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Description of *Girardinichthys ireneae* sp.n. from Zacapu, Michoacan, Mexico with remarks on the genera *Girardinichthys* BLEEKER, 1860 and *Hubbsina* DE BUEN, 1941 (Goodeidae, Pisces)

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Summary

After some remarks on systematics and taxonomy of the genera *Girardinichthys* BLEEKER, 1860 and *Hubbsin*a DE BUEN, 1941 a new species *Girardinichthys (Hubbsina) ireneae* from Zacapu, Michoacan, Mexico, is described.

Zusammenfassung

Nach einigen Anmerkungen zur Systematik und Taxonomie der Gattungen *Girardinichthys* BLEEKER, 1860 und *Hubbsina* DE BUEN, 1941 wird eine neue Art, *Girardinichthys (Hubbsina) ireneae* von Zacapu, Michoacan, Mexiko beschrieben.

Resumen

Despues de algunas observaciones acerca de la sistematica y taxonomia del genero *Girardinichthys* BLEEKER, 1860 y *Hubbsina* DE BUEN, 1941 se puede describir una nueva especie, *Girardinichthys (Hubbsina) ireneae* de Zacapu, Michoacan, Mexico.

Remarks on *Girardinichthys* BLEEKER, 1860 and *Hubbsina* DE BUEN, 1941

Until today two species of the genus *Girardinichthys* and one species of *Hubbsina* have been described:

Girardinichthys viviparus (BUSTAMANTE, 1837)

Synonyms: *G. innominatus* BLEEKER, 1860; *Limnurgus variegatus* GÜNTHER, 1866; *Lucania richi* GIRARD, 1891; *Characodon geddesi* REGAN, 1904; *Limnurgus* innominatus REGAN, 1907.

Distribution area: Distrito Federal de Mexico and neighbouring sites of the State of Mexico.

Girardinichthys multiradiatus (MEEK, 1904)

Synonyms: *Characodon multiradiatus* MEEK, 1904; *Girardinichthys innominatus* EVERMANN & GOLDSBOROUGH, 1902; *Lermichthys multiradiatus* HUBBS, 1926; *Girardinichthys limnurgus* JORDAN & EVERMANN, 1927.

Distribution area: Drainage of the upper Rio Lerma system.

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Hubbsina turneri DE BUEN, 1941

Distribution area: Drainage of the middle Rio Lerma system; type locality: Presa de Cointzio.

With the description of *H. turneri* DE BUEN in 1941 the author erected a new genus *Hubbsina*. Examinations of UYENO et al. (1983) provided nearly identical karyotypes of *G. innominatus*, *G. multiradiatus* and *H. turneri*. Morphology of the three allopatric species is also very similar. They are characterized by the lack of sensory pores on the preopercle. For the same reason one of us (RADDA 1984) transfered this taxon to *Girardinichthys* in 1984.

Because of the high similarity of these three species we would therefore strongly suggest to designate *Hubbsina* as a subgenus of *Girardinichthys*.

Introduction

In February 2001 we made a collection trip to the highlands of Central Mexico in order to collect material of some goodeid species, mainly of the genus *Allotoca* HUBBS and TURNER, 1937. Our twelve collection sites provided the following species: *Neoophorus regalis*, *Allotoca meeki, Allotoca catarinae, Allotoca dugesii, Ilyodon furcidens and Ilyodon xanthusi. Goodea atripinnis, Xenotoca variata, Allotoca* sp., *Zoogoneticus quitzeoensis* and *Skiffia lermae* were found sympatric and syntopic with a form close to *Girardinichthys (Hubbsina) turneri* at the Laguna de Zacapu, a pond comprising about 33,5 ha at the northwest end of the town of Zacapu. After examination of our material and two specimens collected by Mr. D. Lambert in 1990 (in the collection of the junior author), we decided to describe this form as a new species.

Material and methods

The new species of the genus *Girardinichthys* is based on 7 specimens caught in the wild and 2 specimens from the collection of M. Meyer. The type specimens will be deposited in the Naturhistorisches Museum Wien and the Museum Senckenberg Frankfurt/Main. 3 specimens were kept alive, in order to produce offspring for further examinations.

Comparative material: The types and description of *G. (H.) turneri* DE BUEN, (1941). Measurements and counts follow standard practice (MILLER 1948). Measurements were made by vernier callipers reading to 0,1 mm. The number of specimens for all counts is equal to 5. The gill-raker count of the first gill arch includes any gill rakers in the angle of the gill arch. The last two rays in the dorsal fin are counted as a single ray. Vertebral count includes the hypural plate as one vertebra.

Nomenclature of the sensory canal system of the head follows the standard of GOSLINE (1949), that of the gonopodial system follows ROSEN & BAILEY (1963).

Abbreviations

ht = Holotype, pt= Paratype, Sl = Standard length, Pdl = Praedorsal length, Pal = Praeanal length, Pvl = Praeventral length, Bh = Body hight, Hl = Head length, Ed = Eye diametre, Snl = Length of snouth, D = Dorsal fin rays, A = Anal fin rays, Sql = Scales in a longitudinal row, Vert = Number of vertebra, G.r. = Gill rakers.

Genus *Girardinichthys* BLEEKER, 1860

Diagnosis: *Girardinichthys* is characterized by the higher number of dorsal rays (18 - 36) in comparison with all other goodeid genera. The karyotype is 2 n = 48 with subtelo-telocentric chromosomes. The lack of sensory pores on the preopercle is considered to be a derived trait of the genus.

Girardinichthys (*Hubbsina*) *ireneae* sp.n.

Holotype: male (NMW-94578), Sl 22 mm, north end of Laguna de Zacapu Michoacan, Mexico; February 15, 2001, A. C. Radda, Austria and S. M. Calderon, Mexico leg.

Paratypes 2 females (NMW-94579) SL 17 mm; Feb. 14, 2001, A. C. Radda, Austria, and M. K. Meyer, Germany, same locality leg. 2 Paratypes in collection of M.M. from the same locality, collected in July 1990 by D. Lambert, male Sl 29,2 mm, female Sl 31,5 mm.

In comparison to *G. (H). turneri* the new species is characterized by different data of meristics and morphometrics (Tab. 1 - 3): 1) Dorsal ray numbers are lower: 32 - 36 *G.(H.) turneri* vs. 29 - 30 in *G. (H.) ireneae* sp.n.. 2) Anal ray numbers are slightly higher in *G. (H.) ireneae* than in *G.(H.) turneri*..3) Number of scales in a longitudinal row are lower in *G. (H.) ireneae* (29 - 31) vs. *G.(H.) turneri* (33 - 37). 4) Numbers of vertebra 31 - 32 in *G. (H.) ireneae* sp.n. vs. 34 in *G. (H.) turneri*. 5) Gill rakers 9 - 10 (*G.(H.) ireneae* sp.n) vs. 12 (*G.(H.) turneri*).

Tab. 1: Meristic data of four species of the genus *Girardinichthys*.

Species	D	A	Sql	Vert	G.r.
G. viviparus	18-23	20-26	40-45	35-37	-
G. multiradiatus	18(f)-28(m)	18-26	40-45	29-31	-
G. (H.) turneri	35-37 (m)/31-36 (f)	12-14	33-37	34	12
G. (H.) ireneae sp.n.	29-30	14+1	29-31	31-32	9-10

Tab. 2: Morphometric data of types of *G. (H.) ireneae* sp.n. in percentage of standard length (mm).

Types	Sl	Pdl	Pal	Pvl	Bh	Hl	Ed	Snl
m (ht)	22,2	38,5	63,1	48,5	26,9	26,2	9,6	5,0
m (pt)	22,0	40,9	65,9	56,8	27,3	29,5	9,1	5,9
f (pt)	17,0	41,2	61,8	38,2	23,5	22,3	8,8	5,8
f (pt)	17,0	40,6	58,8	37,6	22,9	21,8	8,8	5,8
f (pt)	31,5	41,2	60,3	38,1	25,3	23,0	8,9	5,7

Tab. 3: Comparison of the morphometric data of *G. (H.) turneri* and *G. (H.) ireneae* sp.n. (percentage of standard length)

Species	sex	head length	Pdl.	Pal.	Pvl.	Bh.
G. (H). turneri	f	22,0-23,0	37,0-38,0	58,5-61,5	40,0-46,5	25,0-29,5
G. (H). ireneae sp.n.	f	22,0-23,0	41,0	59,0-62,0	38,0	23,0-25,0
G. (H). turneri	m	21,5-24,0	27,5-30,0	51,0-53,0	39,0-42,0	22,0-24,5
G. (H). ireneae sp.n.	m	26,0-30,0	39,0-41,0	63,0-66,0	49,0-57,0	27,0

Fig. 1: *G. (H.) ireneae* sp. n. male, paratype caught in the wild at Laguna de Zacapu.

While females differ only slightly, the figures of the males are more varied.

The pigmentation of body and fins is also different in both species. Males of *G.(H.) turneri* are black in colour of the upper part of the body and in the dorsal; males of *G. ireneae* sp.n. (as well as females) have numerous dark spots on body and dorsal fin (see Fig. 1).

An important feature is the presence of sensory pores on the preopercle (supraorbital section 5-6), which is absent in the three other *Girardinichthys* species (see FITZSIMONS 1981).

Etymology

The new species is named in honor of Mrs. Irene Radda, Vienna, Austria.

Ecology

The springfed pond is drained by the Angulo River, about 30 - 35 km NE of Zacapu, which divides in two streams after 20 km; it forms an exorheic basin. Collections were done on February 14 and 15, 2001. On February 14, air temperature = 21°C, water temperature = 17 °C, conductivity = 111 µS and 13° German hardness.

In the very densely populated lake the number of specimens of the respective species is very varied: In comparison with *G. (H.) ireneae* sp.n. and *Allotoca* sp., we caught almost 10 - 20 times as many individuals of *Zoogoneticus,* 10 times as many of *Goodea,* 5 times as many *Skiffia* and 2 times as many of *Xenotoca.*

A shortage of food seems to produce dwarf forms of all goodeid species in the pond. The size of adults is almost half of their respective counterparts in other habitats.

Acknowledgements

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