

1-1-1998

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ERKAKAN, Füsun; EKMEKÇİ, F. Güler ATALAY -; and NALBANT, Teodor T. (1998) "Four new species and one new subspecies of the genus Cobitis(Pisces:Ostariophysi: Cobitidae) from Turkey," *Turkish Journal of Zoology*. Vol. 22: No. 1, Article 2. Available at: <https://journals.tubitak.gov.tr/zoology/vol22/iss1/2>

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Four new species and one new subspecies of the genus *Cobitis* (Pisces: Ostariophysi: Cobitidae) from Turkey

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Received: 04.03.1998

Abstract: On the basis of morphological characters such as the shape of the mouth, suborbital spines, lamina circularis subdorsal scales, pigmentation and fin ray formulas four new species (*kellei*, *fahireae*, *splendens* and *puncticulata*) and one subspecies (*C. vardarensis kuru*) of genus *Cobitis* from Turkey are described.

Key Words: Cobitidae, *Cobitis*, new species, Turkey.

Türkiye'den *Cobitis* Genusuna ait dört yeni tür ve bir yeni alttür (Pisces: Ostariophysi: Cobitidae)

Özet: Ağız yapısı, suborbital dikenler, lamina circularis, subdorsal pullar, pigmentasyon ve yüzgeç ışınlarının formülü gibi morfolojik karakterlere dayanılarak Türkiye'den *Cobitis* cinsine ait dört yeni tür (*kellei*, *fahireae*, *splendens* ve *puncticulata*) ve bir yeni alttür (*C. vardarensis kuru*) tanımlanmıştır.

Anahtar Sözcükler: Cobitidae, *Cobitis*, yeni tür, Türkiye

Introduction

The evolution of the genus *Cobitis* on the whole from the Miocene to the present has raised many interesting problems in connection with the evolutions of its different lineages. These aspects cannot be analyzed without the transformation of different territories and climatic conditions as well. Generally, a stabile territory, such as Siberia, maintanis a stable lineage or lineages. Thus, Sytchevskaya (1), making use of fossil suborbital spines from upper Miocene, identified in southern Siberia (basin of the river Irtysh) five species of *Cobitis* and one of *Sabanejewia*. However, it is clear from the detailed figures presented in her contribution that in fact these spines belong to one or two specise of *Cobitis* and not of *Sabanejewia*. In this genus, these osseous pieces have a distinctive shape (see Nalbant (2): 348, Fig.4 or Economidis & Nalbant (3): 342, Fig.13d). If an area was subject to large transformation, as were east Asia, south-eastern Europe and Anatolia, among others, the lineages evolved faster. Very interesting explanations of evolutions in eastern Europe and western Asia in the last 20 m.y. have been presented by several authors, including Almaça

(4), Bianco (5) and Economidis and Nalbant (3), for the genus *Cobitis*. Furthermore, Hanko (6), Battalgil (7), Battalgazi (8), Tortenese (9), Banarescu and Nalbant (10) Kuru (11), Erk'akan and Kuru (12), Coad and Sarieyyüoglu (13) and Krupp and Moubayed (14) have made valuable contributions to the taxonomy of *Cobitis* species from Turkey.

Material and Methods

The specimens used in this study are described under the names of the species. They are preserved in the collections of the Department of Biology, Hacettepe University (Ankara) and the Department of Animal Taxonomy, Institute of Biology (Bucharest). For comparative material we used the large collections (genus *Cobitis* and related genera) of the Department of Animal Taxonomy, Institute of Biology, Bucharest. Generally, we used the same species as presented by (3): 296-298. Counts and measurements were made by the same person (F.G.A.E.) in order to avoid differences in estimates. Under *Material* is presented the number of

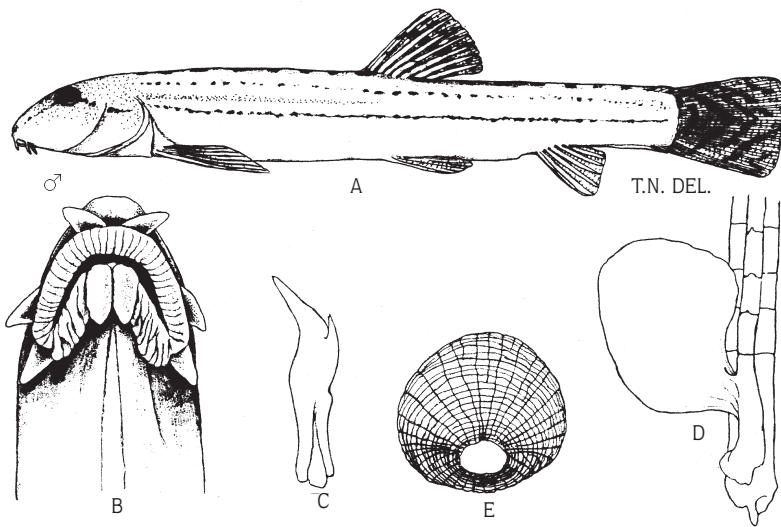


Figure 1. *Cobitis kellei* new species, holotype ISBB 4682, 46.2 mm SL, male, Göksu stream: A- Lateral view of the specimen, B- Mouth, C- Left suborbital spine, D- *Lamina circularis*, E- Subdorsal scale.

specimens of each lot, followed by the value (s) of the standard length in millimeters (i.e., 4: 57-81). All drawings were made by the single person (T.T.N.). For definitions of the different characters of each species, see Economidis and Nalbant (3): 298-299.

In the ichthyological collection of Hacettepe University there are no catalog numbers for the lost or series of samples. Therefore, we are using only the initials of the collection (HUIC).

Results and Discussion

Cobitis kellei, new species

(Fig.1, A-E)

Material: Holotype: ISBB 4682, 1: 46.2 mm SL, Göksu stream, Tigris catchment, Cinar, Diyarbakir, May 10, 1974, Demirsoy coll., donor Dr. Kelle.

Paratype: ISBB 4683, 1: 58 mm SL, bearing same data as holotype.

Etymology: This species was named after the donor of the type specimens, Prof.Dr. Kelle, Diyarbakir.

Diagnosis: A species with minute and rounded lateral spots (the fourth Gambetta's pigmentary zone).

Description: Fin rays formula: D II-III 7, A III 5, V I 6 - I 6, P I 9 - I 9, C n7+7n. Scales rounded with small eccentric focal zone (Fig. 1E).

Head moderately long, with relatively small eyes placed in its anterior half (Fig. 1A). Mouth rather arched with three pairs of very short barbels. Both lips furrowed. Mental lobes well developed (Fig. 1B).

Suborbital spine with laterocaudal processes (small thorn) reduced. There is a mediolateral process (Fig. 1C).

Sexual dimorphism (Fig. 1D)k based on a well developed *lamina circularis* at the base of second pectoral ray in males.

The colour pattern with the four Gambetta's pigmentary zones present but with the third one reduced. The fourth zone is formed by minute rounded dots. At the base of caudal fin there is a small brownish dot. (Fig. 1A).

Remarks: This species appears to be closely related to *Cobitis vardarensis kurui* described in this paper.

Cobitis fahirae, new species (Fig. 2, A - E)

Material: Holotype: HUIC, 1: 44.5 mm, adult male, Küçük Menderes, Selçuk-Aydın, June 5, Erkakan, Kuru & Atalay coll.

Paratypes: ISBB 4684, 4: 36 - 42 mm SL, bearing same data as holotype, HUIC, 28: 28 - 45 mm SL, bearing same data as holotype, HUIC, 42: 36 - 66 mm SL, Bakir stream, close Bergama, June 6, 1984, Erkakan, Kuru & Atalay coll. HUIC, 19: 34 - 59 mm SL, Nif stream, Gediz basin Izmir, June 4, 1984, Erkakan, Kuru, Atalay coll. ISBB 4685, 1: 51 mm SL Karadere, Izmir, June 6, 1984, Erkakan, Kuru & Atalay coll. ISBB 4686, 3: 57 - 63 mm SL, Kirkagaç canal, Bakir stream sytem, June 6, 1984, Erkakan Kuru & Atalay coll.

Etymology: This species was named in the memory of one of the greatest ichthyologists of Turkey, Dr. Fahire Battalgil.

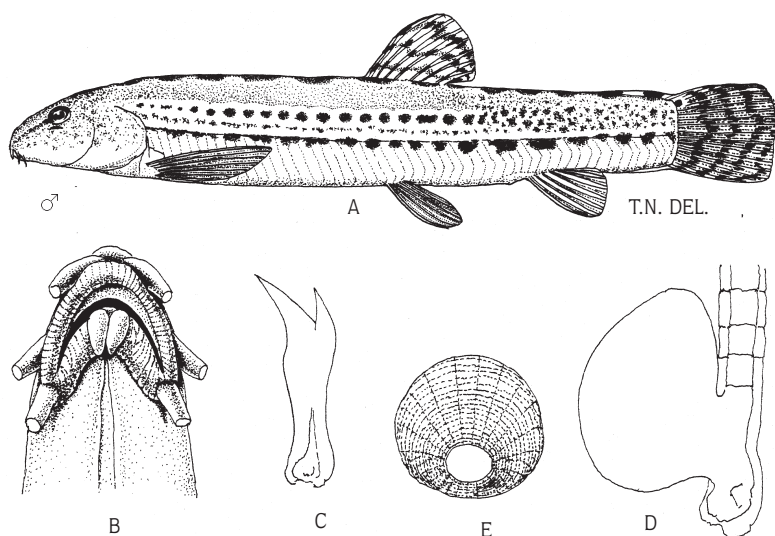


Figure 2. *Cobitis fahireae* new species, paratype, ISBB 4684, 42 mm SL, male, Kucuk Menderes: A- Lateral view of the specimen, B- Mouth, C- Left suborbital spine, D- lamina circularis of the left second pectoral ray, E- Subdorsal scale.

Diagnosis: A species of *Cobitis* with a relatively high and compressed body and with all four of Gambetta's pigmentary zones, but with third one slightly reduced. The jet black caudal spot rounded and rather small.

Description: Fin rays formula: D III 7 (rarely 6), A II-III 5, V I 6-I 6, P I 9-I 9, Cn 7+7n. Scales rounded or subrounded, with eccentric relatively small focal zone (Fig.2E)

Body relatively high and compressed. Head small enough with the eyes in its anterior half. Mouth arched with three pairs of small barbels. Lips furrowed. Mental lobes well prominent but not large (Fig.2B). Suborbital spine straight, generally with no median lateral process (Fig.2C). Above and below the caudal peduncle there is a small keel. Dorsal and pectorals on the same line of insertion placed in the second half of body.

Colour pattern: All three Gambetta's pigmentary zones present. The second one composed of small rounded dots especially in its posterior part. The third zone is a little reduced generally not exceeding the line of dorsal fin. In the upper part of the base of the caudal fin there is a small, always rounded, jet black spot. Dorsal and caudal fins with three and four, respectively, rows of dots.

Remarks: This species appear closely related to *Cobitis vardarensis* complex but differing clearly from it in its reduced third Gambetta's pigmentary zone, with the second one dotted and a rounded small caudal spot.

Cobitis splendens, new species
(Fig.3 A-E)

Material: Holotype: HUIC, 1: 65 mm SL, adult male, a small stream tributary to the Black Sea, about 200 m. from sea border, 16 km east of Akçakoca and about 30 km south-west of Ereğli (Black Sea), Erk'akan coll.

Paratypes: ISBB 4687, 4: 63-75 mm SL, bearing same data as holotype. HUIC, 15: 56-83 mm SL, bearing same data as previous specimen, Erk'akan coll.

Etymology: Splendens is a latin adjective meaning magnificent or beautiful. The name is given in connection with the very beautiful pigmentation of this species.

Diagnose: A species of *Cobitis* with all four of Gambetta's pigmentary zones but the third zone is reduced. The jet black spot of the upper part of caudal base generally large.

Description: Fin ray formula: D III 7, A II-III 5, V I 6-I 6, P I 9-I 9, Cn 7+7n. Scales, oval with a relatively large focal zone (Fig. 3E).

Head relatively short, with eyes placed in the middle. Mouth arched with the three pairs of short barbels. Lips furrowed. Mental lobes rather large, generally not pointed (Fig. 3B). Suborbital spine with no median lateral process (Fig. 3C).

The dorsal fin is placed in the second half of body generally in the same line of insertion with the ventral fins. There is a keel both above and below the caudal peduncle.

Colour pattern: Dorsal spots are irregular. All 4 of Gambetta's pigmentary zone are present but the third is generally reduced, from above the pectoral fins to dorsal fin. Caudal jet black spot large. Both dorsal and caudal with rows of dots (see Fig. 3/A).

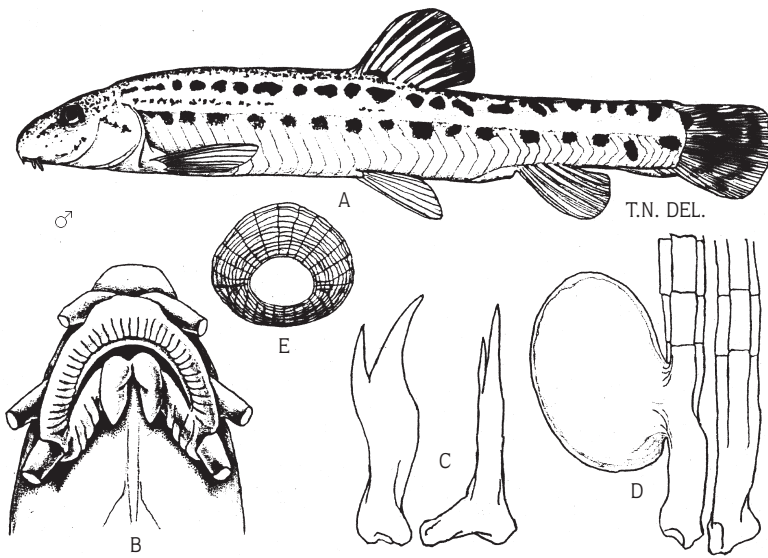


Figure 3. *Cobitis splendens* new species, paratype, ISBB 4687, 63 mm SL, male stream tributary of the Black Sea:
A- Lateral view of the specimen, B- Mouth, C- Suborbital spine in two positions, D- Left *lamina circularis*, E. Subdorsal scale.

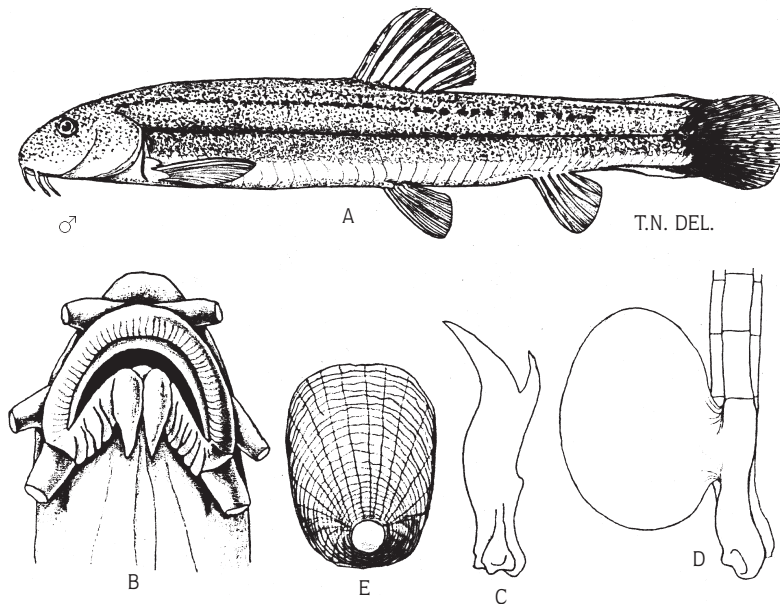


Figure 4. *Cobitis puncticulata* new species, holotype HUIC, 57 mm SL, male:
A- Lateral view of the specimen, B- Mouth of NMW specimen, C- Suborbital spine, NMW specimen, D- *Lamina circularis*, NMW specimen, E- Subdorsal scale, NMW specimen.

Remarks: The colour pattern of this species is unusual for a *Cobitis* s.str. Therefore it is very difficult to make a comparison with a next kinship species.

Cobitis puncticulata, new species

(Fig. 4, A-E)

Material: Holotype: HUIC, 1: 62 mm SL, adult male, Karaderetream at the outlet of Manyas (Kus) Lake, August, 21, 1997, Erkakan and Ekmekci coll.

Paratypes: HUIC, 10: 48-78 mm SL, bearing the same data as Holotype, Erkakan & Ekmekci coll., NMW 1988.

XXIII.6, 1: 56 mm SL, adult male, Kus Lake, ca 20 km of Bandirma, May 1988, Schwammer and party coll.,

Etymology: The name of this species comes from *puncticula*, a latin noun meaning small sting or dot, an allusion to its pigmentation consisting of small dots. Similarly, *puncticulata* is a latin adjective which means bearing small dots or freckles.

Diagnose: A species of *Cobitis* with an unusual colour pattern consisting only of small dark-gray dots, throughout the body and head. A strong keel above and below caudal peduncle.

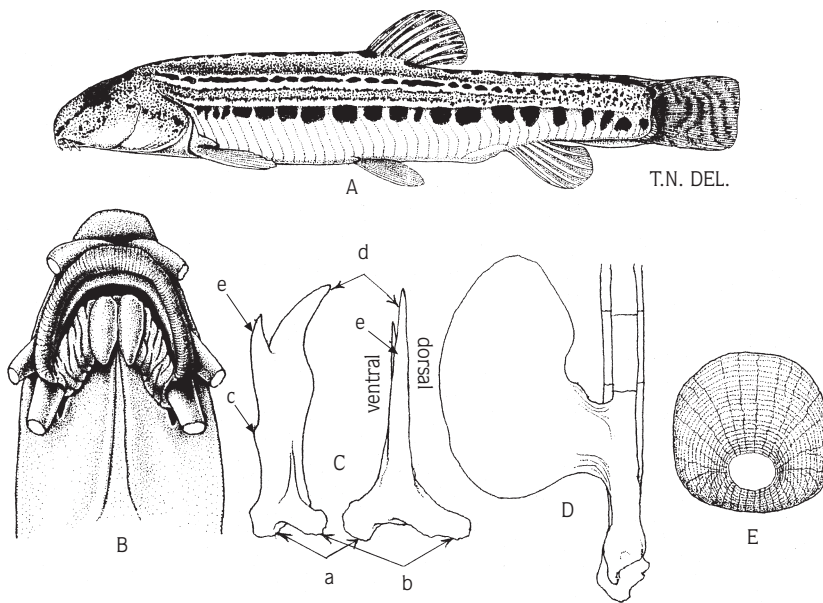


Figure 5. *Cobitis vardarensis*: ISBB uncat. 87 mm SL Simav Stream: A- Lateral view, B- Mouth, C- Right and left suborbital spine: a. and b. the basal c. mediolateral process d. medio-caudal process e. latero-caudal process D- The right second pectoral ray of a 45 mm SL specimen, Dinsiz stream, with *lamina circularis* E- Subdorsal scale of the same specimen.

Description: Fin rays formula: D III 6, A II 5, V I 5-1 5, P I 9-1 9, C n7+7n. Scales elongate, a little narrower at base, with a small acentric focal zone (Fig. 4E).

Body relatively high. Head small, with eyes placed in its anterior part. Mouth slightly arched with three pairs of long barbels. Lips very finely furrowed. Mental lobes normally developed, with pointed tips (Fig.4B). Suborbital spine rather straight with a relatively developed latero-medial process (Fig.4C).

Colour pattern consists of dark-gray fine dots distributed on the head and whole body except the abdomen. From the eye to the tip of the snout there is a blackish stripe. On the mid-sides, a blackish stripe from operculum to caudal base. At the base of this fin there are, above and below, two small blackish dots. Dorsal and caudal with rows of dark-gray dots (Fig.4A).

Remarks: This species appears unique in its morphological features.

Cobitis vardarensis Karaman, 1928

(Fig. 5 A-E)

Material: HUIC, 1: 49 mm SL, Iznik Lake, June 3, 1979, Erkakan coll. HUIC, 18: 37.5-71.7 mm SL, Dinsiz stream, Sakarya basin, June 6, 1979, Erkakan coll. HUIC, 30: 30-67 mm SL, Dinsiz stream, Sakarya basin, June 6, 1979, Erkakan coll. HUIC, 30: 30-67 mm SL, Dinsiz

stream, Adapazarı, June 6, 1979, Erkakan coll.

These specimens do not differ too much from those from those from opposite tributaries of the Aegean Sea, Axios, Gallikos, Loudias and Pinios (see Economidis and Nalbant (3): 301, description and Fig. 5 A-G).

Cobitis vardarensis kurui, new subspecies

(Fig.6)

Material: Holotype: HUIC, 1: 44.5 mm SL adult male, Menderes river, Selçuk-Aydın, Saplık Bridge, June 5, 1984, Erkakan, Kuru & Atalay coll.

Paratypes: HUIC, 29: 28.5 - 45 mm SL, bearing same data as holotype Erkakan, Kuru & Atalay coll.

Etymology: The name of this subspecies is given in honor of Prof.Dr. Mustafa Kuru, who made great contributions to the ichthyology of Anatolia.

Diagnosis: The present subspecies is similar to *vardarensis vardarensis* but differs essentially from it in the lesser size of the black spot at caudal base, which is brownish and a reduced in size of lateral spots (fourth Gambetta's pigmentary zone).

Description: This will be brief because *kurui* have nearly all the same characters as *vardarensis* except pigmentation. Therefore we will not repeat descriptions of the common features.

Fin ray formula: D III 7 (rarely 6), A II-III 5, V I 6-1 6 (rarely 5 or 7), P I 9 - 1 9, C n7+7n. The scales are subrounded with a relatively small and eccentric focal

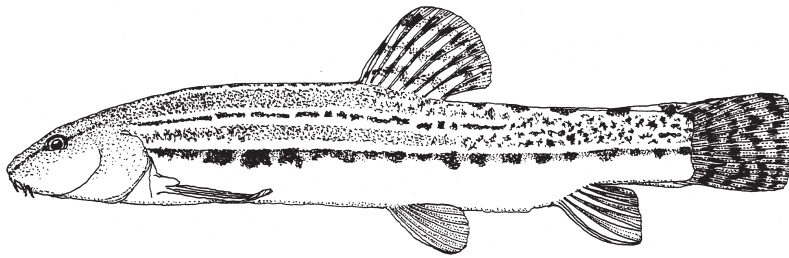


Figure 6. *Cobitis vardarensis kurui* new subspecies, paratype, ISBB uncat. 72 mm SL, Gediz system.

zone.

Mouth relatively arched with three pairs of very short barbels.

Sexual dimorphism. Males with a well developed *lamina circularis*, rather rounded or oval, planed at the base of the second pectoral ray. The males are always smaller than the females.

Colour pattern comprised the four rows of Gambetta's pigmentary zones (see Economidis and Nalbant (3): 298, Fig. 3 e). The fourth zone (lateral spots) consisted generally of small, rounded and numerous (10 - 25, even 27) spots. The small jet black spot at the upper part of caudal base, very common in other species, in *kurui* is very small (even absent) and brownish.

Remarks: This subspecies occurs in all the tributaries of the Aegean Sea south of Susurluk basin (a tributary of Marmara Sea).

Abbreviations

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T.N. DEL.

HUIC: Hacettepe University Ichthyological Collection, Ankara.

ISBB: Institutul de Stünțe Biologice, Bucuresti

MINB: Muzeul de Istorie Natural "Grigore Antipa" Bucuresti.

NMW: Naturhistorisches Museum, Wien.

Acknowledgements

We wish to express our gratitude to the following persons who helped us in different ways:

Drs. Marie-Louise Bauchot (Paris), Ignacio Doadrio and Anabel Perdices (both from Madrid), Pierre Giorgio Bianco (Napoli), Erik Ahlander (Stockholm), Panos S. Economidis (Tessaloniki), Petru M. Banarescu (Burcharest). Special thanks to Professor Mustafa Kuru (Ankara) for the discussions and suggestions given throughout the years.

We would like to express our sincere thanks to those who participated in our collecting trips or sent material:

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