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The suckers of the genus Catostomus are currently divided into two groups, now that Hypentelium and Thoburnia have been separated as distinct genera (Hubbs, 1930: 10). These two groups of Catostomus, called subgenera by Jordan and Evermann (1896: 173), are distinguished by size of scales. Throughout many of the western river systems both types occur (Snyder, 1917:47). Thus in the Columbia River system there is a coarse-scaled form, C. macrocheilus, representing the group Decactylus, and a fine-scaled form which has been passing under the name of Catostomus catostomus. But a second fine-scaled species was described from the same system by Gilbert and Evermann (1894: 189, pl. 9), under the name of Catostomus pocatello (see also Jordan and Evermann, 1896: 175, and 1900: 3237, pl. 32, fig. 76).

The species last-named, C. pocatello, is said to inhabit the Snake River basin in Idaho, but we found it also in the basin of the Clark Fork of the Columbia River in Montana (Brown's Gulch Creek between Butte and Anaconda, and Clark Fork and its tributary, Flint Creek, at Drummond, Granite County). C. pocatello has a rather small mouth; the lower lip is incised almost to its base, so as to leave but one row of papillae across the mid-line; the eye is rather small and submedian; the snout is not greatly flattened or produced; the caudal peduncle is slender (depth about one-third length of head), and the size small. In these respects it differs from C. catostomus as that species is represented in Great Lakes waters. But whether the Great Lakes form is true catostomus we are not now prepared to say; it is apparent at least that it is somewhat different from the Yukon form (Evermann and Goldsborough, 1907 231, fig. 5), and from the Siberian form, which we have not seen. Similar to pocatello, but with a larger eye and larger more coarsely papillate lips, and the dorsal less posterior, is a dwarf lake form from British Columbia, recently named Catostomus catostomus *lacustris* by Bajkov (1927: 21, pl. 1, fig. c, and pl. 2, fig. a). Of this form we have some paratypes from Annette Lake, Jasper Park, Alberta, and others from Garnet Valley Lake near Summerland, British Columbia, the latter collected by J. R. Dymond.

Catostomus pocatello will very likely eventually also be lined up as a subspecies of *Catostomus catostomus.* So also will *Catostomus griseus,* which occurs on the opposite side of the Continental Divide, where it appears to be the only fine-scaled sucker (other than *Pantosteus jordani).* From *griseus, pocatello* is said to differ "in its narrower upper lip and larger eye, as well as in other minor characters." We find it to differ in the slenderer and more constricted caudal peduncle. Our material of *griseus* comes from numerous points in the Missouri River system of Colorado, Wyoming and Montana. Circumstances suggest that Jordan and Evermann (1896: 175) were right in assigning *C. lactarius* and *C. retropinnis* to the synonymy of *C. griseus.*

This much seems clear, that *C. pocatello* and *C. griseus* are more akin to *C. catostomus* than is the Columbia River form which has been identified erroneously as *C. catostomus* by Eigenmann (1894: 107), Gilbert and Evermann (1894: 189), Evermann (1899), Evermann and Nichols (1909: 93) and others. That form is here regarded as a distinct but unnamed species:

Catostomus syncheilus, new species

Holotype. A postnuptial male 183 mm. long to caudal, collected on June 16, **1926,** in Crab Creek about 7 miles below Odessa, Washington, by Carl L, Hubbs and Leonard P. Schultz; Cat. No. 94076, Museum of Zoology, University of Michigan.

The numerous paratypes were collected in Washington by one or both of the authors at the type locality; in the same creek just above Sylvan Lake; in Moses Lake, in the same stream basin, but disconnected by a large lava flow; in a small tributary to Yakima River at Ellensburg, and in a tributary of the Snake River near King Hill, Idaho. Evermann recorded this species from Lake Chelan, Washington; Eigenmann had what was presumably this form from the Columbia River at Golden, British Columbia; Gilbert and Evermann's specimens came from several localities in Idaho, Eastern Washington and Northeastern Oregon, while Evermann and Nichols' record was for Crab Creek, Washington. It obviously has a wide range through the upper parts of the Columbia River system, in Idaho, British Columbia, Washington and Oregon.

Catostomus syncheilus, as the name implies, is characterized by the wide union of the lower lips, allowing several rows of papillae to cross the midline between incision and tip of jaw. It appears to

differ specifically from *C. pocatello* and therefore also from other intimate relatives of *C. catostomus,* because Gilbert and Evermann (1894: 189) recorded both species from Ross Fork of Snake River near Pocatello, Idaho.

C. syncheilus differs in the wide union of the lower lips not only from *C. catostomus,* but also from *C. griseus* of the Missouri system; from *C. discobolus* and *C. latipinnis* of the Colorado system, which are now regarded as distinct species (Gilbert and Scofield, 1898: 489, and Jordan and Evermann, 1898: 2790), and are otherwise very distinct; and also from *C. tahoensis* (Jordan and Evermann, 1896: 177, and 1900: 3237, pl. 32, fig. 177), of the Lahontan system, with which *Chasmistes chamberlaini* has been identified (Snyder, 1917: 43), and from *C. microps* of the Sacramento system (Rutter, 1908: 120, fig. 1).

Other suckers referred to the fine-scaled division have been variously disposed of. *Catostomus lactarius* Girard and *C. retropinnis* Jordan, as intimated above, are apparently synonymous with *C. griseus*. *Catostomus rex* Smith is indicated by Gilbert (1898: 6) as a synonym of *Deltistes luxatus*. *Catostomus warnerensis** Snyder (1908a: 81, fig. 2) has been transferred to the coarse-scaled group by the same author (1917: 47), and *Catostomus conchos* Meek (1902: 75, pl. 15, and 1904: 33, pl. 7) certainly would appear to belong there too.

There remains for differentiation only one species, *Catostomus rimiculus* Gilbert and Snyder of the Klamath and Rogue River systems (Gilbert, 1898: 3; Jordan and Evermann, 1898: 2792; Snyder, 1908b: 161). That species, of which we have many specimens from the Rogue River about 12 miles below Medford, Oregon, likewise has the lower lip only moderately incised, so that several rows of papillae cross the midline. *C. rimiculus,* in fact, appears to be only an isolated variant of the Columbia River form which we are now naming. The indication of intimate relationship of *rimiculus* with *syncheilus* casts a little doubt on the validity of Snyder's(1908b : 156, and map) reference of the Rogue River fauna to the Klamath River fauna, especially since *C. rimiculus* is the only truly fluviatile fish common to the two systems and the only one known in the Rogue River system. The Rogue River system lacks the other species, characteristic of the Klamath River system, namely *Catostomus*

"We note Snyder described the lips of *warnerensis* as having two or more rows of papillae across the mid-line, and it is likely a relative of *syncheilus,* with which it is connected by the (unnamed) form of the Harvey-Malheur lake basin. Probably *rimiculus, warnerensis,* the Harvey-Malheur form, and *syncheilus* form a group of their own: which if proven to be true would render erroneous and useless all attempts to define either as belonging to the coarse scaled *(commersonnii)* or fine scaled *(catostomus)* series.

snyderi, Chasmistes brevirostris, Chasmistes stomias, Chasmistes copei, Deltistes luxatus, Apocope oscula klamathensis, Tigoma bicolor, Siphateles bicolor, Cottus evermanni, Cottus princeps and *Cottus tenuis* (Gilbert, 1898; Evermann and Meek, 1898). Furthermore the *Cottus* of the *gulosus* type in the Rogue River has been referred to the Columbia River form (Snyder, 1908b); however, our specimens from the Rogue River appear to approach *klamathensis*.

The differences between *syncheilus* and *rimiculus* lie chiefly in the development of the fontanelle, in the larger eye and in the size of the scales and in the average number of dorsal rays. The fontanelle in the adult of *syncheilus* is wide, not reduced to a narrow or obsolete slit as in *rimiculus*. The numerical differences are indicated in tabular form. The counts given for *syncheilus* by the several authors who recorded the species as *C. catostomus* confirm the differences, with one exception. Snyder (1908a: 83) has indicated the presence, in Silvies River and Silver River in the lake district of southeastern Oregon, of a local form having the scales about as large as in *C. rimiculus*. In the slenderness of the caudal peduncle at least this form apparently resembles *syncheilus* rather than *rimiculus*. Very likely it will deserve a name, perhaps as a subspecies.

C. syncheilus differs further from *rimiculus*, and also from *tahoensis, microps, griseus* and some forms (subspecies?) of *catostomus* in the slenderer caudal peduncle (least depth only one-third length of head). Oddly, a slender caudal peduncle is also characteristic of the Columbia River representative of *C. catostomus (C. pocatello)* and of the coarse-scaled sucker of the same system, *C. macrocheilus*. *C. discobolus* and *C. latipinnis* have even slenderer caudal peduncles; also much larger fins and larger lips. Compared with *C. pocatello and C. c. lacustris* and the Yukon form of *C. catostomus*, which also have a slender peduncle, *C. syncheilus* differs but little except in the united lower lips. From the far northern *catostomus* it differs in having the scales larger and the snout shorter and less depressed; from *lacustris* in having the origin of the dorsal midway between base of caudal and tip of snout rather than nostrils, and from *pocatello*, of the same stream system, in the more abruptly constricted and more slender caudal peduncle (least depth usually contained slightly more than 3 times in head and 12 or 13 times in standard length, instead of slightly less than 3 times in head and 10 or 11 times in the standard length.); in the smaller head (even in the larger yearlings the head is a little less than one-fourth the standard length, whereas in the dwarfed adults of *pocatello* the head is a

Scale rows in lateral series	*C. syncheilus:* Crab Cr., Wash. (cotypes of type and paratypes)	C. *syncheilus:* King Hill, Ida. (counts of paratypes)	C. *rimiculus:* Klamath system (counts by Gilbert and Snyder)	*C. rimiculus:* Klamath system (counts by Snyder)	C. *rimiculus:* Rogue system (counts by Snyder)	*C. rimiculus*: Rogue system (original counts)	*C. syncheilus* totals	*C. rimiculus* totals
81	1		1	1	3	1		5
82				1				1
83			1	3	1			7
85			1	4	3	1		5
86			1	3	1			4
87				3	3			12
88			1	8	1			10
89			1	2	3			5
90				5	1	1		7
91			1	1	1			3
92				3		1		1
93				1				3
94								
95								
96								
97								
98								
99								
100								
10	1							
102	1							
103	1							
104								
105								
106	1							1
107								
108								
109		1						1
:10								
11_		1						

Scales in lateral series								
36								
37								
38								
39					1	1		
40					3	3		
4				2	2	1		
42				3	1			
43				1				
44					1			
45					3			
46					1			

TABLE 1—CONTINUED

Comparison between *Catostomus syncheilus* and *Catostomus rimiculus* in number of scales and of dorsal fin rays.

	Scales above lateral line	Scales below lateral line	Dorsal rays
	14 15 16 17 18 19 20 21 22	11 12 13 14 15 16 17 18 19 20 21 22 23	10 11 12 13
C. syncheilus: Crab Cr., Wash. (counts of type and paratypes)	1 2 1	1 2 1	1 3 28 2
C. *syncheilus:* King Hill, Ida. (counts of paratypes)	1 1	1 1	1 1 1
C. *rimiculus*: Klamath system (counts by Gilbert and Snyder)	1 1	1 3 2	1 5 1
C. rimiculus: Klamath system (counts by Snyder)	1 1 1 1	1 9 17 12 3 1	1 3 3 1
C. *rimiculus:* Rogue system (counts by Snyder)	1 1	3 3 3 1 1	1 7 2 1
C. rimiculus: Rogue system (original counts)	1 1	1 2 1	2
C. syncheilus totals	1 1 1	1 1 1 1 4	1 29 3
C. rimiculus totals	2 1 1 1 1	1 7 18 20 5 12 3 1 1	5 44 7 1

little more than one-fourth the standard length). In addition to being much less deeply incised, the lips of *syncheilus* differs from those of *pocatello* in being more finely papillate.

Catostomus syncheilus may be more closely related to "*Pantosteus*" *plebeius* of the Rio Grande system than to any of the species now referred to *Catostomus.* It resembles that species very closely in form of body, caudal peduncle, etc., and in the shallowness of the lower lip incision, and in the degree of development and lateral angulation of the cartilaginous sheath to the lower jaw. If there is any difference in these structures, the sheaths of *syncheilus* are more like those of typical *Pantosteus* than are those of *plebeius.* Furthermore, the overfolding of the upper lip on itself and on the lower, another feature of *Pantosteus,* is better developed than in *plebeius*. So also is the obsolescence of papillae on the outer face of the upper lip (these are well developed in *plebeius).* The only lip feature in which *plebeius* agrees better with typical *Pantosteus* than *syncheilus* does, is the deeper incision at the junction of the margins of upper and lower lips. Other differences between *syncheilus* and *plebeius* are the finer scales, the developed fontanelle and the more numerous dorsal rays. In these respects, and others, *C. rimiculus* approaches or agrees with *plebeius.* In fact, except for the later and less consistent closing of the fontanelle, the virtual lack of incision between upper and lower lips, the lower dorsal and the lower average number of dorsal rays (10 to 12 as opposed to 9 or 10), it is difficult to distinguish *rimiculus* from *plebeius.*

It is clear that the current classification of the Western suckers in genera does not adequately indicate their resemblances or probable relationships.

Description (based primarily on the 183 mm. holotype and on three paratypes 167 to 219 mm. long to caudal, from the type stream, Crab Creek, and on two yearling paratypes 77 and 87 mm. long, from a tributary of Snake River near King Hill, Idaho; the measurements of the paratypes are indicated in parentheses, those of the larger being first). The body is chubby, with a strongly curved anterodorsal profile; the greatest depth of the body, below the origin of the dorsal, is contained 4.1 (4.3 to 4.7; 3.9 to 4.7) times in the standard length. The caudal peduncle is abruptly constricted, and its least depth is contained 2.0 (1.8 to 1.9; 1.75 to 1.8) times in its length, 3.0 (2.9 to 3.2; 3.1 to 3.2) times in head, and 12.6 (12.6 to 13.0; 12.6 to 12.7) times in the standard length. The body is rather

thick, considerably wider than head is deep. The head is a little wider than deep and the snout if produced forward has a rather deep and rounded lobe beyond the mouth. The eye is submedian; the snout is contained 0.95 (1.0; 0.95) times in the greatest post-orbital length of the head. The eye is of moderate size, contained 6.1 (6.2 to 7.0; 4.2 to 4.5) times in head; interorbital, 2.5 (2.5 to 2.6; 2.5 to 2.6) in head.

The lips are moderately large and rather coarsely papillate; the width of mouth across lips enters the head 2.6 (2.5 to 2.9; 2.3 to 2.5) times. The upper lip has the outer and inner faces separated by a sharp edge toward the middle of the mouth but not at the angles. The outer face of the upper lip is papillo-plicate; the edge is strongly crenate, and the inner face bears two rows of large papillae opposite the edge of upper jaw. Toward the angle of the mouth the rows of papillae become more numerous. Here the upper lip shows little tendency to overlap the lower, as both lips flatten out to a common plane. The marginal indentation between the lips is but slightly developed. The lower lip is only moderately incised, leaving room for from two to four rows to cross the midline in advance of the point of the incision. The papillae of the lower lip are large, round and isolated forward, but distally they become lower, oval and seriated into radial rows. The edges of the jaws are hard and rather sharp, and rather weakly curved. The ends of the hardened edges do not form conspicuous angles, but merge into the structure of the jaw.

The dorsal fin is slightly falcate; its height is contained 1.2 (1.0 to 1.2; 1.0 to 1.2) times in its base, which enters the total length 5.2 (6.2 to 6.5; 5.3 to 5.8) times. All of the fins are rounded at their tips; length of caudal, 4.75 (4.3 to 4.7; 4.0) ; depressed anal, 4.2 (4.6 to 5.4; 5.2) ; pectoral, 5.0 (5.1 to 5.9; 4.6 to 5.0); pelvic, 5.5 (5.0 to 7.2; 5.7 to 5.9).

The scales are much reduced in size forward, especially on the nape and belly. The fin-ray and scale counts for the type are: dorsal, 12; anal, 7; pectoral, 16; pelvic, 10; scales in lateral line, 106; between origin of dorsal and lateral line, 22; between origin of anal and lateral line, 22; before dorsal, 58. The pectoral rays are 16 or 17, and the pelvic rays occasionally 11 in the paratypes. The counts of the dorsal rays and of the scales in the paratypes are given in Table 1.

The adults are uniformly dark above, pale ventrally. The yearlings show the usual dorsal mottlings and three lateral blotches.

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