

***HYPHESSOBRYCON NATAGAIMA* (CHARACIFORMES:  
CHARACIDAE) A NEW SPECIES FROM COLOMBIA,  
WITH A KEY TO THE MAGDALENA BASIN**

***HYPHESSOBRYCON* SPECIES**

***Hyphessobrycon natagaima* (Characiformes: Characidae) una  
nueva especie para Colombia, con clave para las especies de  
*Hyphessobrycon* de la Cuenca del Magdalena**

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**ABSTRACT**

A new species, *Hyphessobrycon natagaima*, is described from the upper Magdalena River Basin in Colombia. It differs from all other species of *Hyphessobrycon* with a dark lateral stripe inhabiting the Magdalena River Basin: *H. poecilioides*, *H. proteus* and *H. ocaseoensis*, by having eight to twelve pored lateral-line scales (vs. 14-26); four scales between the lateral line and the pelvic-fin insertions (vs. five or six); one tooth on the maxilla (vs. zero in *H. poecilioides*, and two to five in *H. proteus*; except *H. ocaseoensis*, with one), a dark, interrupted, lateral stripe that is not in contact with the caudal peduncle spot (vs. absence of caudal spot in *H. poecilioides*, lateral stripe continued that is in contact with the caudal peduncle spot in *H. ocaseoensis*). It has a rhomboid shaped caudal-peduncle spot that continues on to middle caudal-fin rays (vs. absence of caudal peduncle spot in *H. poecilioides* and caudal peduncle spot round and not continued on to middle caudal-fin rays in *H. ocaseoensis*); and presence of hooks on all fins in mature males (vs. males with hooks on anal, pelvic and pectoral fins). *Hyphessobrycon natagaima* differs from *H. ocaseoensis*, in addition to the above characters, by having four scale rows between the lateral line and the anal-fin origin (vs. six); three or four scale rows between the lateral line and the pelvic-fin insertions (vs. six); ten or eleven predorsal scales (vs. nine); i,9,i dorsal-fin rays (vs. ii,8,i); 18-20 branched anal-fin rays (vs. 21-22) and eleven branched pectoral-fin rays (vs. twelve). A key for the identification of *Hyphessobrycon* species present in the Magdalena River Basin is provided.

**Key words.** Taxonomy, Neotropical, new taxon, biodiversity.

### RESUMEN

Se describe *Hyphessobrycon natagaima*, una nueva especie de la cuenca del río Magdalena en Colombia. Se distingue de todos los congéneres de la cuenca del río Magdalena y que presentan una banda lateral oscura: *H. poecilioides*, *H. proteus* e *H. ocaseoensis*, por presentar: ocho a doce escamas con poros en la línea lateral (vs. 14-26), cuatro escamas entre la línea lateral y las aletas pélvicas (vs. cinco-seis), maxilar con un diente (vs. sin diente en *H. poecilioides*, dos-cinco en *H. proteus*; excepto *H. ocaseoensis* con uno), banda lateral oscura interrumpida y no en contacto con la mancha caudal (vs. sin mancha caudal en *H. poecilioides* y banda lateral continua con la mancha humeral en *H. ocaseoensis*), mancha peduncular conspicua, romboidal y extendida a los radios medios caudales (vs. sin mancha peduncular en *H. poecilioides*, mancha peduncular redondeada y no extendida hasta los radios medios caudales en *H. ocaseoensis*), y machos maduros sexualmente con ganchos óseos en todas las aletas (vs. machos maduros sexualmente con ganchos óseos solo en las aletas pectoral, pélvica y anal). *H. natagaima* puede distinguirse de *H. ocaseoensis* además de los caracteres antes descritos, por presentar cuatro escamas entre la línea lateral y la aleta anal (vs. seis); tres a cuatro escamas entre la línea lateral y las aletas pélvicas (vs. seis); diez a once escamas predorsales (vs. nueve); ii,9 radios en la aleta dorsal (vs. ii,8,i); 18 a 20 radios ramificados de la aleta anal (vs. 21-22), once radios ramificados de la aleta pectoral (vs. doce). Se incluye una clave taxonómica de las especies de *Hyphessobrycon* presentes en la cuenca del río Magdalena.

**Palabras clave.** Taxonomía, Neotropical, especie nueva, biodiversidad.

### INTRODUCTION

*Hyphessobrycon* is a genus of small fishes known for their beauty and color, and they are widely desired by aquarists. Although *Hyphessobrycon* is usually treated as a valid genus (Durbin in Eigenmann 1908, Eigenmann 1917, 1918, 1927, Géry 1977, García-Alzate et al 2008a), it remains poorly defined and is polyphyletic. No modern hypothesis of phylogenetic relationships exists for all species of the genus, and the characters traditionally used to define species have not been analyzed in a phylogenetic perspective, often leading to misinterpretation of those characters. Current phylogenetic hypotheses for Characidae (Mirande 2010, Oliveira et al 2011) include some species

of *Hyphessobrycon*, and recognize that the genus is not monophyletic. However, those works did not include the type species, *Hyphessobrycon compressus* (Meek), which is a species from the northernmost extreme of the range of this genus, in Mexico.

In *Hyphessobrycon* 136 species are currently considered valid (Eschmeyer & Fricke 2015). Of these, 21 species have been reported from Colombia (García-Alzate et al 2013b): *H. acaciae* García-Alzate, Román-Valencia & Prada-Pedrerros 2010, *H. amaronensis* García-Alzate, Román-Valencia & Taphorn 2010, *H. bentosi* Durbin in Eigenmann 1908, *H. columbianus* Zarske & Géry 2002, *H. condotensis* Regan 1913, *H. chocoensis* García-Alzate, Román-

Valencia & Taphorn 2013, *H. diancistrus* Weitzman 1977, *H. ecuadoriensis* Eigenmann & Henn in Eigenmann, Henn & Wilson 1914, *H. erythro stigma* (Fowler 1943), *H. heterorhabdus* (Ulrey 1894), *H. mavro* García-Alzate, Román-Valencia & Prada-Pedrerros 2010, *H. metae* Eigenmann & Henn 1914, *H. niger* García-Alzate, Román-Valencia & Prada-Pedrerros 2010, *H. ocaseoensis* García-Alzate & Román-Valencia 2008, *H. oritoensis* García-Alzate, Román-Valencia & Taphorn 2008, *H. poecilioides* Eigenmann 1913, *H. proteus* Eigenmann 1913, *H. sweglesi* (Géry 1961), *H. sebastiani* García-Alzate, Román-Valencia & Taphorn 2010, *H. saizi* Géry 1964, and *H. taguae* García-Alzate, Román-Valencia & Taphorn 2010. Three of these are distributed in the basin of the Magdalena River basin: *H. poecilioides*, *H. proteus* and *H. ocaseoensis*. The objective of this paper is to describe a new species from the Magdalena River Basin in Colombia, part of the results of the ongoing systematic review of the genus *Hyphessobrycon* by the first author.

## MATERIALS AND METHODS

Fishes were captured using seines and were preserved in situ with 10% formalin and later stored in 70% ethanol. Measurements and counts follow Fink & Weitzman (1974). Measurements were made with digital calipers to 0.01mm precision and are expressed as percentages of standard (SL) and head length (HL). In count ranges, values for the holotype are indicated with an asterisk (\*). Counts and measurements were taken on the left side of specimens when possible. Osteological observations were made on cleared and stained specimens (C&S) prepared according to Taylor & Van Dyke (1985) and Song & Parenti (1995). Bone nomenclature follows Weitzman (1962) and Vari (1995). Type specimens are deposited in the University of Atlántico Caribbean region, Dept. Biology, Museum Collection, Barranquilla, Colombia (UARC-IC), Laboratorio de Ictiología

de la Universidad del Quindío, Armenia, Colombia (IUQ) and Colección Zoológica de la Universidad del Tolima, Sección Ictiología, Ibagué, Colombia (CZUT-IC). In the lists of paratypes, the number of individuals is given in parentheses immediately after the catalog number. Institutional or museums abbreviations are as listed at <http://www.asih.org/node/204>.

We performed a Principal Component Analysis (PCA) of morphometric characters with the software program R version 2.15.3 (available free at the website <http://www.ipez.es/ModestR>). The Burnaby method was used to eliminate the influence of overall size, with the Past program, version 3.0 for Windows.

**Comparative material examined.** All lengths are Standard Length in millimeters.

***Hyphessobrycon condotensis*:** COLOMBIA, **Chocó:** three syntypes, Condoto and San Juan Rivers, 1913. BMNH 1913.10.1.19-21, 25.9-31.2. COLOMBIA, **Chocó:** two, road from Pepé, Baudó, ICNMHN 2278, 27.6-34.7. ***H. columbianus*:** COLOMBIA, **Chocó:** five, Guatí River, Acandí, 1 Aug 1995, IMCN 242, 29.8-39.8. COLOMBIA, **Chocó:** one, Guatí River, 15 Aug 1995, MCNG 47820. ***H. agulha*:** COLOMBIA, **Amazon:** 19, tributary of Matamata Creek, Leticia, Mar 2001 IAvH-P 8345. COLOMBIA, **Amazon:** 37, tributary Matamatá Creek, Leticia, 18 Mar 2001, IAvH-P 8335. COLOMBIA, **Amazon:** four, tributary of Matamata Creek, Leticia, 2 Jul 2001, IAvH-P 8332. COLOMBIA, **Amazon:** 52, tributary Purité River, 25 Mar 2001, IAvH-P 8333. COLOMBIA, **Amazon:** 85, Sufragio Creek in from of Zafire Station, 15 Dec 2002, IAvH-P 9025. COLOMBIA, **Amazon:** fourteen, Creek tributary to Calderón River, 45 minutes N of Zafire Station, 11 Dec 2002, IAvH-P 9046. COLOMBIA, **Amazon:** 38, creek tributary to Calderón River, 45 min. N of Zafire Station, 12 Dec 2002, IAvH-P 9071. PERU, **Madre**

**de Dios:** 25, Creek 2 tributary to Purité River about 3 hours from Salados Varios, Amacayacu National Park, 25 Mar 2003, IAvH-P 9407. PERU, **Madre de Dios:** nine, Creek at km 43, Tambopata MUSM 23173. PERU, **Madre de Dios:** one (C&S), Creek at km 43 Tambopata, MUSM 23173. PERU, **Amazon:** nine, Creek at km 43, Tambopata, MUSM 25315. **H. heterorhabdus:** BRAZIL, Amazon, **Para:** one syntype, 1894, CAS 44415, 16.9. COLOMBIA, **Amazon:** ten, Puré River, Leticia, 02° 07'S, 69°37'W, 8 Jan 2000, ICNMNH 5063, 17.8-23.9. BRAZIL, **Para:** five, Igarapé Acuí, 01°35'S, 48°44'W, 21 Oct 2006, MCP 41577, 19.5-23.6. COLOMBIA, **Amazonas:** three (C&S), Puré River, Leticia, 02°07'S, 69°37'W, 8 Jan 2000, IUQ 1961, 28.3-34.6. BRAZIL, **Para:** one (C&S) Igarapé Acuí Igarapé Acuí, 01°35'S, 48°44'W, IUQ 1963, 33.1. **H. melanostichos:** BRAZIL, Amazon, five, Doze de Outubro River, between Co-modro and Vilhena, 12°35'S, 60°00'W, 14 Jul 2004, MCP 39808, 20.7-25.7. **H. nigrinictus:** PERU, **Cusco-Amazon:** one, Quispicanchi, Camanti, Araza drainage, San Lorenzo River, Ilahuala Creek, 396 m.a.s.l., 26 Oct 2005, MUSM 26791, 32.04. PERU, **Cusco-Amazon:** five, Quispicanchi, Camanti Araza drainage, San Lorenzo River, Ilahuala Creek, 396 m.a.s.l., 26 Oct 2005, MUSM 26786, 30.8-34.3. **H. notidanus:** BRAZIL, Amazon, two paratypes, Doze de Outubro River, between Comodoro and Vilhena, 12°58'S, 0°00'W, 14 Jul 2004, MCP 38676, 24.8-25.7. BRAZIL, Amazon, one C&S, Doze de Outubro River, between Comodoro and Vilhena, 12°58'S, 60°00'W, 14 Jul 2004, MCP 38676. **H. ocaosensis:** COLOMBIA, **Quindío, Cauca-Magdalena,** Holotype, Rio Roble, afluente Rio La Vieja, 100 m abajo del puente peatonal Playa Azul, reserva natural "Monte del Ocaso", Quimbaya, 4°35'68"N, 75°52'81"W, 2 Aug. 2007, IUQ 1635, 44.0. COLOMBIA, **Quindío, Cauca-Magdalena** 11 paratypes, Río Roble, afluente Rio La Vieja, 100 m abajo del puente peatonal Playa

Azul, reserva natural "Monte del Ocaso", Quimbaya, 4°35'68"N, 75°52'81"W, 2 Aug. 2007, IUQ 1634. COLOMBIA, **Quindío, Cauca-Magdalena,** two, Rio Roble, afluente del Río Alto Cauca, La Vieja reserva natural "Monte del Ocaso", 100 metros abajo del puente peatonal Playa Azul, Quimbaya, 4°35'68"N, 75°52'81"W, 19 Aug. 2007, AMNH 246521. COLOMBIA, **Cauca-Magdalena,** two, Rio Roble en el puente hacienda Playa Azul, Reserva Natural Monte El Ocaso, Quimbaya, Quindío, 4°35'68"N, 75°52'81", 23 Nov. 2001, IUQ 1414. COLOMBIA, **Cauca-Magdalena,** two, Las Cañas creek, tributary Rio Cauca, road the Paila-Zarzal, Valle, 4°21'09"N, 76°04'11"W, 6 Aug. 2007, IUQ 1636. COLOMBIA, **Cauca-Magdalena,** two, Rio Risaralda en la confluencia con el Río Mapa, La Virginia, Risaralda. 24 Feb. 2005, IMCN 3377. **H. proteus:** COLOMBIA, **Cauca-Magdalena,** one syntype, Quebrada cerca de Apulo, 1913, CAS 60478, 26.1. COLOMBIA, **Cauca-Magdalena,** three syntypes; Bernal creek, 1913, CAS 60479, 23.8-36.5. COLOMBIA, Magdalena, one syntype; Puerto Wilches, 1913, CAS 60480, 31.3. COLOMBIA, Antioquia department, 38, Caribe basin, Estuario del Rio San Juan, San Juan de Urabá, 23 Nov. 2005, CIUA 296, 47.0-53.8. COLOMBIA, Magdalena, Cesar department, 10, Laguna Los Deseos, La Jagua de Ibirico, 22 mar 07, CIUA 694, 33.5-37.4. COLOMBIA, Magdalena, two C&S, Laguna Los Deseos, La Jagua de Ibirico, Cesar, 22 Mar 07, CIUA 694a, 34.5-35.6. COLOMBIA, eight, Laguna Villa Sonia área de conexión minera carbones de la Jagua, 27 Aug. 07, CIUA 790, 35.8-40.5. COLOMBIA, three C&S, Caribe basin, Sinú River, Complejo lagunar del bajo Sinú, Córdoba, 1 Aug. 06, CIUA 805, 34.2-37.2. Colombia, Atlántico department, Magdalena, three, Compuertas, entrada del agua al embalse del Guájaro, 15 Apr. 90, IUQ 96, 37.2-43.9. COLOMBIA, three, Magdalena, Atlántico department, Arroyo frente a Santa Lucia, 11 Dec. 1999, IUQ 508, 26.4-27.3. COLOMBIA, three,

Magdalena, Atlántico department, frente a Santa Lucía, 5 Aug. 1991, IUQ 583, 33.1-49.7. COLOMBIA, 14, Atrato, Pozeta Río Duata, La Troje, 100 m arriba, vía Quibdó-Tutunendo, Chocó, 23 Dec. 1998, IUQ 714, 27.7-44.8. COLOMBIA, two, Magdalena, Atlántico department, Jagüey frente izquierdo de Puerto Colombia, 15 May. 1990, IUQ 736, 46.0-52.8. COLOMBIA, two C&S, Magdalena, Atlántico department, Ciénaga de Capote, en Soplaviento, bajo Magdalena, 31 May 2003, IUQ 1009, 35.6-38.7. COLOMBIA, 36, Magdalena, Ciénaga de Capote, en Soplaviento, bajo Magdalena, 31 May 2003, IUQ 1965, 35.5-54.8. *H. poecilioides*: see García-Alzate & Román-Valencia (2008). *H. oritoensis*: see García-Alzate et al (2008a). *H. paucilepis*, *H. tuyensis* and *H. fernandezi*: see García-Alzate et al (2008b). *H. amaronensis* and *H. taguae*: see García-Alzate et al (2008c). *H. compressus* and *H. sebastiani*: see García-Alzate et al (2010a). *H. tortuguerae*: see García-Alzate et al (2010b).

*Hyphessobrycon natagaima* new species  
(Table 1; Figs. 1-4)

**Holotype.** Male, COLOMBIA, **Tolima department:** Natagaima County, upper Magdalena River drainage, Laguna Saldañita, 03°30'83"N, 75°09'30"W, 390 masl, 20 Mar 2010, Villa-Navarro, CZUT-IC 11769, 29.5 mm SL.

**Paratypes.** COLOMBIA, **Tolima:** 51, collected with holotype. CZUT-IC 4257, 25.1-47 mm SL. COLOMBIA, **Tolima:** five, collected with holotype. UARC-IC 359, 22.8-40.4 mm SL. COLOMBIA, **Tolima:** three, collected with holotype. IUQ 3730, 31.2-34. mm SL. COLOMBIA, **Tolima:** two (C&S), collected with holotype. UARC-IC 360, 25.5-34.7 mm SL. COLOMBIA, **Tolima:** three, Armero-Guayabal, Laguna El Hato, El Hato, 05°04'06"N, 74°50'64"W, Villa-Navarro. CZUT-IC 2308, 31.2-43.7 mm SL.

COLOMBIA, **Tolima:** three, Natagaima County, Velu, Laguna Saldañita, 03°30'83"N, 75°09'30"W, Villa-Navarro. CZUT-IC 4258, 25.1-41.1 mm SL. COLOMBIA, **Tolima:** one (C&S), Armero-Guayabal, Laguna El Hato, El Hato, 05°04'06"N, 74°50'64"W. Villa-Navarro. CZUT-IC 11770, 33.3 mm SL. **Diagnosis.** *Hyphessobrycon natagaima* differs from all other species of *Hyphessobrycon* with a dark lateral stripe that inhabit the Magdalena River Basin, *H. poecilioides*, *H. proteus* and *H. ocaseoensis*, by the number of pored lateral-line scales (eight to 12 vs. 14-26); the number of scales between lateral line and pelvic-fin insertion (four vs. five or six), the number of teeth on the maxilla (one vs. zero in *H. poecilioides*, and two to five in *H. proteus*; except *H. ocaseoensis*, which also has one); a dark, interrupted lateral stripe that is not in contact with the caudal peduncle spot (vs. absence of caudal spot in *H. poecilioides*, lateral stripe continued that is in contact with the caudal peduncle spot in *H. ocaseoensis*); a rhomboid shaped caudal-peduncle spot that continues on to middle caudal-fin rays (vs. absence of caudal peduncle spot in *H. poecilioides* and caudal peduncle spot round and not continued on to middle caudal-fin rays in *H. ocaseoensis*); and presence of hooks on all fins in mature males (vs. males with hooks on anal, pelvic and pectoral fins). *Hyphessobrycon natagaima* differs from *H. ocaseoensis* in addition to the characters mentions above by having four scale rows between lateral line and anal-fin origin (vs. six); three or four, mode four scale rows between the lateral line and the pelvic-fin insertions (vs. six); ten or eleven, mode eleven predorsal scales (vs. nine); the number of dorsal-fin rays (i,9,i vs. ii,8,i); 18-20, mode 20 branched anal-fin rays (vs. 21-22, mode 22), and eleven branched pectoral-fin rays (vs. 12) (see Figs 1 and 2).

**Description.** Morphometric data are given in Table 1. Body deep and wide, greatest body depth between vertical through pelvic-fin insertions and dorsal-fin origin. Dorsal

profile of head straight from tip of upper lip to vertical through middle of orbit of eye, then convex to dorsal-fin origin. Dorsal-fin base nearly straight, then convex to adipose fin and slightly concave to base of upper caudal-fin lobe. Ventral profile of head convex from lower lip to anal-fin insertion then slightly concave to base of lower caudal-fin lobe.

Head and snout long, jaws equal, mouth terminal, lips soft and flexible, outer premaxillary tooth row not exposed. Premaxilla with long lateral process, rounded over ethmoids, and two rows of teeth: outer row with two\* (24), three (20) or four (two) all tricuspid; inner row with five (46) pentacuspids (with the last tooth tricuspid), that gradually diminish in size away from symphysis. Maxilla long and narrow, its posterior margin straight but anterior margin convex, posterior tip reaches ventral border of second infraorbital, with one (46) pentacuspids tooth. Dentary with convex ventral margin, four (46) heptacuspids front

teeth followed by three\* (32) or four (14) smaller tricuspid teeth (Fig. 3).

Scales cycloid. Lateral line with eight (one), nine (two), ten (three), eleven\*(seven) or twelve (33) pored scales. Lateral scales including those with pores 31 (17), 32\* (18) or 33 (eleven). Six\* (43) or seven (three) horizontal scale rows between dorsal-fin origin and lateral line, not including scale of predorsal series just anterior to first dorsal-fin ray. Four scale rows (46) between anal-fin origin and lateral line. Four horizontal scale rows (46) between pelvic-fin insertions and lateral line. Predorsal scales ten\*(44) or eleven (two). Four scales in a single row on base of anterior anal-fin rays.

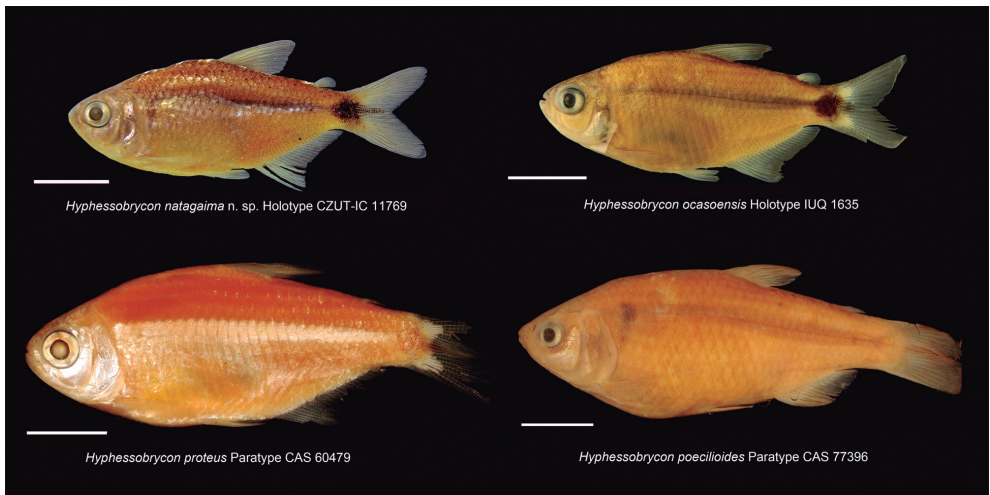
Dorsal-fin rays i,9,i (46). Anal-fin rays iv,18 (three), 19 (20) or 20\* (23). Pelvic-fin rays i,6,i (46). Pectoral-fin rays i,11,i (46). Caudal-fin forked, upper and lower lobes pointed, similar in size. Principal caudal-fin rays 10+9 (three). Procurrent caudal-fin rays ten (three). Total vertebrae 32-33 (5).

**Table 1.** Morphometric data for *Hyphessobrycon natagaima* n. sp. Standard and total length in mm, average in parentheses. SD = standard deviation. N = 46

	<b>Holotype</b>	<b>Paratypes</b>	<b>SD</b>
Standard length	29.5	25.1-43.7 (30.7)	4.3
Total length	37.1	31.3-53.3 (38.9)	4.9
<b>Percent of SL:</b>			
1. Body depth	37.6	34.1-42.9 (38.3)	1.9
2. Snout to dorsal origin length	53.2	50.0-60.0 (54.8)	1.9
3. Snout to pectoral-fin origin length	32.9	27.1-67.3 (31.8)	7.7
4. Snout to pelvic-fin insertion length	49.2	39.2-54.9 (50.1)	3.0
5. Snout to anal-fin length	66.8	38.1-70.9 (64.4)	6.2
6. Dorsal-fin to hypural length	50.2	47.8-57.5 (51.5)	2.0
7. Dorsal-fin to anal-fin length	35.9	35.4-41.6 (38.3)	1.5
8. Dorsal-fin to pectoral-fin length	42.1	36.5-46.1 (41.8)	1.9
9. Dorsal-fin length	26.1	24.7-29.6 (27.3)	1.5
10. Pectoral-fin length	20.0	18.1-25.6 (22.1)	1.9
11. Pelvic-fin length	16.6	12.3-19.5 (16.3)	1.5
12. Anal-fin length	20.7	17.6-24.8 (20.6)	1.6
13. Caudal to peduncle length	13.9	10.8-15.7 (12.7)	0.9
14. Caudal to peduncle depth	9.5	7.9-15.9 (10.9)	2.1
15. Head length	30.8	28.4-34.6 (30.9)	1.4
<b>Percent of Head Length:</b>			
16. Snout length	18.7	12.7-22.8 (18.0)	2.2
17. Eye diameter	30.8	28.3-42.2 (32.5)	2.9
18. Postorbital length	41.7	35.6-51.2 (43.3)	3.6
19. Maxilla length	24.2	22.7-35.0 (27.6)	2.5
20. Interorbital width	42.9	36.1-53.3 (44.3)	3.1
21. Upper jaw length	30.8	20.2-31.1 (26.6)	2.6



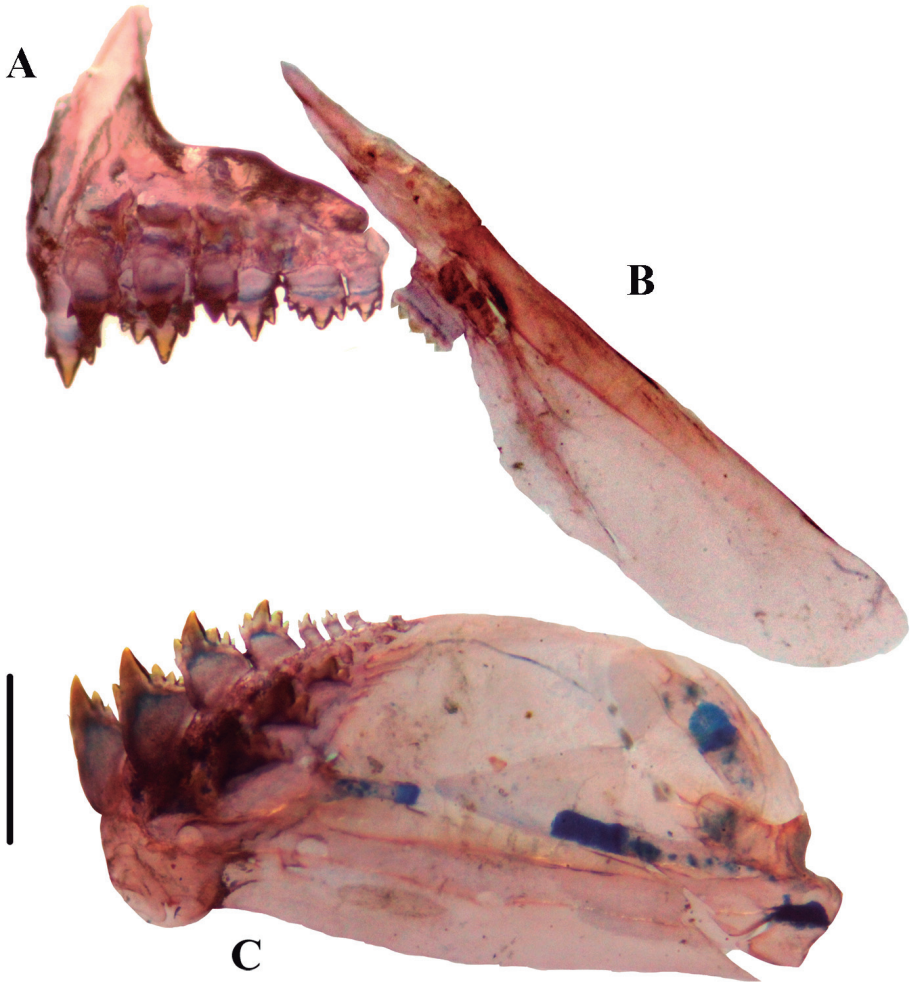
**Figure 1.** *Hyphessobrycon natagaima* n. sp. holotype, CZUT-IC 11769, 29.5 mm SL, male, Colombia, Tolima, Natagaima, Lago Saldañita. Bar = 1 cm.



**Figure 2.** *Hyphessobrycon* species distributed in the Magdalena River Basin, Colombia. Scale bar= 1 cm

First gill arch with 20 rakers, three on hypobranchial, ten on ceratobranchial and seven on epibranchial. Proximal pterygiophores of dorsal-fin rays inserted between neural spines nine to 16; anal-fin with 21 proximal pterygiophores, the first two inserted between hemal spines eleven and twelve, reaching ventral border of centrum of hemal spine twelve. Five elongate supraneurals with cartilage on upper and lower tips, inserted over fourth to ninth neural spines.

**Sexual dimorphism.** Males with hooks on all fin rays, two pairs of eight small hooks on fourth unbranched anal-fin ray, two to eight pairs of hooks from first to seventh branched anal-fin rays. Two to ten pairs of hooks on branched pelvic-fin rays, located on internal branch of the ray. Pectoral-fin rays with two to eight pairs of hooks on first and eighth branched rays. Dorsal-fin with small hooks on distal tip of anterior rays. Caudal-fin with one to four small hooks on middle rays.



**Figure 3.** *Hyphessobrycon natagaima* n. sp., UARC-IC 360, paratype, 34.7 mm SL. P premaxilla (A), maxilla (B) and dentary (C), left side. Bar = 1 mm

**Color in alcohol.** Body light brown, dorsum dark brown. Conspicuous, rhomboidal caudal peduncle spot extends on to middle caudal-fin rays. Flanks with dark stripe, posteriorly to humeral spot, interrupted and not in contact with caudal-peduncle spot, deeper at vertical through dorsal-fin origin. Dark humeral spot, vertically elongate, covering two scales below pored lateral-line. Posterior margin of scales with dark chromatophores. Edges of dorsal and caudal fins dark. Pectoral, pelvic and anal fins

hyaline; anal fin with dark chromatophores on membranes. Top of head dark brown (Fig. 2). **Distribution.** *Hyphessobrycon natagaima* is known from Laguna Saldañita and Laguna El Hato, upper Magdalena river drainage, Tolima. **Etymology.** *Hyphessobrycon natagaima* is in reference to the Amerindian people who have inhabited the region where this new species was found. The legend relates that a chief Nataga and a princess Aima were married to originate the tribe.



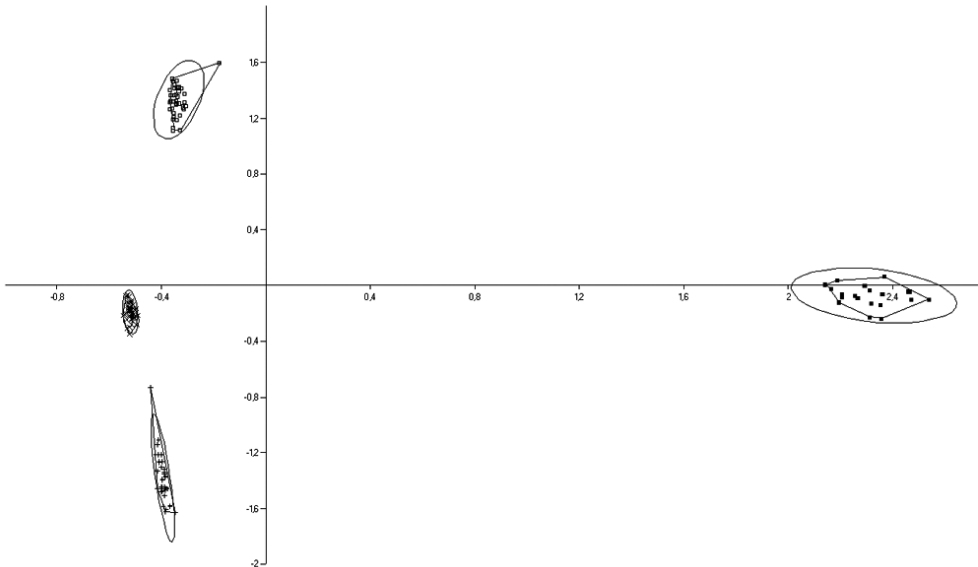
**Ecology.** The Laguna Saldañita wetland, habitat of new taxon, is characterized by riparian vegetation consisting of grasses and rooted and floating aquatic vegetation. *Hyphessobrycon natagaima* was collected with *Roebooides dayi*, *Cyphocharax magdalenae*, *Saccoderma hastatus*, *Astyanax fasciatus*, *Ctenolucius hujeta* and *Poecilia caucana*. This wetland was previously much more extensive and is seriously threatened by encroaching agriculture.

**Remarks.** These taxa, cited below, are in evident allopatric distribution. In addition, principal component analysis revealed differences among *H. natagaima* and *H. poecilioides*, *H. proteus* and *H. ocaseoensis* along the first axis (PC1) related to the distance from the dorsal-fin origin to the hypurals, dorsal-fin length, and the length of the maxilla. On the second axis, the snout-pelvic-fin insertion distance, head length, upper jaw length and caudal peduncle depth were the variables explaining the observed variation. And on the third axis, caudal-

peduncle length, and upper jaw length were important. The first axis explained 84.87% of variation; the second 11.31%, and the third 2.57 for a total of 98.75% (Fig. 4).

**Identification key for *Hyphessobrycon* species of the Magdalena River Basin, Colombia**

1. Caudal peduncle spot absent; anal-fin with 15 to 17 branched rays; humeral spot rounded, located above pored lateral-line scales; color in alcohol yellowish green; body robust ..... *H. poecilioides* 1'.
- 1'. Caudal peduncle spot present; anal-fin with 18 to 26 branched rays; humeral spot vertically elongate and extending ventrally to first scale below pored lateral-line scales; body elongate and fusiform; color in alcohol light yellow ..... 2
2. 19-26 pored lateral-line scales; anal-fin with 24-26 branched rays; premaxilla with four teeth in outer row; pelvic fins with seven branched rays ..... *H. proteus*



**Figure 4.** Representation of the two first principal components PCA (1 component in the X-axis, 2 component in the Y axis), from morphometric data of *Hyphessobrycon proteus* (n=35; [+]), *H. ocaseoensis* (n=23; [■]), *H. poecilioides* (n=49; [x]) and *H. natagaima* n. sp (n=46; [□]).

2'. Eight-17 pored lateral-line scales; anal-fin with 18-22 branched rays; outer premaxillary row with two-three teeth; six branched pelvic-fin rays ..... 3

3. Dark lateral stripe continuous with caudal-peduncle spot; caudal-peduncle spot rounded, and not extending onto middle caudal-fin rays; 15-17 pored lateral-line scales; six scales between lateral line and anal-fin origin; six scales between lateral line and pelvic-fin insertions; nine predorsal scales; ii,8,i dorsal-fin rays; anal fin with 21-22 branched; pectoral-fins with twelve branched rays; males with bony hooks on anal and pelvic fins .....  
..... *H. ocaseoensis*

3'. Dark lateral stripe interrupted, not in contact with caudal-peduncle spot; caudal-peduncle spot rhomboidal and extended on to middle caudal-fin rays; eight-12 pored lateral-line scales; four scales between lateral line and anal-fin origin; three or four scales between lateral line and pelvic fins; ten-eleven predorsal scales; ii, 9 dorsal-fin rays; anal-fin with 18-20 branched rays; pectoral fins with eleven branched rays; males with bony hooks on all fins-rays ..... *H. natagaima* n. sp.

## DISCUSSION

Recent papers describing species of *Hyphessobrycon* frequently indicate that the genus is paraphyletic (Ingenito et al 2013, Carvalho & Langeani 2013, Teixeira et al 2013), without deep exploration of the relationships of its subunits or their relationships. The new species described in this paper is not a member of the genus *Hyphessobrycon sensu stricto* (García-Alzate et al 2013) which includes only the type species *H. compressus* and related species in Central America. A phylogenetic reconstruction is needed that includes the type species to begin to unravel the phylogenetic relationships of the species of *Hyphessobrycon sensu lato*, the group to which *Hyphessobrycon natagaima* belongs, and to determine the limits of *Hemigrammus*. Until such a hypothesis

is available, relationships will continue to be based on apomorphic and ambiguous characters.

Males of some species of Characidae usually have hooks on the anal, pelvic and less frequently on the dorsal and caudal-fins. The presence of bony hooks on all fins including the caudal is not common for species of *Hyphessobrycon*, for example *H. socolofi*, *H. erythrostigma* and *H. hamatus* are reported to have hooks on the anal, pelvic, pectoral and dorsal-fins (but not on the caudal fin) (Weitzman 1977, Bertaco & Malabarba 2005). Hooks on all fins of males have only been reported in *H. natagaima* described herein, *H. togoi* (Miquelarena & Lopez 2006), and *H. taguae* (García-Alzate et al 2008c).

The description of this new species from the upper Magdalena River Basin, a region often considered well explored ichthyologically, shows that we are far from complete in our discovery of the biodiversity of Colombian freshwater fishes.

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