

REMARKS ON THE GENUS *XENOCYPRIS*
(PISCES, CYPRINIDAE) WITH DESCRIPTION
OF A NEW SUBSPECIES

BY

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Six species are accepted as valid within *Xenocypris* (including *Distoechodon* as subgenus). *X. argentea* and *X. davidi* are closely related sibling species; mass hybridization seems to occur between them in some areas. *X. insularis* is considered a valid subspecies of *davidi*, *X. fangi* a subspecies of *X. yunnanensis*, *X. compressus* a subspecies of *X. tumirostris*. A new subspecies, *X. tumirostris multispinnis*, characterized by a high number of scales and gill rakers is described from the upper Yangtze.

The genus *Xenocypris* Günther 1868 ranges from the Amur drainage through continental East Asia to North Vietnam and Hainan Island. Several authors split this genus in the old acceptance, by recognizing two further distinct genera or subgenera: *Plagiognathops* for one species (*microlepis*) with postventral keel and *Distoechodon* for some 3 species with pharyngeal teeth on two rows. The first-named seems actually to deserve full generic rank; the reduction of the number of teeth occurring independently in many groups of minnows, I consider *Distoechodon* only a provisional, possibly polyphyletic subgenus.

Some 19 nominal species and subspecies were described within *Xenocypris* s. str. and *Distoechodon*. Yang (in Wu & others, [7]) synonymizes many of them, recognizing only 5 species in *Xenocypris* and 3 in *Distoechodon*. My conclusions are somewhat different from his.

The delimitation of the species of *Xenocypris* is quite difficult. The body proportions are almost the same in all. Only 3 characters are useful in this delimitation: the number of rows of teeth, that of scales in lateral line and of gill rakers; most authors do not mention the last character.

MATERIAL

Some 130 specimens were examined including 11 types; they belong to the following collections: American Museum of Natural History, New York (A.M.N.H.); Academy of Natural Sciences of Philadelphia (A.N.S.P.); British Museum, Natural History (B.M.N.H.); Institutul de Biologie «Tr. Săvulescu», București (I.B.T.S.); Museum of Comparative Zoology, Cambridge, Massachusetts (M.C.Z.); Muséum National d'Histoire Naturelle, Paris, (M.N.H.N.); Naturhistorische Museum Wien (N.M.W.); United States National Museum, Washington (U.S.N.M.); Zoologisches Museum der Humboldt Universität, Berlin (Z.M.B.).

SYSTEMATIC ACCOUNT

Xenocypris argentea — *X. davidi* complex

The two wide ranging species of the genus, *argentea* and *davidi*, are very similar, the differences between them being only statistical, with overlapping of extreme values. Yang (in Wu & others, [7]) mentions following differences:

argentea: L. lat. 53-64, Sp. br. 38-45; depth 25-27% of length;
davidi: L. lat. 63-68, Sp. br. 42-52, depth 27-30%.

By using these differential characters, the systematic position of some available specimens appears quite clear, while that of other specimens and populations remains problematic.

Xenocypris argentea Günther, 1868

Specimens examined:

- From the Amur drainage: U.S.N.M. 105237, 2 spec., 80.0 and 85.0 mm;
From the Paiho drainage: A.N.S.P. 105282, Peking, 2 sp., 137 and 139 mm;
From the Yangtze drainage: Holotype of *X. argentea*, B.M.N.H., 1855, 9. 19, 1147, 1 spec., 91.0 mm;
— U.S.N.M. 86491 & 86493, Nanking, 3 spec., 156—157 mm and 6 spec., 93—102 mm;
— Lake Liang-tze-hu, Hupeh, 2 specimens, 171.0 and 178.0 mm;
— Yangtze R., at Wuchang (introduced in Romania), 5 spec., 88—117 mm;
— M.N.H.H. 3946 & 3947, Wuchang, 3 spec., 168.5—256.0 mm;
— M.N.H.N. 3474 & 3475 Yangtze, 2 spec., 207.0 mm and 122.0 mm;
— M.N.H.N. 3471 & 3472, upper Yangtze, Szechwan, 2 spec., 128 & 198 mm;
— U.S.N.M. 91762, Suifu, Szechwan, 1 spec., 145.3 mm;
— A.M.N.H. 10672, Tungting Lake, Hunan, 1 spec., 171.0 mm;
— A.M.N.H. 15262, Kafeng, 1 spec., 156.0 mm;
From Hsikiang drainage, South China: M.C.Z. 2138, Hongkong, 152 mm;
— A.M.N.H. 12759, Poseh, Kwangsi, 1 spec., 175.0 mm;
— A.N.S.P. 84985, Poseh, Kwangsi, 1 spec., 184.0 mm;
— U.S.N.M. 94860, Kwangsi, 1 spec., 166 mm;
— Z.M.B. 11322, Linchow, Kwangsi, 1 spec., 149.0 mm;

- Z.M.B. 10733, South China, 1 spec., 140.0 mm;
From North Vietnam: I.B.T.S. 0627, Boi R., 1 spec., 130.0 mm;
— M.N.H.N. 07283 & 34210, 2 spec., in all, 69.2 and 82.0 mm.

The available Amur drainage specimens have 62 scales, 43, respectively 46 gill rakers, depth 27.2 and 28.8%; Nikolski mentions for the Amur River *X. argentea* (= *macrolepis*) 53—64 scales (M=59) and depth 21—30. He does not mention the number of gill rakers.

The available Peiping specimens: L. lat. 58-59, Sp. br. 37 & 41, depth 23.4 and 24.8%.

The many available Yangtze specimens: 9, rarely 8, 10 or 11 branched anal rays (11 in the holotype); 54-64 scales (a few have 54-57, no specimen 58, most have 59-63, M=60.88): 33-46 gill rakers (a few specimens have 33-37, much more have 39-46, M = 40,3).

The fact that in both lateral line scales and gill rakers there are, among the Yangtze specimens, two groups of values with apparently no overlap, may suggest the possibility of the existence of two sibling species. But there are too few specimens in the first group (L. lat. 54-57, Sp. br. 33-37) and not all specimens with a small number of scales have also few gill rakers.

The few available Hsikiang specimens: L. lat. 54-63; Sp. br. 32-47. The North Vietnam specimens: L. lat. 51-61, Sp. br. 36-39.

No trend of reduction of scales and gill rakers number is thus discernable from the Amur to the Hsikiang drainage; but these numbers are smaller in North Vietnam than in Hsikiang specimens.

Besides the above mentioned specimens, the following types too proved to belong to *X. argentea*:

Holotype of *X. macrolepis* Bleeker: M.N.H.N. 5060, China; 122.0 mm; depth 23.0%; L. lat. \pm 63 - 64; Sp. br. 36; A 2/9 (Fig. 1);

Holotype of *X. tapeinosoma* Bleeker: M.N.H.N. 5939, Yangtze; 83.7 mm depth 21.8%; L. lat \pm 59-60; Sp. br. \pm 34; A 2/9 (Fig. 2);

Paratype of *X. nankinensis* Tchang: M.N.H.N. 3473; Nanking; 70.5 mm; depth 27.2%; L. lat \pm 59; Sp. br. 40; A 2/9 (Fig. 3).

According to their descriptions, also *X. güntheri*, *X. lamperti*, *X. sungarinensis* and *X. nitidus* belong to this species, while the status of *X. aenea* and *X. katinensis* is doubtful (see below).

Xenocypris davidi davidi Bleeker, 1871

Specimens examined:

- A.M.N.H. 10668, Anhwei (Yangtze drainage), 4 spec., 138—184 mm; depth 26.1—27.4%; L. lat. 64—66; Sp. br. 43—51, A 2/10—11. (Fig. 4)
A.M.N.H. 10856, Fukien (Minkiang drainage), 5 spec., 66.0—68.0 mm; depth 23.6—28.2%; L. lat. 63—65; Sp. br. 40—49; A 2/10.
A.M.N.H. 10933, Yenping, Fukien, 5 spec., 79—92 mm; depth 26.2—27.4%; L. lat. 64—67; Sp. br. 42—48.
U.S.N.M. 91768, 9735, 91678, 130104, Suifu, Szechwan (upper Yangtze), 4 spec., 157—215 mm, depth 24.3—29.1%; L. lat. 66—67; Sp. 44—48.

U.S.N.M. 85929, China, 4 spec., 115–121 mm; depth 25.4–27.3%; L. lat. 63–67; Sp. br. 42–47

U.S.N.M. no number, China, 3 spec., 143–240 mm; depth 23.4–29.0%; L. lat. 65–68; Sp. br. 47.

The representatives of these series differ from *argentea* in having more scales and gill rakers and usually 10 branched anal rays (as against usually 9); in body depth they cannot be differentiated.

Yet other museum series seem to include both species or mainly intermediate specimens (hybrids?):

A.M.N.H. 10671, Tungting Lake, Hunan (recorded by Nichols [4], as *davidi*): 20 spec., up to 128 mm; depth 23.1–25.4%; L. lat. 60–67; Sp. br. 37–51; anal usually 2/9 (as in *argentea* from the Yangtze). Specimens from this series with 60–62 scales (as *argentea*) have 47 or even 51 gill rakers, like *davidi*, and one specimen with 65 scales has 37 gill rakers. This series seems to consist mainly in hybrids.

A.M.N.H. 10672, Tungting Lake: two spec., one with L. lat. 60–62, Sp. br. 42 is probably an *argentea*, one with L. lat. 64, Sp. br. 40 may be a *X. davidi*.

U.S.N.M. 130502, Shanghai, 2 spec.: one with 60 scales (as *argentea*) but 51 gill rakers (as *davidi*), one with 62 scales and 40 gill rakers.

These data suggest that *argentea* and *davidi* are usually distinct (reproductively isolated) sibling species, but mass hybridization may occur in some area, as for ex. in Tungting Lake.

The status of following two nominal species, usually considered synonyms of *X. argentea* is obscure:

X. aenea Sauvage & Dabry, 1874: holotype, M.N.H.N. 8139 (Fig. 5) 150 mm; depth 27.6%; A 2/10; L. lat. \pm 63–64; Sp. br. 45; thus values of the overlapping ranges of both species.

X. katinensis Tchang, 1930: one paratype, M.N.H.N. 34–76, Szechwan, upper Yangtze, 188 mm; depth 25.8%; A 2/10; L. lat. 63; Sp. 50. (Fig. 6).

Xenocypris davidi insularis Nichols & Pope, 1927. Fig. 7

Specimens examined: Holotype of *X. insularis*, A.M.N.H. 8374, 158 mm; A.M.N.H. 10667, 232.0 mm; N.M.W. 5132, 154.0 mm; all three specimens from Hainan Island; A.M.N.H. 19951, Canton, Hsikiang drainage, 136.0 mm.

A 2/9–12; L. lat. 58–64; Sp. br. 44–51.

While Nichols [4] considers *insularis* a subspecies of *X. davidi*, Yang (in Wu & others, [7]) includes it in the synonymy of this species. The available 4 specimens have evidently fewer scales than *davidi* from the Yangtze and Minkiang drainages, but the same number of gill rakers. One is therefore justified to separate them in a distinct subspecies. In the small number of scales, this subspecies resembles rather the Yangtze specimens of *X. argentea*, while the *argentea* from North Vietnam (in the vicinity of Hainan island) have fewer scales: 51–61 (and 36–39 gill rakers).

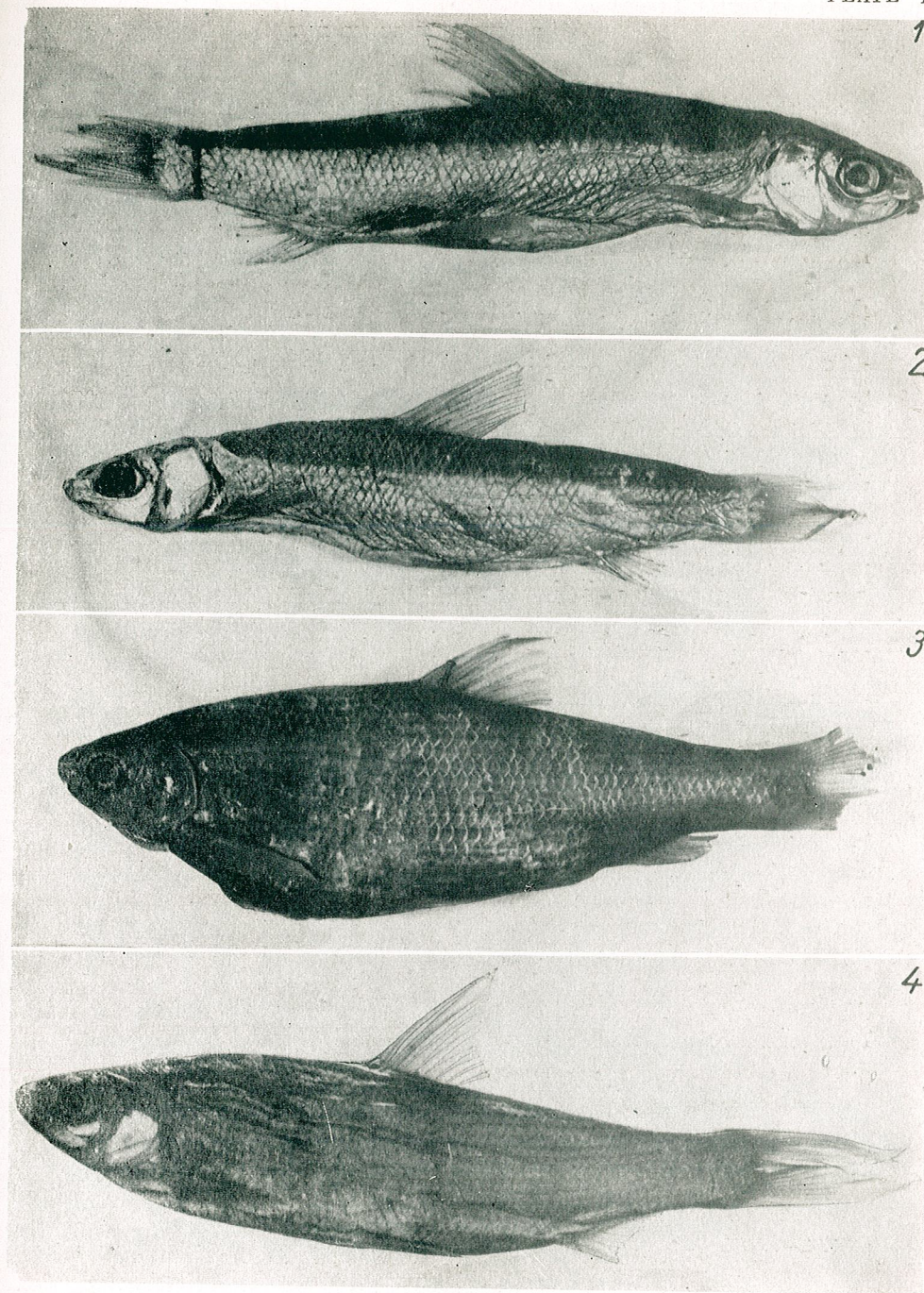


Fig. 1. — *Xenocypris argentea* Günther; holotype of *H. macrolepis* Bleeker, M.N.H.N. 5060, China.

Fig. 2. — *Xenocypris argentea* Günther; holotype of *X. tapeinosoma* Bleeker, M.N.H.N. 5939, Yangtzekiang.

Fig. 3. — *Xenocypris argentea* Günther; paratype of *X. nankinensis* Tchang, M.N.H.N. 3473, Nanking, lower Yangtzekiang.

Fig. 4. — *Xenocypris davidi* Bleeker; A.M.N.H. 10668; Anhwei.

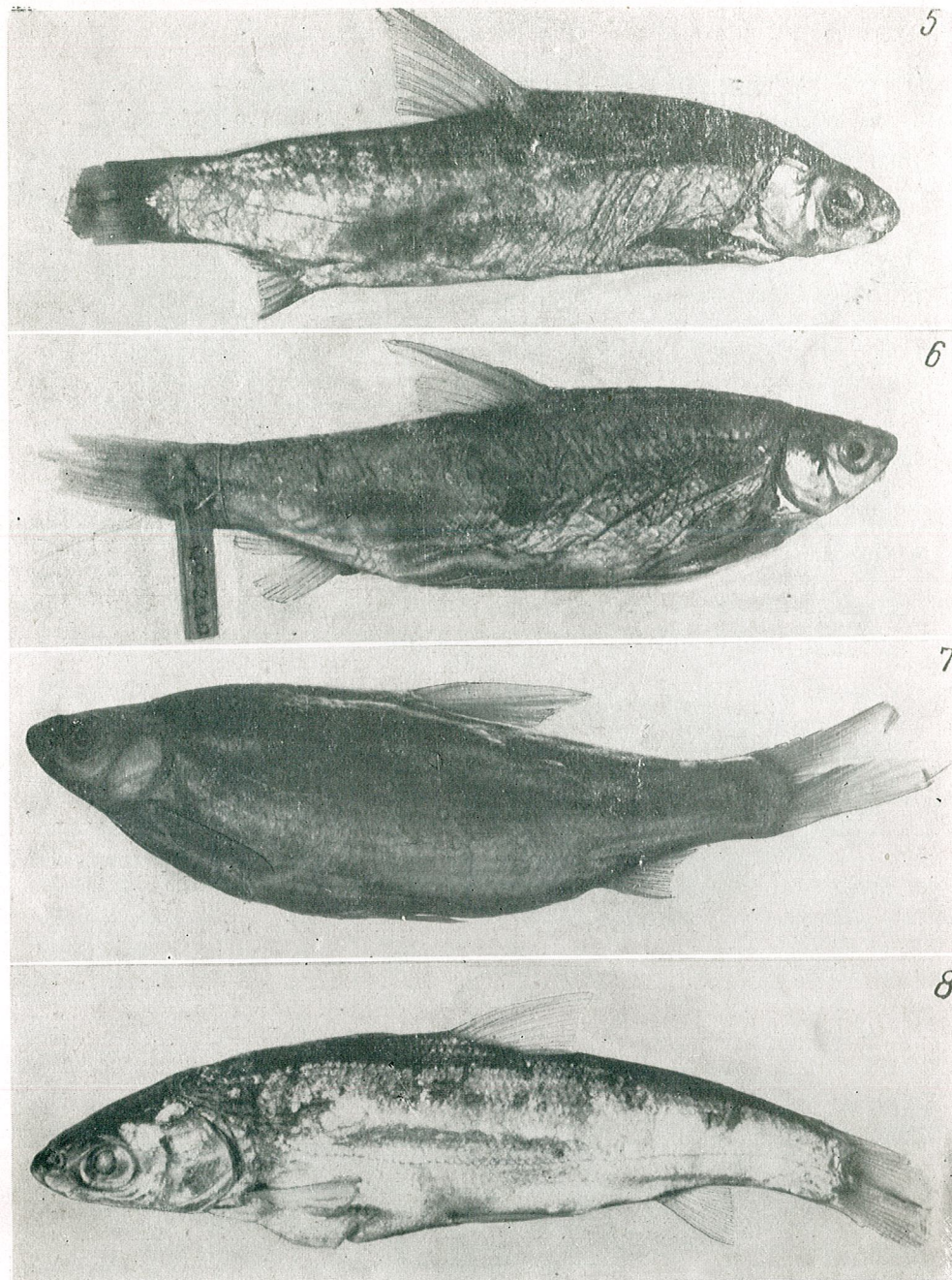


Fig. 5. — *Xenocypris davidi* Bleeker (?); holotype of *X. aenea* Sauv. & Dabry, M.N.H.N. 8139; Yangtzekiang.
 Fig. 6. — *Xenocypris davidi* Bleeker (?); paratype of *X. katinensis* Tchang, M.N.H.N. 34-76; Szechwan, upper Yangtzekiang.
 Fig. 7. — *Xenocypris davidi insularis* Nichols & Pope; A.M.N.H. 10667; Hainan.
 Fig. 8. — *Xenocypris yunnanensis yunnanensis* Nichols; A.M.N.H. 7172; Yunnan.

Xenocypris yunnanensis yunnanensis Nichols, 1925. Fig. 8

Specimens examined: Holotype, A.M.N.H. 8441, Yunnan Fu, 123.0 mm; A.M.N.H., no nr., 105.5 mm; B.M.N.H. 1921. 7. 26. 24-28, Yunnan Fu, 5 spec., 97.5-112.0 mm; M.N.H.N. 4942, Kunning Lake, Yunnan, 3 spec., 97.5-112.0 mm.

D III 7; A 2/(9)10-11; L.lat. \pm 68 — 74; Sp. br. (40) 42-54; D. phar. 6.4.2-2.4.6, rarely 6.4.2-1.3.6, 7.4.1-2.4.6.

Depth 21.8-23.8% of st. length; (M = 23.11); caudal peduncle 12.4-19.2% (17.05); least depth 9.1-10.3% (9.61); predorsal distance 51.0-53.3% (51.46); preanal 71.5-76.0%; preventral distance 46.7-52.2% (49.93); distance from pectoral to pelvic axil 25.3-27.6% (26.31); from pelvic to anal 21.8-26.0% (24.24); head 24.2-27.8% (25.6); snout 5.2-6.2%; eye 5.5-7.3% of st. length and 74-87% of interorbital width.

Yang (in Wu & others[7]) gives slightly different figures from those in our available specimens: L. lat. 72-77, Sp. br. 48-53.

Xenocypris yunnanensis fangi Tchang, 1930

Specimens examined: U.S.N.M. 130078, 89181, 91599, 91685, 91757, 91770, 19771, Swechwan, 12 specimens in all, 171-252 mm; A. M.N.H. 15277, Omeih sien, upper Yangtze, 1 spec., 201 mm; U.S.N.M. 86989, Foochow, Fukien (Minkiang drainage), 3 spec., 83-97 mm.

D III 7; A 2/10-11; L. lat. 70-79; Sp. br. 34-45; D. phar. on 3 rows, 6-7, rarely 5 on the main row, 4, rarely 3 on the second, 2, rarely 1 on the third.

Depth 22.0-28.3% of st. length;

The number of scales and gill rakers of this form overlap with those of *X. yunnanensis*; I therefore consider *fangi* to be a subspecies of the last named. The three available Foochow specimens agree with the Szechwan ones in number of gill rakers (34-39), differing from them in the number of scales (68-73, as against 70-79); they may represent a third subspecies, closer to the upper Yangtze *X. yun. fangi* than to the Yunnan subspecies *X. yun. yunnanensis*.

Yang (in Wu & others [7]) records from the upper Yangtze as distinct species *X. setchuanensis* with L. lat. 76-78, Sp. br. 33-35 and *X. fangi* with L. lat. 70-72, Sp. br. \pm 44. But *X. setchuanensis* actually has some 88 gill rakers; the specimens recorded by Yang under this name may actually belong to *fangi*, like those recorded as *fangi*.

Xenocypris setchuanensis Tchang, 1930. Fig. 9

Specimen examined: Paratype of *X. setchuanensis*, M.N.H.N. 34.77, Szechwan, 1 spec., 332.5 mm.

D III 7; A 2/8; L.lat. $80 \frac{14}{7}$; Sp. br. 88; D. phar. 7.3.2.-2.3.6.

Depth 24.7% of st. length; caudal peduncle 18.0%; least depth 11.7%; predorsal distance 50.2%; preanal 72.5%; preventral 48.0%;

P-V distance 29.2%; V-A distance 25.8%; pectoral 16.7%; pelvic 15.4%; head 20.8%; snout 6.95%; eye 4.05% (and 45% of interorbital width).

The number of gill rakers is not mentioned in the original description (Tchang [6]). In its high number of gill rakers, this species differs sharply from all other species of *Xenocypris* s. str., approaching *X. (Distoechodon) tumirostris*.

Xenocypris (Distoechodon) hupeinensis (Yih, 1959) Fig. 10

Specimen examined: A.M.N.H. 10676, Tsinan, Shantung (lower Hwang-ho), 1 spec., 107.0 mm. (Fig. 10).

D III 7; A. 2/9; L. lat. $59\frac{11}{5}$; Sp.br.39; D.phar. 6.4 — 4.6.

Depth 26.5% of st. length; caudal peduncle 17.1%; least depth 11.2%; predorsal distance 47.8% preanal 71.2%; preventral 48.0%; P-V. distance 28.1%; V-A distance 26.0%; head 21.5% snout 4.95%; eye 5.6% (and 70.5% of interorbital width). Snout very blunt.

In number of scales and gill rakers this species approaches *X. argentea*, differing from it mainly in the number of teeth rows, then in its blunt snout, short and deep caudal peduncle.

Xenocypris (Distoechodon) tumirostris tumirostris (Peters, 1880)

Specimens examined: Holotype, Z.M.B. 11254, Ningpo, Chekiang, 239.0 mm; Z.M.B. 11255, Ningpo, 2 spec., 195.0 and 237.0 mm. (Fig.11).

D III 7; A 2/(8) 9 (10); L. lat. 71-77; Sp. br. 80-85; D. phar. 7.3-3.7; 7.3-3.6.

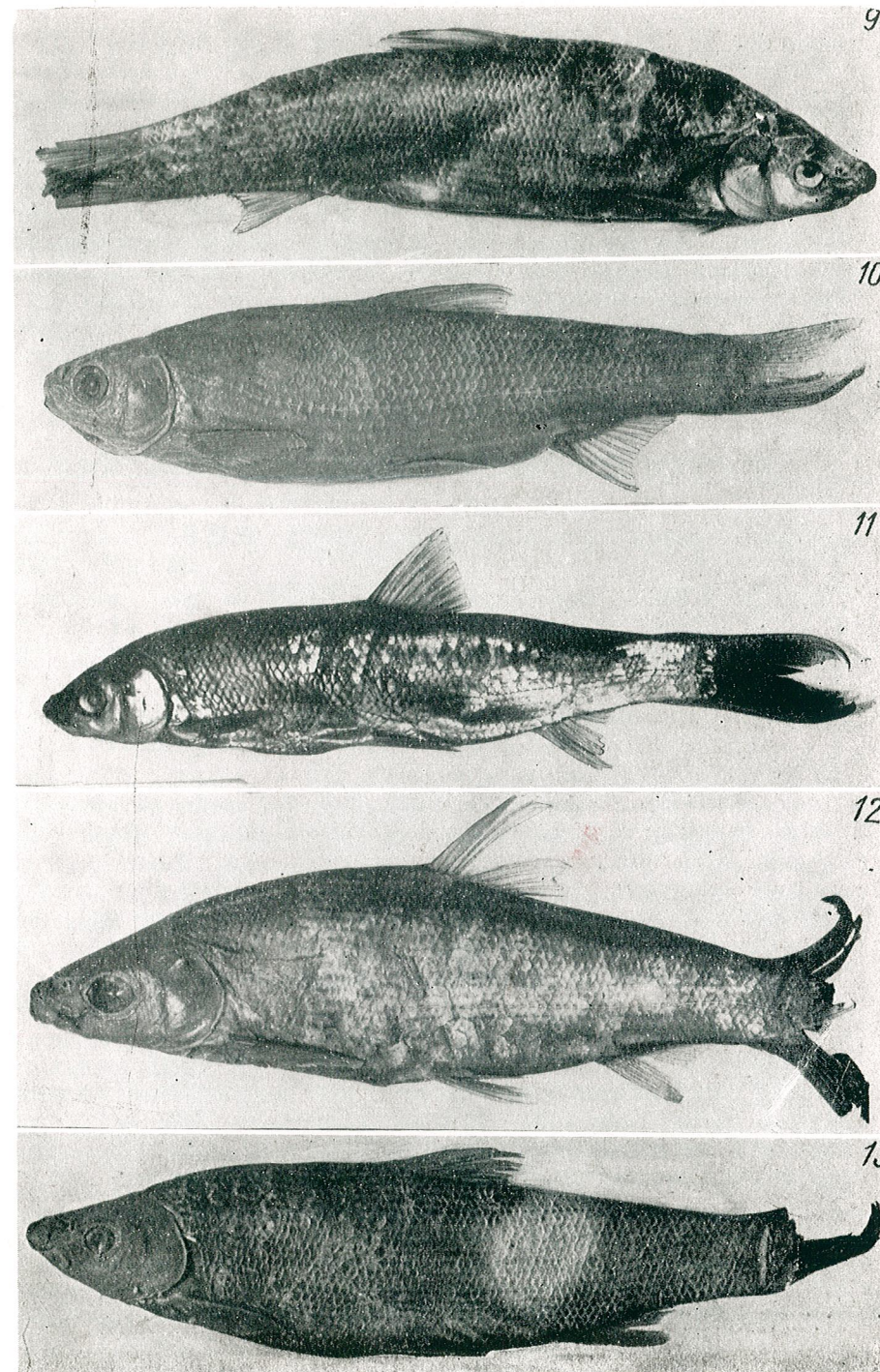
Depth 21.1—22.8% of st. length; caudal peduncle 18.8—20.6%; least depth 9.8—10.5%; predorsal distance 47.8—50.5%; preventral 48.8—50.4%; preanal 69.8—74.5%; P—V distance 26.2—30.3%; V—A distance 21.8—25.2%; head 21.1—23.4%; snout 6.8—7.8% (and 31.0—36.2% of head); eye diameter 3.9—5.8% (respectively 17.0—26.5% of head and 43—73% of interorbital width)

Xenocypris (Distoechodon) tumirostris compressus Nichols, 1925

Specimens examined: Holotype, A.M.N.H. 8427. Yenping, Fukien, 105.0 mm; A.M.N.H. 10856, Fukien, 1 spec., 125.5 mm (the other specimens of this series proved to be *X. davidi*). (Fig. 12).

PLATE III

- Fig. 9. — *Xenocypris setchuanensis* Tchang; paratype. M.N.H.N. 34.77; Szechwan.
 Fig. 10. — *Xenocypris hupeinensis* (Yih). A.M.N.H. 10676; Tsinan, Shantung.
 Fig. 11. — *Xenocypris tumirostris tumirostris* (Peters); holotype. Z.M.B. 11254; Ningpo, Chekiang.
 Fig. 12. — *Xenocypris tumirostris compressus* Nichols. A.M.N.H. 10856; Fukien.
 Fig. 13. — *Xenocypris tumirostris multispinnis* nova subsp.; holotype. U.S.N.M. 87461; Suifu, Szechwan.



D III 7; A 2/9-10; L. lat. 74-75; Sp. br. 93-98; D. ph. 6.3-3.6.

Depth 25.9-27.8% of st. length; caudal peduncle 19.0-19.5%; least depth 9.5-10.2%; predorsal distance 50.5-55.0%; preanal 70-71%; preventral 48.6-51.4%; P-V distance 26.2-26.6%; V-A distance 21.5-22.0%; head 24.6-24.8%; snout 7.2-7.5%; eye diameter 5.7-5.9% (and 61-78% of interorbital width).

The differences between *tumirostris* and *compressus* are only quantitative and concern the number of scales (which largely overlap) and that of gill rakers, in which there is no overlap between *tumirostris* and *compressus*, but there is between *compressus* and the upper Yangtze form, here described as *X. tumirostris multispinnis*.

***Xenocypris (Distoechodon) tumirostris multispinnis* nova subsp.**

Holotype: U.S.N.M. 87461, Suifu, Szechwan (upper Yangtze), 258.0 mm. (Fig. 13.)

Paratypes: out of U.S.N.M. 87461, 4 spec., 103-118 mm; U.S.N.M. 86876, Suifu, 1 spec., 234 mm; U.S.N.M. 86879, Suifu, 1 spec. 220 mm; U.S.N.M. 130111, China (surely Szechwan), 1 spec., 236.0 mm.

Diagnosis: A *Xenocypris* with 77-84 scales in lateral line, 91-108 gill rakers, pharyngeal teeth in two rows.

Description: D III 7; A 2/(8) 9; L. lat. 77-84; Sp. br. (88?) 91-108; D. phar, 7.3-3.7, rarely 7.3-3.6 or 5.3-3.7.

Body depth 22.8-26.8% of st. length; caudal peduncle 19.5-21.9%; least depth 9.8-11.5%; predorsal distance 47.8-50.5%; preanal 69.8-72.5%; preventral 48.8-50.4%; distance from pectoral to pelvic origin 26.2-29.8%; from pelvic to anal origin 21.8-25.2%; head 21.1-23.4%; snout 6.9-7.8% (and 29.8-36.2% of head); eye diameter 3.9-6.0% of st. length, 17.3-26.4% of head, 43-73% of interorbital width.

Remarks. This new subspecies has more scales and especially more gill rakers than *X. tumirostris tumirostris* and *X. t. compressus*, being closer to the last named. The form recorded from the upper Yangtze by Chang [2] as *Dist. tumirostris*, with 77-79 scales, surely belongs to this subspecies, while that recorded by the same author as *Xen. compressus*, with 72-73 scales and pharyngeal teeth in two rows is actually *X. (s.str.) yunnanesis fangi*.

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THE SKULL CHARACTERS OF THE SUBFAMILY CULTRINAE IN RELATION TO ITS PHYLOGENY (PISCES, CYPRINIDAE)

BY

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The cranium of 15 species of Cultrinae and of 5 species of Danioninae is described. *Ochetobius* and *Aspidoparia*, although belonging to Danioninae, approach, in some craniological features, the Cultrinae. *Rasborinus* seems the most primitive among the Cultrinae, having retained some characters from the Danioninae. The remaining Cultrinae can be ascribed to three groups: primitive Cultrinae and two groups of evolved Cultrinae, one of them adapted to pelagic life. Table 1 shows the main craniological features of all three groups and of Danioninae. The Cultrinae seem to have derived from Danioninae.

The craniological and other osteological characters can give indications about the phylletical relations within the family Cyprinidae, each of its subfamily having its own, well marked features.

The present paper — the third in the series — gives the description of the skull within the subfamily Cultrinae, comparatively with another subfamily, the Danioninae, in order to establish their mutual phylletical relationships. Both subfamilies include mainly species living in East and South East Asia, as well as a few European ones. The specimens used for craniological investigations belong to the collection of the "Traian Săvulescu" Institute of Biology in Bucharest and were obtained through the kindness of Dr. P. Bănărescu.

Species examined:

Subfamily Cultrinae: *Rasborinus lineatus altior*, *Chalcalburnus chalcoides mento*, *Alburnus alburnus*, *Hemiculter leucisculus*, *H. bleekeri*, *Erythroculter illishaeformis*, *Culter alburnus*, *Pseudoxygaster gora*, *Oxygaster oxygastroides*, *Pelecus cultratus*, *Parabramis pekinensis*, *Paralabuca typus*, *Pseudolabuca sinensis*, *Salmostoma bacaila*, *S. sardinella*.

Danioninae: *Squaliobarbus curriculus*, *Zacco platypus*, *Z. temmincki*, *Ochetobius elongatus*, *Aspidoparia morar*.

The skulls of the above mentioned species were studied comparatively to each other, in order to establish the phylletical relations of the