* Rambur. Station 11 in July.
This dragonfly moved nervously, in long beats, about a two foot level. Frequently it alighted on the sandy banks with its head pointed toward the water.
2. *Erpetogomphus designatus* Hagen. Stations 2 and 17 in August.
Although at Five Mile Creek there were many rocks available, this species, on being disturbed several times always returned to the same stone.
3. *Erpetogomphus compositus* Hagen.
A female, labeled "Dallas County, 18-IV-38, V.D.H.", is in the collection at Southern Methodist University.
4. *Gomphus externus* Hagen.
One male flew into a parked automobile in the business section of Dallas on May 23, 1937.
5. *Gomphus militaris* Hagen. Stations 4 and 12 in July.
At Cedar Creek one flew in long beats at an elevation of three feet, and rested on tall weeds at the water's edge. At Cockrell Hill Pond the flight was lower. While at rest the head was down and the wings widespread. Apparently it is not easily disturbed since no notice was taken of a net swung near it.
6. *Dromogomphus spoliatus* Hagen. Station 2 in August.
This large gomphine was collected at 11:00 a.m. in a *Typha* filled bay. Although most of the plants were much taller, the dragonfly perched on cat-tails about two feet above the water where it remained for a long period of time, undisturbed by movements of the net.
7. *Anax junius* Durury. Stations 1, 2, 4, and 5 in April, May, July, August, and October.
During the summer nymphal cases were present in great numbers at several habitats. Seven imagoes of *Anax junius* were taken in April over a field north of White Rock Lake. Twice, individuals of this species were collected near electric lights to which they had been attracted.
8. *Nasiaeschna pentacantha* Rambur. Station 11 in June.
Two males circled swiftly, without resting, over an area of turbid back water from the rapidly flowing stream. This is the only species observed with an audible flight probably produced by the rubbing of the basal portion of the wings against the thorax.
9. *Ephiaeschna heros* Fabricius.
One female flew into the first floor window of a building on the campus of Southern Methodist University on May 17, 1939, and was taken by Herbert Knutson.
10. *Macromia* I. C. *Pacific* Hagen.
One male labeled "22-IV-34, Dallas" is the collection at Southern Methodist University.
11. *Didymops transversa* Say.* Station 6 in April.
This dragonfly, collected by Avery Freeman, flew at a height of four feet over shallow water containing much vegetation.
12. *Epicordulia princeps* Hagen. Station 10 in July, and one taken by Richard Maxwell in June marked "Dallas County".
At 7:30 a. m. one flew about four feet high at the edge of a pond, and rested frequently on a fence post, the only tall object near the water. This *Epicordulia* was relatively easy to net, though observations elsewhere showed this to be a very agile species.

²Records believed to be new for Texas are indicated by an asterisk.

13. *Perithemis tenera* Say. Stations 1, 2, 4, 5, 7, 8, 9, in June, July, and August.
At 11:00 a. m. (10-VII-37, Station 7) many *Perithemis* rested on weeds in a low field between the lake and the creek. Several times dragonflies were collected early in the morning in fields away from water, but it is unusual to find any in such a habitat as late as this. Copulation and oviposition were observed in July at a pond west of Dallas. The male and female came together high in the air, then darted quickly down to water, separated, and the female oviposited on a submerged branch covered with algae. Although June, July, and August are the only months given on specimens from Dallas County, a record from a neighboring county shows this to emerge early in May. According to Needham & Heywood, *Perithemis* appears on the wing about the end of May and flies through June. My data, however, show them to emerge earlier and to fly later.
14. *Celithemis eponina* Drury. Stations 1, 6, 19, during May, June, July, August.
At Bachman's Lake they usually rested on cat-tails about six feet in height. Although frequently disturbed by the net, they returned to the same plant. During July, oviposition was observed several times at Sandpit Lake. This took place *in copulo*; the pairs flew two or three feet high and dipped intermittently into the water. Occasionally pairs were seen high over the banks of the lake.
15. *Celithemis elisa* Hagen.* Station 1 in July.
Several were taken flying among the *C. eponina*. No other *Celithemis elisa* were seen.
16. *Celithemis fasciata* Kirby.* Station 1 in June.
A single individual was taken near a small pond at Sandpit Lake.
17. *Erythrodiplax minuscula* Rambur.
One was collected by E. P. Cheatum, 2-VII-35. Another record was for 24-VI-38.
18. *Orthemis ferruginea* Fabricius. Stations 5 and 9 in June and July.
Only a few were collected because of extreme difficulty in capture. These brightly colored dragonflies were numerous at Cedar Hill Pond on 2-VII-37. They flew high and stopped occasionally to rest on dead vegetation about six feet above the water.
19. *Libellula luctuosa* Burmeister. Stations 1, 2, 4, 5, 8, 10, 14, 15, 16, and 17 in June, July, and August.
Needham and Heywood state that this is a common pond species in the Mississippi Valley. In our region it is equally common along creeks. On 22-VI-37 they were very abundant at Bluff View. This was the only time the males proved easy to capture. On this date oviposition was observed. By making regular dips into the water at the narrow part of the creek, the female deposited eggs. When dipping, it flew steadily about six inches high, then suddenly a male came down, joined the female, and both rose high into the air. After a few seconds, still at the same elevation they parted. At this habitat several *Libellula luctuosa* flew higher and more slowly than did either *Platbemis* or *Pachydiplax*. A female was taken while ovipositing, and eggs were collected. These were half a millimeter long and one-fourth of a millimeter wide, with cobblestone-like shells and gelatinous cases. Two days after the eggs were deposited they had changed in color from white to brown, and in about five days hatching began. In hatching, the egg appeared as if cracked through three-fourths of the length. The nymphs were transparent with only the tracheae visible. At this time the antennae were longer than the head, but after two days this was reversed; also, cross bars appeared on the legs. The nymphs were cannibalistic, the larger feeding on the smaller.
20. *Libellula comanche* Calvert. Station 12 in June.
Two nymphs, collected from Cedar Creek, emerged in the laboratory.
21. *Libellula pulchella* Drury. Station 1, 4, 16, 17 in May, July, and September.
The Tenspots are difficult to collect, since their periods of rest are short, and their flight high. At Sandpit Lake in September these were relatively numerous with several being taken among weeds near the road.

22. *Plathemis lydia* Drury. Stations 1, 4, 5, 9, 12, 15, 16, and 17 in May, June, and September.

This is a very agile species that frequents both ponds and sluggish streams. The pruinose males often rest on limestone rocks along creek beds. The females seem to prefer either low plants or bare soil in wooded areas away from water. One day an individual came to rest on a concrete bridge just out of reach of the net. Attempts to disturb the insect by throwing rocks near it and by waving the net were unsuccessful. Presently it took flight and was captured.

23. *Cannacria gravida* Calvert. Station 1 in June, July, and August.

In habits, this is one of the most unusual of the Odonata studied. This species seems to prefer electric light wires and the highest branches of the trees near the sandpit, although they occasionally rest on tall sunflowers. The flight is high, but not strong as that of *Tramea*. When at rest the wings were held upward and the abdomens down. On a single tree the author has seen *Dytbemis fugax*, *Pachydiplax longipennis*, and *Celiibemis eponina* on the lower branches, with *Camacria* on the upper limbs. One unattended female, observed on 20-VII-37, oviposited by dipping irregularly into the water.

24. *Sympetrum corruptum* Hagen. Stations 1, 2, 8, 12, in April, July, September, and November.

About eighteen nymphs, taken from Glen Lakes early in April, emerged in the laboratory that month. No others were seen until a single male was collected from Sandpit Lake in July. At Cedar Creek in November eight males and two females were netted. Needham & Heywood state that "These are the latest of our dragonflies in season. One species, *Sympetrum corruptum*, is sometimes taken early in the spring, having hibernated as an adult." The writer, so far, has not observed this species overwintering as an adult.

25. *Pachydiplax longipennis* Burmeister. Stations 1, 2, 3, 4, 5, and 19 in June, July, and August.

This is one of the most common Odonates in the Dallas vicinity. Individuals rested on objects ranging from the telephone wires to the lowest branches of the willows overhanging the water. When perched, their heads and wings were down and their abdomens up. However, they do not point abdomens as nearly vertical as does *Dytbemis*.

26. *Mesothemis simplicicollis* Say. Stations 1, 2, 4, 5, 6, 10, 14, and 15 in June, July, and August.

Pruinose specimens of this abundant species were usually more numerous than green ones. At White Rock Lake *Mesothemis* was frequently found on cat-tails and also in great numbers resting flat on the ground along the shaded roadway that skirts the lake. In most instances this species is easily netted. At Bluff View Creek on 22-VI-37 at noon, there were only a few on the wing compared to the number of *Libellula luctuosa*. *Mesothemis* flew rapidly about two feet high and occasionally rested on the tall grasses at the edge of the water. Several *Plathemis* were on the wing somewhat above the *Mesothemis*, but neither flew as high as *L. luctuosa*.

27. *Dytbemis velox* Hagen. Stations 1, 4, 10, 11, 16, 19 in June, July, and August.

This dragonfly flies low over the water of the marginal zones. It seems to be selective in its resting habits, since on being disturbed it often returns to the same perch.

28. *Dytbemis fugax* Hagen. Stations 1 and 10 in June and July.

This species is more difficult to capture than *D. velox*. It, also, is selective in resting habits. The position that it takes when perching is unusual in that the head and wings are drawn with the abdomen nearly perpendicular in the air. In oviposition the female has been observed to dip irregularly into the water.

29. *Brechmorboga mendax* Hagen.

No imagoes were taken, but four large nymphs were found in the creek at Kiest Park on 3-VII-38. Although these were brought into the laboratory to be reared, they neither molted nor emerged.

30. *Pantala hymenea* Say. Station 1 in June, and a single specimen by an electric light at Camp Kiwanis in July.

This agile species flew at a height of about seven feet from one small sandpit to another. In alighting they usually selected the lowermost branches of willows at the edge of the water. They oviposited *in copulo*, flying about two feet high in the marginal region of the pond. The dips were from two to five feet apart in open water.

31. *Pantala flavescens* Fabricius.

Exuviae were taken at Sandpit Lake on 23-VI-38. A specimen marked "Dallas, 20-X-38" is in the Southern Methodist University collection.

32. *Tramea lacerata* Hagen. Stations 1, 4, 5, 7, and 9 in June, July, and August.

These are very high and fast flyers; and are often seen *in copulo* at a considerable distance from the water. On 4-VII-37, about 9:00 A.M. within a mile of Mountain Creek Lake, they were so numerous that by riding on the outside of the car and swinging the net, several specimens were taken.

33. *Trama onusta* Hagen. Stations 4 and 5 in April, July, and August.

At Cockrell Hill Pond on 22-VII-37 oviposition was observed. The female dipped her abdomen, repeatedly into the water at the same spot on a mass of algae. During this time it was interrupted by what appeared to be a male *T. lacerata*. Later this female oviposited on another algal mat a few feet from the first place. Definite selection of the algae seemed to be indicated since there was much open water and little algae in this vicinity.

34. *Agrion maculatum* Beauvais. Station 11 from early April through September.

This butterfly-like Odonate was abundant throughout the collecting period at Elam Springs. It rests on plants overhanging the water course in the vicinity of the springs, and alights most frequently on plants at a level of two feet. On 16-VII-37 this species afforded an unusual sight on a low sandy bank about 150 feet down stream from the habitat described above. There were dozens of agrions, each resting on the top of low plants. Observation shows that damselflies of this species have a tendency to rest their heads facing the water. In one instance an individual was seen to alight and turn, as if purposely, toward the stream. Upon placing an *Agrion* in a cyanide bottle, the movements of the fore-wings seemed to alternate with those of the hind-wings; i.e., when the back wings were together the fore-wings were separated. This observation possibly explains why the flight of this species is more awkward and less swift than that of most Odonata.

35. *Hetaerina americana* Fabricius. Station 15 in June and July.

On 23-VI-38 Vance Hoffmaster observed oviposition of this species at Bluff View. A female came to rest on a low plant and carefully bent her abdomen under and apparently deposited an egg or eggs in the plant a fraction of an inch above the water. Then she ascended into the air, copulated, and returned shortly to oviposition. During July the author made a trip to this locality. Several Ruby Spots were taken, but none were ovipositing. On this occasion when the sky became clouded this species was the first to disappear.

36. *Hetaerina tricolor* Burmeister. Station 13 in June.

These damselflies were common on plants about six feet high near the stream bed. The flight was of short duration, with much resting on the higher parts of the plants. The shaded areas seem to be preferred. Two individuals were seen in other parts of this creek on the under parts of the lower plants overhanging the water. Their coloration was slightly different from that given by Needham and Heywood in that the spots on the hind wings contained more violet than in the description.

37. *Archilestes grandis* Rambur. Stations 5, 12, 16 in August September, and November, and at Camp Kiwanis in July.

At Station 16 they rested on law shrubs which grew on the vertical banks, while at Cedar Hill they frequented *Sagittaria*, resting almost at right angles to the stream. Although several trips were made to Cedar Hill Pond in 1937 this species was not seen there until the following year. *Archilestes* is weak in flight, and rests with its wings widespread.

36. *Lestes disjunctus* Selys. Stations 1, 5, and 12 in April, September, and November, At Sandpit Lake this species rested on weeds about two feet high that covered the banks of a small pit across the road from the lake.
39. *Argia agroides* Calvert. Station 15 in July.
40. *Argia apicalis* (Say). 1, 11, 13, in March, June, July and August.
At 7:15 p. m. several pruinose males flew low and frequently rested on limestone rocks.
41. *Argia immunda* (Hagen). Stations 13, 15, 18 in April, July, and August.
The pruinose males were seen resting on white rocks that protruded out to moving water.
43. *Argia sedula* (Hagen). Stations 11, 12, 13, 15, 18, in June, July, and August.
This species was common at each of the collecting stations listed.
44. *Argia translata* (Hagen). Stations 1, 6, 12, 14, 16, in June, and September.
On 27-IX-38 at Wheatland Road Creek females were common, resting on objects about four feet high near the water. About 9:00 a. m. two teneral females were clinging to a limestone cliff by water at the foot of a dam at Station 14.
45. *Argia vivida* (Hagen). Station 11 in May, July, and September.
This species was abundant at Elam Springs flitting about on vegetation close to that frequented by *Agriion*. However, their habits differed in that *Argia vivida* sometimes strayed as far as fifty feet from the water course.
46. *Telebasis salva* (Hagen). Stations 12 and 14 in June, July, October, and November.
In October, 1939, *Telebasis* was common at a very small fish pond in Oak Cliff. At Beckley they were numerous among ragweed plants adjacent to the lake.
47. *Enallagma civile* (Hagen). Stations 1, 2, 4, 5, 6, 8 in April, July, September, and November.
At Sandpit Lake in September hundreds were *in copulo*, ovipositing on small plants just below the surface of the water. This species was swarming over the entire lake. During April, a number emerged in the laboratory from nymphs that were taken from several habitats. In July at about 11:00 a. m. one pair was collected from roadside weeds at Cockrell Hill Pond. In November at Sandpit Lake a few of these were seen *in copulo*.
48. *Enallagma basidens* Calvert. Stations 1, 3, 12, and 15 in April and July.
Four males and one female were taken from tall composites (*Achlophappus*) growing among large boulders near Sandpit Lake. During July this species was *in copulo* at Bluff View. They were common although there had been a light rain. In July two nymphs taken from Cedar Creek transformed in the laboratory.
49. *Ischnura ramburii* Selys. Stations 1 and 6 in April, July and September.
At Sandpit Lake this species was found resting on low vegetation near the water. In July, at the same habitat, copulating pairs were collected. In one case on a stem one and one-half inches out of the water two males and one female were together as if both males were trying to copulate with the same female.
50. *Ischnura posita* (Hagen). Stations 1, 6, 8, 12, 14, 15 in April, May, June, July, August, and on *Sagittaria* in a small fish pond in Oak Cliff during October.
This species was usually abundant on low thick vegetation over shallow water, and occasionally on high plants away from the water.
51. *Anomalagrion bastatum* (Say). Stations 1, 2, 5 in April and June.
On the embankment of a road bordering the north end of White Rock in April, dozens of females and few males were taken. This was the only time *Anomalagrion* was observed in abundance.

Summary

1. A distributional and ecological study was made of the Odonata of Dallas County.
2. Fifty-one imagoes representing thirty-two genera are reported on in this paper.
3. *Didymops transversa* Say, *Celithemis elisa* Hagen, and *Celithemis fasciata* Kirby are believed to be new records for Texas.
4. Oviposition data are given for seven species.

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