A Report on the Crawfishes (Decapoda, Astacidae)\(^1\)
of Oklahoma

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Since the survey of the crawfishes of Oklahoma by Creaser and Ortenburger in 1933, there have been several changes in the taxonomy of the family Astacidae and the number of species and subspecies now known to occur within the state has increased to 19. Ten species were reported by Creaser and Ortenburger, one of which I consider erroneous.

The crawfishes in North America east of the Rocky Mountains are currently assigned to either Cambarinae (Hobbs, 1942) or Cambarellinae (Languarda, 1961). These two subfamilies are equivalent to the genera Cambarus used by most crawfish taxonomists prior to 1942. The subfamily Cambarellinae contains only one genus, Cambarellus, and is not known from within the boundaries of Oklahoma. The subfamily Cambarinae consists of seven genera, Troglomicarbus, Paracamarus, Procambarus, Cambarus, Orconectes, Hobbesus (Joe F. Fitzpatrick, Jr., personal communication) and Faxonella, four of which are known to occur in the state. The genus Troglomicarbus is confined to the subterranean waters of Florida, Hobbesus to the Pearl and Tombigbee drainages in Alabama and Mississippi and the upper part of the Pearl River in Mississippi, and Paracamarus to Mexico.

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CHECK-LIST OF CRAWFISHES OCCURRING IN OKLAHOMA WITH
EQUIVALENT TAXONOMIC UNITS USED BY CREASER AND ORTENBURGER

Family Astacidae

Subfamily Cambarinae Hobbs, 1942

Procambarus Ortmann, 1905
- Procambarus clarkii (Girard, 1852)
- Procambarus acutus acutus (Girard, 1852)
- Procambarus similans similans (Faxon, 1885)
- Procambarus gracilis (Bundy, 1876)
- Procambarus fennisis Hobbs, 1950

Cambarus Erichson, 1846
- Cambarus diogenes diogenes Girard, 1852
- Cambarus diogenes ludovicianus Faxon, 1884
- Cambarus hedgpathi Hobbs, 1948
- Cambarus setosus Faxon, 1889

Orconectes Cope, 1872
- Orconectes difficilis (Faxon, 1898)
- Orconectes palmeri longimanus (Faxon, 1898)
- Orconectes nais (Faxon, 1885)
- Orconectes meeki brevis Williams, 1952
- Orconectes causeyi Jester, 1967
- Orconectes neglectus neglectus (Faxon, 1885)
- Orconectes nana nana Williams, 1952
- Orconectes menae (Creaser, 1933)
- Orconectes leptogonopus leptogonopus Hobbs, 1948

Faxonella Creaser, 1933
- Faxonella clypeata (Hay, 1899)

Genus Cambarus (in part)

Subgenus Ortmannicus Fowler, 1911
- Cambarus blandingi acutus
- Cambarus simulans
- Cambarus gracilis

Subgenus Cambarus
- Cambarus diogenes

Cambarus setosus (extralimital)

Subgenus Faxonius Ortmann, 1905 (in part)
- Cambarus difficilis
- Cambarus longimanus
- Cambarus nais
- Cambarus neglectus

Subgenus Faxonius (in part)
- Cambarus clypeatus

SUBGENUS CAMBARUS, FOWLER, 1911

Cambarus diogenes (Girard, 1852)
- Cambarus blandingi acutus (Girard, 1852)
- Cambarus simulans (Girard, 1852)
- Cambarus gracilis (Girard, 1852)

Faxonella Creaser, 1933
- Faxonella clypeata (Hay, 1899)
The following key is based on sexually active males, referred to as Form I or first form males. Form I males can be distinguished from Form II or second form males by a comparison of their first pair of pereiopods, which are modified for copulation and are called gonopods (Figs. 1-32). The terminal elements of Form I gonopods are well defined and at least one is corneous. For identification of immature individuals, females and Form II males, one must consult the recognition characters (Figs. 1-46) given for each species.

1. Gonopod ending in two distinct processes ................................................................. 2
2. Gonopod ending in three or more distinct processes .................................................. 19

3. Areola open .................................................................................................................. Cambarus
4. Areola obliterated ......................................................................................................... 4

5. Rostrum and epistome narrow; three red bands of pigment running down dorsum of abdomen Cambarus diogenus ludovicianus
6. Rostrum and epistome broad; red bands of pigment on abdomen absent ......................... Cambarus diogenus diogenus

7. Central projection of gonopod at least twice length of mesial process .......................... Faxonella clypeata
8. Central projection less than twice length of mesial process ........................................ Orconectes

9. Areola obliterated ......................................................................................................... 8
10. Areola open .................................................................................................................. 10
11. Rostrum, acumen and antennal scale extremely elongate; acumen over 1/2 length of rostrum (Figs. 22, 35) Orconectes lanciger
12. Rostrum, acumen and antennal scale not as above; acumen less than 1/2 length of rostrum .................................................................................................................................................................................. 9
13. Processes of gonopod short, mesial process curved caudal at approximately a 90° angle to axis of shaft Orconectes difficilis
14. Processes of gonopod long, mesial process never curved so strongly caudal ................... Orconectes palmeri longimanus

15. Areola narrow, lacking punctae at narrowest point or with only one row Orconectes palmeri longimanus
16. Areola narrow or broad, with two, three or more rows of punctae at narrowest point Orconectes nana nana

17. Areola open but lacking punctae at narrowest point; tips of fingers of chelae bright red, followed proximally by band of deep blue pigment Orconectes palmeri longimanus
18. Areola almost always with one row of punctae at narrowest point; chelae not so colored Orconectes nana nana

19. Rostrum very narrow ..................................................................................................... 13
20. Rostrum broad .............................................................................................................. 14

21. Central projection of gonopod reaching to base of second pair of pereiopods Orconectes nana nana
18. Central projection of gonopod reaching to base of first pair of pereiopods

Orconectes nana macrurus

14. Both terminal processes of gonopod curved gently caudad, along entire length

Orconectes caudatus

14. Central projection curved caudad, mesial process straight or bent in opposition to central projection

Orconectes meeki meeki

15. Antennal scale evenly rounded mesially, broadest at mid-length

Orconectes caudatus

15. Antennal scale abruptly rounded mesially, broadest anterior to mid-length

Orconectes meeki meeki

16. Rostrum with sides concave, acumen long
Orconectes meeki meeki

16. Rostrum with sides not concave, often with sides converging anteriorly, acumen short
Orconectes meeki brevis

17. Central projection much longer than mesial process, mesial process making up approximately 67% of central projection; central projection reaching at least to tip of first pair of pereiopods

Orconectes leptogonopodus leptogonopodus

17. Central projection only slightly longer than mesial process and never reaching beyond second pair of pereiopods

Orconectes neglectus

18. Rostrum with carina; tips of chelae red, followed proximally by black ring of pigment
Orconectes neglectus neglectus

18. Rostrum without carina; tips of chelae light orange but without conspicuous black marking
Orconectes meeki meeki

19. Hooks present on ischia of second and third pairs of pereiopods

Cambarellus pueblensis

19. Hooks present on ischia of third and fourth pairs of pereiopods
Procamburus simulans simulans

20. Two cervical spines on each side of cephalothorax
Procamburus dupratii

20. Cephalothorax with one lateral spine on each side or spine entirely lacking
Procamburus dupratii

21. Males with hooks on ischia of third pair of pereiopods only
(Fig. 15)
Procamburus gracilis

21. Males with hooks on ischia of third and fourth pairs of pereiopods
Procamburus gracilis

22. Antennal scale widest anterior to mid-length; areola obliterated or extremely narrow, never with punctae at narrowest point
Procamburus graciosus

22. Antennal scale widest posterior to mid-length; areola narrow to broad, always with at least one row of punctae at narrowest point
Procamburus graciosus

23. Gonopod ending in three terminal processes; marginal rostral spines and cervical spines absent
Procamburus tenuis

23. Gonopod ending in four terminal processes; marginal rostral spines and cervical spines on cephalothorax present but often reduced
Procamburus acutus acutus

24. Areola obliterated in middle
Procamburus clarki

24. Areola narrow but never obliterated
Procamburus acutus acutus

ANNOTATED LIST OF SPECIES AND SUBSPECIES

A detailed list of the localities for the crawfishes in Oklahoma will be supplied by the author upon request.

Cambarellus Erichson, 1846

The species of this genus occurring within the state are, for the most...
part, burrowing species. They build neat and often quite high chimneys (10 to 12 inches). *Cambarus setosus* is a troglobitic form known only from subterranean waters and does not burrow. Hobbs and Barr (1960) summarized the data on this species. Data regarding *Cambarus diogenes* and *Cambarus diogenes ludovicianus* were summarized by Marlow (1960); additional data were supplied by Reimer (1964). Life history and ecological data were reported for *Cambarus hedgethi* by Penn and Marlow (1959), Penn and Hobbs (1958) and Reimer (loc. cit.).

**Cambarus diogenes diogenes** Girard, 1852

Figs. 1, 18, 38; Map 1

Body pigmented; rostrum without marginal spines; areola obliterated; suborbital angle prominent; rostrum and epistome broader than in *Cambarus diogenes ludovicianus*; dorsum of abdomen without stripes characteristic of *Cambarus diogenes ludovicianus*.

Distribution: From Alabama to Michigan and Atlantic Coast to Rocky Mountains in Colorado and Wyoming (Williams, 1954a).

**Cambarus diogenes ludovicianus** Faxon, 1884

Body pigmented; rostrum without lateral spines; areola obliterated; suborbital angle prominent; rostrum and epistome narrower than in *Cambarus diogenes diogenes*; dorsum of abdomen with three longitudinal bands of pigment. In another paper I shall raise *Cambarus diogenes ludovicianus* to a species based on a narrower rostrum, narrower epistome, color pattern and range. However, since this change is unpublished, the trinomen is retained here.

Distribution: Previously this subspecies was thought to be confined to the "Alluvial Fault Basin in Louisiana" (Penn and Marlow, 1959; Marlow, 1960). My collections indicate that this form is much more widespread. Reimer (1964) reported it from throughout the Gulf Coastal Plains in Arkansas. OKLAHOMA: Glover River at Glover, McCurtain County.

**Cambarus hedgethi** Hobbs, 1948

Figs. 2, 39

Body pigmented; rostrum without marginal spines; areola obliterated; suborbital angle absent or only slightly evident, never as prominent as in *Cambarus diogenes*.

Distribution: Texas, Louisiana, Mississippi, Arkansas and Oklahoma. OKLAHOMA: Three miles south of Tom, McCurtain County (U.S.N.M. No. 96157).

**Cambarus setosus** Faxon, 1889

Figs. 3, 19, 33 Map 1

Albinistic; eyes reduced and without pigment; rostrum with distinct shoulders at base of acumen and often with small marginal spines; areola open, but narrow.

Distribution: Southwestern Missouri and northeastern Oklahoma (Hobbs and Barr, 1960).

**Orconectes** Cope, 1872

The species of this genus occurring in Oklahoma are usually found in clear, permanent, flowing bodies of water. They can usually be found
under rocks or other debris in the streams. Many of these crayfishes have been reported from burrows; however, burrowing usually occurs only during periods of drought and never reaches the degree of refinement found in *Cambarus*. Almost all species herein reported were reviewed by Williams (1954a). Additional data were reported by Penn (1952, 1967), Williams (1954b), Penn and Hobbs (1958), Reimer (1964), Fitzpatrick (1965), Momot (1966) and Jester (1967).

*Orconectes difficilis* (Faxon, 1898)

Fig. 20. Map 2

Rostrum with lateral spines; areola obliterated; one cervical spine on each side; antennal scale widest at mid-length.

Distribution: Oklahoma, Louisiana and Texas.

*Orconectes palmeri longimanus* (Faxon, 1898)

Map 1

Rostrum with marginal spines; areola obliterated in most specimens: one cervical spine on each side; antennal scale widest at midlength; fingers of chelae with conspicuous red tips followed proximally by a deep blue pigment band. Individuals with an open areola can be distinguished from *Orconectes nais* in northeastern Oklahoma by the color pattern on the fingers of the chelae.

Distribution: "All western tributaries of the Mississippi River from the Arkansas River to the Gulf and Gulf drainage streams from the Mississippi River to the Guadalupe River in Texas" (Penn, 1957).

*Orconectes nais* (Faxon, 1885)

Figs. 9, 23, 36. Map 3

Rostrum with marginal spines; areola narrow usually with only one row of punctae at narrowest point; one cervical spine on each side; antennal scale widest at mid-length.

Distribution: Oklahoma, Kansas and Arkansas.

*Orconectes meeki brevis* Williams, 1952

Fig. 5. Map 4

Rostrum with marginal spines; areola narrow usually with two or three rows of punctae at narrowest point; cervical spine on each side of cephalothorax present, but reduced; antennal scale widest anterior to mid-length.

Distribution: Oklahoma and Arkansas.

*Orconectes causeyi* Jester, 1967

Figs. 4, 10, 24, 37. Map 2

Rostrum with lateral spines; areola narrow to broad; one cervical spine on each side; antennal scale widest at mid-length.

There seems to be an east to west cline in regard to the width of the areola in this species. Specimens from the western part of the state, as well as New Mexico and western Kansas, have a very narrow areola while those in extreme northeastern Oklahoma, Arkansas, Kansas and Missouri have a much broader one. Subspecific designations may be warranted, however, other complications concerning this species prevent such designations.
**BIOLOGICAL SCIENCES**

*Orconectes caueyi* has been confused with *O. nais*, but is much more closely related to *O. virilis* and may be only one of its subspecies. *Orconectes nais* shows closest affinities to *O. palmeri longimanus* and *O. meeki meeki*. The taxonomy of *Orconectes caueyi*, and its relationship to *O. virilis*, will be treated in my forthcoming paper on the genus *Orconectes* in western North America. For present purposes, the name, *Orconectes caueyi*, is retained for those *virilis*-like crawfish occurring in Oklahoma.

**Distribution:** New Mexico, Texas, Arkansas, Oklahoma, Missouri, and Kansas.

*Orconectes neglectus neglectus* (Faxon, 1885)

Figs. 14, 41. Map 3

Rostrum broad and carinate; marginal rostral spines small; areola broad; cervical spine on each side present but reduced; antennal scale widest distal to mid-length; tips of fingers of chelae orange or red, followed proximally by ring of black pigment.

**Distribution:** Northeastern Colorado, extreme southern Nebraska, Kansas, northeastern Oklahoma and northwestern Arkansas (Williams, 1954b).

*Orconectes nana nana* Williams, 1952

Figs. 6, 25, 40. Map 2

Rostrum very narrow; marginal rostral spines small; areola broad; cervical spine absent; antennal scale widest anterior to mid-length.

**Distribution:** Northeastern Oklahoma and northwestern Arkansas.

*Orconectes menae* (Creaser, 1933)

Fig. 26.

Rostrum wide; marginal rostral spines reduced; areola moderately broad; cervical spine absent; antennal scale widest anterior to mid-length.

**Distribution:** Ouachita Mountain Province of Oklahoma and Arkansas. OKLAHOMA: Little Eagle Creek, west of Octavia, LeFlore County (U.S.N.M. No. 114315).

*Orconectes leptogonopodus leptogonopodus* Hobbs, 1948

Fig. 27.

Rostrum with reduced lateral spines; areola broad; lateral spine on cephalothorax absent; antennal scale widest anterior to mid-length.

**Distribution:** Ouachita Mountain Province of Oklahoma and Arkansas. OKLAHOMA: Eagle Creek n.w. of Smithville, McCurtain County; 6 mi. n.n.e. of Broken Bow, McCurtain County.

*Faxonella* Creaser, 1933

*Faxonella* was elevated from a subgenus of *Orconectes* by Fitzpatrick in 1963. *Faxonella clypeata*, one of the two species belonging to this genus, has been taken from several different types of aquatic habitats, including roadside ditches, creeks, ponds and burrows. The life history of this species was worked out by Smith (1953). Since Fitzpatrick's study of *Faxonella*, additional data were presented by Reimer (1964) based on material from Arkansas.
Faxonella clypeata (Hay, 1899)

Figs. 21, 34. Map 1

Rostrum broad and lacking marginal spines; areola broad; cervical spine absent; central projection of gonopod three times longer than mesial process; tips of central projection overlap in normal position.

Distribution: Oklahoma, Arkansas, Louisiana, Mississippi, Florida, Georgia, South Carolina, Alabama and Texas (Fitzpatrick, 1963).

Procambarus Ortmann, 1905

With the exception of Procambarus gracilis and Procambarus tenuis, the species of this genus in the state, are found about as often in burrows as in roadside ditches, ponds and other permanent and semipermanent aquatic habitats. Procambarus gracilis is a primary burrower and may be found far from any surface water. Adults are almost always taken from burrows. Procambarus tenuis shares basically the same type of habitat as the members of the genus Orconectes and has been taken only in the clear, rocky streams of the Ouachita Mountains.

Various aspects of the biology of the following species were reviewed by Penn (1943, 1956), Williams (1954a), Penn and Hobbs (1958), Hobbs (1962, 1967), and Reimer (1964).

Procambarus clarkii (Girard, 1852)

Figs. 13, 28, 43.

Rostrum tapering to small marginal spines; areola obliterated in middle; one cervical spine on each side; antennal scale widest proximal to mid-length; hooks on ischia of third and fourth pair of pereiopods.

Distribution: "From eastern Alabama to western Texas and up the Mississippi Valley to Dunklin County, Missouri, and Hickman County, Kentucky. (Introductions: Calif., Fla., Nev., Va., Hawaii and Japan.)" (Hobbs, 1962). OKLAHOMA: Stream 2.8 miles north of Harris on U.S. Highway 259, McCurtain County.

Procambarus acutus acutus (Girard, 1852)

Figs. 12, 29, 44. Map 3

Rostrum triangular, with minute marginal spines; areola narrow; one cervical spine on each side; antennal scale widest proximal to mid-length; hooks on ischia of third and fourth pair of pereiopods.

Distribution: "From eastern Alabama to western Texas and up the Mississippi Valley to Dunklin County, Missouri, and Hickman County, Kentucky. (Introductions: Calif., Fla., Nev., Va., Hawaii and Japan.)" (Hobbs, 1962). OKLAHOMA: Stream 2.8 miles north of Harris on U.S. Highway 259, McCurtain County.

Procambarus simulans simulans (Faxon, 1885)

Figs. 7, 30, 42. Map 4

Rostrum with sides convex; marginal rostral spines absent; areola narrow; one cervical spine on each side; antennal scale widest proximal to mid-length; hooks on ischia of third pair of pereiopods.

Distribution: Texas, Louisiana, Arkansas, Oklahoma, New Mexico, Kansas and Colorado.

Procambarus gracilis (Bundy, 1876)

Figs. 8, 46. Map 1
Rostrum with sides nearly parallel; marginal rostral spines absent; areola obliterated or extremely narrow, never with punctae at narrowest point; antennal scale widest slightly distal to mid-length; hooks present on ischia of third pair of pereiopods.

Distribution: Texas, Oklahoma, Kansas, Missouri, Iowa, Illinois and Wisconsin.

_Procambarus tenuis_ Hobbs, 1950

Figs. 31, 45. Map 1

Rostrum with sides converging; marginal rostral spines absent; cervical spine on each side absent; areola narrow; antennal scale widest distal to mid-length; hooks on ischia of third and fourth pair of pereiopods.

Distribution: Ouachita Mountain Province of Oklahoma and Arkansas.

**Erroneous and Extralimital Species**

_Cambarus immunitis_ Hagen (= _Orconectes immunitis_) was reported by Creaser and Ortenburger (1933) from Okfuskee County. Surveys made since their report (Williams and Leonard, 1952; Williams, 1954a) indicate that the range of this species does not extend farther south than northern Missouri and northeastern Kansas. Therefore, I consider the locality in Oklahoma to be in error.

Several species have been reported from neighboring states, in drainages extending into Oklahoma. Reimer (1964) reported _Procambarus dupratzi_ Penn from the Little River drainage in Sevier and Little River counties, Arkansas. _Orconectes lancifer_ (Hagen) was reported from the Red River drainage in Red River County, Texas (Penn and Hobbs, 1958) and Hempstead County, Arkansas (Reimer, loc. cit.). _Orconectes nana macrus_ Williams and _Orconectes meeki meeki_ (Faxon) were reported from northwestern Arkansas by Williams (1954a) and Reimer (loc. cit.). _Cambarellus puer_ Hobbs, a member of the subfamily Cambarellinae, was taken from the Little River drainage in Little River County, Arkansas by Reimer (loc. cit.).

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For Legend, see P. 61
For Legend, see P. 61


Map 1. S. \( \times \) : S. alamos \( \bigcirc \) : S. palmeri longispina \( \blacktriangle \);
E. \( \ast \) : E. \( \cdots \) : E. \( \ast \).

Map 2. A. \( \square \) : A. diffusilla \( \blacktriangle \) : A. \( \bigcirc \).

REFERENCES CITED


