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COTTUS TUBULATUS, A NEW SCULPIN FROM IDAHO

BY CARL L. HUBBS AND LEONARD P. SCHULTZ

IN our recent studies of the fish fauna of the western United States, we have had occasion to examine many fresh-water sculpins, genus *Cottus*. Among these we find three specimens, from the lower Snake River basin of the Columbia River system, which appear to represent an undescribed species of that genus.

The new species is probably a local form of isolated distribution, since it has been found only in one tributary of the North Fork of the Clearwater River, and since the water in that stream flows above ground throughout the year from near Bovill only as far down as a few miles above Kendrick, Idaho, where it settles among the rocks. Below this location down to the North Fork of the Clearwater, a distance of 15 miles by road along the valley, there is no surface flow of water except during freshets which occur in the springtime. In the summer months a few isolated pools remain, some of which abound in small cyprinids but contain no *Cottus*. These pools are often fed by a small trickle of water coming up through the rocks. Inquiry at Julietta and Kendrick, Idaho, disclosed that "bullheads" (*Cottus*) are caught for bait only in the upper part of this stream, and do not occur in the portion of the river which goes dry. This information regarding the

stream was obtained by the junior author and Mr. Allan De Lacy, on a visit subsequent to the preparation of the following description.

***Cottus tubulatus*, new species**

The holotype, 54 mm. long to caudal fin, was collected with the two paratypes, 40 and 48 mm. long, in a tributary to the North Fork of the Clearwater River, near Bovill, Idaho, by Arthur and Ruth Dowell Svihla, on August 10, 1930; Cat. No. 92342, Museum of Zoology, University of Michigan.

The body is slender, deepest at origin of dorsal, from which the contours converge backward as almost straight lines to the caudal base, with scarcely any arching along the dorsal base and with but slight out-flaring at caudal base; greatest depth 5.3 (5.0, 5.5)¹ in standard length, a little greater than width of body at same point. The caudal peduncle is of the deep, compressed, non-constricted type, about one-fifth deeper than length of snout; least depth 10.1 (9.0, 9.3) in standard length.

The head is flattish in ventral contour, rather strongly and evenly arched above; length of head, 3.3 (3.2, 3.3). As seen from above the head is broad posteriorly (half broader than deep), but narrows sharply forward (opposite front of eyes the head is but little more than half as wide as posteriorly); the sides of the head are slightly concave, and the margin of the upper lip as exposed in superior aspect is evenly semi-circular. The muzzle is rather sharply pointed in side view; snout slightly longer than eye, 3.8 (4.0) in head. The upper lip is thick, decidedly thicker than the included lower lip. The mouth is nearly horizontal, and small; the upper jaw extends backward but little beyond the vertical from front of pupil, and is contained 2.7 (2.5) times in head. The suborbital is a little more (or a little less) than half as wide as orbit. The interorbital is concave, and its bony width is one-third (or two-fifths) as wide as eye. The orbit projects a

¹ Counts and measurements given in parenthesis are of the two paratypes; in those characters for which no such values are given, the paratypes agree with the holotype.

little into the dorsal profile; its length is contained 4.0 (4.1) times in head.

The preopercle bears but one spine at its angle, below which the edge is entire except for a small rounded elevation indicating the position of the usual second spine. Teeth are developed on the vomer but not on the palatines. Both nostrils are distinctly tubular, as in *Cottus aleuticus*.

Fin-rays: dorsal, VII-17 (16, 17); anal, 12 (11, 12); pectorals, 13-14 (13-14, 14-14); pelvics, I, 4, with fourth ray decidedly more than half as long as the longest (last ray of dorsal and anal counted as a double ray).

The dorsal fins are in contact at their extreme bases only. The base of the first fin is half the base of the second, and is separated from tip of snout by one-third the standard length. The origin of the second dorsal fin is situated approximately one orbital length nearer caudal base than snout tip. The distance from tip of snout to anus extends backward to anterior fifth of caudal fin; the distance from tip of snout to origin of anal, backward to end of second third of length of caudal. The length of anal base is contained 3.4 (3.5) times in standard length. The length of caudal peduncle (distance from end of anal base to end of hypural on axis of body) is contained 2.1 times in head. The highest or longest ray in each fin is contained in the head the following times: first dorsal, 2.7 (2.7, 3.0); second dorsal, 2.0 (1.8, 2.0); anal, 2.0 (1.9, 2.0); caudal, 1.3 (1.3, 1.4); pectoral, 1.2 (1.1); pelvic, 1.4 (1.5).

The body is wholly smooth, devoid of detectable prickles, even in axil. The lateral line, of 27 to 29 pores, is incomplete, ending under the posterior fifth of second dorsal base.

Caudal vertebrae 20 (in one paratype).

The color is rather dark. The bars are so much disrupted, pale and speckled with black as almost to lose their identity on the sides. The dorsal saddles are moderately distinct, separate from the disrupted lateral bars, and are 8 in number, counting one at nape, two below spinous dorsal (extending onto this fin as two irregularly-disrupted black blotches),

four along the base of soft dorsal fin (these barely extending onto the fin), and one along caudal base. The posterior edge of this bar at caudal base is indented on the midline by a round spot, as usual. The second dorsal is obliquely banded with blackish specks on basal half, and by dusky bars on outer half; the caudal is rather irregularly banded with dusky; the anal is weakly, the pectoral strongly, banded. The pelvic fin is without definite bars, but the rays are somewhat darkened along their edges distally. The chin likewise is without definite bars or mottlings. Several much disrupted bars radiate from the eye, the two across the cheek best developed.

Cottus tubulatus is distinguished from all other non-coastwise species of America in having both nostrils tubular (sometimes the nostrils are semitubular in *C. rhotheus* and *C. punctulatus*). In this respect it agrees with *C. aleuticus*, from which it differs trenchantly in having only 20 caudal vertebrae instead of 24 to 27, usually 26 (Schultz, 1930), and only one developed preopercular spine. *Cottus chamberlaini* Evermann and Goldsborough (1907: 309, fig. 66), is also described as having tubular posterior nostrils, and in some other technical features approaches *tubulatus*, but differs strikingly in such characters as the very large and prominent eyes, declivous snout, and very high anal.

In the form of body, head and mouth, position of fins, number of rays and coloration, *C. tubulatus* agrees remarkably well with *C. leiopomus* as described and figured by Gilbert and Evermann (1894: 203, pl. 8, fig. 2). It differs from *leiopomus* trenchantly in having a well developed preopercular spine and the lateral line incomplete.

The new species needs no detailed comparison with the following American species, all of which have palatine teeth and more than one developed preopercular spine as well as other differences: *asper*, *rhotheus*, *shasta*, *punctulatus*, *semiscaber*, *bairdii*, *ricei* (*onychus* a synonym), and *bendirei*. From *princeps* and *evermanni* (Gilbert, 1898), it differs in having the fin rays fewer, the dorsals not connected, and the

second dorsal beginning nearer base of caudal than tip of snout, and from *C. tenuis* Evermann and Meek (1898: 83, fig. 6) and *C. asperrimus* Rutter (1908: 144, fig. 3) in having 4 soft pelvic rays, only one preopercular spine, and the origin of second dorsal farther back.

From the three other American species with I, 3 pelvic rays (see Hubbs, 1919: 3), *tubulatus* differs further as follows: from *greenei* in lacking palatine teeth, and from *cognatus* and *marginatus* in having only one preopercular spine, and apparently in lacking a distinct pale border to the spinous dorsal. It approaches *marginatus* closely both in characters and in distribution, and may well be a close relative. The significance of the number of pelvic rays now appears too slight to warrant the use of this character for generic distinction (Hubbs, 1926: 76).

Cottus tubulatus has many characters in common with *C. gulosus* (see Snyder, 1908: 185), but differs in having but one preopercular spine and in other respects. It differs even less from *klamathensis* Gilbert (1898: 10, fig.; Snyder, 1908: 188), *macrops* Rutter (1908: 147, fig. 4), *beldingii* Eigenmann and Eigenmann (1891: 1132), and *annae* Jordan and Starks (in Jordan, 1896: 223, pl. 27). In these four species of the *gulosus* type, the tendency of the lower preopercular spines in that species to be weakened, is carried to complete or almost complete obsolescence, and the prickles and palatine teeth are typically absent or at least very nearly so.² From the four species just mentioned, as well as from *gulosus*, *tubulatus* seems to differ chiefly in having the posterior nostrils tubular and in having the body averaging slenderer and of a different form. *C. tubulatus*, like *leiopomus*, *evermanni*, *princeps*, *tenuis*, and *asperrimus*, has the body deepest at the front of the dorsal, behind which the dorsal contour converges toward the ventral in a straight line, whereas the four species with which we are now comparing *tubulatus*, as well as many others, have the dorsal contour behind origin of dorsal rather

² Snyder (1917: 81), in disagreement with other authors, states that *beldingii* usually has a narrow band of palatine teeth.

strongly arched. From *klamathensis* and *beldingii*, *tubulatus* differs further in having the mouth much smaller; from *klamathensis* and *macrops* in having on the average fewer dorsal and anal rays; from *klamathensis* in having the eye larger, and from *macrops* in having the eye smaller; from *annae* in having head and eye larger.

Cottus tubulatus probably differs from *beldingii*, *gulosus*, and other species in having fewer caudal vertebrae (see Table I).

TABLE I
VARIATION IN NUMBER OF CAUDAL VERTEBRAE IN CERTAIN WESTERN SPECIES
OF *Cottus*³

Species	State	Caudal vertebrae									N	Ave.
		20	21	22	23	24	25	26	27	28		
<i>C. tubulatus</i>	Idaho	1	—	—	—	—	—	—	—	—	1	20.
<i>C. aleuticus</i>	Washington ..	—	—	—	—	1	12	25	5	—	43	25.79
	Oregon	—	—	—	—	—	1	—	—	—	1	25.
	California ...	—	—	—	—	1	5	5	—	—	11	25.36
<i>C. asper</i>	Washington ..	—	—	—	—	—	4	23	4	1	32	26.06
	Oregon	—	—	—	—	—	—	14	—	—	14	26.00
	California ...	—	—	—	—	4	36	16	3	—	59	25.30
<i>C. rhotheus</i>	Washington ..	3	53	42	6	—	—	—	—	—	104	21.49
	Oregon	1	3	4	—	—	—	—	—	—	8	21.37
<i>C. gulosus</i>	Washington ..	—	1	42	31	—	—	—	—	—	74	22.40
	Oregon	—	16	27	18	—	—	—	—	—	61	22.03
	California ...	—	20	40	—	—	—	—	—	—	60	21.67
<i>C. beldingii</i>	Washington ..	—	6	17	9	—	—	—	—	—	32	22.09

³ The vertebral counts given in this table were made by Rennie Wells and Allan De Lacy, students in the Department of Fisheries, University of Washington.

It is possible that *Cottus tubulatus* is inseparable from the species described by Eigenmann and Eigenmann (in Eigenmann, 1892: 963; see also Eigenmann, 1894: 118) as *C. philonips*, but according to the descriptions, that form has a smaller head (3.8 to 4.75), slenderer body (6.0), and more dorsal spines (8 or 9). Even if the two forms should prove

identical, the name *philonips* would not be available for our form, as it was clearly proposed as a substitute name for *Cottus minutus* Pallas and *Uranidea microstoma* Lockington. Since those two species are probably not identical; since "*Cottus minutus* Pallas" is listed first by Eigenmann and Eigenmann in the synonymy of *C. philonips*, and since our action makes unnecessary the replacement of the name *Cottus aleuticus* Gilbert (1895: 418), which was based on the same species called *Uranidea microstoma* by Lockington, we rule as first revisers that *Cottus philonips* was proposed as a substitute name for *Cottus minutus* Pallas and not for *Uranidea microstoma* Lockington. If the species described as *Cottus philonips* is really distinct, it will of course require a new name. To make this discussion clearer, we quote below the original account of *Cottus philonips*.

7. *Cottus philonips* E. and E., nom. sp. nov.

Cottus minutus Pallas, Zoogr. Rosso. Asiat. iii, 145, 1811-1831.

Uranidea microstomus Lockington. Proc. U. S. Nat. Mus., 1880, 58; not *Cottus microstomus* Heckel.

The only companion of *Coregonus coulterii* in the snow water of the Kicking Horse at Field, B. C., was a species of *Cottus*, of which seventeen specimens were obtained. These are probably to be referred to the description quoted above. This species seems to be an inhabitant of the cold waters of Alaska and to extend along the Rocky Mountains and the Sierras to Lake Tahoe, where it is replaced by *Cottus beldingii*. Specimens of the latter species are not now at hand, so that a direct comparison can not be made.

Head proportionately longer in the adult, about 4 $\frac{1}{4}$ -4 in head. D. VIII or IX-16 to 18; A. 11-13; V. 14. Pectoral reaching anal or past vent even in the largest specimens. Anus equidistant from tip of snout and base of caudal or nearer tip of snout. Ashy gray, with blackish blotches; no well defined cross bars except sometimes on the tail. Frequently a dusky blotch on anterior part of spinous dorsal and another near its posterior end; the fin sometimes wholly dusky, margined with white; pectorals, soft dorsal and caudal more or less barred.

Since our species agrees so well in general appearance, form and color with *Cottus leiopomus* Gilbert and Evermann (1894: 203, pl. 8, fig. 2), we deem it unnecessary to present an illustration of *Cottus tubulatus*.

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NOTES ON THE AMPHIBIANS AND REPTILES
OF UTAH

BY ALEXANDER G. RUTHVEN

FOR a number of years the Museum of Zoology, University of Michigan, has, under the direction of the writer, been making field studies on the amphibians and reptiles of Utah. The general object of the investigations has been to extend our knowledge of the distribution, habits, and habitat relations of the fauna. The results will appear in brief papers as they are compiled.¹ The present paper records only the geographical notes on the species.

Field studies have been made as follows:

Salt Lake City region, summer of 1924, by A. G. Ruthven and A. P. Ruthven.

Green River region, summer of 1925, by A. G. Ruthven and A. P. Ruthven.

Moab region, summer of 1929, by H. K. Gloyd.

Skull Valley, region of Orr's ranch, summer of 1930, by A. G. Ruthven and B. W. Ruthven.

Fillmore region, summer of 1931, by L. C. Stuart.

¹ The two publications which have preceded this one are:

Ruthven, A. G., "Notes on Utah Reptiles," *Occ. Pap., Mus. Zool., Univ. Mich.*, 179, 1926: 1-4.

Ruthven, A. G., and Stuart, L. C., "Notes on the Period of Post-depositional Development in Several Common Lizards," *ibid.*, 241, 1932: 1-3.

LIST OF SPECIES

1. *Ambystoma tigrinum* (Green). Salamander Lake, Mount Tympanogos (8,000 ft.); Granddaddy Lakes, Uintah Mountains (10,300 ft.); watering trough, one mile east of Fillmore.
2. *Scaphiopus hammondi* Baird. Flood plain of Green River, Green River; floor of Skull Valley, Orr's ranch.
3. *Bufo boreas boreas* (Baird and Girard). Mount Tympanogos (7,600 ft.); Alta, Little Cottonwood Canyon (9,000 ft.); Silver Lake, (Brighton).
4. *Bufo cognatus cognatus* (Say). Flood plain of Green River, Green River.
5. *Bufo woodhousii* Girard. Flats at Salt Lake City and Midvale; flood plain of Green River, Green River; Moab.
6. *Pseudacris triseriata* (Wied). Salamander Lake, Mount Tympanogos (8,000 ft.); flats near Salt Lake City.
7. *Rana pipiens* Schreber. Ditches west of Salt Lake City; Midvale; Provo Canyon; Thistle Canyon (5,000 ft.).
8. *Crotaphytus collaris baileyi* (Stejneger). Cedar Mountains, west side, Skull Valley, Orr's ranch; Silver Reef, Wendover; Castle Valley, Moab; Ice Spring lava flow, ten miles west of Fillmore; Helper.
9. *Crotaphytus wislizenii* Baird and Girard. Flats and washes, Green River; floor of Skull Valley, Cedar Mountains, Orr's ranch; valleys and slopes, Silver Reef, Wendover; Castle Valley, flood plain of Colorado River, flats near Moab; White Mountain, Cedar Mountain, Tabernacle lava flow, flats, sand dunes, near Fillmore.
10. *Uta levis* Stejneger. Sandstone cliffs, cliffs and rocks in Colorado Canyon, near Moab.
11. *Uta stansburiana stansburiana* (Baird and Girard). North end of Oquirrh Range; Green River, Helper; Orr's ranch, Skull Valley; Silver Reef, Wendover; Moab; White Mountain, Cedar Mountain, and general vicinity of Fillmore.
12. *Sceloporus elongatus* Stejneger. Helper; Moab; Tabernacle Mountain and White Mountain, Fillmore.

13. *Sceloporus graciosus graciosus* (Baird and Girard). Flats, mountain slopes, and canyons from Salt Lake City to 8,000 feet, Salt Lake Valley; north end of Oquirrh Range; Park City; Green River; Helper; floor of Skull Valley, Orr's ranch; Castle Valley and vicinity of Moab; White Mountain, flats and sand dunes, vicinity of Fillmore.

14. *Sceloporus magister* Hallowell. Tree and shrub areas, Green River.

15. *Phrynosoma douglassii ornatissimum* (Girard). Moab; foothills east of Fillmore; Pahvant Mountains to 9,000 feet.

16. *Phrynosoma douglassii ornatum* (Girard). Valley floor, Salt Lake City; floor of Skull Valley, Orr's ranch.

17. *Phrynosoma platyrhinos* Girard. Floor of Skull Valley, Orr's ranch; Silver Reef, Wendover; flats, Tabernacle lava flow, Cedar Mountain, White Mountain, Fillmore; Reading Spring.

18. *Cnemidophorus sexlineatus perplexus* (Baird and Girard). Moab.

19. *Cnemidophorus tessellatus tessellatus* (Say). Valley floor, Dry Canyon, Little Willow Canyon, Salt Lake City; Green River; benches and Cedar Mountains, Skull Valley, Orr's ranch; Silver Reef, Wendover; Moab; White Mountain, Cedar Mountain, Tabernacle lava flow, vicinity of Fillmore.

20. *Eumeces skiltonianus* (Baird and Girard). Along irrigation ditch, Fillmore.

21. *Charina bottae* (Blainville). Mount Tympanogos (7,600–8,500 ft.).

22. *Liopeltis vernalis* (Harlan). Mount Tympanogos (7,500 ft.).

23. *Coluber constrictor mormon* (Baird and Girard). Valley floor and Dry Canyon (5,500 ft.), Salt Lake City; Moab.

24. *Masticophis taeniatus taeniatus* (Hallowell). Castle Valley, Colorado River Canyon, Thompson Canyon, Moab; Ice Spring lava flow, White Mountain, flats in vicinity of Fillmore.

25. *Pituophis catenifer deserticola* Stejneger. Dry Canyon (6,500 ft.), and flats in vicinity of Salt Lake City; Green River; floor of Skull Valley, Orr's ranch; Fillmore Canyon, and flats in vicinity of Fillmore.

26. *Hypsiglena ochrorhynchus ochrorhynchus* (Cope). Foothills of La Sal Mountains, Moab.

27. *Thamnophis eques* (Reuss). Moab.

28. *Thamnophis ordinoides elegans* (Baird and Girard). Valley floor, Little Cottonwood Canyon (8,000 ft.), Salt Lake City; Mount Tympanogos (7,600 and 8,000 ft.); Heber City; Castle Valley, Colorado River Canyon, flats in vicinity of Moab. Observed at Orr's ranch in Skull Valley.

29. *Thamnophis sirtalis parietalis* (Say). South City.

30. *Crotalus confluentus concolor* (Woodbury). Helper; Moab.

31. *Crotalus confluentus lutosus* Klauber. Valley floor, Dry Canyon (6,750 ft.), Salt Lake City; floor of Skull Valley, Orr's ranch; Silver Reef, Wendover; Fillmore Canyon, and flats in vicinity of Fillmore.