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27

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ANNOTATIONES ZOOLOGICAE et BOTANICAE

Slovenské národné múzeum

25. III. 1966

No. 27

NOTES ON THE GENUS Gobiobotia (PISCES, CYPRINIDAE) WITH DESCRIPTION OF THREE NEW SPECIES

Pertu BĂNĂRESCU and Teodor T. NALBANT

The East-Asian genus *Gobiobotia* KREYENBERG, 1911 differs from all other Cyprinidae in having three pairs of mental barbels, besides the maxillo-mandibular pair. Eleven species have been described, eight from China — *pappenheimi* KREYENBERG, 1911, *ichangensis* FANG, 1930, *abbreviata* FANG & WANG, 1931, *kiangensis* FANG, 1930, *longibarba* FANG & WANG, 1931, *homalopteroidea* RENDAHL 1932, *tungi* FANG, 1933, *boulengeri* TCHANG, 1929 — and three from Korea — *naktongensis* MORI, 1935, *brevibarba* MORI, 1935 and *macrocephalus* MORI, 1935. The first-named species is the only with a wide range, having been recorded from Tientsin (Hopei or Chihli province, Pai-ho drainage northern China), from the Amur drainage in the U. S. S. R. and from lake Tungting on the lower Yangtse. *G. boulengeri* is known only from Szechwan, but was found in the this province by several authors. The remaining nine species were recorded only once or twice and their range is restricted to the Yangtse in Szechwan and western Hupeh, upwards of Ichang gorge (*abbreviata*, *kiatingensis*, *ichangensis*), to Chekiang (*longibarba*, *tungi*), to the upper Hwang-ho in Kansu (*homalopteroidea*) or to Korea (the three species mentioned above).

Material. 47 specimens, including the type specimens of *G. pappenheimi* and *G. homalopteroidea* and the types and paratypes of the new species have been examined personally. The specimens examined are mentioned in the description of each species. They belong to following collections:

- A. M. N. H. = American Museum of Natural History, New York.
C. N. H. M. = Chicago Natural History Museum.
I. B. T. S. = Institutul de Biologie „Tr. Savulescu“, Bucuresti.
M. C. Z. = Museum of Comparative Zoology, Harvard, Cambridge, Mass.
N. M. W. = Naturhistorisches Museum, Wien.
N. R. M. S. = Naturhistoriska Riksmuseet, Stockholm.
U. M. M. Z. = University of Michigan, Museum of Zoology, Ann Arbor.
Z. I. A. N. = Zoologicheskij Institut Akademii Nauk, Leningrad.
Z. M. B. = Zoologisches Museum der Humboldt Universität, Berlin.

Systematic Account

1. *Gobiobotia pappenheimi* KREYENBERG, 1911.

— Pl. I., figs. 1, 2: Pl. II. figs. 3, 4 —

Synonyms:

Gobiobotia pappenheimi KREYENBERG, 1911: 417, figs. 1–3 (Tientsin); BERG, 1914: 518, figs. 88, 89 (lower Amur; Ussuri); NICHOLS, 1928: 40 (Tungting Lake, Hunan); SHAW & TCHANG, 1931: 66 (San-Chiatien near Peiping); FANG & WANG, 1931: 300, fig. 6 (Hwa-lai Hopei); NICHOLS, 1943: 195 (Tungting Lake); BERG, 1949: 672, figs. 428, 429 (middle and lower Amur drainage; Ussuri; Sungari); NIKOLSKI, 1956: 217 (Amur drainage); *Pseudogobio filifer* GARMAN, 1912: 121 (Yangtse at Changyanghsien, Hupeh); RENDAHL, 1928: 92 (ref.); NICHOLS, 1943: 185 (ref.).

Specimens examined:

— Type specimen, Z. M. B. 18466, standard length 45 mm, Tientsin.

— A. M. N. H. 10311, 19 specimens, standard length 32.2 — 41.0 mm, Huping on lake Tungting, Hunan, collected by C. H. POPE.

— I. B. T. S. 995 (formerly Z. I. A. N. 19565), 5 specimens, 38.8 — 52 mm., Amur river, 45 km upwards from Khabarovsk, May 25, 1913, collected by V. K. SOL-DATOV.

$$D \ 3 \ 7, A \ 3 \ 6, L. \ lat. \ 38 \frac{4 - 5 \frac{1}{2}}{2-3} \ 42 \ (43)$$

The body proportions are indicated in table I. The dorsal fin is inserted slightly behind origin of pelvics. The origin of the dorsal is equally distant to tip of snout and $\frac{1}{4}$, $\frac{1}{3}$ or middle of caudal peduncle and from middle of eye and last ray of anal. The first pair of mental barbels is inserted at the level or somewhat in advance of the maxillo-mandibular barbels, as mentioned by FANG & WANG (1931). The breast and belly in front of vent are naked; the figure of the ventral side of the body in BERG 1914, fig. 89, 1949, fig. 429) is not right, that of FANG & WANG (1931, fig. 6) is better.

There is one well developed longitudinal keel in each scale of all five rows above lateral line in the specimens from the Amur and from lake Tungting; these keels are better developed on the scales in front of the dorsal fin; in some specimens from Tungting, they seem to fail behind the dorsal. In the type-specimen there are keels only on the first three rows of scales in front of dorsal, they fail on the two other rows of scales above lateral line as well as behind dorsal.

In all specimens examined, including the type, the chin is papillose, the disposition of the papillae being as figured by BERG (1914, 1949). According to FANG & WANG (1913) the chin is smooth in a specimens from Hwa-lai, Hopei examined by them and they point out that, in the original description of the species, KREYENBERG (1911) does neither mention nor figure papillae on the chin. In fact, KREYENBERG had overlooked the papillae which exist in the type specimen (Pl. II, fig. 4), although they are not as evident as in those from the Amur and Tungting, the type being not so well preserved.

Pseudogobio filifer GARMAN is a synonym of *G. pappenheimi*. The description of this fish by GARMAN is quite unsatisfactory, but the photograph of the type-specimen, M. C. Z. 29834 (Pl. I, fig. 1 and 2) which Mrs. M. M. DICK kindly sent us, lets no doubt concerning the identification of this species with *G. pa-*

pappenheimi. Mrs. DICK compared the type and only paratype (M. C. Z. 29833)¹⁾ of *Ps. filifer* with the description of the 6 Chinese species of *Gobiobotia* known in 1931 and concluded (in litt. Jan. 16, 1962) that *Ps. filifer* is surely a synonym of *Gobiobotia pappenheimi*.

Variation.

We remarked some differences between the specimens from different river drainages. In the five specimens from the Amur (I. B. T. S. 995) there are 40–43 scales ($M=40.6 \pm 0.29$); according to NIKOLSKI (1956) the number of scales in the specimens from the whole Amur drainage ranges from 37 to 42 and the mean-values from 39.1 to 40.4. In the type-specimen we found 42 scales on the right side and 40 on the left side; in those from lake Tungting (lower Yangtse drainage), 38–40 ($M=38.7 \pm 0.14$). FANG & WANG (1931) found 43 scales in a specimen from Hopei (Pai-ho drainage) and GARMAN, (1912) 42–44 in the two types of *Pseudogobio filifer*. We already mentioned that, according to FANG & WANG (1913), the specimen from Hopei examined by them had a smooth chin, but this may be an artefact, due to the state of preservation of the specimen.

The differences in body proportions between the specimens examined are shown in Table 1. As one sees, the predorsal, preanal and preventral distances, as well as the caudal peduncle and the head are longer in the specimens from the Amur than in those from Tungting: the least depth, the pectorals and both anal dorsal are somewhat bigger in the specimens from Tungting, whilst other proportions are practically the same. In most characters in which the specimens from the Amur differ from the lake Tungting ones, the type-specimen (original from North China, e. g. nearer to the Amur) has a rather intermediate position or is closer to the Amur specimens.

The differences in body proportions are too small to justify the separation of the specimens from the Yangtse in a distinct subspecies. In the disposition of keels on the scales, the Amur specimens are identical with those from Tungting whilst the type is somewhat different, having keels only on the first three dorsal rows of scales. The difference is somewhat bigger in the number of scales, the mean values being 40.6 in the specimens from the Amur and 38.7 in those from lake Tungting; but according to NIKOLSKI (1956), there are populations in the Amur drainage in which the mean value of the scales number is 39.1, practically the same as in the Tungting — specimens, whilst GARMAN found 42–44 scales in the two specimens of „*Pseudogobio filifer*“ from the middle Yangtse.

The general conclusion is that the number of scales is not the same in main river drainages (Amur, Yangtse), but differs from population to population. It is therefore, actually not possible to distinguish wide-ranged subspecies, but intensive studies in the future will probably result in the separation of this species in several subspecies each of them with restricted range.

The biggest body length (without caudal fin) is 52 mm in the specimens from

¹⁾ GARMAN (1912) described *Ps. filifer* after two specimens (M. C. Z. 29834 and 2983) without indicating one of them as holotype. We are choosing here the best preserved specimen (M. C. Z. 2834), whose photographs we reproduce, as lectotype, the other specimen being a paratype.

the Amur and lower Yangtze drainages recorded in the literature, (BERG, 1949; NICHOLS, 1943; NIKOLSKI 1956), but the type of *Ps. filifer* has 95 mm (according to the photograph: Pl. I, fig. 1).

	Type Zo. M. B. 18466	Amur, Khabarovsk I. B. T. S. 995, 5 spec.	Tungting Lake A. M. N. H. 10311, n=10
1., mm	45.0	38.8 — 520, M = 43.8	32.2 — 41.0, M = 35.42
in % of l.	H	16.2	15.0 — 17.0, M = 15.83
	p	23.4	20.6 — 23.2, M = 21.74
	h	7.78	5.9 — 7.3, M = 6.65
	x	45.8	44.0 — 48.1, M = 45.70
	y	68.1	68.0 — 70.3, M = 69.0
	z	42.6	41.2 — 44.0 M = 42.32
	P—V	22.6	19.5 — 23.0 M = 21.32
	V—A	24.0	24.3 — 26.6 M = 25.35
	P	24.0	22.7 — 26.4 M = 24.56
	V	18.9	17.3 — 21.8 M = 20.02
	DH	20.4	16.3 — 20.4 M = 19.04
	DI	16.0	15.1 — 17.4 M = 16.20
	AH	17.2	13.7 — 17.1 M = 16.01
	AI	10.0	10.0 — 11.9 M = 11.04
	C	24.4	22.5 — 25.8 M = 24.80
	r	8.45	8.1 — 10.0 M = 9.20
	o	4.45	4.4 — 6.1 M = 5.37
in % of c.	Ci	5.55	8.2 — 9.8 M = 9.33
	r	34.6	35.0 — 39.7 M = 37.02
	o	18.2	19.7 — 23.7 M = 21.60
	Ci	22.8	42.6 — 38.8 M = 37.80
o in % of l.	66.7	69.0 — 93.5 M = 81.64	71.5 — 95.0, M = 84.93

Table 1. Body proportions in *Gobiobotia pappenheimi*.
I — body standard length; H — body greatest depth; p — caudal peduncle length; h — body (caudale peduncle) minimal depth; x — predorsal distance; y — preanal distance; z — preventral distance; P—V — from pectoral to pelvic; V—A — from pelvic to anal; P — pectoral length; V — pelvic length; DH — dorsal height; DI — its base; AH — anal height; AI — its base; c — head length; r — snout length; o — eye diameter; Ci — maxillo-mandibular barbel; i — interorbital width.

RANGE: Amur drainage, Pai-ho, middle and lower Yangtse, probably also upper Yangtze and Hwang-ho.

COMPARATIVE OBSERVATIONS. The closest relative of *G. pappenheimi* is *G. nakdongensis* from the upper Nakdong river, Korea. According to the figures and descriptions of this species by MORI (1935) and UCHIDA (1939), *nakdongensis* agrees with *pappenheimi* in general habitus, insertion of the dorsal slightly behind the pelvics and position of the barbels. Most body proportions indicated by MORI (in 6 specimens of *G. nakdongensis*, 51—70 mm standard length) are similar to those of *G. pappenheimi*: depth 14.7—18.2 % (M=16.6 %), head 23.2—25 %, caudal peduncle 17.9—19.8 %, minimal depth 5.9—6.45 % of standard length; but the snout is shorter (19.2—22.2 % of head), the eye much bigger than in *pappenheimi* (27.8—31.1 % of head and 131—150 % of interorbital distance) and there are only 34—36 scales. The body proportions given by UCHIDA (1939) for three specimens of *nakdongensis*, 41.5—50 mm, are somewhat different: depth 16.7—22.7 %, head 25.0—27.0 % of length, minimal depth 7.1—8.7 %; the eye has the same values as in MORI's specimens, but there are 38—40 scales, thus nearly the same number as in *pappenheimi*.

It is not possible, for the moment, to decide if *nakdongensis* is a distinct species or a subspecies of *pappenheimi*: it is necessary to study specimens from northern and western Korea, in order to see if both intergrade or not.

2. *Gobiobotia homalopteroidea* RENDAHL, 1932

Pl. II, fig. 6: text-fig. 1—2

Synonyms: *G. homalopteroidea* RENDAHL, 1932: 54 (Lanchow, Kansu); NICHOLS, 1943: 196 (ref.).

Specimen examined: holotype, N. R. M. S. 10146, a ♂, 80.2 mm standard length, Lanchow, Kansu (upper Hwang-ho drainage), collected by K. G. SÖDERBOHM, April 20 to 30, 1928.

$$D\ 3\ (7,\ A\ 3)\ 6,\ L.\ lat.\ 42\ \frac{6}{4}$$

In percents of standard length: body greatest depth 16.3, predorsal distance 48.7, preanal 69.5, preventral 48.7, distance from origin of pectoral to pelvic 26.4, from pelvic to anal 21.4, caudal peduncle 21.1 minimal depth 5.1, pectoral 23.4, pelvic 18.7, height of dorsal 18.7, its base 15.1, height of anal 15.0 its base 11.0, length of head 25.3, snout 11, maxillar barbel 5.6. The eye is very small, its diameter being only 2.5 % of standard length and 33.3 % of the interorbital distance.

The origin of the dorsal is somewhat nearer to tip of snout than to root of caudal and about equally distant from middle of eye and first third of caudal peduncle. The origin of pelvic is slightly behind that of dorsal. The vent is nearer origin of the pelvic than that of anal. A keel on all scales above and on the first row of scales below lateral line. On the upper face and on the sides of the head there are many tubercles (may be breeding tubercles) and keels, similar to those on the scales. The disposition of these tubercle and keels is the same as in *G. nicholsi* (text fig. 5). The breast and belly in front of the pelvics are naked. The insertion of the first pair of mental barbels is somewhat behind the level of the insertion of the maxillo-mandibular barbels, (fig. 2); as noted by RENDAHL (1932), the barbels of the first mental pair are very short, but one can easily recognize that they have been cut by accident. The chin is papillose, the disposition of the papillae being the same as in *G. pappenheimi*.

G. homalopteroidea differs from all other species within the genus through its exceedingly low caudal peduncle; this character suggests an adaptation to swift water. An other characteristic feature of this species is the small eye, but in two further species (*nicholsi* and *houlengeri*) the eye is as small as in *homalopteroidea*.

In describing this species, RENDAHL pointed out its strong resemblance with a *Homaloptera*. In fact, all *Gobiobotia* do more or less suggest a homalopterin loach. The small eye and very low caudal peduncle of *G. homalopteroidea* suggest rather *Noemacheilus stoliczkai* or *Gobio uranoscopus*.

✓ 3. *Gobiobotia nicholsi* nova sp.

Pl. II. fig. 5; text-figs. 3, 4, 5 —

SYNONYM: *Gobiobotia pappenheimi* (non KREYENBERG), NICHOLS, 1928: 40 (Tungting Lake, Hunan; partim); NICHOLS, 1943: 195 (Tungting lake: partim).

HOLOTYPE: A. M. N. H. 20523, 1 specimen, standard length 35.7 mm Huping on lake Tungting, Hunan, collected by C. H. POPE.

Paratypes: A. M. N. H. 20524, two specimens, standard length 32.2 and 21.9 mm. same locality and collector.

(All three specimens belonged to a series of 24 specimens, A. M. N. H. 10311, determined as *Gobiobotia pappenheimi*.)

DIAGNOSIS. A *Gobiobotia* with 44—45 scales in lateral line, well developed keels on the dorsal scales, origin of dorsal slightly behind that of pelvics, first mental barbels in advance of maxillo-mandibular barbels, distance between origin of pectorals and pelvics smaller than that between pelvics and anal and small eyes, their diameter being less than 20 % of the head length and about half the fleshy interorbital distance.

DESCRIPTION. D $\frac{3}{7}$, A $\frac{3}{6}$, L. lat. $44 \frac{5}{31/2}$ 45

In % of standard length: body greatest depth 16.8 in the holotype, 17.1 and 15.1 in the paratypes; length of caudal peduncle 22.4 and 23.3¹⁾, minimal depth 7.55 and 8.1, predorsal distance 42.0 and 43.5, preanal 67.4 and 66.8, preventral 42.0 and 43.5 pectoral — pelvic distance 19.1 and 18.7 %, pelvic — anal distance 25.2 and 24.5, length of pectorals 26.6 and 25.2, length of pelvic 19.6, height of dorsal 22.4 and 23.3 its base 16.3 and height of anal 17.4 and 18.7, its base 11.2 and 11.8, head length 25.2 and 24.8 (27.4 in the small paratype), length of snout 9.9, 9.6 and 9.5 length of maxillo-mandibular barbels 9.2 and 9.9. The eye is very small, its diameter being 4.75 %, respectively 4.65 % of standard length, 19.8 and 18.7 % of head and 58.5 % and 53.5 % of the interorbital distance.

The origin of dorsal is equidistant from tip of the snout and about $\frac{1}{3}$ or $\frac{2}{5}$ of caudal peduncle and from the center of eye and the last ray of anal. The dorsal is inserted slightly behind origin of pelvics. The insertion is the barbels of the first mental pair is in advance to that of the maxillo-mandibular barbel. (Fig. 4) The first mental barbels pass beyond origin of the second mental pair and reachest already under front of eye. The maxillo-mandibular barbel pass beyond posterior margin of the eye, the second pair of mental barbels beyond the end of maxillo-

¹⁾ For all proportions, the first value refers to the holotype, the second to the bigger paratype.

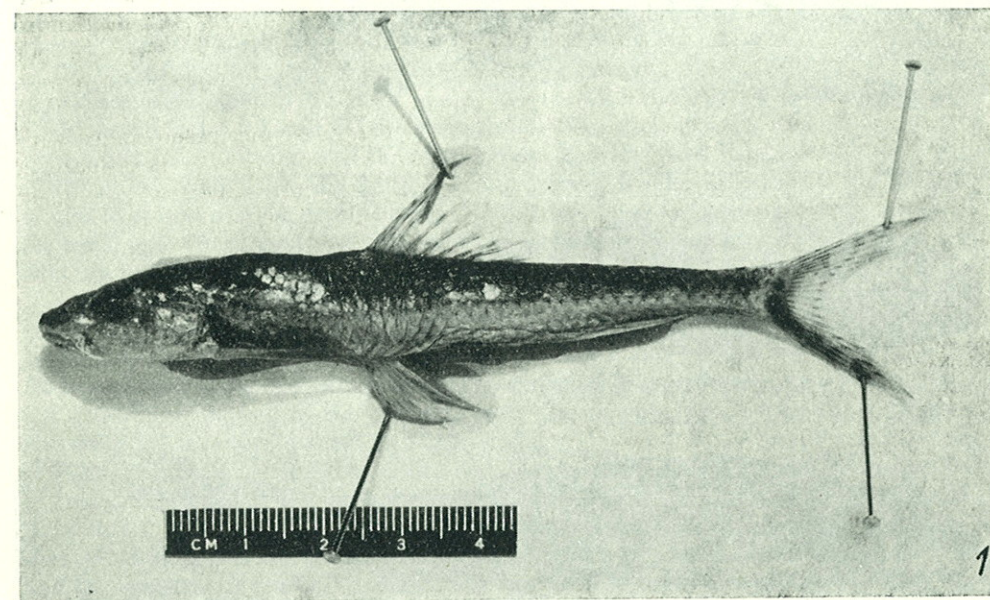
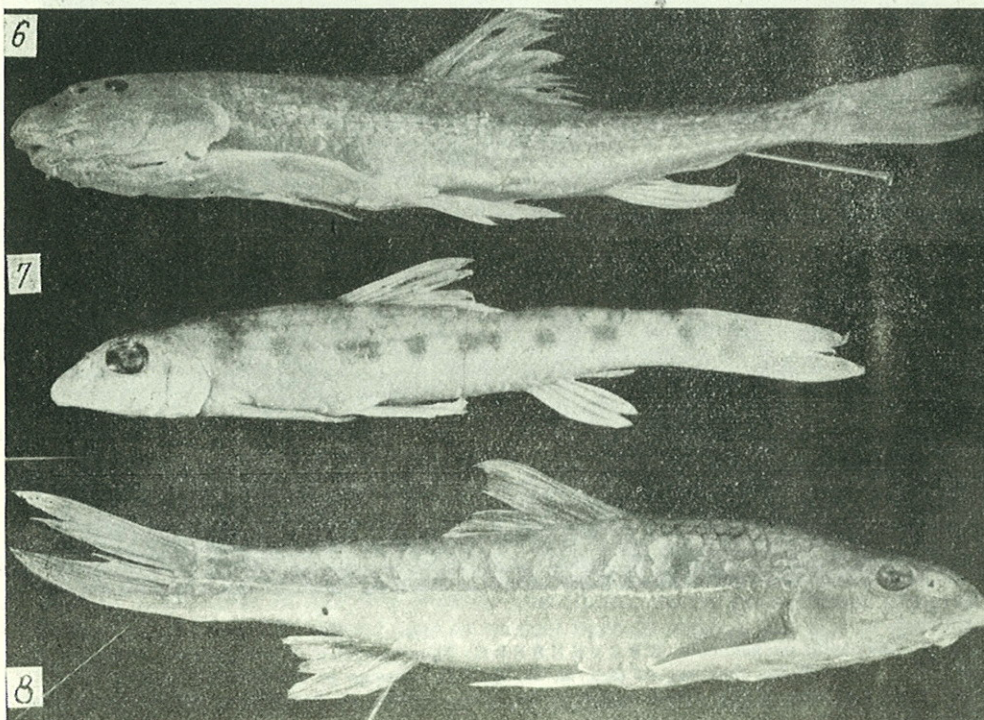
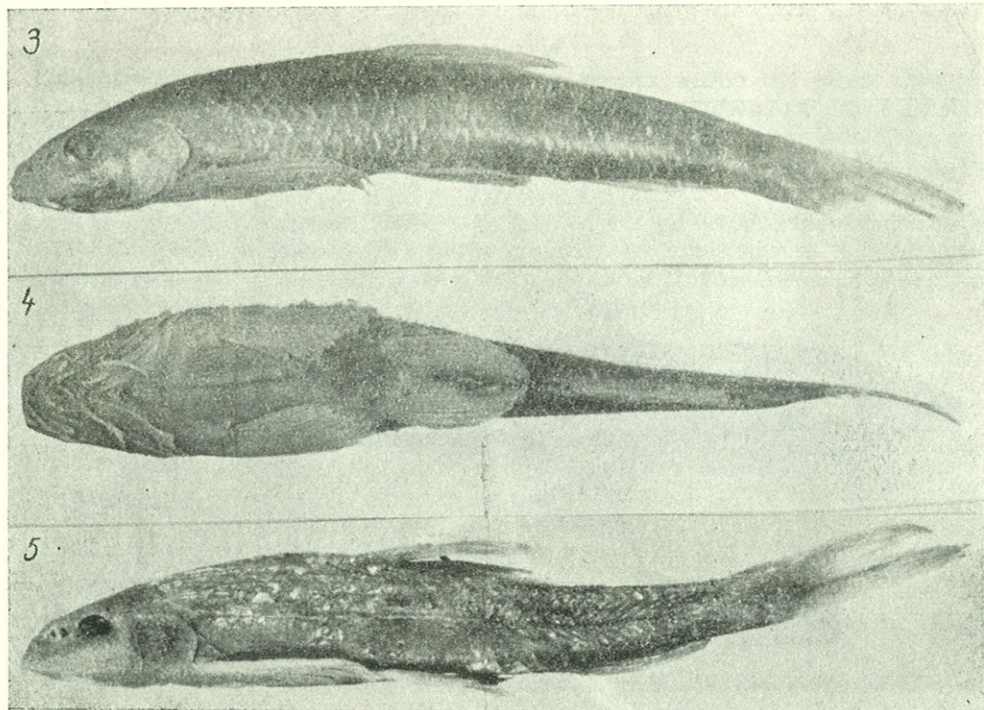


Plate I.

Fig. 1. *Gobiobotia pappenheimi* KREYENBERG: Type-specimen of *Pseudogobio filifer* GARMAN, C. C. Z. 29834). Courtesy of Mrs. M. M. DICK, Museum of Comparative Zoology.

Fig. 2. Ventral view of the mouth region of the type specimen of *Pseudogobio filifer*. Courtesy of Mrs. M. M. Dick.



mandibular barbels and in one specimen reaches the hind margin of the preopercle. The third pair of mental barbels is inserted under the posterior part of the eye; these barbels nearly reach the insertion of the pectorals.

The length of the mental barbels is:

- first pair: 5.6 and 6.2 % of stand. length, 22.2 and 25.0 % of head.
- second pair: 8.1 and 8.7 %, respectively 32.2 and 35.0 %
- third pair: 8.9 and 10.9 %, respectively 35.5 and 43.6 %.

The chin is papillose, the papillae being better developed between the barbels of the first and second mental pairs; their disposition is about the same as in *G. pappenheimi*. The breast and belly are naked, this scaleless zone extending to the vent, as in *G. pappenheimi*.

A well developed longitudinal keel on each scale above lateral line, better marked in front of dorsal, but present also on the scales behind dorsal. Well developed whitish keels on the snout in front of the nostrils and on sides of head (fig. 5). Both keels and tubercles occur also in other species (*pappenheimi*, *homalopteroidea*) but are better marked in *nicholsi*, although the specimens on which this new species is based are smaller and probably young.

COMPARATIVE OBSERVATIONS. The three specimens on which this species is based were found in a sample with 19 *G. pappenheimi* and two *G. boulengeri*. *G. nicholsi* is somewhat intermediate between both-named species: its *boulengeri* — characters are the small eyes, the insertion of the first mental barbels and the number of scales; its *pappenheimi*-characters: insertion of dorsal slightly behind pelvics the presence of well marked keels on dorsal scales and low caudal peduncle. We do not think that *nicholsi* is a hybrid between both other species, because in *Cyprinidae* the hybrids are always much more seldom than both parental species.

We must point out that *pappenheimi* and *nicholsi* are the only *Gobiobotia* — species in which the dorsal is inserted slightly behind the pelvics and, besides *G. kollerii*, the only species in which the distance between pectorals and pelvics is smaller than that between pelvics and anal.

Through its small eyes, *G. nicholsi* bears some similarity also with *G. kiatingensis*, but in this species the dorsal is inserted slightly in advance of the pelvics, the body is lower (depth 14.4 %) and the eye somewhat bigger (20.8 % of head).

4. *Gobiobotia kollerii* nova sp.

— Pl. II, Fig. 7; text-figs. 6, 7, 8 —

SYNONYMS: *Gobiobotia pappenheimi* (non KREYENBERG), KOLLER, 1927: 47 (Hainan-Island: partim).

HOLOTYPE: N. M. W. 5015, one specimen, standard length 68.1 mm, Kankong river, Hainan, 1906.

Plate II.

Fig. 3. *Gobiobotia pappenheimi* KREYENBERG. Type specimen, Z. M. B. 18466. Tientsin.

Fig. 4. *Gobiobotia pappenheimi*. Type specimen, ventral view.

Fig. 5. *Gobiobotia nicholsi* nova sp. Type specimen, A. M. N. H. 20523 Huping on lake Tungting, Hunan.

Fig. 6. *Gobiobotia homalopteroidea* RENDAHL. Type specimen, N. R. M. S. 10146. Lanchow, Kansu.

Fig. 7. *Gobiobotia kollerii* nova sp. Type specimen N. M. W. 5015 Kankong river, Hainan.

Fig. 8. *Gobiobotia cheni* nova sp. Type specimen, I. B. T. S. 1334 Taichung, Taiwan.

PARATYPES: N. M. W. 5016, four specimens, standard length 66—87.9 mm, and I. B. T. S. 1548, one specimen, standard length 72 mm, same locality and data.

DIAGNOSIS: A *Gobiobotia*-species with 37—40 scales in lateral line, insertion of pelvics under that of dorsal, first pair of mental barbels inserted in advance of the maxillo-mandibular barbels, third pair of mental barbels and pair fins much shorter as in *G. longibarba*, eye bigger than interorbital width, the dorsal scales keeled only in front of dorsal fin and second ray of pectoral not elongated.

DESCRIPTION. D $3\frac{7}{8}$, A $3\frac{5}{6}$, L. lat. (37) $38\frac{5}{3}$ 39 (40).

Bdy depth 15.2—19.3 % (16.6 %), caudal peduncle 22.4—23.8 (M=23.0 %), minimal depth 7.8—8.2 % (M 8.05 %), predorsal distance 43.1—45.0 % (M=43.8 %), preanal 66.4—70.0 % (M=68.5 %), preventral 41.6—46.0 % (M=44.0 %), distance from pectoral to pelvic 19.7—22.5 % (M=21.2 %), from pelvic to anal 23.2—25.4 % (M=24.6 %), length of pectoral 20.6—24.6 % (M=22.3 %), length of pelvic 18.1—20.8 % (M=18.8 %), height of dorsal 19.1—20.4 %, its base 14.1—15.7 %, height of anal 14.1—16.8 %, its base 8.3—9.4 %, head length 25.0—26.0 % (M=25.45 %) of standard length. Eye bigger than in all other *Gobiobotia* — species, its diameter being 5.7—6.3 % (M=6.05 %) of standard length, 22.8—25.0 % (M=23.66 %) of

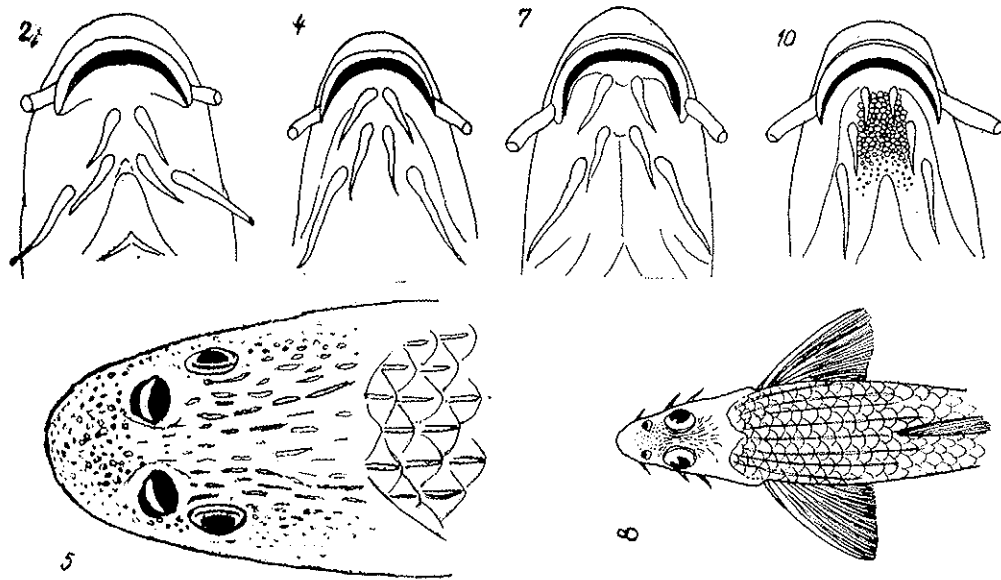


Fig. 1. *Gobiobotia homalopteroidea* RENDAHL. Type specimen, N. R. M. S. 10146.

Fig. 2. *Gobiobotia homalopteroidea*. Ventral view of head.

Fig. 3. *Gobiobotia nicholsi* nova sp. Type specimen, A. M. N. H. 20523.

Fig. 4. *Gobiobotia nicholsi*. Ventral view of head.

Fig. 5. *Gobiobotia nicholsi*. Dorsal view of head.

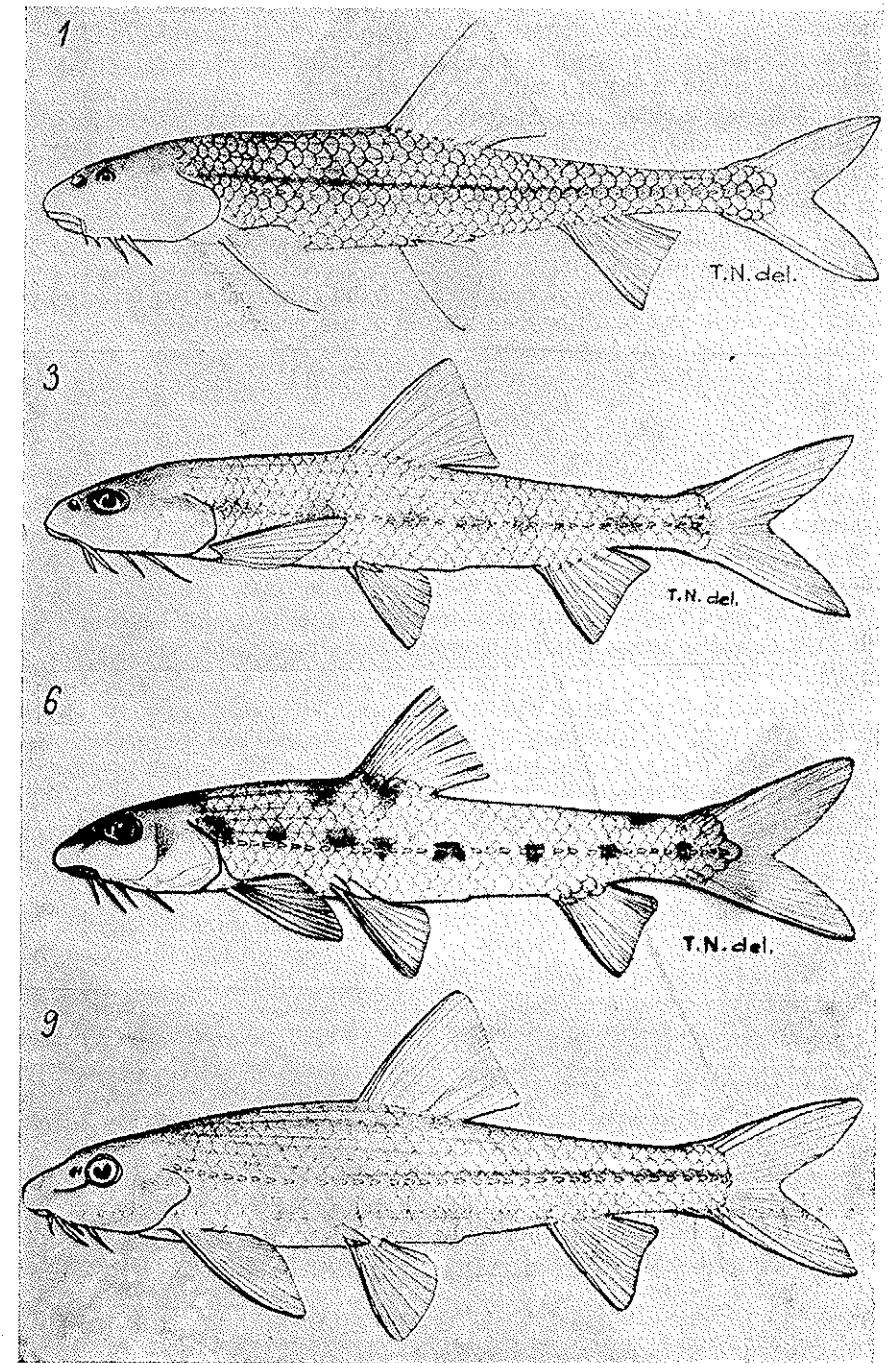
Fig. 6. *Gobiobotia kolleri* nova sp. Type specimen, N. M. W. 5015

Fig. 7. *Gobiobotia kolleri*. Ventral view of head.

Fig. 8. *Gobiobotia kolleri*. Dorsal view of the anterior part.

Fig. 10. *Gobiobotia cheni* nova sp. Type specimen, I. B. T. S. 1334.

Fig. 10. *Gobiobotia cheni*. Ventral view of head.



head and 107—119 % (M=114.7 % of interorbital width. It is the only species of *Gobiobotia* in which the eye is bigger than the interorbital distance. The snout is, in smaller specimens, somewhat shorter than the postorbital distance, in bigger specimens a little longer; its length is 8.9—10.1 % of standard length (M=9.66 %) and 34.6—40.5 % (M=38.05 %) of head.

The maxillo-mandibular barbels reach in most specimens, beyond vertical of middle of eye, in one specimen under middle of eye; their length is 6.0—9.3 % of standard length (M=7.95 %) and 23.3—37.2 % (M=31.2 %) of head.

The barbels of the first mental pair are inserted in advance of the maxillo-mandibular pair and reach beyond origin of second pair or slightly beyond vertical of anterior margin of eye. The barbels of the second mental pair reach under or nearly under hind margin of eye; those of the third pair are inserted under anterior half of eye and reach beyond margin of preopercle. (Fig. 7.)

The length of the mental barbels is:

First pair: 5.1—6.8 % of standard length (M=5.72 %) and 19.2—27 % of head (M=22.85).

Second pair: 5.9—7.5 % (M=6.8 %) and 22.8—30.0 % (M=25.6 %).

Third pair: 8.0—9.7 % (M=8.93 %) and 30.8—37.5 % (M=35.0 %).

The origin of dorsal is about equally distant from tip of snout and middle of caudal peduncle or of middle of eye and last ray of anal. Origin of pelvic exactly under that of dorsal. In bigger specimens the pectoral do not reach the origin of pelvics; in smaller ones, they reach to or beyond origin of pelvics.

The chin is papillose, as in *G. pappenheimi*. The breast and belly in front of pelvic insertion are naked; between pelvics and vent there are scales, as in *G. longibarba*. Well developed keels on dorsal scales in front of dorsal fin; this zone with keeled scales is more or less triangular, being broad anteriorly, where it extends on 11 scales, and very narrow near the origin of dorsal, where it is reduced to 3 scales (Fig. 8.). Keels and tubercles on the upper face of head, as in *G. pappenheimi*, *nicholsi*, etc.

COLOUR PATTERN (specimens in alcohol): light yellowish with 6—8 (seldom 5 or 9) big, well marked, rather squarish paired spots on sides of body; much smaller and slight dorsal spots. Fins unspotted. Dorsal face of head dark.

COMPARATIVE OBSERVATIONS. *G. kollerii* differs from all other species within the genus in its very big eye. Having the origin of pelvics exactly under that of dorsal, it is intermediate between *G. pappenheimi*, *nicholsi* and *naktongensis* on one hand and *G. abbreviata*, *cheni*, *longibarba*, *ichangensis*, *kiatingensis*, *homalopteroides* and *boulengeri* on the other hand. It approaches *ichangensis*, *kiatingensis* and *boulengeri* in having the first pair of mental barbels in advance of the maxillomandibular pair, but differs from them in its much bigger eye and position of the dorsal fin. It is intermediate between *kiatingensis*, *ichangensis* and *pappenheimi* on one hand, *abbreviata* and *longibarba* on the other in having the snout about equal to the postorbital distance. It approaches *G. longibarba* in having a big eye, keeled scales only in front of the dorsal and scales between pelvic and vent, but differs from it in its much shorter barbels and pectorals, the position of the dorsal and that of the first pair of mental barbels. *G. longibarba* may be the closest relative of *G. kollerii*.

DERIVATIO NOMINIS: after late Dr. O. KOLLER, the first ichthyologist who examined the specimens on which this species is based.

5. *Gobiobotia cheni* nova sp.

— Pl. II, Fig. 8; text-figs. 9, 10 —

HOLOTYPE: I. B. T. S. 1334, one specimen, standard length 75.0 mm, rivers near Taichung, Taiwan, received from Prof. J. T. CHEN.

PARATYPES: I. B. T. S. 1541 (1—3), three specimens, standard length 76.0, 70.8 and 66.2 mm, same locality and collector.

DIAGNOSIS: A rather high-bodied *Gobiobotia*, with snout shorter than postorbital distance, its length being 8.9—9.9 % of standard length and 37—39 % of head; eye 4.2—4.5 % of standard length, 16.7—18.8 % of head. Insertion of first pair of mental barbels at the same level than that of the maxillo-mandibular pair. Second ray of pectoral fin much longer than the other.

DESCRIPTION. D 3/7, A 3/6, L. lat. 37

Body rather high and thick, its greatest depth being 20.9—23.3 % (M=22.4 %) of standard length. The origin of dorsal is equally distant from tip of snout and middle of caudal peduncle and from hind margin of eye and origin of anal. Origin of pelvics slightly behind that of dorsal. The predorsal distance is 43.8—45.0 % (M=44.6 %), the preanal distance 68.0—70.2 %, the prepelvic distance 44.6—49.5 % (M=46.75 %), the distance from origin of pectorals to that of pelvics 24.3—26.0 %, (M=25.5 %), from pelvics to anal 22.6—25.0 % (M=23.75 %), the length of caudal peduncle 21.4—24.0 % (M=22.5 %), its minimal depth 9.05—10.0 % (M=9.46 %), the length of pectoral 23.0—26.0 % (M=24.5 %), that of pelvic 17.6—20.4 % (M=18.4 %), the height of dorsal 18.4—18.7 %, its base 13.3—15.1 %, the height of anal 16.0—17.1 %, its base 9.05—10.5 %, the length of head 23.7—25.4 % (M=24.6 %) of standard length. The snout is much shorter than the postorbital distance, its length being 8.95—9.85 % (M=9.3 %) of standard length and 37.2—38.9 % of head. The eye lies nearer tip of snout than gill opening; its diameter is 4.2—4.5 % (M=4.34 %) of standard length, 17.6—18.8 % (M=17.7 %) of head and 60.0—69.0 % (M=63.9 %) of fleshy interorbital width. The maxillo-mandibular barbels reach to or beyond middle of eye; their length is 6.5—7.6 % (M=7.05 %) of standard length and 27.8—31.3 % (M=28.8 %) of head. The first pair of mental barbels is inserted at the same level than the maxillo-mandibular barbels (fig. 10); they reach to or slightly beyond insertion of second pair, the second pair beyond hind margin of eye and the third pair beyond margin of preopercle. The disposition of the papillae on the chin is the same as in the three species already described.

The scales above the lateral line with a longitudinal keel, less marked as in *G. pappenheimi*. The keels and tubercles on head have the same disposition as in *G. pappenheimi*, but are feebler.

The second and especially the third rays of the pectorals are much longer than the other, as in *G. homalopteroides* and, according to FANG & WANG, in *G. ichangensis* and *G. kiatingensis*. This character occurs in both sexes, is therefore not an expression of the sexual dimorphism, but may occur only in mature specimens.

The breast and belly are naked, the naked zone reaches to hind margin of the pelvics, but not to vent.

COLOUR (specimens preserved originally in formalin): light grayish with irregular minute blackish spots above, yellowish below. A series of squarish or rather elongate spots along the sides, more or less confounded in a longitudinal stripe.

Scales of lateral line partially bordered with black. Upper face of head dark. Fins unspotted.

DERIVATIO NOMINIS: after Prof. J. T. CHEN, who sent us the specimens.

COMPARATIVE OBSERVATIONS AND RELATIONSHIP. This new gudgeon seems to be closer related with *G. abbreviata* FANG & WANG, 1931 from Chengtu, Szechwan (upper Yangtse) than to any other *Gobiobotia*. *G. abbreviata* was described after a single specimen. Our specimens agree with *abbreviata* in the general habitus and in the deep body and caudal peduncle (in *abbreviata* the body greatest depth is 23.2 %, the minimal depth 8.3 %); but the snout is much longer in *abbreviata* (12.1 % of standard length, 46.5 % of head), the eye being thus nearer to gill opening than to tip of snout. This difference is not due to the difference of size, because the type-specimen of *abbreviata* is smaller (54 mm) and the snout becomes always bigger in older fishes. Also the eye is bigger in *abbreviata* (its diameter being 5.55 % of st. length, 21.4 % of head, 73.3 of interorbital) and the insertion of the first pair of mental barbels is slightly posterior to that of the maxillo-mandibular barbel. In *abbreviata* the second ray of pectoral is not elongate, but this may be due to the eventual immaturity of the type specimen.

According to FANG & WANG (1931), the closest relative of *abbreviata* is *G. longibarba* from Chekiang, in the vicinity of Taiwan. We think *abbreviata* and *cheni* are nearer to each other than either of them to *longibarba*; in the last-named species the body is lower, the eye much bigger, the barbels and pectorals much longer than in both *abbreviata* and *cheni*.

G. brevibarba MORI, 1935 from Norther Kan and Rinshin rivers in Central Korea bears much similarity with *G. abbreviata* and *G. cheni*. In *brevibarba* the body is about as deep as in *abbreviata* and *cheni* (body depth 15.9—17.9 % according to MORI, 1935 and 20.0—22.2 % according to UCHIDA, 1939), the caudal peduncle high (minimal depth 9.6—10.3 % according to MORI, 12.5—14.2 % according to UCHIDA). The eye is nearer gill opening, as in *abbreviata*, but its diameter is about the same as in *cheni* (15.2—18.5 % of head), the snout is as long as in *abbreviata* (47.5—50 % of head). The barbels are smaller as in all other species of *Gobiobotia*; the insertion of first mental pair is, according to the figures, somewhat behind that of the maxillo-mandibular pair, as in *abbreviata*, but the dorsal seems, according to the figures in both MORI and UCHIDA, to originate slightly behind pelvics; in this character, *brevibarba* differs from both *abbreviata* and *cheni* and approaches *pappenheimi* and *nicholsi*. Because of this difference in the insertion of the dorsal, we consider *brevibarba* specifically distinct from *abbreviata*.

6. *Gobiobotia boulengeri* TCHANG, 1929

SYNONYMS: *Gobiobotia boulengeri* TCHANG, 1929: 307 (Szechwan); FANG & WANG, 1931: 302, fig. 7 (Kiating, Szechwan); RENDAHLL, 1932: 52 (Chungking, Szechwan); NICHOLS, 1943: 195 (ref.).

Specimens examined:

— C. N. H. M. 43562, 4 specimens, standard length 91.7—104.0 mm, Kiating (fish market), Szechwan, April 29, 1932, collected by F. T. SMITH.

— A. M. N. H.10311, two small specimens, stand. length 30.0 and 31.2 mm, Huping on Tungting Lake, Hunan, collected by C. H. POPE (in the same series

with 19 *G. pappenheimi* and 3 *G. nicholsi*, already mentioned, all being determined as *G. pappenheimi*.

— U. M. M. Z. 158511, one specimen, standard length 96.2 mm, Chengtu or Loshan (= Kiating), Szechwan.

D 3/7, A 3/6, L. lat. 44-46.

Body greatest depth 17.5—23.0 %, head 27.2—29.3 %, length of the caudal peduncle 18.1—20.8 %, its minimal height 9.6—12.2 %, preanal distance 67.4—79.5 %, predorsal 45.0—50.0 %, preventral 47.0—52.5 %, distance from pectoral to pelvic 23.0—28.8 %, from pelvic to anal 19.0—22.6 %, length of pectoral 22.4—28.2 %, of pelvic 18.2—20.0 %, height of dorsal 19.6—22.8 %, its base 14.9—19.3 %, height of anal 19.6—22.1 %, its base 9.6—12.8 % of standard length. The length of snout is 10.0—11.5 % of standard length and 34.2—41.7 % of head; the longitudinal diameter of the eye 2.8—4.2 % of standard length, 10.2—18.2 % of head and 38.6—64.6 % of interorbital width.

The vent is nearer origin of the anal than that of pelvics. The disposition of the scales, the insertion of dorsal (behind pelvics) and that of the first pair of mental barbels (in advance to the maxillo-mandibular barbels) agree with the figures and description of this species in TCHANG and in FANG & WANG. There are no keels on the scales, neither on the head, but the upper face of the head (including that of the snout) is covered with whitish tubercles.

RANGE. Upper and lower Yangtse drainage. The specimens from lake Tungting, Hunan, identified by us, are the first ones recorded from the lower Yangtse.

We have no informations, besides those in the literature, on the five other species within this genus. *G. tungi* and *G. macrocephalus* are surely conspecific; they differ sharply from all other *Gobiobotia* in having the pupil vertically elliptical. *G. kiatingensis*, *G. ichangensis* and *G. longibarba* are probably distinct species. We cannot agree with NICHOLS (1943) who suggest *ichangensis* may be a synonym of *pappenheimi*.

The genus *Gobiobotia* contains thus thirteen species (or twelve, if we consider *naktongensis* as a subspecies of *pappenheimi*), one of which — *tungi* — consists of two subspecies. Quite probably, there are many other species and subspecies not yet described.

The species of *Gobiobotia* belong to three phylletic groups, *pappenheimi*, *tungi* and *boulengeri*, the two last-named groups consisting each of a single species, the first one of the remaining 10 or 11 species. The differences between these three groups are as big as those between subgenera in other genera of *Cyprinidae*.

Through the fibrous capsule of its air-bladder (LIU, 1940), *G. abbreviata* seems to be the most primitive species of the *pappenheimi* — group; if we consider the position of the dorsal behind the pelvics, *pappenheimi*, *naktongensis*, *nicholsi* and *brevibarba* appear more primitive. Through its very low caudal peduncle, *homalopteroides* seems to be the best adapted to rheophil conditions; its very small eyes may be an adaptation to the trouble water, which is the normal conditions in the tributaries of the Hwangho in the arid Kansu.

From the six species examined by us *boulengeri* is the most specialized; the embedded scales, great extension of the ventral naked area, very small eyes are surely secondary characters; but this species has retained also a primitive character: the position of the vent nearer the anal. Its rather high body, high and laterally compressed caudal peduncle suggest that it lives in slow water.

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