

TWO NEW SPECIES OF *BETTA* (TELEOSTEI: OSPHRONEMIDAE) FROM THE KAPUAS BASIN, KALIMANTAN BARAT, BORNEO

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ABSTRACT. - *Betta pinguis*, new species, from the middle Kapuas basin differs from the other members of the *B. akarensis* group by having the most thick-set body (body depth 30.6-31.6 % SL, vs. 23.3-31.5) and having the most pigmented opercle. *Betta breviobesus*, new species, from the upper Kapuas basin belongs to the *B. pugnax* group and can be differentiated from the other members by having a deep body (body depth 28.7-32.8% SL), a relatively small head (head length 32.9-36.3 % SL) and long pelvic fins reaching the base of the 9th to 18th anal ray (pelvic-fin length 33.9-55.4 % SL).

KEYWORDS. - *Betta pinguis*, *B. breviobesus*, Osphronemidae, Kapuas basin.

INTRODUCTION

The fighting fishes *Betta* is the most speciose genus in the family Osphronemidae. So far, 18 valid species are known from Borneo. Their poor swimming ability and species-specific behaviour have apparently played a key role in their speciation (Kottelat & Ng, 1994: 65); in the Kalimantan lowlands, speciation has been further increased by the presence of mountain ranges and large rivers isolating several smaller basins. In this paper, we describe two new species from the Kapuas Basin.

Several authors organised the species of *Betta* into various species-groups (Schaller, 1985; Vierke, 1991; Witte & Schmidt, 1992), but it now appears that these were mainly for convenience, based on general morphology and easily observable characters. The various species groups are defined in Witte & Schmidt (1992). Recently, Ng & Kottelat (1994) revised and redefined the *B. waseri* group. The two new species from the Kapuas basin belong to two species groups which are redefined below. They are: *B. pinguis* (*B. akarensis* group) and *B. breviobesus* (*B. pugnax* group).

MATERIAL AND METHODS

The species concept used is the phylogenetic species concept (Cracraft, 1989; Warren, 1992; see discussion in Kottelat, 1997). Species recognition in the genus *Betta* is further discussed in Kottelat & Ng (1994: 65-67) who also comment on the use of colour marks as diagnostic characters and the limited or lack of use of morphometric characters. Systematic research may take different forms, and different types of publications may fulfill different purposes; our priority in documenting biodiversity has been discussed at length in Kottelat (1995b, 1997).

Terminology and measurements used in the text follow Witte & Schmidt (1992) except that all measurements are taken from point to point and that the predorsal scale counts are counted continuously (following Ng & Kottelat, 1994). Chin-bar is used to refer to the dark thin stripe running under the preorbital stripe, from the lower margin of the eye forwards and downwards to the throat. The dark, narrow, often slightly curved, concentric bars perpendicular to the rays on the interradiation membranes of the dorsal and caudal fins are called dorsal (respectively caudal) transverse bars. SL refers to standard length, HL to head length. We call species group (abbreviated group) an assemblage of species sharing a set of diagnostic characters which may or may not be a monophyletic lineage. In some cases, available data may support the monophyly of a given group, while for other groups such data are (still) missing or have not yet been reevaluated. Our inability to demonstrate monophyly today does not automatically imply that a given group is not monophyletic, just that we do not know. Meanwhile, the recognition of groups, be they for convenience only, is justified by the necessity of handling subsets of the genus *Betta*, for example for comparing a species with those it seems related with and avoiding trivial and lengthy comparisons with completely and obviously unrelated species.

Specimens examined are deposited in the Natural History Museum, London (BMNH); California Academy of Sciences, San Francisco (CAS); Muséum National d'Histoire Naturelle, Paris (MNHN); Muzium Zoologicum Bogoriense, Bogor (MZB); Nationaal Natuurhistorisch Museum, Leiden (RMNH); Instituut voor Systematiek & Populatiebiologie, Universiteit van Amsterdam (ZMA); Zoological Reference Collection, School of Biological Sciences, National University of Singapore (ZRC); and the collection of the second author in Cornol, Switzerland (CMK).

TAXONOMY

Betta akarensis group

Diagnosis. - Members of the *B. akarensis* group are diagnosed by the possession of the following combination of characters (none of them unique to the species group): 1) a central black stripe from tip of snout to eye, with a complete chin-bar and a post-orbital stripe which extends from behind the eye to the gill opening (may be interrupted or faint); 2) the caudal-fin usually rhomboidal in shape, the median rays distinctly elongated in adult males, with the branching of rays starting from about 40 mm SL, usually with caudal transverse bars on the caudal-fin interradiation membranes (always distinct in mature males); 3) greenish to bluish iridescence on body scales of some of the members (according to Witte & Schmidt, 1992; Ng, 1993; pers. obs.).

The *B. akarensis* and *B. pugnax* groups can be readily differentiated by the following two characters: 1) faintly coloured greenish-gold opercle scales of the *B. akarensis* group (vs. the strongly coloured bluish-green opercle scales of the *B. pugnax* group); 2) higher anal ray counts (28-30, vs. 25-28). Adult specimens of *B. akarensis* may possess greenish-gold opercle scales which disappear when kept in captivity (THH, pers. obs.). Juvenile specimens may possess gold opercle scales, but these disappear with age (THH, pers. obs.). The presence of the faintly coloured opercle scales of the adults could be due to stress from handling and capture.

Comments. - Four valid species are currently recognised in this group: *B. akarensis* Regan, 1910, *B. balunga* Herre, 1940, *B. chini* Ng, 1993 and *B. pinguis*. Kottelat & Ng (1994) tentatively regarded *B. chloropharynx* from Banka as a member of the *B. akarensis* group. However the following characters of *B. chloropharynx* do not agree with the group diagnosis: distinct presence of iridescent greenish-gold opercle and throat scales; absence of caudal transverse bars on caudal-fin interradiation membranes; and absence of a chin-bar on throat below mouth. *Betta chloropharynx* actually belongs to the *B. waseri* group as defined by Ng & Kottelat (1994) (Tan, 1998).

Betta climacura Vierke, 1988, is tentatively considered as a synonym of *B. akarensis* (Witte & Schmidt, 1992: 326; Kottelat et al., 1993: 161), but this requires more research. The species is widely distributed in Sarawak and Brunei, and this apparently encompasses the type locality of *B. akarensis* (River Akar, Baram River basin). *Betta akarensis* was described on the basis of a single, juvenile specimen, now in poor condition; a definitive identification and confirmation of the synonymy requires fresh material from the type locality. The material closest to the type locality examined by us is from Marudi, Baram basin (ZRC 37993), and it conforms to our concept of *B. akarensis* (see Kottelat et al., 1993, for diagnosis).

***Betta pinguis*, new species**

(Fig. 1)

?*Betta (akarensis)* sp. D: Witte & Schmidt, 1992: 324, 326.

Material examined. - Holotype - MZB 5936, 72.5 mm SL male; Indonesia, Borneo, Kalimantan Barat: Kapuas basin, Sungai Letang, near Kampung Kandung Suli (Kecamatan Jongkong); M. Kottelat et al., 8 Jun. 1995.

Paratypes - CMK 11592, 1 male, 79.1 mm SL, 1 female, 70.8 mm SL, ZRC 39629, 1 male, 63.1 mm SL; same locality as holotype.

Diagnosis. - *Betta pinguis* has the following characters which differentiates it from the other species of the *B. akarensis* group: fewer total anal rays than *B. balunga* (28-29 vs. 30); more lateral scales than *B. balunga* and *B. chini* ($31\frac{1}{2}$ - $32\frac{1}{2}$ vs. 29-31); more lateral scales below dorsal-fin origin (18-19, vs. 15-18); greater total length than *B. balunga* and *B. chini* (145.5-153.5% SL, vs. 132.8-144.6); shorter head length than *B. balunga* (31.3 - 31.7% SL, vs. 32.6 - 35.5); deeper body depth at dorsal-fin origin than *B. akarensis* and *B. chini* (30.6 - 31.6% SL, vs. 25.1 - 30.9); shorter preanal length than *B. balunga* (44.7 - 46.3% SL, vs. 49.2 - 52.2). Among the *B. akarensis* group, *B. pinguis* has the most pigmented opercle pattern, having a darkly pigmented opercle distal edge and many spots (more than seven, vs. five or less, or stripes) (Fig. 3d).

Description. - General body shape and appearance are shown in Figure 1. Body stout, head blunt. Caudal lanceolate, dorsal and anal pointed, pelvic filamentous. Dorsal fin with 6-13 short narrow black transverse bars on interrarial membranes. Interrarial caudal fin membranes each with 14-22 narrow black transverse bars. For meristic and morphometric data, refer to Table 1.

Colour of preserved specimens. - Body uniformly dark brown; opercle covered with many black marks below orbit, between the snout and opercle edge (Figs. 1, 3d), throat with distinct chin-bar running from just below front of orbit to below the preorbital black stripe; transverse black bars present on dorsal and caudal of mature males, only on dorsal of female; anal with distinct black distal edge; pelvic with filamentous tip hyaline on the distal 1/3 and rest brownish. No information on the live colours are available. Specimens were just noted generally dark brown without noticeable pattern. The specimens were obtained from fishermen during a rain storm and it was not possible to make more precise observation.

Distribution. - Currently known only from the middle Kapuas basin, *B. pinguis* is the southernmost species of the *B. akarensis* group.

Ecology. - This species was obtained from a small blackish-water stream in degraded forest. All the specimens were obtained from fishermen who had caught them by hook and line upstream, they were found among hundreds of *B. enisae*. These fish were to be used as bait for *Chitala lopis* (Notopteridae). The only other *Betta* currently known from the same locality are *B. enisae* Kottelat, 1995, and *B. dimidiata* Roberts, 1989.

Etymology. - From the Latin *pinguis* for stout, alluding to the large body size. A noun in apposition.

Remarks. - The present species could possibly be the *Betta (akarensis)* sp. D from Kalimantan Barat and Kalimantan Tengah of Witte & Schmidt (1992: 324). This was based on two specimens, one of them CMK 6797 is a juvenile of 23.0 mm SL, from which no proper morphometric or colouration data can be obtained. We could not get access to the second specimen.

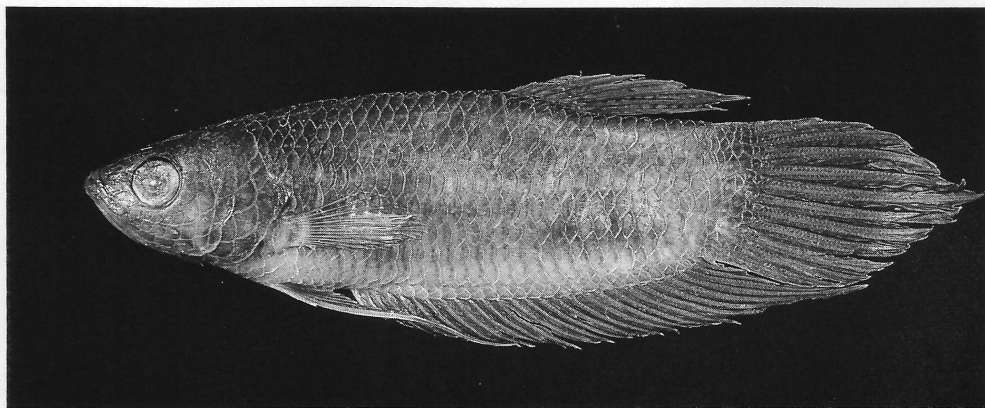


Fig. 1. *Betta pinguis*, paratype, ZRC 39629, 63.7 mm SL, male; Borneo: Kapuas basin.

Table 1. Meristics and morphometrics of the members of the *Betta akarensis* species group

Sample size, n	<i>B. akarensis</i> 18	<i>B. balunga</i> 2	<i>B. chini</i> 8	<i>B. pinguis</i> 4
MERISTICS (mode)				
Vertebrae	2-3 + 8-9 + 20-21 = 31-33 (mode 32, n=10)	2-3 + 9 + 19-21 = 31-32 (n=2)	2 + 8 + 19-21 = 29-32 (mode 30) (n=8)	2 + 9 + 20-21 = 31-32 (n=4)
Anal-fin rays	I-II, 26-28 (total 28-30, 28)	0-III, 27	II, 24-28 (total 26-30, 28)	II, 26-27 (total 28[2]-29[2])
Dorsal-fin rays	I, 7-8 (total 7-9, 8)	0-II, 8-9	I, 7-9 (total 8-10, 8)	I, 8 (total 8-9, 9)
Subdorsal scales	5-6 (5)	6	5 ¹ / ₂ -7 (6)	5-5 ¹ / ₂ (5 ¹ / ₂)
Lateral scales	31-33 (32)	29-30	30-31 (31)	31 ¹ / ₂ -32 ¹ / ₂ (32)
Predorsal scales	22-25 (23)	21-23	22-24 (23)	23-24 (24)
Postdorsal scales	10-12 (11)	9-10	9-11 (10)	10
Lateral scales below dorsal-fin origin	16-18 (17)	15-16	16-17 (16)	18[2]-19[2]
Lateral scales above anal-fin origin	6-8 (6)	6	5-7 (6)	7
MORPHOMETRICS				
% SL (mean)				
Total length	134.4-154.2 (143.7)	132.8-141.3	137.2-144.6 (141.7)	145.5-153.5 (148.8)
Head length	29.8-34.9 (32.3)	32.6-35.5	31.4-33.3 (32.6)	31.3-31.7 (31.5)
Body depth	25.1-30.9 (27.7)	28.0-31.5	26.3-29.0 (28.0)	30.6-31.6 (31.1)
Preal anal length	43.4-48.5 (45.7)	49.2-52.2	42.6-45.7 (44.0)	44.7-46.3 (45.3)
Anal-fin base length	49.6-56.8 (54.6)	47.8-55.4	54.8-58.5 (56.4)	54.5-56.8 (56.1)
Dorsal-fin base length	9.9-14.1 (11.5)	13.7-14.1	11.0-14.0 (12.2)	11.6-14.1 (12.8)
Lower jaw length	8.8-10.7 (9.6)	10.2	8.9-11.3 (9.7)	9.3-9.9 (9.7)
Body depth at pectoral-fin origin	15.7-19.6 (17.5)	16.1	16.9-21.5 (18.2)	18.2-19.7 (19.1)
% Head length (mean)				
Postorbital length	45.7-51.6 (49.0)	46.7-49.2	46.7-52.5 (49.2)	47.8-50.6 (49.2)
Lower jaw length	25.4-34.4 (29.6)	28.8	25.8-31.5 (28.7)	29.5-31.7 (30.9)
Body depth at pectoral-fin origin	47.3-61.9 (54.1)	45.5	47.6-59.3 (53.9)	58.1-62.0 (60.4)

***Betta pugnax* group**

Diagnosis. - Members of this species group are diagnosed by the possession of the following suite of characters (none of them unique to the group): 1) a relatively large head, 28-40 % SL; 2) live specimens usually brown with greenish to bluish iridescent spots on the body scales; 3) males with strongly coloured (blue, green or greenish blue) iridescent opercle scales, occasionally also covering the anterior portion of the belly; 4) juveniles and females usually have a light brown background displaying two dark stripes running along the body and meeting at the base of the caudal peduncle with a dark spot; 5) head rhombic when viewed from above, with central stripe (the stripe running from tip of snout through eye to middle of caudal-fin base) and with or without a chin-bar; 6) fins of mature specimens pointed, often elongated, caudal lanceolate, males may exhibit caudal transverse bars on caudal-fin interradiation membranes.

Comments. - Witte & Schmidt (1992: 324-325) recognised a *B. pugnax* group characterised by the presence of the preorbital part of the lower stripe, vertebrae number, and distribution. They also recognised a *Betta* sp. E group characterised by having no chin-bar; pelvic with very long filamentous ray; adult male with bright iridescent opercle and throat, light blue body; head without light spots. Within their *Betta* sp. E group, they distinguish a *Betta* sp. E and *Betta* sp. F on the basis of differences in body depth and head length. The ghost species *Betta* sp. F is based on "two senescent aquarium specimens without locality data" (p. 327) and therefore its identity is unclear. We treat the *B. pugnax* and *Betta* sp. E groups of Witte & Schmidt (1992) as a single group, the *B. pugnax* group. The presence or absence of the chin-bar does not appear to be a useful character as some populations of *B. pugnax* from Peninsular Malaysia exhibit either clear, faint or absence of the chin-bar (Tan & Tan, 1996). The mention of "very long pelvic fin" without actual comparative data makes it useless as a diagnostic character. The only character left, the absence of light spots on head, does not appear to justify the recognition of a distinct species group.

Seven valid species are presently recognised in this group: *B. pugnax* (Cantor, 1850), *B. fusca* Regan, 1910, *B. schalleri* Kottelat & Ng, 1994, *B. prima* Kottelat, 1994, *B. enisae* Kottelat, 1995a, *B. pulchra* Tan & Tan, 1996, and *B. breviobesus*. Syntypes of *B. fusca* have also been examined. Kottelat & Ng (1994: 77) have discussed the status of *B. fusca* and *B. schalleri*.

***Betta breviobesus*, new species**

(Fig. 2)

Betta pugnax (non Cantor, 1850): Roberts, 1989: 173.

Material examined. - Holotype - MZB 3866, 1 male, 45.4 mm SL; Borneo, Indonesia: Kalimantan Barat, stream about 1 km up Sungai Tajan from Tajan, 87 km E of Pontianak, 0°02'S 110°07'E; T. R. Roberts et al., 22 Aug. 1976.

Paratypes - ZMA 16.547, 1 female, 36.4 mm SL; same locality as holotype. — MZB 3859, 1 female, 30.8 mm SL; Borneo, Indonesia: Kalimantan Barat, Sungai Paklehung, tributary to Sungai Mempawah, 48 km NNW from Pontianak, 9 km NE of Andjongan, and 1-3 km upstream from Toho, 0°24.5'N 109°13.5'E; T. R. Roberts et al., 13 Jul. 1976. — MZB 3863, 1 female, 39.8 mm SL; Borneo, Indonesia: Kalimantan Barat, tributary of Sungai Mandai, 2-3 km upstream from Kapuas mainstream, 17 km WSW of Putussibau, 0°47'N 112°48'E; T. R. Roberts et al., 10 Aug. 1976. — MZB 3864, 2 males, 38.0-45.7 mm SL, 1 female, 41.3 mm SL, MNHN 1982-719, 1 male, 54.5 mm SL, 2 females, 49.1-

54.5 mm SL, RMNH 289118, 1 male, 45.3 mm SL, 3 females, 42.3-58.9 mm SL; Borneo, Indonesia: Kalimantan Barat, Sungai Mandai Kechil, near confluence with Kapuas mainstream, 18 km WSW of Putussibau, 0°48'N 112°47'E; T. R. Roberts et al., 11 Aug. 1976. — MZB 3865, 1 female, 40.0 mm SL; Borneo, Indonesia: Kalimantan Barat, Sungai Seriang, tributary of Sungai Palin, 37 km W of Putussibau and 3-5 km up Sungai Palin from Kapuas mainstream, 0°51.5'N 112°36'E; T. R. Roberts et al., 12 Aug. 1976. — CMK 6927, 4 ex., 36.3-65.0 mm SL, ZRC 40284, 3 ex., 39.5-49.0 mm SL; Borneo, Indonesia: Kalimantan Barat, right tributary of Sungai Sibau, about 3 km upstream of Putussibau (Putussibau: 0°51'N 112°51'E); M. Kottelat et al., 28 Apr. 1990

Diagnosis. - This species looks superficially similar to *B. enisae* Kottelat, 1995a, from which it differs in having: absence of caudal transverse bars vs. presence; more anal rays (25-27, mode 27, vs. 23-26, mode 24-25); more subdorsal scales ($5\frac{1}{2}$ -7, mode 7, vs. 5); more lateral scales (28-30, mode 30, vs. 26-28, mode 27); smaller predorsal length (62.1-67.0% SL, vs. 67.3-70.3); larger body depth at dorsal-fin origin (28.7-32.8% SL, vs. 26.2-28.9); slightly longer pelvic fin (33.9-55.4% SL, vs. 33.8-46.7); longer dorsal-fin base (11.4-14.9% SL, vs. 8.7-12.1); smaller total length (128.0-150.9% SL, vs. 143.0-155.2); smaller orbit diameter (48-69% of postorbital length, vs. 57-68); smaller interorbital width (64-74% of postorbital length, vs. 70-76) (data on *B. enisae* obtained from Kottelat, 1995a). *Betta breviobesus* can be further differentiated from its congeners by the following characters: absence of chin-bar (vs. presence in *B. pugnax*, *B. prima* and *B. pulchra*); presence of dark distal borders on anal and caudal fins (vs. absence in *B. pugnax*, *B. fusca*, *B. schalleri*, *B. prima* and *B. pulchra*); absence of caudal transverse bars (vs. presence in *B. pugnax* and *B. pulchra*); more anal-rays than *B. fusca* (25-27, vs. 24-25); fewer lateral scales than *B. schalleri* (28-30, vs. 31); more predorsal scales than *B. schalleri* (19-21, mode 21, vs. 17-19, mode 19); more postdorsal scales than *B. prima* (11-12, vs. 9-10); greater head length than *B. fusca* (51.3-54.3 % predorsal length, vs. 47.2-49.4); smaller predorsal length than *B. fusca* and *B. prima* (62.1-67.0 % SL, vs. 68.1-70.2); smaller postdorsal length than *B. prima* (21.9-23.4 % SL, vs. 24.1-26.3); smaller preanal length than *B. prima* (48.0-51.5 % SL, vs. 50.6-54.8); greater body depth than *B. schalleri* (28.7-32.8 % SL, vs. 26.7-27.6); longer pelvic fins than *B. pugnax* (filamentous tip reaching 9-18th anal ray, vs. 4-10th; 33.9-55.4% SL, vs. 26.6-43.8); longer anal-fin base than *B. fusca* and *B. schalleri* (51.1-54.5 % SL, vs. 47.8-52.0); smaller orbit diameter than *B. pugnax* and *B. pulchra* (24.2-28.5 % HL, vs. 27.9-38.5); smaller interorbital width than *B. pugnax* and *B. pulchra* (29.6-36.1 % HL, vs. 32.4-53.0) (data on *B. schalleri* from Kottelat & Ng, 1994; *B. prima* from Kottelat, 1994; and data on *B. pugnax* and *B. pulchra* from Tan & Tan, 1996).

Description. - General appearance as in Fig. 2, morphometric and meristic data of holotype

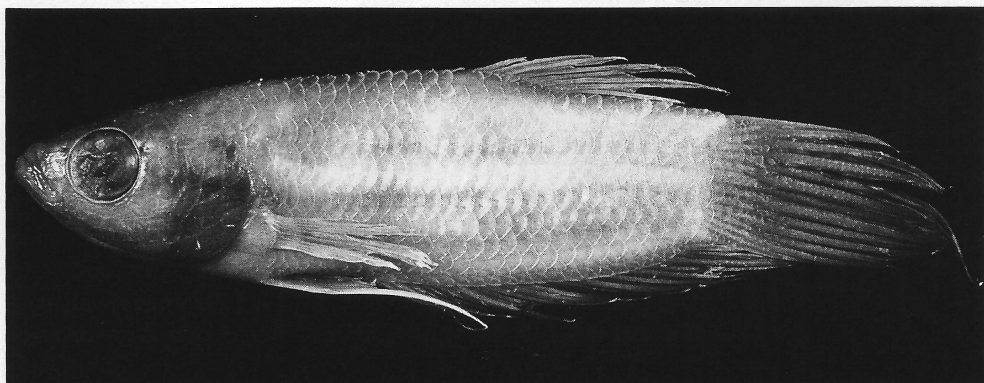


Fig. 2. *Betta breviobesus*, holotype, MZB 3866, 45.4 mm SL, male; Borneo: Kapuas basin.

Table 2. Meristics and morphometrics of holotype and three paratypes of *Betta breviobesus*.

	Holotype MZB 3866	CMK 6297	Paratypes CMK 6297	CMK 6297
Sex	male	female	male	male
Standard length	45.4	65.0	51.2	51.7
Total length	68.5	94.3	77.1	73.1
Head length	16.5	21.9	17.4	17.0
MERISTICS				
Vertebrae	2+8+19	2+8+19	3+8+19	2+8+18
Anal-fin rays	II, 24	II, 23	II, 24	II, 23
Dorsal-fin rays	I, 8	I, 8	I, 8	I, 8
Caudal-fin rays	ii, 6+6, i	ii, 6+6, i	ii, 5+7, i	ii, 6+6, i
Subdorsal scales	7	6	6 $\frac{1}{2}$	7
Transverse scales at dorsal-fin origin	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$
Lateral scales	30	30	29	30
Predorsal scales	21	21	21	19
Postdorsal scales	11	12	11	11
MORPHOMETRICS (% SL)				
Total length	150.9	145.1	150.6	141.4
Predorsal length	67.0	64.2	66.2	63.2
Postdorsal length	23.1	23.4	21.9	23.4
Caudal peduncle depth	18.3	19.8	17.8	18.2
Preanal length	51.5	49.4	48.8	48.0
Head length	36.3	33.7	34.0	32.9
Body depth at dorsal-fin origin	30.2	32.8	31.4	29.6
Pelvic-fin length	54.6	55.4	51.2	43.1
Anal-fin base length	51.1	54.5	53.1	52.6
Dorsal-fin base length	13.9	13.7	13.1	13.9
(% head length)				
Orbit diameter	28.5	24.2	26.4	27.1
Postorbital length	46.1	50.2	47.1	47.1
Interorbital width	34.6	36.1	33.3	34.7
(% postorbital length)				
Head length	217	199	212	213
Orbit diameter	62	48	56	58
Interorbital width	75	72	71	74
(% predorsal length)				
Head length	54.3	52.5	51.3	52.0

and three paratypes are given in Table 2 in order to provide a general impression of the body shape. Characters used in the diagnosis and descriptions have been obtained from all (eight) adult specimens. Pelvic fin filament reaching 9th to 18th anal ray. Caudal fin lanceolate. Dorsal and anal fins pointed; dorsal fin with or without (up to) 6 faint transverse black bars on interradiial membranes. Vertebral formula: 2-3 + 8 + 18-19 (total 28-30, mode 29) (n=5).

Colour of preserved specimens. - Specimens are dark brown dorsally and light brown ventrally (Fig. 2). Pelvic with filamentous ray white and rest of fin hyaline. Anal with a thin distal dark edge, which may be continuous with distal dark edge of lower half of caudal. A conspicuous dark stripe running from tip of lower jaw through eye to opercle edge. Chin-bar on throat absent. Throat darkly pigmented on some males, otherwise cream coloured in females and juveniles.

Distribution. - *Betta breviobesus* is apparently restricted to the Kapuas basin in Kalimantan Barat. Most of the examined specimens have been collected from within 50 km of Putussibau

in the upper part of the basin.

Ecology. - *Betta breviobesus* was collected mainly from small forest streams with slightly acidic waters (pH 6-7). The type series collected by the second author had been caught in a trap by villagers and were to be used as bait. They had been obtained after heavy rains close to the mouth of a relatively deep stream (2-3 m deep), 2-5 m wide, with murky water. The only sympatric *Betta* species in the same habitat is *B. dimidiata* Roberts, 1989.

Etymology. - From the Latins *brevis* and *obesus*, alluding to the stocky and thick-set appearance of the body. Used as an adjective.

Remarks. - Although Roberts (1989) identified his material of the present species as *B. pugnax*; direct comparisons of *B. pugnax* (fide Tan & Tan, 1996) and *B. breviobesus* show that they are obviously different. See above diagnosis for the differences.

Comparative material examined. - *Betta akarensis* - BMNH 1895.7.2:44, 31.6 mm SL juvenile, holotype; Borneo: Sarawak, Sungai Akar; C. Hose. — BMNH 1868.6.9:18-20, 2 ex., 46.4-56.1 mm SL; Sarawak; M. Doria. — BMNH 1889.7.31:4-5, 2 ex., 58.5-62.5 mm SL; Baram; C. Hose. — BMNH 1891.1.27:26-27, 2 male ex., 78.8-79.7 mm SL; Baram; C. Hose. — BMNH 1893.3.6:139, 1 female ex., 52.0 mm SL; Poch; A. Everett. — BMNH

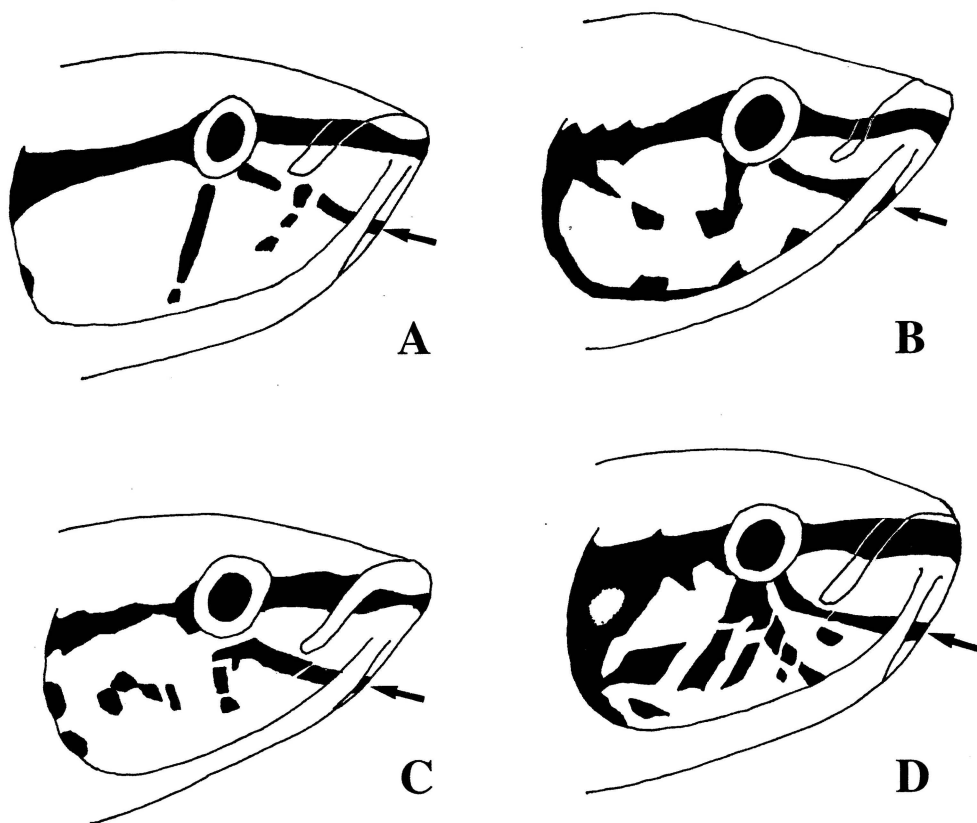


Fig. 3. Schematic diagram of the members of the *Betta akarensis* group showing diagnostic colour pattern of the gular area (arrow indicates chin-bar): a - *B. akarensis*; b - *B. balunga*; c - *B. chini*; d - *B. pinguis*.

1893.3.6:141-144, 4 ex., 49.5-67.5 mm SL; north Borneo; A. Everett. — BMNH 1894.8.3:28-30, 3 ex., 52.1-54.4 mm SL; Baram river; C. Hose. — BMNH 1895.7.2:43, 1 male ex., 61.1 mm SL; Baram district; C. Hose. — ZRC 37993, 1 ex., 37.9 mm SL; Borneo: Sarawak, Marudi Airport - Lubok Nibong road, at 12.1 km; M. Kottelat & T. H. T. Tan, 19 Jun. 1994. — ZRC 37967, 1 ex., 52.5 mm SL; Borneo: Sarawak, Sungai Tebu at 8 km, Daro - Matu road; M. Kottelat & T. H. T. Tan, 14 Jun. 1994. — ZRC 37972, 1 ex., 52.2 mm SL; Borneo: Sarawak, Parit Nyadok, 200 m after 10 km stone, Daro - Matu road; M. Kottelat & T. H. T. Tan, 14 Jun. 1994. — ZRC 37858, 3 ex., 19.3-56.1 mm SL, CMK 10881, 2 ex.; Borneo: Sarawak, Sungai Nibong, ca. 1 km north of Durin ferry on Sri Aman - Sibul road; M. Kottelat et al., 7 and 15 May 1994. — ZRC 37929, 2 ex., 39.5-50.9 mm SL, CMK 10874, 3 ex.; Borneo: Sarawak, outskirts of Sibul, Sungai Teku, 5.2 km north of airport runway end on Jalan Teku; M. Kottelat et al., 15 May 1994. — ZRC 37845, 8 juv., CMK 10868, 8 ex.; Borneo: Sarawak, outskirts of Sibul, 4.2 km north of airport runway end on Jalan Teku; M. Kottelat et al., 15 May 1994. — ZRC 37925, 6 ex., 19.7-60.2 mm SL, CMK 10940, 7 ex.; Borneo: Sarawak, ditch 34 km from Mukah, on Mukah - Sibul road; M. Kottelat et al., 14 May 1994. — ZRC 37914, 1 juv.; Borneo: Sarawak, Sungai Mantala, about 28 km from Mukah on Mukah-Sibul road; M. Kottelat et al., 14 May 1994. — ZRC 37940, 2 juv.; Borneo: Sarawak, Sungai Gayao, about 40 km from Mukah on Mukah-Sibul road; M. Kottelat et al., 14 May 1994. — ZRC 37902, 1 juv.; Borneo: Sarawak, Sungai Ngeli, about km 6 Simunjan - Balai road; M. Kottelat et al., 11 May 1994. — ZRC37952, 5 ex., 17.5-50.8 mm SL, CMK 10960, 5 ex.; Borneo: Sarawak, Sibul - Sarikei road, 1.5 km south of Durin ferry; M. Kottelat et al., 14 May 1994. — ZRC 31812-17, 6 ex., 9.4-56.6 mm SL; Borneo: Brunei, Belait District, near Seria; K. K. P. Lim, 11 May 1993. — ZRC 35437-441, 5 ex., 34.1-71.6 mm SL; Borneo: Brunei, Belait District, Sungai Liang area; H. & S. C. Choy, 4 Oct. 1992. — ZRC 31863-64, 2 juv.; Borneo: Brunei, Tutong District, Lamunin; K. K. P. Lim & S. C. Choy, 14 May 1993.

Betta balunga - CAS/ SU 33203 (photograph and radiograph only), 46.0 mm SL, holotype; Borneo: Sabah, Tawau, Sungai Balung. — ZRC 35497, 1 ex., 37.2 mm SL, CMK 9451, 8 ex., 17.2-33.4 mm SL; Borneo: Kalimantan Timur, Sungai Sebuks basin, near Pembelianan, creek along road from base camp to Semanud, draining into Sungai Tikung (4°0'48"N 117°2'54"E); M. Kottelat & P. McKee, 10 Feb. 1993.

Betta chini - ZRC 35086, 51.0 mm SL, male, holotype; Borneo: Sabah, Beaufort area, peat swamps, along logging trail, ca. 12 km from Beaufort, on road from Kota Kinabalu to Beaufort (5°33'06"N 115°50'23"E); P. K. L. Ng & R. B. Stuebing, 29 Dec. 1992. — ZRC 35087-093, 7 ex., paratypes, 17.4-54.2 mm SL, SBM uncat., paratypes, 2 ex., 31.0-33.3 mm SL; same locality data as holotype. — ZRC 35096-35102, 7 ex., paratypes, 22.8-45.5 mm SL, CMK 10027, 3 ex., paratypes; Borneo: Sabah, Beaufort area, Sungai Mawao, peat swamps; R. B. Stuebing, 11 Jan. 1993. — ZRC 35094-95, 2 ex., 25.4-47.3 mm SL; Borneo: Sabah, Beaufort area, Kg. Lumat; R. B. Stuebing, 7 Jan. 1993.

Betta fusca - BMNH 1908.17.13:18-19, 2 ex., syntypes, 53.2-59.7 mm SL; Morton.

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