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PAREXOGLOSSUM HUBBSI, A NEW CYPRINID
FISH FROM WESTERN OHIO

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THE species here described was first recorded as *Exoglossum maxillingua* (Le Sueur) by Osburn (1901: 64), from six specimens taken August 15, 1899, in Stillwater Creek, a tributary of Miami River, near Dayton, Montgomery County, Ohio. These specimens appear to be no longer extant. They undoubtedly were not *Exoglossum maxillingua*, as that species is now known to occur in the Ohio River system only in the headwaters of the Allegheny River in Pennsylvania (Hubbs, 1931: 3). This conclusion is further strengthened by careful investigations made recently at this same locality, which resulted in securing specimens of the cyprinid described in this paper, but none of *Exoglossum*. It is true that Dr. Osburn's description of *Exoglossum maxillingua* is referable only to that genus and species. He has informed me, however, that this description was taken almost verbatim from Jordan and Evermann (1896: 327), and not from the specimens themselves.

The species was not recorded or taken again until July 12, 1927, when Mr. Edward L. Wickliff seined a single specimen from the same stream system (Mad River, Champaign County, Ohio). Another individual was taken by Mr.

Charles F. Walker and me at the same place later in the month. Since then it has been collected by me on several occasions at various localities in both the Stillwater and Mad River systems (but in no other part of the state).

Suspicion that these Ohio specimens were not *Exoglossum maxillingua* was aroused in the fall of 1928, when Dr. Carl L. Hubbs discovered that the fish recorded as *Exoglossum maxillingua* from the Kanawha River system above the falls was generically and specifically distinct, and as yet undescribed. Examination of the Ohio specimens then proved conclusively that they belonged to this unnamed genus.

In a revised list of the fishes of Ohio, Osburn, Wickliff, and Trautman (1930: 173) recorded these specimens as *Exoglossops laurae* Hubbs (MS). This is a "nomen nudum."

Later a comparison of the Kanawha River system specimens with those from the Miami River system was made by Dr. Hubbs and myself. Obvious specific differences immediately became apparent. This was rather to be expected when a consideration of the ecological and faunal differences between these two river systems is taken into account. This view is further strengthened by the fact that at present three other cyprinids, *Notropis kanawha* Jordan and Jenkins, *Notropis scabriceps* (Cope) and *Phenacobius teretulus* Cope, and a darter which at present is being described by Trautman and Hubbs, are restricted entirely to the peculiar fauna of the upper Kanawha River system above the falls.

Parexoglossum hubbsi, new species

The subject of this paper, now named *Parexoglossum hubbsi* (Plate I) differs markedly in many respects from the genus and species known as *Exoglossum maxillingua*. It can be separated¹ from that genus by the presence of barbels; lack of fleshy lobes on the mandibular bases; in having the lower lip, in contrast, approaching a normal structure, non-lobular and extended along the sides of the mandible; in hav-

¹ The distinctive characters here employed are those used by Hubbs (1931: 4) to distinguish *Parexoglossum* from *Exoglossum*.

ing the posterior portion of the dentary bones less swollen; and in the different scale structure—radii wholly absent on the lateral fields, the posterior field rhombic instead of lobular, and the lines separating the lateral and posterior fields angulated instead of rectilinear across the scale. The height and length of the scale is about equal. It has about 10 radii. The species obviously belongs to *Parexoglossum* as it agrees in detail with Hubbs' (1931: 4) description of that genus.

Diagnosis.—A cyprinid of the genus *Parexoglossum*, closely allied to the species *laurae*, agreeing with it in fin ray and scale numbers. From that species it is distinctly different in the following eight characters: (1) Perhaps the most striking difference lies in the formation of the mouth, which has the outer border roughly approximating a triangle instead of forming four sides of a hexagon; the angle separating the lateral borders of the mouth from the anterolateral edges not sharp but so broad as to be scarcely noticeable; the face of the upper lip but slightly flexed, and not nearly so thick or pendant; and the deep grooves formed by the inner edges of the lower lips not parallel but twice as close together anteriorly as posteriorly. The last named point greatly heightens the triangular appearance of the mouth. (2) Papillae are better developed at the tip of the upper lip and under side of the snout, and are somewhat developed on the gular membrane between the interopercles. (3) The rami of the dentary bones taper gradually toward their anterior tips and do not become spatulate (see Figure 1). (4) The head is shorter. (5) The body is less deep. (6) The caudal peduncle is deeper. (7) The upper jaw is shorter. (8) The dorsal fin is higher.

Range.—*Parexoglossum hubbsi* is known only from the Mad and Stillwater rivers, tributaries of the Miami system, in the western part of the state of Ohio.

Holotype.—A specimen 63 mm. in length from tip of snout to caudal base, collected by M. B. Trautman and R. B. Foster in the Mad River, western Bath Township, Greene County, Ohio, July 20, 1929. It is catalogued as No. 92408, Museum

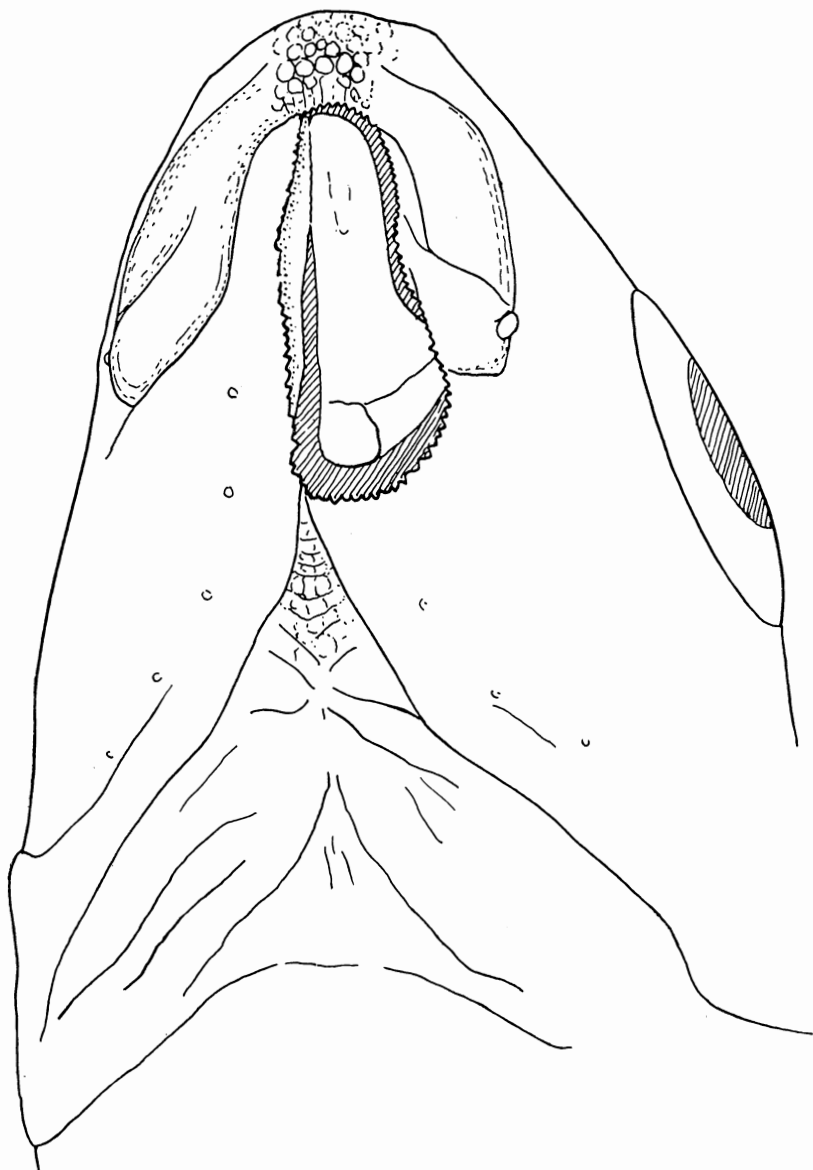


FIG. 1. Semi-diagrammatic view of the lower surface of the head of *P. hubbsi*. The left side is shown as partly dissected to reveal the structure of the lower jaw bones. Comparison should be made with the similar figure for *Parexoglossum laurae* in Hubbs' paper, which precedes this one.

of Zoology, University of Michigan. The principal counts and measurements of this individual can be found in Table 1.

Thirty-three specimens are also designated as paratypes. These are in the Ohio State Museum and the Museum of Zoology, University of Michigan, and are listed below. Their counts and measurements can be found in Tables 1 and 2.

Mad River near Urbana, Mad River Township, Champaign County, Ohio; July 12, 1927; one specimen 46 mm. long; Cat. No. F57, Ohio State Museum.

Mad River near Urbana, Mad River Township, Champaign County, Ohio; July 30, 1927; one specimen 54 mm. long; Cat. No. 85865, Museum of Zoology.

Mad River, Mad River Township, Montgomery County, Ohio; July 20, 1929; one specimen 49.5 mm. long; Cat. No. 87369, Museum of Zoology.

Mad River, Mad River Township, Montgomery County, Ohio; July 20, 1929; one specimen 58 mm. long; Cat. No. F347, Ohio State Museum.

Mad River, Mad River Township, Montgomery County, Ohio; June 21, 1930; one specimen 57 mm. long; Cat. No. F539, Ohio State Museum.

Mad River, Mad River Township, Champaign County, Ohio; November 18, 1930; three specimens 49, 47, and 45 mm. long; Cat. No. F616, Ohio State Museum.

Mad River, four miles north of Springfield, German Township, Clark County, Ohio; June 21, 1930; two specimens 52 and 47 mm. long; Cat. No. F540, Ohio State Museum.

Mad River, four miles north of Springfield, German Township, Clark County, Ohio; June 21, 1930; three specimens 48, 47.5, and 46.5 mm. long; Cat. No. 92664, Museum of Zoology.

Stillwater River at Webster, Wayne Township, Darke County, Ohio; July 19, 1930; two specimens 62 and 56 mm. long; Cat. No. F566, Ohio State Museum.

West Branch of Greenville Creek at its mouth, Greenville Township, Darke County, Ohio; July 20, 1930; one specimen 28 mm. long; Cat. No. F570, Ohio State Museum.

TABLE 1

	COUNTS AND MEASUREMENTS OF THE TYPES OF <i>Paracroglossum hubbsi</i> FROM 45 TO 63 MM. IN LENGTH							
	MofZ	OSM	MofZ	OSM	MofZ	OSM	MofZ	OSM
Museum ¹	92408 ²	F57	85865	F547	87369	F539	87369	F540
Number	63	46	54	58	49.5	57	52	47
Length to caudal, mm.	17	17	16	17	17	16	17	17
Pectoral rays, left	17	17	16	17	17	16	16	17
Pectoral rays, right	9	9	9	9	9	9	9½	9
Scales above lateral line ..	52	49	50	50	49	48	49	49
Scales in lateral line	6	6	6	6½	6	6	6	6
Scales below lateral line ..	4.20	4.05	4.10	4.25	3.95	4.10	4.02	4.00
Head in standard length ..	4.70	4.80	5.03	4.95	5.25	4.95	4.88	4.80
Depth of body in length ..	1.42	1.52	1.45	1.55	1.55	1.50	1.45	1.50
Width in depth	1.55	1.98	1.95	1.85	1.90	1.95	1.90	1.95
Depth of caudal peduncle:								
in its length	1.93	1.95	2.00	2.00	2.05	2.00	1.97	1.90
in head	3.85	3.55	3.40	3.85	3.90	3.90	3.98	3.90
Eye in head	3.00	3.03	3.05	3.20	3.20	2.98	3.00	2.98
Interorbital in head	2.85	2.98	3.00	3.00	3.00	3.02	3.03	3.00
Snout in head	3.90	4.90	4.00	3.98	4.00	4.25	4.60	4.10
Suborbital in head	3.65	3.50	3.70	3.45	3.50	3.85	3.40	3.38
Upper jaw in head	1.50	1.40	1.38	1.45	1.33	1.40	1.30	1.35
Depressed dorsal:								
in dorsal to occiput	2.30	2.10	2.15	2.20	2.18	2.10	2.05	2.15
in dorsal to snout	1.03	1.00	0.98	1.00	1.03	1.03	1.00	0.98
in head	1.15	1.10	1.10	1.22	1.15	1.17	1.15	1.10
Depressed anal in head	1.15	1.20	1.18	1.17	1.17	1.15	1.20	1.15
Depressed pectoral in head ..	1.45	1.45	1.35	1.43	1.30	1.45	1.45	1.35
Length pelvics in head								

¹ MofZ = Museum of Zoology, University of Michigan; OSM = Ohio State Museum.

² The holotype is 92408.

TABLE 1—(continued)

COUNTS AND MEASUREMENTS OF THE TYPES OF <i>Parexoglossum hubbsi</i> FROM 45 TO 63 MM. IN LENGTH								
Museum	OSM	OSM	MofZ	MofZ	MofZ	OSM	OSM	OSM
Number	F566	F566	92664	92664	92664	F616	F616	F616
Length to caudal, mm.	62	56	48	47.5	46.5	49	47	45
Pectoral rays, left	16	17	17	17	17	17	17	17
Pectoral rays, right	17	17	17	17	17	17	17	17
Scales above lateral line	9	9	9	9	9	9	9	9
Scales in lateral line	48	48	50	48	50	49	49	48
Scales below lateral line	5	6½	6	6	6	6	6	6
Head in standard length	4.05	4.00	4.05	4.15	3.95	4.00	4.02	3.95
Depth of body in length	5.05	5.03	5.35	4.95	4.90	5.02	4.90	5.05
Width in depth	1.30	1.45	1.30	1.52	1.48	1.38	1.50	1.38
Depth of caudal peduncle:								
in its length	2.00	1.75	1.95	1.95	1.98	1.88	1.85	1.83
in head	2.00	2.00	2.03	1.98	1.98	1.98	1.98	1.95
Eye in head	3.98	3.90	3.55	3.75	3.65	3.90	3.93	3.90
Interorbital in head	3.08	3.05	3.05	3.03	3.55	2.98	2.95	2.95
Snout in head	2.95	2.85	3.00	3.00	3.10	3.03	2.98	3.00
Suborbital in head	4.08	4.00	4.25	4.10	4.05	4.20	4.05	4.20
Upper jaw in head	3.35	3.38	3.85	3.50	3.35	3.35	3.55	3.38
Depressed dorsal:								
in dorsal to occiput	1.45	1.40	1.23	1.38	1.35	1.28	1.25	1.15
in dorsal to snout	2.25	2.15	2.08	2.15	2.12	2.03	2.08	1.95
in head	1.05	1.03	1.00	1.03	1.01	1.00	0.98	0.90
Depressed anal in head	1.10	1.05	1.10	1.15	1.15	1.15	1.08	1.05
Length pectoral in head	1.20	1.10	1.20	1.15	1.18	1.15	1.12	1.08
Length pelvis in head	1.45	1.40	1.33	1.45	1.38	1.35	1.30	1.25

Greenville Creek, western Greenville Township, Darke County, Ohio; July 20, 1930; seventeen specimens from 26 to 30 mm. long; Cat. No. F571, Ohio State Museum.

Description of the species.—The body is quite terete; its greatest width is contained from 1.32 to 1.55 times in the depth, taken just before the dorsal. The greatest depth ranges from 4.70 to 5.35 times in the standard length, measured from tip of snout to base of caudal.

The anterior dorsal profile rises rather sharply from the tip of the snout to above the nostril, thence continuing to rise but slightly to the origin of the dorsal. The posterior dorsal profile tapers evenly and very gently downward to the caudal base. The ventral profile is a slight but uniform curve throughout its length; starting from the tip of the snout it curves downward to the origin of the pelvics, then gradually upward to the base of the caudal.

The head is squarish in outline; the height and width near the base are practically equal; its length is contained from 3.95 to 4.25 times in the standard length in the larger specimens. The mouth is somewhat oblique. The tip of the upper jaw is normally below the lower edge of the orbital rim, and is contained from 3.35 to 3.85 (usually about 3.50) times in the head. The features of the mouth are described under "Diagnosis." The lipless edge of the mandibles form an even curve which is less than half the width of the eye. The outer edge of the dentary bones taper gradually from their posterior bases to their anterior tips. The inner edge of these rami lie parallel and are tightly pressed against each other anteriorly for one-third their length, but separated throughout the other two-thirds (see Fig. 1).

A number of papillae usually occur on the anterior portion of the gular membrane in the angle formed by the interopercles. A prominent barbel is situated on the outer border of the lips just in front of the posterior angle of the mouth. This is present in all specimens examined. The tip of the snout is quite pointed and conical, differing in that respect from the more broadly rounded one of *P. laurae*.

TABLE 2
 ADDITIONAL MEASUREMENTS OF PARATYPES OF *Parexoglossum hubbsi* FROM
 26 TO 30 MM. IN LENGTH

Number (Ohio State Museum)	Length to caudal	Head in stand- ard length	Depth of body in length	Width in depth	Eye in head	Upper jaw in head	Depressed dorsal in dorsal to tip of snout
F570	28	3.9	5.0	1.5	3.2	4.1	2.0
F571	27	3.9	5.0	1.7	3.2	4.0	2.1
F571	28	3.9	5.0	1.6	3.3	4.1	2.2
F571	28	3.7	4.9	1.5	3.2	4.0	2.0
F571	30	3.9	4.9	1.5	3.3	3.9	2.0
F571	28	3.6	4.8	1.5	3.3	3.8	2.0
F571	28	3.5	4.9	1.5	3.3	4.0	1.9
F571	26	3.7	4.8	1.6	3.2	4.1	2.0
F571	28	3.9	4.8	1.6	3.2	4.0	1.9
F571	29	3.8	5.0	1.5	3.4	4.0	2.0
F571	28	3.5	4.8	1.5	3.2	4.0	2.0
F571	28	3.6	4.9	1.5	3.4	3.9	1.9
F571	27	3.7	5.0	1.5	3.2	3.8	2.0
F571	28	3.6	4.9	1.5	3.2	4.0	2.1
F571	28	3.7	4.9	1.4	3.3	4.0	1.9
F571	28	3.9	4.9	1.5	3.3	4.0	2.0
F571	29	3.8	4.8	1.6	3.3	4.0	2.0
F571	26	3.6	4.7	1.6	3.1	3.9	2.3

The eye is of normal size, ranging from 3.40 to 3.98 times in the length of the head in specimens of 40 mm. or over. It is larger in the smaller specimens.

The lower pharyngeals are wholly concealed by the shoulder girdle, which is pronounced forward as a slightly bilobed shelf. The pharyngeal arch itself is quite slender with but ill defined shelves, and contains one weak conical tooth on the inner row and four somewhat stronger and well hooked teeth on the outer row of each arch.

The gill slit is rather restricted. The gill rakers number 2+3; only the pair at the angle are more than rudiments.

All the fins are fairly strong. The dorsal fin has 8 rays, and when depressed is contained from 1.95 to 2.30 (averaging about 2.12) times in the distance from the origin of the dorsal fin to the tip of the snout. The origin of the dorsal is approximately equidistant between the tip of the snout and the base of the caudal, and but very slightly behind the vertical from the origin of the pelvics.

The anal fin is contained from 1.08 to 1.22 times in the length of the head, and has 7 rays; the pelvics from 1.25 to 1.45 times, and have 8 rays each; and the pectorals from 1.10 to 1.20 times, and have 17 (occasionally 16) rays each.

The scales in the complete lateral line number from 48 to 52; 9 scale rows are present from the lateral line to the origin of the dorsal; and 6 from this line to the origin of the pelvics. The breast is fully scaled.

The depth of the caudal peduncle in specimens longer than 40 mm. ranges from 1.90 to 2.05 times in the length of the head. The peritoneum is silvery with a few well scattered black specks.

The facts that no specimens longer than 63 mm. to caudal have been taken, and that those over 45 mm. appear to be mature, suggest that this is a smaller species than *P. laurae*.

The general color of the dorsal half of the fish normally tends to shades of olive, and is darkest on the nape and occiput. The ventral half is more or less silvery or white, especially anteriorly and on the belly. A dusky streak starts at the tip of the snout, extends backward across the eye, cheek, and opercle, and continues as the lateral band to the tail. A dark vertical bar at the base of the caudal is about half as long as the depth of the fish at that point. There is a waxy appearance over the entire body, almost translucent, which gives it a very unique appearance and greatly facilitates its detection when in the seine with other minnows. A lavender sheen is present over most of the fish, but is prominent only above the anterior half of the lateral streak. The fins are tinted with amber, which is most pronounced on the tail.

Habitat.—*P. hubbsi* appears to be very restricted in its habitat. It is a fish which occupies medium to large sized streams, from 12 to 50 yards wide, that have a rapid flow of water over a gravelly or stony bottom. In almost every collection containing specimens longer than 40 mm., *Hypentelium nigricans* (Le Sueur), *Rhinichthys atronasus meleagris* Agassiz, *Semotilus atromaculatus atromaculatus* (Mitchill), *Clinostomus elongatus* (Kirtland), *Chrosomus erythrogaster* Rafinesque, and *Cottus bairdii bairdii* Girard were among the most prominent associates. It is most unusual, in Ohio at least, to find these normally clear, small creek or brook species in such large streams. It appears to be this peculiar circumstance, in which brook species find ecological conditions favorable in these good sized streams, which supplies the most congenial habitat for *P. hubbsi*. As this condition is rare, it accounts to some degree at least, for the restricted range of the species. During the very intensive collecting of the past few years a constant watch has been maintained for this fish elsewhere in Ohio, but with no success.

It is with great pleasure that I dedicate this species to Dr. Carl L. Hubbs, in recognition of his encouragement of my ichthyological studies, and of his assistance in the preparation of this paper.

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PLATE I

Parexoglossum hubbsi, new species. Reproduced by courtesy of Ohio Division of Conservation from a painting made from a paratype taken with the holotype.

