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Luciobarbus kottelati, a new species of barbel (Teleostei: Cyprinidae) from the Büyük Menderes River, Turkey, with rediagnose of *L. lydianus*

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Abstract

Luciobarbus kottelati, new species, is described from the River Büyük Menderes, Aegean Sea drainage, Turkey. It is distinguished from all other species of *Luciobarbus* in Europe and western Anatolia by the pelvic-fin origin markedly in front of the dorsal-fin origin (vs. behind). *Luciobarbus lydianus*, considered to be a synonym of *L. pectoralis* by most recent authors is a valid species and is rediagnosed.

Key words: New species, Taxonomy, *Luciobarbus*, Turkey

Introduction

Although the name is still erroneously used for a number of Eurasian and African fishes, the genus *Barbus* includes fishes found in the Western Palearctic and northwestern Africa (see, e.g., Banarescu & Bogutskaya, 2003). In recent years, however, two lineages have been recognized within *Barbus* and they are now considered to be distinct genera, *Barbus* and *Luciobarbus* (Doadrio, 1990; Bianco, 1995; Bogutskaya & Naseka, 2004; Kottelat & Freyhof, 2007). *Barbus* includes species from Europe, the Caucasus, Turkey, and the Aral and Caspian basin and *Luciobarbus* includes species from north western Africa (Morocco, Algeria), the Iberian and Balkan peninsulas and western Asia. *Luciobarbus* is distinguished from *Barbus* s. str. by the shape of the lower lip (absence of papillae on the central part of the lower lip vs. central part of the lower lip completely covered by papillae), the number of teeth in the main row of pharyngeal teeth (only four pharyngeal teeth in main row, vs. five) (see Banarescu & Bogutskaya, 2003: 4), and molecular characters (see Tsigenopoulos *et al.*, 2003).

Only one nominal species of *Luciobarbus* has been reported from western Anatolia until now. It had been identified as *L. capito pectoralis* by most recent authors, following Ladiges (1960) and Karaman (1971). The discovery of a new species of *Luciobarbus* in River Menderes prompted a re-examination of the identity of the Anatolian species of the genus. We found that the western Anatolian species in fact is *L. lydianus*, already described by Boulenger (1896) and that it is related to neither *L. capito* (from the Caspian basin) nor *L. pectoralis* (from the Orontes drainage) but to *L. graecus* (from eastern Greece) according to mersitic counts, metric characters and general features. We herein describe the new species *L. kottelati* and re-diagnose and provide the first figure of *L. lydianus*.

Material and methods

Specimens were caught with pulsed DC electro fishing equipment. Material is deposited in: IUSHM, Zoology Museum of Istanbul Technical University; FFR, Karadeniz Technical University Zoology Museum of the Faculty of Fisheries; CMK, Collection of Maurice Kottelat; and CGE, Collection of F. Güler Ekmekçi. Measurements were taken with digital callipers (0.1 mm accuracy). Counts and measurements follow Hubbs & Lagler (1947) except as follows. Head width₁: distance between anterior margin of eyes; head width₂: distance between posterior margin of eyes; head width₃: measured at posteriormost point of the operculum; head depth₁: head depth at interorbital region; head depth₂: head depth at occiput; snout width: measured at level of nostril. The lateral line scale counts include the scales on the base of the caudal fin. The vertebrae counts include the four Weberian vertebrae and the hypural complex have been examined by X-radiography. The last two branched dorsal and anal-fin rays articulating on a single pterygiophore are counted as “1½”. Pharyngeal teeth counts are made on the dissected fifth ceratobranchial from the specimens. The terminology to describe the shape of the lips is that of Kottelat & Freyhof (2007: 111). The species concept used here is the phylogenetic species concept (see Kottelat, 1997). As we were not able to examine specimens of *L. capito*, all the values for this species used in discussion section were from Almaça (1984). Both the distance between two anterior barbels and posterior barbels on the both side of the head were measured from point to point.

Results

Luciobarbus lydianus Boulenger, 1896

(Fig. 1)

Barbus lydianus Boulenger, 1896 (type locality: Gediz River in İzmir province).

Material examined. FFR 452, 7, 128–230 mm SL; CMK 18680, 3, 170–221 mm SL; CGE, 3, 134–145 mm SL; Turkey: Manisa Prov.: Lake Avşar, River Gediz basin: Sarıgöl, 70 km East of Manisa, D. Turan, N. Öztürk, 01 June 2005. - FFR 453, 4, 130–212 mm. SL; Turkey: İzmir Prov.: Gediz River, D. Turan, N. Öztürk, 02 June 2005. - FFR 752, 4, 130–212 mm. SL; Turkey: İzmir Prov.: Gediz River, D. Turan, N. Öztürk, 02 June 2005. - FFR 2527, 1, 87 mm SL; Turkey: Çanakkale Prov.: Aşağıçavuşlu Stream at Aşağıçavuşlu Village, D. Turan, S. Engin, 27 November, 2006.

Diagnosis. General appearance of body is shown in Figure 1 and head viewed from below given in Figure 3-a; morphometric and meristic data are in Tables 1 and 2. *Luciobarbus lydianus* is distinguished from all other species of *Luciobarbus* in Greece and Anatolia in having 45–48 total lateral line scales (vs. 50–90 in all others, except *L. kottelati* and *L. graecus* as seen in Table 2). It is distinguished from *L. kottelati* (from western Anatolia) in having the dorsal-fin origin directly above pelvic-fin origin or very slightly behind it (vs. conspicuously behind), the caudal-fin lobes of equal length (vs. lower lobe longer than upper) and morphometric characters mentioned in Discussion. It is distinguished from *L. graecus* (from central Greece) by the lips fleshy (vs. thin), with the lower lip conspicuously thicker than the upper lip (vs. only slightly thicker), the middle of the lower lip with a median fleshy pad with a shallow groove posteriorly (Fig. 3-a; vs. without median fleshy pad), and a well-developed black spot on each scale pocket back and the level below of the pectorals and pelvics, but not present on the scales on belly (vs. absent or inconspicuous).

Other characters useful for identification are: 15–17 gill rakers on first gill arch; last unbranched dorsal-fin ray weakly ossified, with small serrae along posterior edge (Fig. 2-a). As seen many cyprinid fish, there is sexual dimorphism; male with tubercles on snout in spawning period, this period was between May and July in the Avşar Lake (Topkara & Balık, 2004), and between April and July in the Gediz River Balık (1980).



FIGURE 1. *Luciobarbus lydianus*; FFR 452, 141 mm SL; Turkey: Gediz drainage.



FIGURE 2. Last simple dorsal-fin ray of: **a**, *Luciobarbus lydianus*, FFR 454, 157 mm SL; **b**, *L. kottelati*, FFR 452, 142 mm SL.

Coloration. Both live and after fixation: dark brownish grey on back and flanks, yellowish white on belly. Dorsal and caudal fins greyish, pectoral, anal and pelvic fins yellowish. Flank scales with faintly marked and narrow black margin along posterior edge, not much contrasted against rest of scale; dark spot on scale pocket very contrasted. This feature is very marked on back and flanks, but less distinct on the scales close to belly and disappears totally after the line above pectoral and pelvic fins.

Distribution. *Luciobarbus lydianus* is presently known only from the Gediz River, which drains to the Aegean Sea, and the Aşağıçavuşlu Stream, which drains to the Sea of Marmara (Fig. 4)

TABLE 1. Morphometry of *Luciobarbus lydianus*, *L. kottelat*, *L. graecus* and *L. pectoralis*.

Species	<i>L. lydianus</i>	<i>L. graecus</i>	<i>L. kottelati</i>	<i>L. pectoralis</i>
Basin	Aegean	Eagean	Aegean	Mediterranean
Drainage	Gediz R.	Kifosos S.	Menderes R	Orontes R.
	n=14	n=4	n= 15	n=11
	min-max (mean)	min-max (mean)	min-max (mean)	min-max (mean)
Standard length (in mm)	72-211	110-183	111-157	133-239
In percents of standard length				
Head length	26.4-27.6 (27.1)	25.1-28.1 (26.8)	6.0-27.5 (26.8)	26.2-28.6 (27.5)
Body depth of dorsal-fin origin	22.7-26.7 (24.4)	25.6-27.2 (26.3)	25.6-28.9 (27.4)	22.9-26.4 (24.6)
Predorsal length	52.0-55.1 (53.9)	51.5-54.7 (53.5)	54.9-60.0 (56.6)	51.9-55.3 (53.4)
Prepelvic length	53.1-54.9 (54.1)	51.4-54.7 (53.3)	52.1-57.1 (54.2)	51.9-54.3 (53.5)
Preanal length	76.1-80.7 (78.2)	74.2-78.1 (76.7)	76.6-82.3 (78.0)	74.2-79.5 (77.1)
Pectoral-fin origin to anal fin	51.5-55.9 (53.6)	52.7-55.0 (53.7)	51.9-58.5 (54.4)	49.3-53.6 (51.7)
Pectoral-fin origin to pelvic fin	27.9-30.6 (28.9)	27.9-29.1 (28.6)	27.8-32.2 (29.9)	25.4-29.6 (27.7)
Pelvic-fin origin to anal fin	23.8-26.7 (25.2)	23.1-24.9 (24.1)	4.0-26.8 (25.0)	22.6-27.7 (24.4)
Dorsal-fin height	14.7-17.5 (16.6)	16.6-20.0 (18.4)	15.6-19.1 (17.8)	14.9-21.2 (17.8)
Anal-fin length	16.3-18.3 (17.2)	17.7-18.9 (18.2)	15.3-18.0 (16.5)	14.1-19.1 (16.7)
Pectoral-fin length	14.0-18.8 (17.7)	19.9-20.8 (20.4)	17.0-20.1 (19.1)	17.5-19.7 (18.9)
Pelvic-fin length	15.4-16.4 (15.9)	16.2-17.3 (17.0)	14.5-17.8 (16.6)	14.0-18.3 (16.5)
Upper caudal-fin lobe	21.8-23.3 (22.8)	22.5-24.9 (23.4)	20.8-24.3 (23.1)	20.6-25.2 (23.0)
Length of middle caudal-fin rays	11.0-12.2 (11.5)	12.1-13.3 (12.4)	11.3-13.8 (11.7)	9.0-13.1 (10.7)
Length of caudal peduncle	16.7-19.4 (18.3)	16.6-19.2 (18.0)	16.3-19.0 (17.3)	16.9-19.6 (18.0)
Depth of caudal peduncle	10.6-11.8 (11.4)	11.0-12.8 (11.8)	11.4-12.6 (12.1)	10.7-11.9 (11.4)
In percents of head length				
Snout length	35.6-38.6 (37.1)	35.7-41.6 (38.3)	35.9-40.6 (38.1)	37.2-41.6 (39.4)
Eye diameter	12.2-14.8 (13.5)	16.2-23.3 (19.1)	13.9-19.3 (16.1)	13.1-19.3 (15.2)
Interorbital width	33.5-36.6 (34.9)	31.6-33.0 (32.3)	32.3-36.5 (34.5)	28.1-34.7 (32.4)
Head width ₁ at anterior. margin of eyes	39.7-43.5 (41.1)	34.7-38.8 (37.4)	38.4-43.1 (41.0)	35.9-41.2 (38.9)
Head width ₂ at posterior. margin of eyes	51.2-55.6 (53.0)	50.4-53.2 (52.0)	49.2-55.3 (53.0)	47.2-54.6 (51.4)
Head width ₃ at opercule	58.5-62.9 (61.1)	54.2-62.2 (58.7)	57.5- 66.1 (61.1)	55.2-60.9 (58.4)
Head depth ₁ at interorbital region	43.2-49.4 (46.7)	46.1-49.7 (47.4)	42.4-50.2 (46.3)	42.0-48.6 (46.1)
Head depth ₂ at occiput	58.7-64.6 (62.1)	67.3-71.4 (68.3)	63.0-68.3 (66.1)	59.9-66.9 (63.2)
Snout width at nostrils	32.8-37.0 (35.1)	31.5-36.2 (34.3)	31.4-38.2 (35.3)	31.6-36.3 (33.9)
Snout depth at nostrils	29.7-33.0 (31.3)	31.2-35.9 (33.4)	29.8-33.1 (32.0)	30.6-36.3 (32.1)
Anterior barbel length	22.0-25.3 (23.4)	16.1-22.4 (19.1)	22.7-29.2 (25.7)	16.3-23.6 (20.5)
Posterior barbel length	23.8-30.9 (27.0)	19.9-26.2 (23.1)	27.6-33.2 (29.8)	18.4-28.2 (22.6)
Distance between anterior barbell	20.0-21.7 (21.0)	19.7-24.4 (21.8)	21.2-24.8 (22.6)	18.5-21.0 (20.1)
Distance between posterior barbell	26.5-31.9 (28.4)	26.0-27.3 (26.4)	23.8-28.7 (26.6)	21.5-29.9 (24.9)

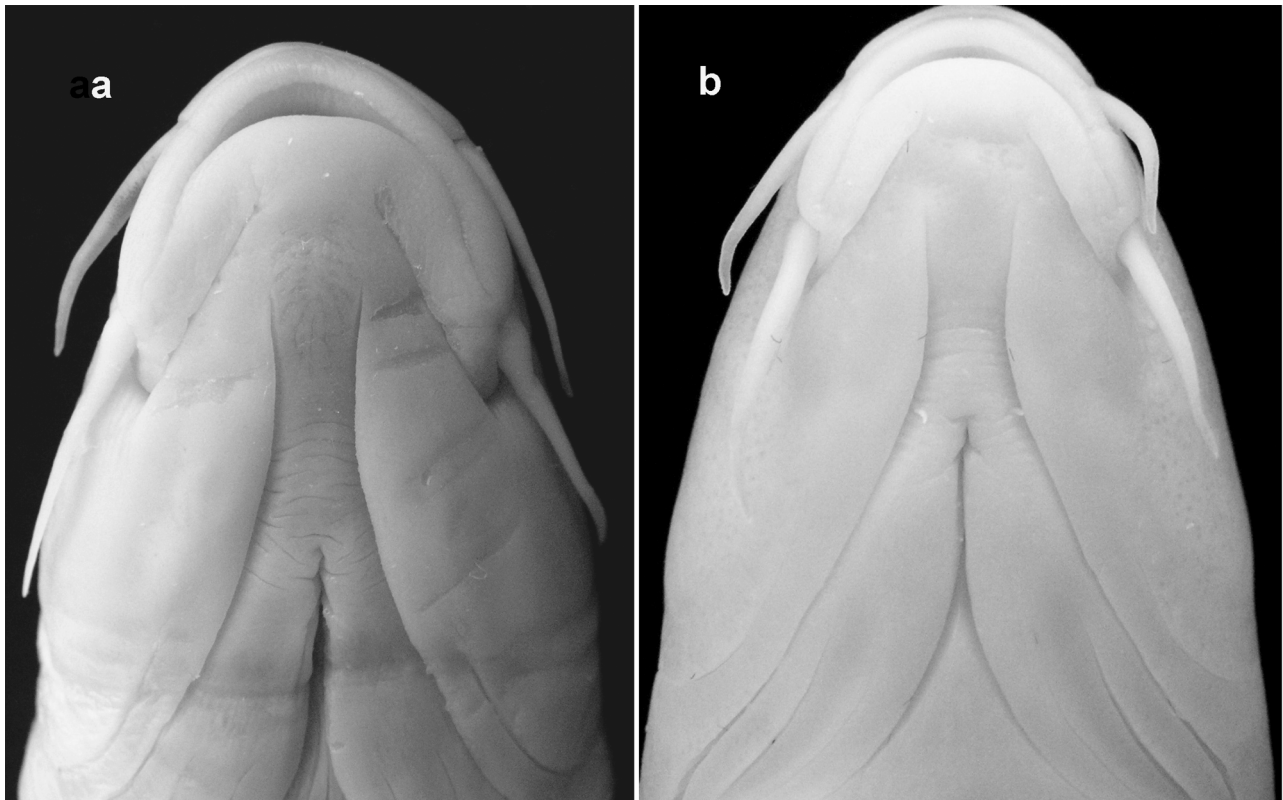


FIGURE 3. Ventral view of head of: **a**, *Luciobarbus lydianus*, FFR 452, 187 mm SL; **b**, *L. kottelati*, FFR 454, 152 mm SL.

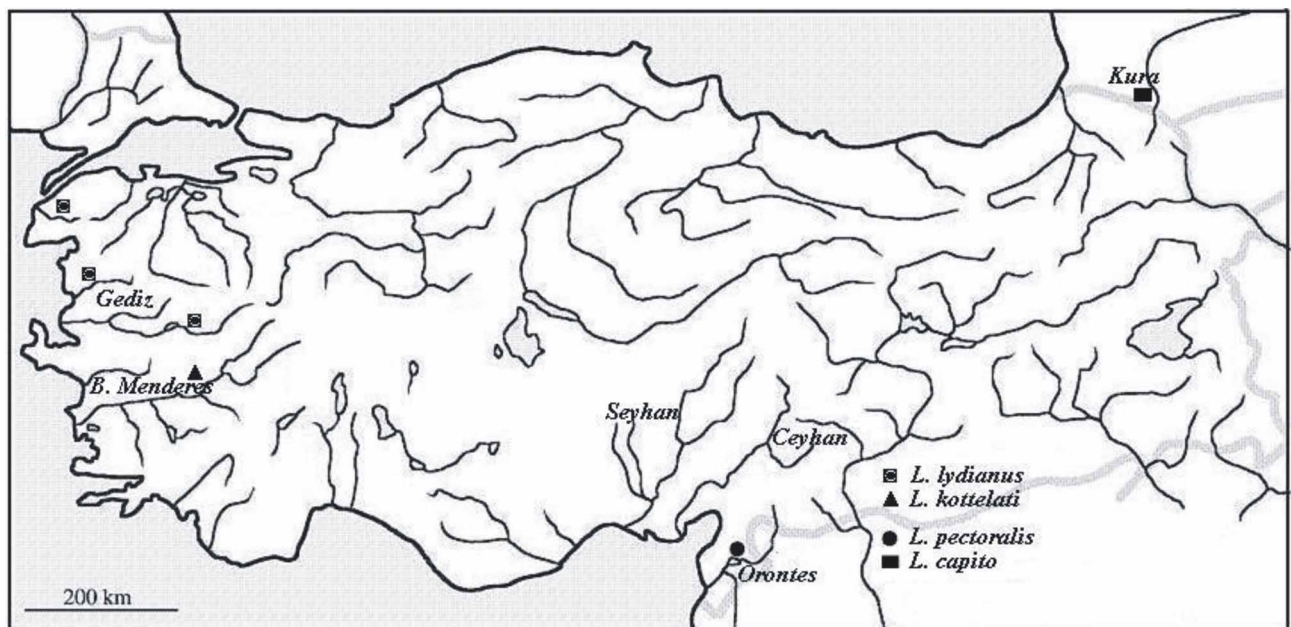


FIGURE 4. Distribution of some species of *Luciobarbus* in Turkey

Luciobarbus kottelati, sp. nov.

(Fig. 5)

Holotype. IUSHM 27300-879, 165 mm SL, Turkey: Aydın Prov.: River Büyük Menderes, Dandalas Stream, Karacasu, 90 km south of Aydın; D. Turan, S. Engin & M. Gölükçetin, 6 April 2005.

Paratypes. IUSHM 27300-878, 4, 120–145 mm SL; CMK 18592, 4, 111–151 mm SL; FRR 454, 10, 91–280 mm SL; CGE uncat., 2, 124–143 mm SL; same data as holotype.

Diagnosis. *Luciobarbus kottelatii* is distinguished from all other species of *Luciobarbus* in Anatolia and Europe by the position of the dorsal-fin origin conspicuously behind the pelvic-fin origin (vs. directly above or very slightly behind) and by having 43–46 total lateral line scales (vs. 50–90 in all others, except *L. lydi-anus* and *L. graecus* [Table 2]).

Other characters useful for identification are: 14–15, modally 15, gill rakers on the first gill arch; lips thin; lower lip with a swollen median pad margined by a shallow groove in some specimens; last simple ray of the dorsal fin well ossified, with moderate serrae along posterior edge (Fig. 2-b).

Description. General appearance of body is shown in Figure 5 and head from below in Figure 3-b; morphometric and meristic data are given in Tables 1 and 2. Body moderately high and slightly compressed laterally, caudal peduncle deep. Dorsal profile of body slightly arched, ventral profile more or less similar. Dorsal head profile slightly convex. Upper lip thin; lower lip thicker than upper lip, with a median swollen pad margined by a shallow groove in some specimens (Fig. 3-b). Maxillary barbel reaching anterior margin of eye. Mandibular barbel reaching posterior margin of eye.

Dorsal fin with 4 simple and 8 branched rays, outer margin slightly concave, its origin markedly behind vertical through pelvic-fin origin, last simple ray thick and strongly ossified (Fig. 2a). Pectoral fin with 17–19 branched rays, outer margin convex. Pelvic fin with 1 simple and 8 branched rays, outer margin convex. Anal fin with 3 simple and 5 branched rays, outer margin convex. Caudal fin deeply forked, with lobes slightly rounded, lower lobe longer than upper lobe. Lateral line with 43–46 pored scales on body and anterior part of caudal; 7–8 scale rows between lateral line and dorsal-fin origin; 5–6 scales between lateral line and anal-fin origin. Gill rakers 4+9–11= 14–15 on outer side of first gill arch; 41–43 (modally 42) total vertebrae. Pharyngeal teeth 5.3.2–2.3.4, usually four on right and five on left in main row. Sexual dimorphism is present, male with tubercles on snout in spawning period.



FIGURE 5. *Luciobarbus kottelati*, holotype, FFR 454, 155 mm SL; Turkey: Büyük Menderes drainage.

Coloration. Formalin preserved specimens, grey on back and brown on flanks, and yellowish white on belly. Dorsal and caudal fins greyish, pectoral, anal and pelvic fins yellowish. Flank scales with a faintly but distinctly marked dark brown edge along posterior margin; dark spot on scale pocket faintly marked. In life,

dark brown on back and flanks, yellowish white on belly. Dorsal and caudal fins brown, pectoral, anal and pelvic fins yellowish. Each scale margined by a band of black pigments, forming a regular reticulated pattern.

Distribution. *Luciobarbus kottelati* is presently known only from the River Büyük Menderes drainage (Fig. 4). The Büyük Menderes originates from the Denizli and Aydın Mountains and it discharges into the Aegean Sea in Aydın. *Luciobarbus kottelati* was collected in clean and very slowly running waters, in habitats with coarse sand and fine gravel bottom.

Etymology. The species is named for Maurice Kottelat, who contributed to the knowledge of the fish fauna of Europe and Asia.

TABLE 2. Frequency distribution of meristic features of *Luciobarbus lydianus*, *L. graecus*, *L. kottelati* and *L. pectoralis*.

Species	N	Lateral line scales												Mean
		43	44	45	46	47	48	49	50	51	52	53	54	
<i>L. lydianus</i>	14	-	-	1	8	4	1	-	-	-	-	-	-	46
<i>L. graecus</i>	4	-	-	3	1	-	-	-	-	-	-	-	-	45
<i>L. kottelati</i>	15	1	2	4	8	-	-	-	-	-	-	-	-	45
<i>L. pectoralis</i>	11	-	-	-	-	-	-	1	1	1	2	4	2	53
Species	N	Transverse line scales												Mean
		Above lateral line						Below lateral line						
		7	8	9	10	11	Mean	5	6	7	8	Mean		
<i>L. lydianus</i>	14	-	14	-	-	-	8	-	14	-	-	6		
<i>L. graecus</i>	4	-	4	-	-	-	8	-	4	-	-	6		
<i>L. kottelati</i>	15	3	12	-	-	-	8	4	11	-	-	6		
<i>L. pectoralis</i>	11	-	-	-	5	6	11	-	-	9	2	7		
Species	N	Pectoral rays				Gill rakers								
		17	18	19	Mean	14	15	16	17	18	19	Mean		
<i>L. lydianus</i>	14	10	3	1	17	-	3	9	2	-	-	16		
<i>L. graecus</i>	4	3	1	-	17	-	-	-	-	-	-			
<i>L. kottelati</i>	15	4	9	2	18	3	12	-	-	-	-	15		
<i>L. pectoralis</i>	11	2	6	3	18	-	-	-	8	3	-	17		

Discussion

The species of *Luciobarbus* from western Anatolia (*L. lydianus* and *L. kottelati*) had been identified as *L. pectoralis* by Ladiges (1960). *Luciobarbus capito* and *L. pectoralis* have been considered conspecific by Karaman (1971), followed by most Turkish authors (e.g., Geldiay & Balık, 1999; Kuru, 2004). This point of view was not followed by Almaça (1982, 1984, 1986), Doadrio (1990), Banarescu & Bogutskaya (2003) and Bogutskaya & Naseka (2004), they considered *L. pectoralis* as a valid species. *Luciobarbus capito* is known from the Caspian basin and *L. pectoralis* from the Orontes basin (Almaça, 1986; Kottelat & Freyhof, 2007). Their ranges are widely disjunct (Fig. 4) and they are readily distinguished by differences in total lateral line scale counts (57–65 total scales in *L. capito* vs. 50–55 in *L. pectoralis*) and gill raker counts (17–19 gill rakers on the first gill arch vs. 17–18).

The range of the *Luciobarbus* species of western Anatolia (*L. lydianus*, *L. kottelati*) are very distant from those of *L. capito* and *L. pectoralis*, separated by several river drainages and belong to conspicuously distinct zoogeographic regions; also they have very different appearance and it is difficult to understand why they had been considered conspecific. Further, they do not seem closely related. Molecular data of Tsigenopoulos *et al.* (2003) also show that they belong to different lineages. *Luciobarbus lydianus* and *L. kottelati* are distin-

guished from *L. capito* and *L. pectoralis* by having fewer total lateral line scales (43–47 vs. 50–55 in *L. pectoralis* and 52–72, usually 60–66 in *L. capito*), fewer scale rows between dorsal-fin origin and lateral line (7–8, vs. 10–11 in *L. pectoralis* and 10–12 in *L. capito*) and fewer scale row between anal-fin origin and lateral line (6, vs. 7–8 in *L. pectoralis* and *L. capito*).

The populations of *Luciobarbus* from western Anatolia belong to two species, at once distinguished by the respective positions of the origin of the dorsal and pelvic fins. *Luciobarbus kottelati* is distinguished from *L. lydianus* by having the pelvic-fin origin markedly in front of the dorsal-fin origin (vs. originating directly below or slightly in front of the dorsal-fin), by having a greater predorsal distance (54.9–60.0 % SL, vs. 52.0–55.1 in *L. lydianus*) and by having fewer serrae along posterior edge of last simple dorsal-fin ray (23–27, vs. 29–33). The position of the pelvic-fin origin in front of the dorsal-fin origin in fact also distinguishes *L. kottelati* from all other species of *Luciobarbus* in Europe and Anatolia.

In *L. kottelati*, the anterior-most dorsal pterygiophore is inserted between the neural spines of vertebrae 12 and 13, or 13 and 14, the dorsal-fin origin is above vertebrae 15 or in space between vertebrae 14 and 15, and the base of the anterior pelvic-fin ray is below vertebra 14. In *L. lydianus*, the anterior-most dorsal pterygiophore is inserted between the neural spines of vertebrae 12 and 13, the dorsal-fin origin is above vertebra 14, and the base of the anterior pelvic-fin ray below vertebra 14 or 15 (modally 15).

Besides the very important difference in the respective position of the dorsal and pelvic fins, *L. kottelati* further differs from *L. lydianus* by having a well ossified last simple dorsal-fin ray in adults (vs. weakly ossified; Fig. 2a,b), somewhat fewer scales in lateral line (43–46, vs. 45–48), fewer gill rakers on the first gill arch (14–15, mode 15, vs. 15–17, mode 16), the lower caudal-fin lobe longer than the upper one (vs. equal), a deeper body (body depth at dorsal-fin origin 25.6–28.9 % SL, mean 27.4, vs. 22.7–26.7, mean 24.4), a deeper caudal peduncle (caudal peduncle depth 11.4–12.6 % SL, mean 12.1, vs. 10.6–11.8, mean 11.4), and a shallower head (head depth at occiput 63.0–68.3, mean 66.1 % HL vs. 58.7–64.6, mean 62.1).

Luciobarbus kottelati is also distinguished from all other *Luciobarbus* species in Western Asia (all geographically very distant) by having fewer lateral line scales (43–46, vs. 62–90 in *L. brachycephalus*, 52–72 in *L. capito*, 85–103 in *L. mursa*, 56 in *L. kersin*, 52–55 in *L. mystaceus*, 59–61 in *L. xanthopterus*, 63–71 in *L. esocinus*, 53 in *L. scheich*, 50–55 in *L. pectoralis*, 52–54 in *L. barbulus*) (data from Almaça, 1986; Kottelat & Freyhof, 2007).

Luciobarbus lydianus is similar in appearance to *L. graecus* from the Kifissos drainage of central Greece. Their morphometric and meristic data are given in Tables 1 and 2. Molecular data of Tsigenopoulos *et al.* (2003) suggest that there is close relationship between *L. lydianus* from Gediz River (Western Turkey) and *L. graecus* from Sperchios River (Central Greece). Their ranges are separated by the Aegean Sea and by a large area where no other *Luciobarbus* is known (part of Central Greece, northern Greece and European Turkey). The two species can be distinguished by the well-developed black spot on each scale pocket in *L. lydianus* (vs. absent or inconspicuous in *L. graecus*), the faintly marked and narrow black margin along the posterior edge of scales (vs. well marked and wide), the more pointed snout (vs. somewhat blunt), the wider mouth (vs. narrower; not quantifiable), the lips fleshy (vs. thin), with the lower lip conspicuously thicker than the upper lip (vs. only slightly thicker), the middle of the lower lip with a median fleshy pad with a shallow groove posteriorly (vs. without median fleshy pad). Moreover *L. lydianus* has a shorter pectoral fin than *L. graecus* (14.0–18.8 mm % SL, mean 17.7, vs. 19.9–20.8, mean 20.4), a wider head at anterior margin of eye (39.7–43.5 % HL, mean 41.1, vs. 34.7–38.8, mean 37.4), a more slender head (depth at occiput 58.7–64.6 % HL, mean 61.2, vs. 67.3–71.4, mean 68.3), and a wider interorbital (33.5–36.6 % HL, mean 34.9, vs. 31.6–33.0, mean 32.3).

Luciobarbus kottelati occurs in sympatry with *Barbus pergamonensis* in the Büyük Menderes River. They are easily distinguished, with *L. kottelati* having fewer scales in lateral line (43–46, vs. 52–58 in *B. pergamonensis*), more gill rakers on the first gill arch (14–15, vs. 8–10), a strong, spinous last simple dorsal ray (vs. weak, flexible), a lower lip without median lobe (vs. thick, fleshy, with a median lobe) and by the absence of black spots and blotches on the body (vs. presence).

Comparative material

Luciobarbus graecus, CMK 13435, 4, 110–175 mm SL; Greece: Beotia Prov.: Kifisos Stream; P.S. Economidis, 29. October 1996.

Luciobarbus pectoralis: FFR 455, 11, 124–229 mm SL; Turkey: Antakya Prov.: Orontes River drainage, Lake Gölbaşı at Kırıkhan town; D. Turan & Z. Bostancı, 25 June 2006. - FFR 457, 15, 130–224 mm SL; same locality; ; D. Turan, 19 June 2005.

Barbus pergamonensis, FFR 308, 10, 96–142 mm SL; Turkey: Aydın Prov.: Büyük Menderes River drainage, Dandalas Stream at Karacasu; D. Turan, 9 April 2005.

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