NOTES ON FISHES IN THE INDIAN MUSEUM.

IV On Fishes belonging to the genus Botia (Cobitidae).

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The Kashmir Survey Party of the Zoological Survey of India has recently brought back a large series of specimens of the genus *Botia*. The taxonomy of the Indian species assigned to this genus is unsatisfactory and in this note an attempt is made to clear it up. I have also included a key to all the known species of the genus based, in the case of extra-Indian species, on the published descriptions and figures.

Genus **Botia** Gray.

The genus may be described as follows : A genus of Cobitidae consisting of elongate and laterally compressed species often of large size with minute scales on the body, with a bifid spine before and partly below the eye. There are six or eight barbels, in the former case four are situated on the rostrum and are united at their base and two at the corners of the mouth. In the case of those species that possess eight barbels there is an extra pair at the mandibular symphysis. The head is long and pointed. The eyes are provided with a free circular orbital margin. The mouth is small and is surrounded by thick lips. The nostrils are situated close together, the anterior ones are tubular. The origin of the dorsal is distinctly in advance of the ventrals ; the anal fin is short and the caudal is deeply forked. The pharyngeal bones are delicate and bear a single series of sharp slender teeth. The air-bladder is of the Cyprinoid type, but the anterior chamber is partially or wholly enclosed in a bony capsule and the posterior chamber, which lies free in the abdominal cavity, is generally reduced.

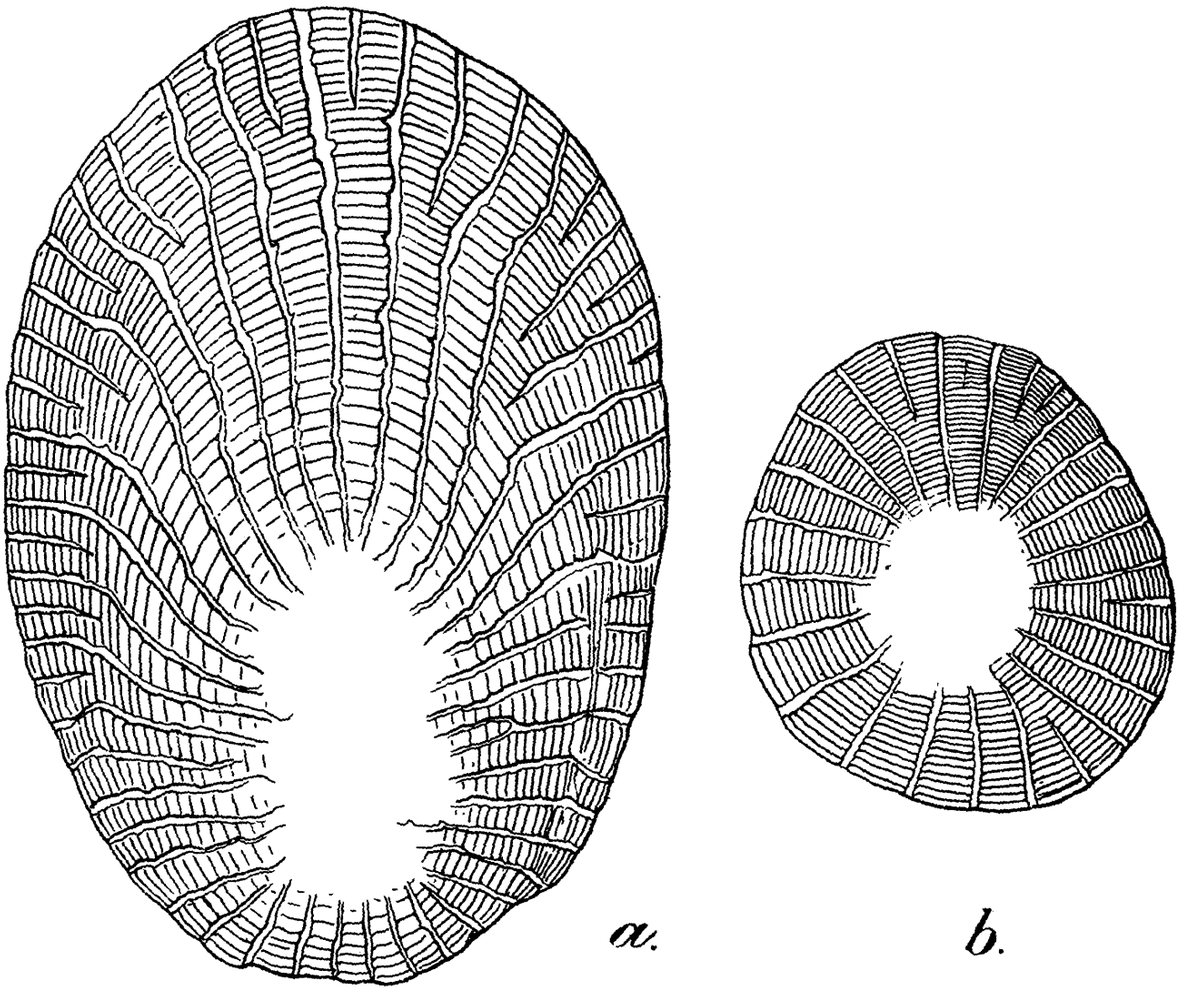
The genus is closely allied to *Parabotia*[1] and *Leptobotia*[2] ; the three genera may be distinguished by the following key :—

A. Suborbital spine bifid	*Botia.*
B. Suborbital spine simple.	
I. Six barbels, two on the upper jaw and four on the mandible ; preopercular region not ornamented with a series of small scales	*Parabotia.*
II. Six barbels, four on the upper jaw and two on the mandible ; preopercular region ornamented with a series of small scales	*Leptobotia.*

[1] Sauvage and Thiersant, *Ann. Sci. Nat.* (6) I, p. 17 (1874.)
[2] Bleeker, *Versl. Meded. Ak. Wetensch. Amsterdam* (4) IV p. 254 (1870).

Both the genera *Parabotia* and *Leptobotia* are known from China (Yang-tse-kiang and Mu-tan-kiang) while the genus *Botia* is known from India, Burma, the Indo-Australian Archipelago (Sumatra, Java, Borneo and Singapore), China and Japan.

The fishes of the genus *Botia* may be conveniently divided into two groups according to the number of the barbels, viz. those with six barbels and those with eight barbels. With the



Two types of scale in *Botia*.

a. Scale from dorsal surface of *Botia almorhae*: ×65.
b. Scale from dorsal surface of *Botia hymenophysa*: ×65.

exception of *Botia hymenophysa* known from Burma, Siam and the Indo-Australian Archipelago, all the species from the Indian Empire possess eight barbels. On the other hand all the known species from China and Japan are characterized by six barbels only. In the intermediate regions, Burma, Siam and the Indo-Australian Archipelago, representatives of both the groups are met with. Jordan and Fowler [1] have regarded the two groups as distinct genera and have adopted the name *Hymenophysa* McClelland,[2]

[1] Jordan and Fowler, *Proc. U.S. Nat. Mus.* XXVI. p. 772 (1903).
[2] McClelland, *Asiatic Researches* p. 443 (1838).

for the species possessing six barbels. I have, however, retained the name *Botia* for both the groups mainly for two reasons, firstly because in several Cyprinoid genera species are grouped irrespective of the number of barbels and secondly because Günther's two species, *Botia pratti* and *B. superciliaris*, possess "a pair of soft rounded buttons" on the chin; these may or may not be considered as barbels and appear to afford a link between the two primary groups.

I have examined the scales in the various species represented in our collection and find that those of *B. hymenophysa* differ greatly in structure from those of the remaining species. In *B. hymenophysa* they are almost circular with a big central nucleus and a number of radii to all parts of the periphery, whereas in the other species the scale is ellipsoidal with an excentric nucleus and with a large number of long radii to the apex and a few short ones to the base.

Both Günther[1] and Day[2] considered that the anterior division of the bladder in the genus *Botia* is partially enclosed in bony capsule, whilst the posterior division floats free in the abdominal cavity. This is true in all the species that I have examined with the exception of *B. almorhae* in which the anterior chamber is completely enclosed in bone and the posterior, though lying free in the abdominal cavity, is greatly reduced. In other species also the posterior chamber is somewhat reduced.

Botia nebulosa, Blyth,[3] is known from a single specimen from Darjiling, which is now preserved in the collection of the Zoological Survey of India On examination I am unable to refer it to the genus *Botia*. I believe that it belongs to *Nemachilus* and in all probability is the male of *N. botius*. My reasons are as follows:—

(i) I have not been able to find any trace of the suborbital spine in the unique specimen. Day[4] thought that the suborbital spine was damaged, but the groove that is present is not sufficiently deep to justify the view that it ever contained a spine. The groove is of the nature of a shallow slit partly covered superiorly by a fold of skin. I[5] have already remarked in a previous paper that such grooves and folds of skin form the secondary sexual characters of the males of certain species of *Nemachilus*.

(ii) The caudal fin of the specimen is now damaged, but Day, who examined it in a better condition, remarks "caudal slightly rounded." Some years ago Dr. B. L. Chaudhuri had this specimen figured and the manuscript drawing is now with me. It shows the caudal fin as slightly emarginate with both the lobes rounded. In the genus *Botia* the caudal fin is forked and the lobes sharply pointed.

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[1] Günther, *Brit. Mus. Cat. Fish.* VII, p. 366 (1868).
[2] Day, *Journ. As. Soc. Bengal* XLI, part II, p. 176 (1872).
[3] Blyth, *Journ. As. Soc. Bengal* XXIX, p. 165 (1860).
[4] Day, *Proc. Zool. Soc. London*, p. 549 (1869).
[5] Hora, *Rec. Ind. Mus.* (in press).

(iii) The air-bladder consists of two lateral chambers enclosed in a bony capsule. This type of bladder is characteristic of the genus *Nemachilus* and is not to be met with in any species of *Botia*.

(iv) There are six barbels, four rostral and two maxillary, but the rostral barbels are not united at their base as is the case in *Botia*.

(v) The shape of the mouth, the structure of the lips, jaws and of the scales is quite different from any species of the genus *Botia* that I have examined.

The following is an artificial key to all the known species of the genus *Botia*[1]:—

GROUP I. BARBELS SIX (*Hymenophysa*).

I. Eye in middle of head [Commencement of dorsal equidistant from tip of snout and base of caudal] ... ... *B. multifasciata.*

II. Eye not in middle of head.

A. Eye nearer end of operculum than that of snout or almost wholly in posterior half of head.

1. Length of head equals depth of body [Suborbital spine extending to below posterior margin of eye; a broad black bar at base of caudal] ... ... *B. modesta.**

2. Length of head greater than depth of body.

a. Suborbital spine extending beyond eye in both directions ... ... *B. superciliaris.*

b. Suborbital spine extending to below middle of eye ... ... *B. hymenophysa.**

B. Eye nearer end of snout than that of operculum.

1. Suborbital spine not extending to below hind margin of eye ... ... *B. curta.**

2. Suborbital spine distinctly extending to below hind margin of eye.

a. Interorbital space twice as wide as orbit; "ground-colour yellowish, the body ornamented with five black bands" ... ... *B. variegata.*

b. Interorbital space three to four times as wide as orbit; "ground-colour brownish olive, without distinct markings on the body" ... ... *B. pratti.*

GROUP II. BARBELS EIGHT (*Botia* s.s.).

I. Eye in middle of head ... ... *B. helodes.*

II. Eye not in middle of head.

A. Length of snout considerably more than that of remaining part of head.

1. Body marked with two broad bands ... ... *B. macracanthus.**

2. Body marked "with irregular and partly confluent brown cross bands, which enclose larger and smaller round whitish spots" ... . *B. rostrata.*

B. Length of snout either equal to or less than that of remaining part of head.

1. Eye almost in posterior half of head.

a. Head and body marked with a number of narrow oblique vertical bands ... ... *B. striata.**

b. Head and body marked with a few broad vertical bands or reticulations.

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[1] The species marked with an asterisk are present in the collection of the Zoological Survey of India.

i. Anterior origin of dorsal almost equidistant from tip of snout and base of caudal.
α. Eye small, its diameter contained 4 to 4·5 times in length of snout ... ... *B. birdi.**
β. Eye moderately large, its diameter contained 3 times in length of snout ... *B. dario.**
ii. Anterior origin of dorsal not equidistant from tip of snout and base of caudal ... ... *B. histrionica.**
2. Eye not situated wholly in posterior half of head.
a. Head and body marked with reticulation. Air-bladder much reduced, anterior chamber wholly enclosed in bone ... ... *B. almorhae.**
b. Head and body marked with vertical bands. Air-bladder almost normal, anterior chamber partially enclosed in bone.
i. Caudal marked with 2–3 bands, body marked with loops dorsally and with short vertical bands laterally ... ... *B. lohachata.**
ii. Caudal marked with two black spots, body marked with 6-7 oblique vertical bands ... ... *B. geto.**

Botia multifasciata Regan.

1905. *Botia multifasciata*, Regan, *Rev. Suisse Zool.* XIII, p. 389, pl. v, fig. 3.

Habitat:—China.

Botia modesta Bleeker.

1864. *Botia modesta*, Bleeker, *Nederl. Tydsch. Diek*, p. 11.
1868. *Botia modesta*, Günther, *Brit. Mus. Cat. Fish.* VII, p. 368.
1870. *Botia modesta*, Bleeker, *Versl. Meded. Ak. Amsterd.* IV p. 254 (figured).
1876. *Botia modesta*, Sauvage, *Bull. Soc. Philom.* XIII, p. 99.
1876. *Botia rubripinnis*, Sauvage, *Bull. Soc. Philom.* XIII, p. 99.
1881. *Botia modesta*, Sauvage, *Nouv. Arch. Mus. Paris.* (2) IV p. 192.

Habitat.—Siam. I have examined specimens from Lopburi sent to me by Dr. Malcolm Smith.

Botia superciliaris Günther.

1892. *Botia superciliaris*, Günther, in Pratts' "*Snows of Tibet*" p. 250, pl. iv, fig. B.

I have placed this species in the section comprising forms having six barbels. It possesses, however, according to Günther "a pair of soft rounded buttons" which are probably remnants of the additional pair.

Habitat.—Kia-tiang-fu (foot of Amieshan), Province Sze Chuen, China.

Botia hymenophysa (Bleeker).

1852. *Cobitis hymenophysa*, Bleeker, *Nat. Tijdschr. Ned. Indië* III, p. 602.
1858. *Hymenophysa MacClellandi*, Bleeker, *Nat. Tijdschr. Ned. Indië* XVI, p. 358.
1860. *Hymenophysa MacClellandi*, Bleeker, *Ichth. Arch. Ind. Prodr.* II., *Cyprini*, p. 63.
1860. *Syncrossus Berdmorei*, Blyth, *Journ. As. Soc. Bengal* XXIX, p. 166.

1863. *Botia hymenophysa*, Bleeker, *Atl. Ichth.* III, p. 6, pl. cii, fig. 3.
1868. *Botia hymenophysa*, Günther, *Brit. Mus. Cat. Fish.* VII, p. 368.
1869. *Botia berdmorei*, Day, *Proc. Zool. Soc. London*, p. 549.
1872. *Botia hymenophysa*, Day, *Journ. As. Soc. Bengal* XLI, part II, p. 178.
1878. *Botia berdmorei*, Day, *Fish. India* II, p. 607, pl. cliv, fig. 3.
1889. *Botia berdmorei*, Day, *Faun. Brit. Ind. Fish.* I, p. 217.
1889. *Botia berdmorei*, Vinciguerra, *Ann. Mus. Nat. Genova* XXIX, p. 345.
1903. *Botia hymenophysa*, Volz, *Zool. Jahrb. Syst.* XIX, p. 406.
1906. *Botia hymenophysa*, Popta, *Notes Leyden Mus.* XXVII, p. 207.
1916. *Botia hymenophysa*, Weber and Beaufort, *Fish. Indo-Austral Archipelago*, III, p. 24, fig. 6.
1921. *Botia berdmorei*, Hora, *Rec. Ind. Mus* XXII, p. 195.

This species is distributed over a very wide area. It occurs in the Indo-Australian Archipelago, Siam and Burma. Its range extends as far as the Manipur Valley (Assam), whence the waters flow into the Irrawaddi system.

There has been considerable confusion as to the occurrence of this species in Burmese waters. Day in 1872 (*op. cit.*) recorded it from "the northern portions of British and also Upper Burma," but in his later works he referred fishes with the same Burmese names, "*Nga-tha-lay-doh*," and "*Shoay-Zagay*" to *Botia berdmorei* which he considered to be "closely allied to *B. hymenophysa*, Bleeker," but differing "in its dorsal fin, and also in its colours, etc." In his "Monograph of Indian Cyprinidae" he gave the habitat of *B. berdmorei* as "Darjiling and Bengal generally." This is incorrect and it appears to me from the description of the species that the specimens referred to are not *Botia* at all. In the Manipur examples (*op. cit.*, p. 195) I found great variation in the number of oblique bands and also in the general colouration of the body. On the character of the colouration, therefore, I am unable to recognise *B. berdmorei* as distinct from *B. hymenophysa*. In my conclusions I am supported by Vinciguerra (*op. cit.*).

In the Siamese examples that I have examined, sent me from Lopburi by Dr. Malcolm Smith, the position of the anus is somewhat different. It is situated half-way between the base of the anal fin and the posterior origin of the ventral fin. In another example the anus is much nearer to the base of the anal fin than to that of the ventral fin. There are, however, so many points of agreement between the Siamese and the Burmese forms that I do not think myself justified in separating them.

Botia curta (Schlegel).

1850. *Cobitis curta*, Schlegel, *Faun. Japon. Pisces*, p. 223, pl. ciii, fig. 4.
1868. *Botia curta*, Günther, *Brit. Mus. Cat. Fish.* VII, p. 368.
1903. *Hymenophysa curta*, Jordan and Fowler, *Proc. U.S. Nat. Mus.* XXVI, p. 772.

Habitat.—Japan. I have examined a specimen from Yodo river, sent to the Indian Museum by the Otsu Lake Laboratory.

Botia variegata Günther.

1889. *Botia variegata*, Günther, *Ann. Mag. Nat. Hist.* (6) IV, p. 228.
1892. *Botia variegata*, Günther, in Pratt's "*Snows of Tibet*," p. 249.

Habitat.—Ichang (China).

Botia pratti Günther.

1892. *Botia pratti*, Günther, in Pratt's "*Snows of Tibet*," p. 250, pl. iv, fig. A.

Habitat.—Kia-tiang-fu (foot of Omie-shan), province of Sze Chuan, China.

Botia helodes Sauvage.

1876. *Botia helodes*, Sauvage, *Bull. Soc. Philom.* XIII, p. 99.
1881. *Botia helodes*, Sauvage, *Nouv. Archiv. Mus. Paris* (2) IV p. 192.

Habitat.—Siam.

Botia rostrata Günther.

1868. *Botia rostrata*, Günther, *Brit. Mus. Cat. Fish.* VII, p. 367 (head figured).
1872. *Botia rostrata*, Day, *Journ. As. Soc. Bengal* XLI, ii p. 178,

Habitat.—Bengal and Assam.

Botia striata Rao.

1920. *Botia striata*, Rao, *Ann. Mag. Nat. Hist.* (9) VI, p. 60, pl. ii, figs. 4, 4*a*, 4*b*.

Habitat.—River Thunga in Mysore State, South India. The range of the species extends as far as the Satara District in the Bombay Presidency, whence a single specimen, now in our collection, was obtained by Dr. S. P. Agharkar.

Botia birdi Chaudhuri.

1878. *Botia geto*, Day (*nec* Buchanan), *Fish. India* II, p. 606, pl. cliv, fig. 2.
1889. *Botia geto*, Day (*nec* Buchanan), *Faun. Brit. Ind. Fish.* p. 217, fig. 77.
1909. *Botia birdi*, Chaudhuri, *Rec. Ind. Mus.* III, p. 339.

This species exhibits considerable variation in colour with the age of the fish. The dark bands on the body often break up to form an irregular reticulation on the dorsal surface and the sides. Recently a large series of specimens has been obtained from the Kashmir Valley. All forms of colour pattern from regular bands to reticulation are present in this series.

The females contain a large number of minute eggs; in a ripe female the depth of body is considerably greater than the length of the head and the ventral profile is greatly arched.

Habitat.—Sind in the Kashmir Valley and the Punjab.

Botia dario (Ham. Buch.).

1822. *Cobitis dario*, Hamilton Buchanan, *Fish. Ganges*, pp. 354, 394 pl. xxix, fig. 95.
1868. *Botia dario*, Günther (in part), *Brit. Mus. Cat. Fish.* VII, p. 366.
1872. *Botia dario*, Day, *Journ. As. Soc. Bengal*, XLI, part II, p. 177.
1878. *Botia dario*, Day, *Fish. India* II, p. 606, pl. cliv, fig. 1.
1889. *Botia dario*, Day, *Faun Brit. Ind. Fish.* I, p. 216

Habitat.—Upper Bengal and Assan. Hamilton Buchanan found this species in all the districts of Northern Bengal and Bihar that he visited. We have a number of specimens from Cachar.

Botia histrionica Blyth.

1860. *Botia histrionica*, Blyth, *Journ. As. Soc. Bengal* XXIX, p. 166.
1869. *Botia histrionica*, Day, *Proc. Zool. Soc. London*, p. 550.
1872. *Botia histrionica*, Day, *Journ. As. Soc. Bengal* XLI, part II, p. 179.
1878. *Botia histrionica*, Day, *Fish. India* II, p. 607, pl. cliv, fig. 4.
1889. *Botia histrionica*, Day, *Faun. Brit. Ind. Fish.* I, p. 218.
1889. *Botia histrionica*, Vinciguerra, *Ann. Mus. Civ. Nat. Genova*, p. 346.
1921. *Botia histrionica*, Hora, *Rec. Ind. Mus.* XXII, p. 195.

Habitat.—The species was originally described from Pegu, but since then it has been recorded from several other places in Burma such as Bhamo and Mandalay and from the Manipur Valley in Assam.

Botia macracanthus (Bleeker.)

1852. *Cobitis macracanthus*, Bleeker, *Nat. Tijdschr. Ned. Indië* III, p. 603.
1860. *Hymenophysa macracanthus*, Bleeker, *Ichth. Arch. Ind. Prodr.* II, Cyprini, p. 62.
1863. *Botia macracanthus*, Bleeker, *Atl. Ichth.* III, p. 5, pl. cii, fig. 2.
1868. *Botia macracanthus*, Günther, *Brit. Mus. Cat. Fish.* VII, p. 368.
1903. *Botia macracanthus*, Volz, *Zool. Jahrb., Syst.* XIX, p. 405.
1905. *Botia macracanthus*, Fowler, *Proc. Nat. Sci. Philadelphia.* (2) LVII, p. 474.
1916. *Botia macracanthus*, Weber and Beaufort, *Fish. Indo-Austral. Archipelago* III, p. 23, fig. 7.

I have examined a specimen of this species from Sumatra kindly sent me by Prof. Max Weber.

Habitat.—Sumatra and Borneo.

Botia almorhae Gray.

1831. *Botia almorhae*, Gray, *Zool. Misc.* p. 8.
1838. *Botia grandis*, Gray, *Ill. Ind. Zool.*, pl. xciv, fig. 3.
1868. *Botia almorhae*, Günther, *Brit. Mus. Cat. Fish.* VII, p. 367.
1872. *Botia almorhae*, Day, *Journ. As. Soc. Bengal* XLI, part. II, p. 178.
1878. *Botia almorhae*, Day, *Fish. India* II, p. 607, pl. cliv, fig. 5.
1889. *Botia almorhae*, Day, *Faun. Brit. Ind. Fish.* I, p. 217.

This species is known from Almora (United Provinces). McClelland[1] recorded a fish under the name of *Botia* (*Schistura*)

[1] McClelland, *Calcutta Journ. Nat. Hist.* II, p. 586 (1842).

grandis from the Khasi Hills and later on Vinciguerra [1] found *Botia almorhae* in "Meetan" and "Meekalan" (Burma). I think the later records require confirmation.

Botia lohachata Chaudhuri.

1912. *Botia lohachata*, Chaudhuri, *Rec. Ind. Mus.* VII, p. 441, pl. xl, figs. 2, 2*a*, 2*b*.

Habitat.—Gandak River in Saran, Bihar.

Botia geto (Ham. Buch.).

1822. *Cobitis geto*, Hamilton Buchanan, *Fish. Ganges*, pp. 355, 394, pl. xi, figs, 96.

This species is Buchanan's [2] *Gengto* of Goalpara. I collected some specimens at Gorakhpur which correspond in every respect with the figure published by its author. Günther [3] considered it to be the young of *Botia dario* and Day [4] in his earlier works was of the same view. The specimens from Gorakhpur are not in good condition for detailed morphological investigation and I am therefore unable to confirm Günther's statement. The colouration is, however very distinct and seems to be characteristic of the species.

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[1] Vinciguerra, *Ann. Mus. Nat. Genova* XXIX, p. 344 (1889).
[2] Hunter's *Statistical Account of Bengal* XX, p. 41 (1877).
[3] Günther, *Brit. Mus. Cat. Fish.* VII, p. 366 (1868).
[4] Day, *Journ. As. Soc. Bengal* XLI, part II, p. 177 (1872).