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A. V. Provonsha

Purdue University, West Lafayette, Indiana

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THE ZYGOPTERA (ODONATA) OF UTAH
WITH NOTES ON THEIR BIOLOGY

A. V. Provonsha

ABSTRACT.—Detailed distribution maps of Utah are provided for each of the 33 state species of Zygoptera. Notes on the general range, habitat preference, reproductive behavior, emergence data, and general biology of each species are also included.

As noted by Kormondy (1957), published data on the geographical distribution of western Odonata is scarce. Kennedy (1915) gave a partial list of the Odonata of Washington and Oregon, and in 1917 he published records from central California and Nevada. The Washington list has recently been updated by Paulson (1970) and a complete list and keys to the California Odonata is given by Smith and Pritchard (1956). Bick and Hornuff (1972) published many new Odonata records for northwestern Wyoming. Although Larsen (1952) and Musser (1962) added considerably to our knowledge of Utah Anisoptera, only one paper (Brown 1934) dealing exclusively with the Odonata of Utah included a treatment of the Zygoptera. Brown’s report consisted of an annotated checklist including some 25 currently valid zygopteran species.

During the summers of 1970 and 1971 the state of Utah was extensively collected in an effort to gain an increased understanding of the distribution and species composition of the damselfly fauna of that area. Some 152 localities throughout the state were sampled, and the collections at the University of Utah, Utah State University, Brigham Young University, and Dixie College were examined. As a result, the list of Zygoptera known to occur in Utah has been expanded to 33. In addition, field work and rearing has added considerably to our knowledge of the biology of many species (also see Provonsha and McCafferty 1973).

No attempt has been made to cite in detail all collection records. Although county records may be adequate for some states where counties are numerous and relatively small, they are meaningless for Utah, where several counties contain over 5,000 square miles and in many cases more than one distinct biotic region. Instead, distributions based on all collecting localities known to the author are plotted for each species. For those instances where counties are mentioned in the text, the reader may refer to Fig. 1 for their specific location. Where possible, notes on general distribution, habitat preferences, emergence data, and reproductive behavior are included in the text.

For keys to the zygopteran species known to occur in Utah, the author recommends the following publications: Johnson (1972), Smith and Pritchard (1956), and Walker (1953).

Fig. 1. County map of Utah.

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2Department of Entomology, Purdue University, West Lafayette, Indiana 47907.
Calopteryx aequabilis Say, 1839

Fig. 2

This species is known to occur throughout most of Canada east of Saskatchewan and the north central and northeastern United States, with isolated pockets in Colorado, California, and the Columbia River drainage system. The major population of C. aequabilis in Utah is found at the Raft River, Box Elder Co., which is the only major river in Utah flowing north as part of the Columbia River drainage system. One other small isolated population occurs at Far West, Weber Co. A single male was collected at Goshen, Utah Co., on 19 May 1969, by P. V. Winger. Subsequent collections at that locality have failed to provide additional specimens, and it is doubtful that a population is established there. The species is restricted to streams where the nymphs cling to debris and submerged roots along the banks. The above record from Goshen is the earliest Utah record I have; species have been taken at the Raft River through mid-September. This species does not oviposit in tandem; however, the male remains in close proximity to the female and actively wards off other intruding males. Martin (1939) and Walker (1953) observed females descending as much as one foot below the water to deposit eggs. In July 1971 I observed several females ovipositing at the Raft River. On this occasion none submerged but completed oviposition just below the water line in algal mats in shallow water close to the bank. It must be noted, however, that the water level was lower than usual and there was little suitable vegetation in the deeper portions of the river.

Hetaerina americana (Fabricius, 1788)

Fig. 2

With the exception of the far eastern and northwestern states and Florida, H. americana has a general distribution throughout the United States and extends southward through Mexico into Guatemala. It is found throughout Utah in rivers and streams below 5,800 feet elevation which have a moderate flow and sufficient marginal vegetation for oviposition and nymphal development. The earliest emergence date I have for the state is 29 May. The nymphs emerge over most of the summer and can be found in the adult stage to the end of September. The female oviposits singularly and completely submerge to deposit their eggs, while the male, which perches nearby, faces the submerged female and actively fends off intruding males (Johnson 1961 and Bick and Sulzback 1966).

Hetaerina vulnerata Hagen, 1853

Fig. 2

H. vulnerata is restricted to the southwestern United States and Mexico, entering only the southwest corner of Utah in Washington County, which is part of the Mohave Desert Lower Sonoran. Like H. americana, the nymphs are found on roots, vegetation, and debris in streams with a moderate current. Although these two species were found at nearby streams, they were never taken at the same localities (Provonsha and McCafferty 1973).
Archelestes grandis (Rambur, 1842)

Although this species ranges over much of the United States, in Utah it is restricted to the southern deserts. The nymphs are active swimmers and can be found in ponds and slow desert streams. All Utah collecting sites were below 4,600 feet. A. grandis is the largest of all Nearctic damselflies, the females having a wing span of approximately 40 mm. Like most other lestids, it is a late emitter. The earliest Utah record I have is 9 July. Bick and Bick (1970) reported that in Oklahoma emergence is much earlier and that oviposition is common by mid-June. In that area the eggs reportedly hatch approximately 16 days after oviposition, and the nymphs overwinter in a fairly late stage of development. However, there is some evidence that in the western deserts, where emergence tends to be later and where there is often a winter drought, eclosion may be delayed until the following spring. Oviposition takes place in tandem, and the eggs are deposited as high as 13 m above water in woody plants overhanging the water. This unique reproductive behavior has enabled this species to colonize certain habitats, such as desert streams, where marginal vegetation may be plentiful but vegetation within the water may be wanting.

Lestes congener Hagen, 1861

This species is found over much of the United States and is by far the most common and wide-ranging Lestes in Utah. All collecting sites were at permanent and semipermanent ponds or "pondlike" expansions of slow streams at altitudes ranging from 4,200 to 7,000 feet. The nymphs are free swimmers and seem to prefer shallow ponds with some areas free of vegetation. Emergence begins in early July and continues through late August. As in most other Lestes species, the eggs are usually deposited some distance above water. However, on one occasion during flood conditions I observed two females submerge their abdomens almost to the base to deposit eggs below the water line.

Lestes disjunctus disjunctus Selys, 1862

Although primarily found in Canada, Alaska, and the northern regions of the United States, this species does follow the mountains south through Utah and Colorado into Arizona. In Utah it was found mainly at permanent and semipermanent, richly vegetated ponds in mountainous areas between 5,000 and 7,000 feet. Emergence begins around mid-July and continues through mid-August. Although ovi-
position usually takes place well above water, on two separate occasions in 1970 I observed paired adults completely submerge to ovipost. These observations were made during flood conditions when more than the usual amount of vertical stems were below water. These observations coincide for the most part with observations by Bick and Bick (1961) for *L. d. australis* Walker.

*Lestes dryas* Kirby, 1890

Fig. 5

This species is Holarctic, occurring not only in North America but Europe and Asia as well. It is found most commonly at permanent and semipermanent ponds and less frequently in marshy areas. It was the only *Lestes* species taken above 8,000 feet in Utah. Although the locality records are scattered, *L. dryas* tended to be the dominant species at these localities. Emergence begins about the last week in June and continues through mid-August.

*Lestes unquiculatus* Hagen, 1861

Fig. 6

The range of *L. unquiculatus* is transcontinental in the northern United States and southern Canada. It was found at only a few localities in Utah and never in any large numbers. Specimens were collected primarily at temporary and semipermanent marshy areas between 5,000 and 6,350 feet. Emergence data for the state is insufficient. However, Walker (1953) reported that in Canada they fly mainly in July and August.

*Argia alberta* Kennedy, 1918

Fig. 7

*A. alberta* is restricted to the western United States. Although it occurs in most regions of Utah at altitudes between 4,000 and 6,500 feet, it was never taken in any large numbers. The nymph has not been described, and none were taken during this study. With the exception of the San Juan River in San Juan Co., all adults were taken in association with small, slow flowing streams or marshy springs. The earliest collecting record I have for the state is 4 June and the flight period extends through the end of August. As with most *Argia* species, oviposition usually takes place in tandem.

*Argia emma* Kennedy, 1915

Fig. 8

This species is found in the western United States and British Columbia. In Utah it is found in the mountainous areas
in the northern two-thirds of the state in rivers and streams with gentle to moderate currents at altitudes between 4,200 and 5,800 feet. The nymphs may be found on stones but were most frequently taken on roots and debris near the bank. Emergence begins around the first of June and continues through mid-July and oviposition usually takes place in tandem.

*Argia fumipennis violacea* (Hagen, 1861)

This species is known from Guatemala north through the southwestern United States, most of the central and eastern United States, and eastern Canada. However, I have seen only one specimen from Utah (Univ. of Mich. Coll.). The label read: "Utah E. M. Legard #55." Although specific local information was lacking, it is speculated, based on overall distribution, that this specimen was collected in the Lower Sonoran region of Washington Co. It is reported that *A. f. violacea* prefers small lakes and shallow streams with moderate currents and exposed rocks (Walker 1953).

*Argia lugens* (Selys, 1854)

This species is found only in Mexico and the southwestern United States. The only Utah records I have are from Zion National Park and Leeds Canyon (both in Washington Co.) where the nymphs inhabit permanent desert streams. I have no emergence data for the state. All specimens examined were collected during the month of July.
Argia moesta (Hagen, 1861)  
Fig. 9

Although common throughout North America with the exception of the northwestern states and western Canada, this species has been taken in Utah only from the Colorado River, where the nymphs can be found on rubble and in debris near the bank. Emergence begins in late May and continues through most of June. Walker (1953) reports that females oviposit either in tandem or unattended by the male and that they may completely submerge to deposit their eggs. Unlike most western species of Argia, which prefer to light on bare ground, all individuals of A. moesta observed in Utah rested on willows along the river's edge.

Argia nahauna Calvert, 1901  
Fig. 8

This species is known only from the southwestern United States, entering Utah only in Washington Co. It is found at small streams with moderate currents and occasionally in permanent desert springs. At most localities it was found in association with A. sedula. The earliest Utah record I have is 5 June and the latest is 9 September.

Argia sedula (Hagen, 1861)  
Fig. 7

The reported range of A. sedula includes most of the southern portion of the United States, northern Mexico, the midwestern states, and southern Ontario. In Utah it was found only in Washington Co. at altitudes between 2,800 and 4,400 feet. The nymphs prefer small streams with gentle current and a rich growth of vegetation. Emergence begins in mid-May and continues through mid-June.

Argia vivida Hagen, 1865  
Fig. 10

A. vivida is restricted to the western United States and southwestern Canada. It is fairly common in Utah and can be found at most rivers and streams with moderate currents. During this study they were taken at altitudes between 2,800 and 6,500 feet. Although they can be found in debris along the stream banks, the nymphs prefer stones and rubble well within the main current of the stream. Emergence begins around the first of June and continues through mid-July. Oviposition takes place in tandem, and eggs are laid just below the water surface in a wide variety of aquatic plants. Like most other Argia species, the males will frequently balance in a vertical position during oviposition when the immediate environment does not provide a good object for them to grasp.

Amphiagrion abbreviatum (Selys, 1876)  
Fig. 11

This species is known from the western United States and southwestern Canada. I found this species at a great many localities throughout the state, but never in any large numbers. The habitats were varied, ranging from moderately flowing streams with gravel bottoms, to heavily vegetated ponds and springs, to large lakes. However, as Whitehouse (1941) found, they tend to prefer shallow, sunlit marshy areas with little or no current. They were taken at altitudes between 4,200 and 7,500 feet. Emergence begins in early May and the flight period extends through the end of August. Oviposition usually takes place in tandem, but I have observed unattended females probing algal mats.
Telebasis salva (Hagen, 1861)

Fig. 12

*T. salva* ranges from the southwestern United States to Venezuela. I have seen only three specimens taken in Utah. They were all collected at a small spring-fed pond near St. George, Washington Co.: two in 1941 (Univ. of Utah Coll.) and one in 1959 (Dixie College Coll.). Recently the area has been converted into a golf course, greatly changing the original habitat. It is possible that this species no longer occurs in the state.

Coenagrion resolutum (Hagen, 1876)

Fig. 12

This species is known from throughout most of Canada and Alaska, the northeastern states, and higher elevations in the West. In Utah it was found at small ponds and slow-flowing high meadow streams above 7,000 feet, where they emerge during the month of July. Evidently all oviposition is in tandem.

Enallagma anna Williamson, 1900

Fig. 13

*E. anna* is restricted to the western United States. This species is fairly common throughout the mountainous areas of northern Utah at altitudes between 4,200 and 7,000 feet. Nymphal development takes place in rivers and streams with slow to moderate currents. The flight period ranges from mid-May through the first of September, and, like most other species of *Enallagma*, oviposition takes place in tandem.
**Enallagma boreale** Selys, 1875

The range of this species includes most of Canada and the northern United States with isolated populations at higher altitudes in the southwest. Next to *Ischnura perparva* Selys, it is the most common species in Utah, being absent only from the desert areas in the southeast. It is most frequently found at lakes and ponds and rarely at slow-flowing streams. Collection sites ranged from 4,000 to 9,000 feet. It is an early emerger, and the first record I have for the state is 8 May. None were taken after mid-August. Oviposition usually takes place in tandem.

**Enallagma carunculatum** Morse, 1895

With the exception of a break along the Rocky Mountains, this species is found transcontinentally in southern Canada and the northern United States, extending southward in the West into northern Mexico. This is one of the more common and widely adapted species in Utah, often occurring in great numbers. Although it was most frequently found at small ponds, it was also taken at streams, rivers, and some of the larger lakes and reservoirs at altitudes between 3,000 and 8,000 feet. *E. carunculatum* is one of the few species which can develop in brackish water, such as that occurring in drainage ditches west of Salt Lake City near the Great Salt Lake, where it was found in close association with *E. clausum* Morse. This association has also been reported for other brackish waters such as Pyramid Lake, Nevada (Kennedy 1917). Emergence begins in late May, and oviposition takes place in tandem.

**Enallagma civile** (Hagen, 1861)

With the exception of the far northwest, *E. civile* has a wide range over most of the United States and extends as far south as the West Indies and Colombia. Although this is one of the most common species in North America, it was taken at only a few scattered localities in Utah. Locally abundant populations were taken in the Sevier River drainage system in Millard Co., but only small numbers were taken at most other collecting sites. Nymphs were taken in lakes, ponds, and streams and rivers with slow currents at altitudes from 2,800 to 6,000 feet. Like its close relative *E. carunculatum*, emergence begins in late May and continues through most of the summer.
may be found in slow streams and lakes with some wave action. *Enallagma clausum* is tolerant to saline conditions and was frequently found in association with *E. carunculatum* at brackish waters in the western desert. Unlike most species of *Enallagma*, adults prefer to rest on bare ground rather than on vegetation; when they are at rest the wings are frequently held at a slight angle away from the body. Emergence begins in late May and continues through most of the summer.

*Enallagma cyathigerum* (Charpentier, 1840)

Fig. 18

This is a Holarctic species, being found in Europe, Asia, Canada, and most of the northern United States. It is one of the more common species in Utah and is absent only from the western deserts. Although most common at small ponds, it was frequently taken at streams with slow to moderate currents. With the exception of *Coenagrion resolutum*, it was the only species taken above 9,000 feet. Emergence begins in mid-June, and adults can be found through early September.

*Enallagma ebrium* (Hagen, 1861)

Fig. 16

The range of this species is reported as Boreal North America. It has been taken at only two localities in Utah. Fourteen specimens were collected at the Weber River, West Weber, Weber Co., by C. J. D. Brown (1934), and two adults were collected during this present study at marshy areas along the Bear River in Cache Co. Both of the above-mentioned collections were made in July. Walker (1953) records the flight period in Canada to be from 30 May through 24 August.

*Enallagma praevarum* (Hagen, 1861)

Fig. 13

This species ranges from the southern United States to southern Mexico. In Utah it is restricted to desert streams and springs at 2,800 to 5,800 feet elevation in the unique southwest corner of the state. Although very closely related to *E. anna*, at no place did their ranges overlap. Emergence begins in mid-May and continues through the month of June.
Ischnura barberi Currie, 1903

*Ischnura barberi* is known only from the western United States. All collecting sites in Utah were at ponds in the western portion of the state at altitudes ranging from 2,800 to 4,730 feet. This species appears to be rare in numbers, since no more than two specimens were taken at any one locality. Oviposition was never observed. All collections were made during the months of June and July.

Ischnura cervula Selys, 1876

*Ischnura cervula* is known in southwestern Canada, western United States, and northern Mexico are included in the range of this species. It is fairly common and was frequently found at ponds and slow streams with a preference for shallow marshy areas. Samples were from altitudes ranging from 4,200 to 7,000 feet. Oviposition does not usually take place in tandem. Emergence begins in early May and continues through most of the summer.

Ischnura damula Calvert, 1901

*Ischnura damula* is known in southern Canada from Manitoba west and the western United States. Except for the warm springs in Tooele Co., its distribution in Utah is restricted to the southern portion of the state. All specimens were collected from small ponds and springs with dense stands of cattails along the margins. All sites were between an altitude of 4,225 and 5,825 feet. Females were observed ovipos-
Iting singularly and in tandem. The earliest record I have for the state is 23 May. It is probable that emergence begins in early May and continues through early July.

*Ischnura demorsa* (Hagen, 1861)  
Fig. 19

*Ischnura demorsa* is reported from the western United States and Mexico. This close relative of *I. perparva* is rare in Utah, however. Only two specimens were taken during this study, both from McCracken Spring in San Juan Co. at an altitude of 4,900 feet. I have no emergence data for this species.

*Ischnura denticollis* (Burmeister, 1839)  
Fig. 22

This species is found only in the southwestern United States and Mexico. In Utah it is restricted to the cold deserts in the western half of the state. It is equally suited to both ponds and streams and is tolerant to a wide range of altitudes, being found from 2,700 to 6,300 feet. Oviposition usually takes place in tandem. This species tends to emerge somewhat later than most other Utah ischnurans. No specimens were taken before the first of June, and 15 August was the last date they were encountered.

*Ischnura perparva* Selys, 1876  
Fig. 23

This species is known from the western United States and southwestern British Columbia. This is by far the most common damselfly in Utah. It was found at 87 of the 152 localities sampled during this
study (almost twice as many as any other species). Its great abundance can be attributed, in part, to its ability to survive in many diverse habitats. It was found in most aquatic situations between 4,200 and 7,500 feet where there was sufficient vegetation and a high enough minimum temperature to support zygopteran forms. Although oviposition may take place in tandem, it is usually accomplished unattended by the male. Emergence begins in early May and continues throughout most of the summer.

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