

## ANNOTATED INVENTORY OF THE MAYFLIES (EPHEMEROPTERA) OF ARIZONA<sup>1,2</sup>

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**ABSTRACT:** Sixty-six nominal species in 28 genera and nine families of Ephemeroptera are reported from Arizona. *Acentrella turbida*, *Ameletus sparsatus*, *Baetis caelestis*, *Baetodes alleni*, *Callibaetis americanus*, *C. pallidus*, *Camelobaetidium warreni*, *Centroptilum elsa*, *Cloeodes macrolamellus*, and *Tricorythodes explicatus* are newly reported from the state. The most diverse fauna of the state is that of Apache County, with 41 species. It is followed in decreasing species numbers by Gila, Yavapai, Coconino, Navajo, Cochise, Greenlee, Graham, Mohave, Maricopa, Pima, Santa Cruz, and Pinal Counties. *Thraulodes arizonicus* and *T. salinus* are shown to be junior synonyms of *T. speciosus* and *T. gonzalesi*, respectively. *Traverella castanea* and *Traverella* sp. A are shown to be synonyms of *T. albertana*.

Eaton (1885) provided the first records of mayflies from Arizona based on *Cinygmula par* (Eaton) and *Heptagenia elegantula* (Eaton), and later (Eaton 1892) recorded *Choroterpes inornata* Eaton from there also. Since then, only sparse Arizona records have appeared in the taxonomic works of Banks (1918), Traver (1934, 1935) McDunnough (1938, 1942), Allen and Edmunds (1962, 1963, 1965), Edmunds and Allen (1964), Allen (1967, 1968, 1974, 1978), Koss (1972), Kilgore and Allen (1973), Allen and Brusca (1978), Allen and Chao (1978a, 1978b, 1981), Morihara and McCafferty (1979), Kondratieff and Voshell (1984), McCafferty and Waltz (1986, 1995), Allen and Murvosh (1987a, 1987b), Waltz and McCafferty (1987), and Provonsha (1990), and in the ecological work of Gray (1981).

Our inventory of the Ephemeroptera of Arizona is based on published records and newly studied materials housed in the Monte L. Bean Science Museum (MLB), Brigham Young University, Provo, Utah; the Purdue Entomological Research Collection (PERC), West Lafayette, Indiana; and the entomological collection at Colorado State University (CSU), Fort Collins. Families are ordered according to the phylogenetic classification provided by McCafferty (1991). Asterisks before species names indicate new state records. Complete locale data that form the basis of the new state records are annotated, and comments regarding the species' range are given under the relevant species. Asterisks before county names indicate new county records, and asterisks before stream names indicate first records for those streams. The complete locale data on which new county and stream records are based are available from the authors upon request. New synonyms of species names are indicated and discussed under the relevant species.

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We account for 65 nominal species of mayflies in 28 genera and nine families. Apache County has the most diverse fauna of the state, with 41 species. It is followed by Gila (31), Yavapai (25), Coconino (24), Navajo (21), Cochise (16), Greenlee (13), Graham (12), Mohave (11), Maricopa (10), Pima (9), Santa Cruz (7), and Pinal (5) Counties. No species have been reported from Yuma County, which is essentially devoid of mayfly habitat except for the Colorado River. Ten species are newly reported from Arizona.

Several mayfly genera known from the surrounding areas of northern Mexico, southern California, New Mexico, and southern Utah have yet to be found in Arizona, but may eventually be found there. They include *Acerpenna* Waltz and McCafferty, *Apobaetis* Day, *Attenella* Edmunds, *Brachycercus* Curtis, *Farrodes* Peters, *Hexagenia* Walsh, *Homoeoneuria* Eaton, *Ironodes* Traver, *Lachlania* Hagen, *Leptophlebia* Westwood, *Leucrocuta* Flowers, *Paracloeodes* Day, *Procloeon* Bengtsson, and *Timpanoga* Needham.

#### SIPHONURIDAE

*Siphonurus occidentalis* Eaton — Apache Co: \*Black R, \*Little Colorado R, \*Nutrioso Cr, White R; Cochise Co: Herb Martyr L; Coconino Co: Flagstaff; \*Gila Co: Boulder Cr; \*Yavapai Co: Boulder Cr. All previously published records are from Allen and Chao (1981).

#### AMELETIDAE

*Ameletus falsus* McDunnough — Apache Co: Greer (McDunnough 1938).

\**Ameletus sparsatus* McDunnough — Apache Co, Black R, at Forest Rd 25, Apache National Forest, V-4-1981, W. P. McCafferty, A. V. Provonsha, and D. Bloodgood, larvae, deposited at PERC.

This species was originally described from Alberta by McDunnough (1931). McCafferty *et al.* (1993) included it in their inventory of the mayflies of Colorado. Its presence in Arizona suggests that it may be found eventually in New Mexico and Utah.

*Ameletus velox* Dodds — Apache Co: Greer; \*Cochise Co: Chiricaua Mts; \*Gila Co: Christopher Cr; Graham Co: Moonshine Cr, Wet Cr; \*Pima Co: Santa Catalina Mts. All previously published records are from Allen and Chao (1981).

#### BAETIDAE

*Acentrella insignificans* (McDunnough) — Apache Co: White R; Coconino Co: Sedona; Maricopa Co: Sycamore Cr (Gray 1981), Verde R; \*Mohave Co: Burro Cr; \*Pinal Co: Gila R; Yavapai Co: Verde R. Previously published records are from Morihara and McCafferty (1979), except where noted, and all were as *Baetis insignificans* McDunnough.

\**Acentrella turbida* (McDunnough) — Apache Co, Paradise Cr, at Hawley Lake Rd, Rt 473, IX-9-1967, R. Koss and D. Argyle, larvae, deposited at PERC.

This species was previously reported from Alberta (McDunnough 1924),

Utah (Edmunds 1954), and Colorado (McCafferty *et al.* 1993). Recently, McCafferty *et al.* (1994) reported it from British Columbia and described its larval stage. Arizona represents the southernmost part of its range in western North America.

*Baetis caelestis* Allen and Murvosh — Apache Co, Fort Apache, White R, VII-6-1969, R. W. Koss, W. P. McCafferty, and A. V. Provonsha, larvae, deposited at PERC.

Morihara and McCafferty (1979) reported this species as *Baetis* sp. A from New Mexico. Later, Allen and Murvosh (1983) described it as *B. caelestis* from Baja California. Its presence in Arizona was thus expected.

*Baetis magnus* McCafferty and Waltz — Apache Co: \*Draw Cr, Hall Cr (Morihara and McCafferty 1979, as *Baetis* sp. B), \*Rosey Cr, \*Snake Cr; \*Cochise Co: Carr Canyon, Rucker Cr, Turkey Cr; \*Coconino Co: Oak Cr; \*Gila Co: Bye Cr, Christopher Cr, East Verde R, Tonto Cr; \*Graham Co: Noon Cr; \*Pima Co: Madera Canyon Cr, Molino Basin; Yavapai Co: \*Santa Maria R, \*Sycamore Cr, Verde R (McCafferty and Waltz 1986).

*Baetis notos* Allen and Murvosh — \*Apache Co: White R; \*Cochise Co: Cave Cr; \*Gila Co: Christopher Cr; \*Maricopa Co: Verde R; \*Mohave Co: Burro Cr; \*Pima Co: Cañada del Oro; Yavapai Co: Verde R (Morihara and McCafferty 1979, as *Baetis* sp. C).

*Baetis tricaudatus* Dodds — \*Apache Co: Hall Cr, Little Colorado R, Lukachukai Cr, Paradise Cr, White R; \*Cochise Co: East Turkey Cr; \*Coconino Co: Havasu Cr, Oak Cr; Gila Co: \*Christopher Cr, \*Horton Cr, Parker Cr, \*Pine Cr, Tonto Cr; \*Graham Co: Grant Cr, Marijilda Cr; \*Greenlee Co: Black R; \*Maricopa Co: Phoenix; \*Mohave Co: Virgin R; Navajo Co: White R; \*Pima Co: Sabino Cr; \*Santa Cruz Co: Madera Canyon; Yavapai Co: Beaver Cr, \*Clear Cr, \*Oak Cr, \*Page Springs, Verde R. All previously published records are from Morihara and McCafferty (1979).

*Baetodes alleni* McCafferty and Provonsha — Yavapai Co, Oak Cr, Red Rock Crossing, IV-28-1978, R. W. Baumann, larvae, deposited at MLB and PERC.

McCafferty and Provonsha (1993) described *B. alleni* from Texas. This is the first report of this species outside of that state, suggesting that it may be more generally widespread west of Texas.

*Baetodes arizonensis* Koss — Coconino Co: Oak Cr (Koss 1972).

*Baetodes edmundsi* Koss — Yavapai Co: Clear Cr, Verde R (Koss 1972).

*Callibaetis americanus* Banks — Apache Co, Snake Cr, Rt 273, IX-9-1967, R. W. Koss and D. Argyle, male and female adults, deposited at PERC.

This species has a widespread distribution in western North America (McCafferty *et al.* 1993). The present report extends its known range slightly southward.

*Callibaetis montanus* Eaton — \*Apache Co: Paradise Cr, Snake Cr; \*Cochise Co: San Pedro R; \*Coconino Co: Cheylon Cr; \*Gila Co: Salt R; Maricopa Co: Sycamore Cr (Gray 1981); \*Mohave Co: Big Sandy R; \*Navajo Co: Tool Hollow L; \*Pima Co: Quitobaquito Spring.

*Callibaetis pallidus* Banks — Coconino Co, Stoneman Lake, IV-27-1975, M. W. Sanderson, larvae, deposited at PERC; Mud Springs, Mormon Mtn, VII-23-1976, M. W. Sanderson, larvae, deposited at PERC.

McCafferty *et al.* (1993) extended the known range of this species westward into Colorado. The new records indicate an even more westward distribution and suggest that it may be found eventually in New Mexico and Utah.

*Callibaetis pictus* Eaton — \*Apache Co: Paradise Cr; \*Cochise Co: Chiricahua Mts; Coconino Co: Williams (Banks 1918, as *Callibaetis signatus* Banks); \*Gila Co: Boulder Cr, Carrizo Cr; \*Mohave Co: Wheeler Springs; \*Navajo Co: Show Low; \*Pima Co: Santa Catalina Mts; \*Yavapai Co: Boulder Cr.

*Camelobaetidium salinus* (Allen and Chao) — Gila Co: Salt R (Allen and Chao 1978a, as *Dactylobaetis salinus* Allen and Chao).

*Camelobaetidium trivialis* (Allen and Chao) — Gila Co: Gila R, Verde R; Navajo Co: White R; Yavapai Co: Oak Cr, Verde R. All records are from Allen and Chao (1978a), as *Dactylobaetis trivialis* Allen and Chao.

\**Cameolobaetidium warreni* (Traver and Edmunds) — Apache Co, Fort Apache, White R, VII-6-1969, R. W. Koss, W. P. McCafferty, and A. V. Provonsha, larvae, deposited at PERC; Yavapai Co., east side of Camp Verde, Verde R, V-6-1969, R. W. Koss and A. V. Provonsha, larvae, deposited at PERC; Clear Cr Campground, E of Camp Verde, VI-8-1982, Baumann and Clark, larvae, deposited at MLB and PERC.

This species was previously reported in the United States from west-central California (Traver and Edmunds 1968) and southern Colorado (McCafferty *et al.* 1993). More recently, Lugo-Ortiz and McCafferty (1994) reported it from the Mexican states of Baja California Sur, Chiapas, Chihuahua, Guerrero, Oaxaca, and Sonora. Its presence in Arizona was quite predictable.

\**Centroptilum elsa* Traver — Apache Co, Coyote Cr, at Forest Rd 276, V-4-1981, W. P. McCafferty, A. V. Provonsha, and D. Bloodgood, larvae, deposited at PERC; meadow brook on Williams Rd, nr Forest Rd 276 cut off, V-4-1981, W. P. McCafferty, A. V. Provonsha, and D. Bloodgood, larvae, deposited at PERC.

The present report of this species from Arizona significantly extends its range southward. *Centroptilum elsa* was previously reported only from Grand Teton National Park in Wyoming (Traver 1935). Its presence in Arizona suggests that it may be found eventually in Colorado, New Mexico, and Utah.

*Cloeodes excogitatus* Waltz and McCafferty — Coconino Co: Oak Cr Canyon (Waltz and McCafferty 1987); \*Yavapai Co: Roundtree Cr.

\**Cloeodes macrolamellus* Waltz and McCafferty — Pima Co, Santa Catalina Mts, III-13-1936, J. G. Needham, larva, deposited at PERC; Santa Cruz Co, Madera Canyon, V-7-1969, R. W. Koss and A. V. Provonsha, larvae, deposited at PERC.

In the United States, this species was known only from the type locality in New Mexico (Waltz and McCafferty 1987). Lugo-Ortiz and McCafferty (1994) reported it from the Mexican states of Chihuahua and Durango. Its presence in Arizona extends its known range northwestward.

*Fallceon quilleri* (Dodds) — Apache Co: \*Black R, Little Colorado R (Moriyama and McCafferty 1979); \*Cochise Co: Rucker Cr; \*Coconino Co: Verde R; \*Gila Co: Carrizo Cr, East Verde R; \*Graham Co: Gila R; \*Greenlee Co: Blue R; Maricopa Co: Phoenix (Moriyama and McCafferty 1979), Sycamore Cr (Gray 1981); \*Mohave Co: Beaver Dam Wash, Burro Cr; \*Navajo Co: Show Low; Pima Co: Bear Canyon (Traver 1935, as *Baetis erebus* Traver), \*Madera Canyon; \*Santa Cruz Co: Rock Corral Cr; \*Yavapai Co: Santa Maria R, Verde R. Previously published records of this species were as *Baetis quilleri* Dodds.

*Labiobaetis apache* McCafferty and Waltz — Apache Co: Little Colorado R (McCafferty and Waltz 1995).

#### ISONYCHIIDAE

*Isonychia intermedia* (Eaton) — Gila Co: E Verde R; Greenlee Co: San Francisco R; \*Maricopa Co: Verde R; Yavapai Co: Oak Cr, Verde R. All previously published records are from Kondratieff and Voshell (1984).

#### HEPTAGENIIDAE

*Cinygmula par* (Eaton) — Unknown location (Eaton 1885, as *Cinygma par* Eaton).

*Epeorus deceptivus* McDunnough — Gila Co: Christopher Cr (Allen and Chao 1978b).

*Epeorus longimanus* Eaton Apache Co: Hall Cr, Little Colorado R, \*Paradise Cr, White R; \*Cochise Co: East Turkey Cr; \*Gila Co: Christopher Cr, Pine Cr. All previously published records are from Allen and Chao (1978b).

*Epeorus margarita* Edmunds and Allen — \*Apache Co: Black R; Coconino Co: Oak Cr Canyon; Gila Co: Clear Cr Canyon, \*East Verde R, \*Tonto Cr; Navajo Co: Clear Cr Canyon; \*Yavapai Co: Oak Cr., Page Springs. All previously published records are from Edmunds and Allen (1964).

*Heptagenia elegantula* (Eaton) — \*Apache Co: Paradise Cr; \*Navajo Co: White R; Unknown location (Eaton 1885, as *Rhithrogena elegantula* Eaton).

*Heptagenia solitaria* McDunnough — Apache Co: White R (Allen and Chao 1978b); \*Graham Co: Gila R; \*Mohave Co: Black Cr.

*Nixe criddlei* (McDunnough) — Apache Co: Gooseberry Cr, Hall Cr, Nutrioso Cr, White R; \*Cochise Co: East Turkey Cr, Huachuca Canyon, Ramsey Canyon; Coconino Co: Oak Cr; Gila Co: Tonto Cr; Graham Co: Wet Cr; Navajo Co: White R; \*Pima Co: Jabino Canyon Cr; Yavapai Co; Verde R. All previously published records are from Allen and Chao (1978b), as *Heptagenia criddlei* McDunnough.

*Nixe simplicioides* (McDunnough) — Apache Co: Little Colorado R, White R; \*Coconino Co: Oak Cr Canyon; \*Navajo Co: White R. All previous records are from Allen and Chao (1978b), as *Heptagenia simplicioides* McDunnough.

*Rhithrogena hageni* Eaton — Apache Co: White R (Allen and Chao 1978b).

*Rhithrogena morrisoni* (Banks) — Apache Co: White R (Allen and Chao 1978b); \*Navajo Co: White R.

*Rhithrogena plana* Allen and Chao — Navajo Co: White R (Allen and Chao 1978b).

*Rhithrogena undulata* (Banks) — Apache Co: Paradise Cr, White R; Navajo Co: White R. All records are from Allen and Chao (1978b).

*Rhithrogena vitta* Allen and Chao — Apache Co: White R; Navajo Co: White R. All previous records are from Allen and Chao (1978b).

#### LEPTOPHLEBIIDAE

*Choroterpes inornata* Eaton — Apache Co: Little Colorado R; \*Cochise Co: Cave Cr; Gila Co: Salt R, San Carlos R; \*Greenlee Co: Blue R; \*Mohave Co: Big Sandy R; Navajo Co: Silver

Cr, White R; Santa Cruz Co: Sycamore Canyon; \*Yavapai Co: Clear Cr, Santa María R; Unknown locale (Eaton 1892). Previously published records are from Kilgore and Allen (1973), except where noted.

*Neochoroterpes kossi* (Allen) — \*Apache Co: Black R; Coconino Co: Oak Cr; Gila Co: \*Sycamore Cr, Verde R; \*Greenlee Co: Black R; \*Navajo Co: Show Low. All previously published records are from Allen (1974), as *Choroterpes kossi* Allen.

*Parleptophlebia memorialis* (Eaton) — Apache Co: \*Colorado R, \*East Verde R, Hall Cr (Kilgore and Allen 1973), \*Nutrioso Cr, \*Webber Cr, \*White R; Cochise Co: Herb Martyr L (Allen and Murvosh 1987b); \*Gila Co: East Verde R; Graham Co: Wet Cr (Allen and Murvosh 1987b); Greenlee Co: Blue R (Kilgore and Allen 1973).

*Thraulodes brunneus* Koss — Cochise Co: Cave Cr; Gila Co: Highler Cr; \*Santa Cruz Co: Sycamore Canyon; Yavapai Co: Beaver Cr. All previously published records are from Kilgore and Allen (1973).

*Thraulodes gonzalesi* Traver and Edmunds [= *Thraulodes salinus* Kilgore and Allen, n. syn.] — Apache Co: \*Black R, Salt R (Kilgore and Allen 1973, as *Thraulodes salinus*); \*Gila Co: East Verde R; \*Navajo Co: White R.

Kilgore and Allen (1973) described *T. salinus* from a small series of larvae from Apache County, Arizona, and indicated that the distinct abdominal coloration should readily separate it from other members of the genus. Later, Allen and Murvosh (1987b) reported *T. salinus* from the Mexican states of Chihuahua, Sinaloa, and Sonora. We have studied populations that possess an abdominal coloration intermediate between the typical *T. gonzalesi* and *T. salinus*, and there are no specific structural differences in any of the individuals in this gradient. Moreover, immature individuals of *T. gonzalesi* show a color pattern similar to that shown by Kilgore and Allen (1973) and Allen and Brusca (1978) for *T. salinus*, whereas more mature individuals show the *gonzalesi* pattern on some terga and the *salinus* pattern on others. Our examination of the holotype of *T. salinus* revealed that it is an immature larva assignable to *T. gonzalesi*, not a mature larva as indicated by Kilgore and Allen (1973). Based on all of the above observations, we place *T. salinus* as junior synonym of *T. gonzalesi*.

*Thraulodes speciosus* Traver [= *Thraulodes arizonicus* McDunnough, n. syn.] — \*Apache Co: Black R, Little Colorado R; Cochise Co: \*Cave Cr, Chiricahua Mts (Traver 1934), \*Rucker Cr; Coconino Co: Oak Cr (McDunnough 1942, as *Thraulodes arizonicus*); Gila Co: East Verde R, Haigler Cr, \*Tonto Cr; \*Graham Co: Gila R; Greenlee Co: Black R; Maricopa Co: Sycamore Cr (Gray 1981); Yavapai Co: Beaver Cr, \*Roundtree Cr. Previously published records are from Allen and Brusca (1978), except where noted.

McDunnough (1942) originally described *T. arizonicus* from male adults only, and indicated that these were very similar to those of *T. speciosus*. Traver and Edmunds (1967) tentatively identified larvae collected from near the type locality as *T. arizonicus*. Mayo (1969) associated the larvae and adults of *T. speciosus* through rearing, and indicated that these were very similar to those of *T. speciosus*. Mayo (1969) only suggested minor differences to separate the two species. Our examination of extensive material from Arizona,

New Mexico, and northern Mexico, however, indicated that those differences are due to variation among populations. We must consider *T. arizonicus* a junior synonym of *T. speciosus*.

*Traverella albertana* (McDunnough) [= *Traverella castanea* Kilgore and Allen, n. syn., = *Traverella* sp. A Allen] — Gila Co: East Verde R, Salt R; \*Graham Co: Gila R; Greenlee Co: Blue R; Navajo Co: White R; Yavapai Co: Oak Cr. All previously published records are from Kilgore and Allen (1973), as *Traverella castanea* Kilgore and Allen.

McDunnough (1931) described *T. albertana* from a series of male and female adults from Alberta, Canada. Later, Edmunds (1948) described its larva based on reared material collected from Dagget County, Utah. Kilgore and Allen (1973) described *T. castanea* based on larvae collected from Grant County, New Mexico. Allen (1973) separated the larvae of *T. albertana*, *T. castanea*, and what he referred to as *T. sp. A* on the basis of the size of the frontoclypeal projection, setation of the legs, abdominal coloration, and size of gill 7. We found, however, that those characters show considerable variability, even within populations. Additionally, we found that the holotype of *T. castanea* is not a mature larva, as Kilgore and Allen (1973) indicated, and that coloration, degree of development of the frontoclypeal projection and gill 7, and number of setae on the legs are typical of immature larvae of *T. albertana*. Allen's depiction of the head of *T. castanea* is inaccurate [Fig. 8 Allen (1973)] because he figured the anterior margin of the frontoclypeus extending along the entire posterior margin of the labrum, whereas in actuality the length of the anterior margin of the frontoclypeus is similar to that of *T. albertana* [Fig. 5 Allen (1973)]. All of the above leads to the conclusion that *T. castanea* and *T. sp. A* are synonymous with *T. albertana*.

#### EPHEMERELLIDAE

*Drunella coloradensis* (Dodds) — Gila Co: Horton Cr (Allen and Edmunds 1962, as *Ephemerella coloradensis* Dodds).

*Drunella grandis grandis* (Eaton) — Apache Co: Voigt R; Gila Co: Horton Cr; Graham Co: Grant Cr (Kilgore and Allen 1973); Greenlee Co: Black R. All previously published records are from Allen and Edmunds (1962), except where noted, and all were as *Ephemerella grandis grandis* Eaton.

*Ephemerella altana* Allen — Apache Co: Diamond Cr, Little Colorado R, Paradise Cr, White R (Allen 1968).

*Ephemerella inermis* Eaton — \*Apache Co: Coyote Cr, Little Colorado R, White R; Gila Co: Horton Cr; Graham Co: White R; Greenlee Co: White R; \*Mohave Co: Virgin R; \*Navajo Co: White R. All previously published records are from Allen and Edmunds (1965).

*Serratella micheneri* (Traver) — \*Apache Co: Paradise Cr; Coconino Co: Oak Cr (Allen and Edmunds 1963); Gila Co: Haigler Cr; Navajo Co: White R (Allen and Edmunds 1963); Pinal Co: Kelvin; Yavapai Co: Oak Cr. Previously published records are from Kilgore and Allen (1973), except where noted, and all were as *Ephemerella micheneri* Traver.

*Serratella tibialis* (McDunnough) — Gila Co: Horton Cr (Allen and Edmunds 1963, as *Ephemerella tibialis*).

## LEPTOHYPHIDAE

*Leptohyphes apache* Allen — Apache Co: White R (Allen 1967); Gila Co: Salt R, San Carlos R, Verde R; \*Maricopa Co: Verde R; Pinal Co: Aravapai Cr; Yavapai Co: Oak Cr, Verde R. Previously published records are from Allen (1978), except where noted.

*Leptohyphes ferruginus* Allen and Brusca — Gila Co: East Verde R (Allen and Murvosh 1987a).

*Leptohyphes mirus* Allen — Gila Co: Río Blanco (Allen 1967); Santa Cruz Co: Sonoita Cr (Kilgore and Allen 1973).

*Leptohyphes packeri* Allen — Maricopa Co: Sycamore Cr (Gray 1981); Mohave Co: Big Sandy R (Kilgore and Allen 1973).

*Leptohyphes quercus* Kilgore and Allen — Coconino Co: Oak Cr (Kilgore and Allen 1973); Pinal Co: Aravapai Cr (Allen 1978).

*Tricorythodes condylus* Allen — Apache Co: Little Colorado R; Coconino Co: Oak Cr; Greenlee Co: Black R; Navajo Co: White R. All records are from Allen (1967).

*Tricorythodes dimorphus* Allen — \*Apache Co: Black R; Cochise Co: Cave Cr (Kilgore and Allen 1973); \*Coconino Co: Oak Cr; Gila Co: East Verde R (Kilgore and Allen 1973); Greenlee Co: Black R (Allen 1967); Maricopa Co: Sycamore Cr (Gray 1981); Yavapai Co: Beaver Cr, Oak Cr (Allen 1967).

\**Tricorythodes explicatus* (Eaton) — Apache Co, Black R, at Forest Rd 25, Apache National Forest, V-4-1981, W. P. McCafferty, A. V. Provonsha, and D. Bloodgood, larvae, deposited at PERC; Mohave Co, Virgin R, at rest stop, Blacky Cr Canyon, 12 mi S of Bloomington, UT, V-2-1981, W. P. McCafferty, A. V. Provonsha, and D. Bloodgood, larvae, deposited at PERC; Yavapai Co, Verde R, above Clarksdale, IV-9-1968, R. W. Koss and R. W. Baumann, larvae, deposited at PERC; Oak Cr, Red Rocks Crossing, IV-28-1978, R. W. Baumann, deposited at MLB.

Allen and Murvosh (1983) reported this species from New Mexico and the Mexican states of Baja California Norte, Baja California Sur, Chihuahua, and Sonora. Its presence in Arizona was thus expected. It should be noted that this species and *T. minutus* are extremely difficult to separate, and the two may prove to be equivalent upon further analysis.

*Tricorythodes minutus* Traver — Apache Co: Gooseberry Cr; Coconino Co: Oak Cr; Gila Co: East Verde R, San Carlos R; Graham Co: Gila R; Navajo Co: White R; Pinal Co: Gila R; Santa Cruz Co: Sonoita Cr; Yavapai Co: Verde R. All records are from Kilgore and Allen (1973).

## CAENIDAE

*Caenis amica* Hagen — Yavapai Co: Jerome (Provonsha 1990).

*Caenis bajaensis* Allen and Murvosh — Cochise Co: Chiricahua Mts, \*West Turkey Cr; Coconino Co: Oak Cr; Greenlee Co: Black R; Santa Cruz Co: Madera Canyon, Yanks Springs; Yavapai Co: Oak Cr Canyon. All records are from Provonsha (1990).

*Caenis latipennis* Banks — Coconino Co: Oak Cr Canyon (Provonsha 1990).

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