Composition of the Characidae Family (Order: Characiformes, Pisces) in an Andean-Amazonian River, Case Study Hacha River Basin (Caquetá-Colombia)

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Abstract

An ichthyological inventory of the Characidae family (order: Characiformes) was carried out on an altitudinal gradient (2112 to 248 m.s.) of an Andean-Amazonian river basin of the Hacha river, located in the municipality of Florencia, department of Caquetá (Colombia). The collections were developed in 10 sampling stations through two fishing gears (electric fishing and traditional fishing); between the months of October to March, in two consecutive years (2009 and 2010), corresponding to the low water period. 459 individuals were collected, identified and grouped into 14 genera and 18 species; the highest abundances corresponded to the species *Hemibrycon* sp. (151 individuals), *Boehlkea* cf. *fredcochui* (88), *Creagrutus amoenus* (50) and *Creagrutus cochui* (35). In conclusion, it can be indicated that the greatest wealth (12sp.) occurs in the lower basin of the river, it is also noteworthy that the 18 species are new reports for the Hacha river basin, 12 species for Caquetá and one (1) species for the Colombian Amazon.

Keywords: Characidae, Hacha River, Andean-Amazonian.

Introduction

The order Characiformes is composed of approximately 1962 species, which correspond to about 34% of freshwater species in the world (ALBERT *et al.*, 2011), grouped into 274 genera and 18 families (GÉRY, 1977, REIS, KULLANDER 2003, MOYLE, CECHE, 2004, NELSON, 2006). By regions, the Amazon basin exhibits the highest richness with about 1450 species of fish (GÉRY, 1984), of this number almost 50% are species of the order Characiformes (Nelson, 2006). However, despite the high wealth, there are regions of the basin where the knowledge of this order is meager, such as the Colombian Amazonian Andean region and in particular the case of the river basin of the Hacha River, located in the municipality of Florencia (Caquetá), which supplies drinking water to the municipality (the most populated city of the Colombian Amazon), the Hacha River is the main place of recreation and, a little noble use, as a receiver of the wastewater of the city (PELÁEZ *et al.*, 2006).

The first samplings for the Department of Caquetá were carried out by Brother Nicéforo María on the Orteguaza River around 1900, the results of which were published by Fowler (1943, 1945). Mojica *et al.* (2005) and Galvis *et al.* (2007) reported 30 species for the order Characiformes collected in tributaries of the Caquetá river, among them the Orteguaza river. At the local level, the Universidad of the Amazonia, has carried out some works, results of degree projects and master thesis such as Celis, Ortiz (2003); Rueda, Almarino (2004); Díaz, Escobar (2004); Celis (2010); Cháves (2011) and Perdomo *et al.* (2012). The following is

an updated list of the Characidae family (order: Characiformes) of the Hacha River Basin, integrated from the literature review, the biological collection of the Institute of Natural Sciences (ICN) and what was reported in this work.

Materials and methods

The study was carried out in the main channel of a mountain river (Hacha) of the Andean-Amazonian region, department of Caquetá (Colombia) between the coordinates 01 ° 52'40,7 "N- 75 ° 40'44,1 "W and 1°33'19,2" N-75°31'55 "W. The hydrographic basin covers an area of 490.18 square kilometers and covers a distance of 66.7 km from its source at 2,400 m. a. s. l. in Cerro Gabinete until its convergence with the Orteguaza River, at an altitude of 248 m. a. s. l. (POMCA, 2005) (Figure 1).

The collections were made during two consecutive years, between the months of October to March (low waters) of 2009 and 2010 respectively. These were carried out in 10 sampling stations representative of the uses given to the river Hacha (Annex A, the list of structural characteristics of the stations is presented), through two fishing techniques: traditional fishing (cast nets and hooks) and electric fishing (LOBÓN-CERVIÁ, 1991; ELOSEGI, SABATER 2009) in order to capture the largest number of specimens present in this ecosystem. The captured specimens were fixed in 10% formaldehyde, then in 70% alcohol (MOJICA *et al.*, 2005; MALDONADO-OCAMPO *et al.*, 2006) and were deposited in the ICN's Ichthyological collection.

Figure 1 – Geographical location of the study area, municipality Floresncia, Caquetá (Colombia).

For the taxonomic determination, we followed Fowler (1943); Fowler (1945); GÉRY (1977); Castro (1997); Mojica (1999); Maldonado *et al.* (2006); Gregory-Maldonado (2006); Ortega-Lara *et al.* (2006); Galvis *et al.* (2007);

Rubio (2007) and Román-Valencia *et al.* (2013). Likewise, ichthyological material deposited in the reference collection of the ICN-MHN of the Universidad Nacional de Colombia and the advice of specialists was consulted.

Results

The results obtained are presented through a systematic list of the ichthyofauna

found in the basin of the Hacha river. We collected 459 individuals grouped into 14 genera and 18 species (Appendix B) and Figure 2.

Figure 2 – Species Characidae family 1. *Astyanax fasciatus*, 2. *Astyanax symmetricus*, 3. *Boehlkea cf. fredcochui*, 4. *Creagrutus cf. amoenus*, 5. *Creagrutus cochui*, 6. *Ctenobrycon cf. hauxwellianus*, 7. *Cynopotamus amazonum*, 8. *Hemybrycon sp.*, 9. *Hemibrycon sp.2*, 10. *Hemibrycon sp.3*, 11. *Hyphessobrycon sp.*, 12. *Knodus carlosi*, 13. *Moenkhausia robertsi*, 14. *Odontostilbe cf. caquetae*, 15. *Salminus affinis*, 16. *Prestobrycon calmoni*, 17. *Serrasalmus rombeus*, 18. *Tetragonopterus argenteus*.

This list of species includes information on:

- **Scientific name:** Gender and specific epithet, followed by the author of the description and the year of publication.
- **Species in collection:** The number of the file of the deposited species is listed in the Institute of Natural Sciences (INS), Museum of Natural History (MNH), ichthyology area.
- **Synonymies:** Includes the scientific name, author and year.
- **Common name:** Reference the regional name of the species.
- **Description:** Information regarding the pigmentation, morphology, size and morphometry of the species.
- **Distribution:** It reviews the localities where there are reliable records of the species; they begin with the type locality (altitudinal range in the Hacha river); then, general data of the distribution for Colombia and the Neotropic are referenced, based on the literature review. Also, image of the species is attached.

ORDER CHARACIFORMES:

CHARACIDAE FAMILY

1. *Astyanax fasciatus* (CUVIER, 1819).

Collection number ICN-MHN: 17918.

Synonyms: *A. fasciatusorteguasae* (FOWLER, 1943).

Common name: red tail sardine, yellow tail sardine, tolomba, greedy, old lady (Ven).

Description: Medium-sized fish that reach 17cm instandard length (SL), are silvery color dorsally, caudal with a well-marked black caudal spot. Some specimens show an intense reddish color in the caudal fin (GALVIS *et al.*, 2007); middle rays of the

dark caudal and the other orange with the hyaline ends (VARGAS-TISNES, 1989).

Distribution: Located in the stations of the urban area of the city of Florencia between 262-261m. a. s. l.; Fowler (1943, 1945) reported it for the Bodoquero river of Morelia Caquetá; However, in other regions it has a wide distribution as in the Magdalena, Cauca and the Amazon basins (FOWLER, 1943; MOJICA, 1999; ORTEGA-LARA *et al.*, 2002; GREGORY-MALDONADO, 2006; Galvis *et al.*, 2007; MALDONADO-OCAMPO *et al.*, 2008; MALABARMA *et al.*, 2003) report edit from Mexico to Argentina.

2. *Astyanax symmetricus* (EIGENMANN, 1908).

Collection number ICN-MHN: 17861.

Common name: Sardine.

Description: Small fish with SL from 3 to 6 cm, more or less uniform body, terminal mouth. In alcohol it turns brown with a light colored stripe on the ventral side.

Distribution: 262-261 m.a.s.l.; It was located in the stations known as La Floresta and Puente López in the municipality of Florencia (capture method: Electric fishing). Malabarma *et al.* (2003) reported for the Amazon River basin.

3. *Boehlkea cf. fredcochui* (GÉRY, 1966).

Synonymies: *Microbryconcochui* (NON LADIGES, 1950) www.fishbase.org.

Common name: Little sardine, blue tetra (Per).

Description: Small size fish of 4 to 5cm of SL, similar to the Hemibrycon (GÉRY, 1977), irregular lateral line. Its body is metallic light blue.

Distribution: 635-262 m.a.s.l.; it was located between the station known as Carañoto to the la Floresta station in the city of Florencia (method of capture: electric fishing). Gregory-Maldonado (2006) reported it for the Colombian Amazon.

4. *Creagrutusamoenus* (FOWLER, 1943).

Synonymies: *Creagrutusboehlkei* (GÉRY, 1977).

Common name: Little sardine.

Description: Fishes with SL of 8cm are recognized by presenting the maxilla more pronounced than the jaw. They have a gray spot on the dorsal fin and dark patches on the lateral line. The general coloration of the body is silver with reddish overtones and in alcohol presents a clear brown coloration.

Distribution: 635-296 m.a.s.l.; it was collected between the sites known as Paraíso-Carañoto to the first bridge (north) of the city of Florencia (capture method: Electric fishing). Fowler (1943) and Galvis *et al.* (2007) reported it to the Ortegüaza River; Gregory-Maldonado (2006) for the Amazon River basin.

5. *Creagrutuscochui* (GÉRY, 1964).

Collection number ICN-MHN: 17871, 17874, 17887.

Common name: Squeaky (Florencia), little mojarra, little sardine.

Description: Small species that grows up to 7.9 cm of SL. With an elongated and cylindrical body, brown with a well-defined horizontal humeral spot and all its fins are hyaline except for the dorsal fin.

Distribution: 890-248 m.a.s.l.; between the sites known as the vereda Sucre to the confluence of the Hacha river with the Ortegüaza (methods of capture: traditional fishing and electric fishing). Maldonado-Ocampo *et al.* (2008); Galvis *et al.* (2007); Gregory-Maldonado (2006), reported it in streams of intermediate waters near Leticia.

6. *Ctenobryconhauxwellianus* (COPE, 1870).

Synonymies: *C. spilurushauxwellianus*, *Tetragonopterusauxwellianus* (COPE, 1870).

Common name: Wide sardine (Florence), s. fat, pinky, little mojarra, lambari (Bra).

Description: Small species that reached 6.5 cm of SL. Wide body and small scales, light brown in the dorsal and silver on the ventral side, with a gray band on the lateral line.

Distribution: 253 - 248 m.a.s.l.; it was located between the Florencia Airport station to the confluence with the Ortegüaza river (capture method: Electric fishing). Galvis *et al.* (2007); Fowler (1943, 1945) reported it for tributaries of the Caquetá River in the municipality of Morelia. It is also distributed in the Amazon River basin (MOJICA *et al.* 2005; GREGORY-MALDONADO 2006; MALDONADO-OCAMPO *et al.* 2008; WWW.SINCHI.org.co/2011).

7. *Cynopotamusamazonum* (GÜNTHER, 1868).

Collection number ICN-MHN: 17901.

Subfamily: Characinae.

Synonymies: *Anacrytuslimaesquamis* (COPE, 1878).

Common name: Chango (Caquetá), clear, dog, dentex (Per), cacunda (Bra)

Description: Large species that reached 23 cm of SL of elongated body with a small hump between the dorsal fin and the head, the scales are rough. Its coloration is silver; the caudal and adipose fins have a yellow hue. Very similar to the *Charax* species (GÉRY, 1977).

Distribution: 248 m.a.s.l.; it was only captured at the confluence (Venecia sector) with the Ortegüaza river (method of capture: Traditional fishing). It is located in the Amazon River basin (GREGORY-MALDONADO 2006; MALDONADO-OCAMPO *et al.*, 2008; WWW.SINCHI.org.co/2011).

8. *Hemibrycon sp.* (GÜNTHER, 1864).

Collection number ICN-MHN: 17857, 17858, 17918.

Common name: Yellow tail sardine, tolomba, mojara (Per).

Description: Medium-sized fish that reach 17cm in SL, are dorsally dark and laterally silvery in color; the rays of the anal fin are orange or yellow (ORTEGA-LARA *et al.*, 2002).

Distribution: 1100-248 m.a.s.l.; It has a wide distribution in the Hacha river basin (method of capture: traditional fishing gear and electric fishing). In Colombia, it is also found in the basin of the Meta,

Magdalena and Amazonas rivers (GREGORY-MALDONADO *et al.* 2006, GALVIS *et al.* 2007).

9. *Hemibrycon sp2.* (GÜNTHER, 1864).

Collection number ICN-MHN: 17855.

Common name: Thunder sardine (Caquetá), boquilla (Ecu).

Description: Small species that reached 3.5 cm of SL of color silver and brown on the caudal region.

Distribution: 635-248 m.a.s.l; it was located between the Vereda Paraíso until the confluence with the Ortegüaza river (method of capture: Traditional fishing and electric fishing). It is distributed in the Amazon River basin (GREGORY-MALDONADO, 2006).

10. *Hemibrycon sp3.* (GÜNTHER, 1864).

Common name: Sardine, tolomba.

Description: Medium species that reached 7 cm of SL of silver color and prominent lower jaw.

Distribution: 262 m.a.s.l.;it was captured in the area called the forest (capture method: electric fishing). It is located in the Amazon basin, Orinoco and Magdalena (GÉRY, 1977; REIS, KULLANDER, 2003; GREGORY-MALDONADO, 2006; MALDONADO-OCAMPO *et al.*, 2008).

Observation: First report for the Hacha and Caquetá basin.

11. *Hyphessobrycon sp.* (FOWLER, 1941).

Common name: Tetras, little sardines, Colombian tetra.

Description: Small species that reached 5 cm of SL. They are characterized by having the internal row of premaxillary teeth with five or more teeth on each side, incomplete lateral line, adipose fin and caudal non-scaly.

Distribution: 253-248 m.a.s.l.; It was collected in the airport sector until the confluence with the Ortegüaza River (capture method: Electric fishing). Maldonado *et al.* (2008), Gregory-Maldonado (2006) reported it for the Colombian Amazon.

12. *Knodus carlosi* (ROMÁN-VALENCIA *et al.*, 2013).

Common name: Little sardine.

Description: Small species that reached 6.5 cm of SL. Compressed body, robust and slender. Full lateral line, silver color and in the yellow outline, in alcohol it is observed of light brown color.

Distribution: 262-248 m.a.s.l.; It was collected in the Floresta sector until the confluence with the Ortegüaza River (capture method: Electric fishing). Román-Valencia *et al.*, (2013) reported it for the Amazon River basin.

13. *Moenkhausia robertsi* (GÉRY, 1964).

Common name: Sardine, tetra.

Description: Small species that reached the 7.6 cm of SL of silver color and with a broad humeral spot, its fins are hyaline. In alcohol it is observed in brown and some parts in black.

Distribution: 635-296 m.a.s.l.; It was located in the middle basin of the Hacha river

(capture method: Electric fishing). Fowler (1943), reported for the Ortegüaza River the species *Moenkhausia lepidura* and *Moenkhausia orteguasae*. Also, it is located in the Amazon River basin (MOJICA *et al.*, 2005; GREGORY-MALDONADO, 2006; MALDONADO-OCAMPO *et al.*, 2008; WWW.SINCHI.org.co/2011).

14. *Odontostilbe cf. caquetae* (FOWLER, 1943).

Synonymies: *Fugitive Cheirodon*, *Fugitive Odontostilbe*, *O madeirae*.

Common name: Little sardine, mojarra.

Description: Small fish that reach 4 cm of SL. Body elongated and brown, with a silver strip that ends in a dark spot that may or may not cover the caudal peduncle (GÉRY, 1977).

Distribution: 261-248 m.a.s.l.; species captured in the area called the López bridge to the confluence with the Ortegüaza river (method of capture: traditional fishing and electric fishing). Galvis *et al.* (2007) and Fowler (1943, 1945) reported it in the same region. Gregory-Maldonado (2006) reported it for the Amazon River basin.

15. *Salminus affinis* (STEINDACHNER, 1880).

Collection number ICN-MHN: 17910.

Subfamily: Salmininae.

Common name: Golden, beaked, blonde, lady (Ecu), male shad (Per).

Description: Medium sized fish that reached 32 cm of SL. Elongated body shape; caudal without elongation, the caudal lobes are pink-intense red towards the tips, at the

base of the yellow fin and a black stripe towards the peduncle, red anal fin, the operculum is also pinkish-reddish, the fins present the color yellow, the dorsal part of the body is silver gray and the ventral part white-yellowish (MOJICA *et al.*, 2012).

Distribution: 890-253 m.a.s.l.; It was located from the vereda Sucre to the airport sector of the municipality of Florencia (method of capture: Traditional fishing). It was reported for the Magdalena and Amazonas river basins (MOJICA *et al.* 2005; GREGORY-MALDONADO *et al.* 2006; MALDONADO-OCAMPO *et al.* 2008; WWW.SINCHI.org.co/2011).

Observation: In The Red Book of Freshwater Fishes of Colombia, it is classified as vulnerable in the IUCN category (A2 c, d) - National in Danger (B1bii, B1ciii) - Regional (MOJICA *et al.*, 2012). It is also the first report for the basin of the Hacha and Caquetá river.

16. *Pristobryconcalmoni* (STEINDACHNER, 1908).

Collection number ICN-MHN: 17912.

Subfamily: Serrasalminae.

Synonymies: *Serrasalmuscalmoni*, *S. bilineatus*, *Pygocentrusbilineatus*.

Common name: Piranha, white piranha (Bra), Caribbean (Ven).

Description: Medium sized fish that reached 12 cm of SL of silver and orange coloration on the base of the anal, dorsal and adipose fin. Lower jaw prominent.

Distribution: 296-248 m.a.s.l.; It was collected from the sector called the first bridge

to the confluence with the Ortegüaza river (method of capture: traditional fishing). It was reported for the Amazon and Orinoco river basins (MOJICA *et al.*, 2005; GREGORY-MALDONADO 2006; MALDONADO-OCAMPO *et al.*, 2008).

17. *Serrasalmusrhombeus* (LINEUS, 1766).

Collection number ICN-MHN: 17911.

Subfamily: Serrasalminae.

Synonymies: *Pygocentrusnormani*, *Serrasalmohumeralisgracilior*, *S. immaculatus*, *S. normani*, *S. paraense*.

Common name: Piranha, fist, Caribbean (Orinoco), black piranha (Bra).

Description: Medium fish that reached 13cm of SL of orange coloration with metallic gray areas, caudal fin with black border. Border of the elongated lower jaw with well-developed teeth (CASTRO, 1997).

Distribution: 296-248 m.a.s.l.; It was collected in the area called the first bridge to the confluence with the Ortegüaza river (method of capture: traditional fishing). Also, it is located in the basin of the Amazon River, Putumayo, Caquetá and Guaviare (GÉRY, 1977; MOJICA, *et al.*, 2005; GREGORY-MALDONADO, 2006; MALDONADO-OCAMPO *et al.*, 2008; WWW.SINCHI.org.co/2011).

18. *Tetragonopterus argenteus* (CUVIER, 1816).

Collection number ICN-MHN: 17912.

Subfamily: Tetragonopterinae.

Common name: Palometa (Caquetá), Golden (Leticia), sabaleta, matupiri (Bra).

Description: Medium fish that reached 13cm of SL of silver coloration and on the ventral edge of yellow color. It has a high, discoidal, deep and compressed body that differentiates it from the *Moenkhausia* genus (GÉRY, 1977).

Distribution: 262-248 m.a.s.l.; It was located in the urban area of the municipality of Florencia to the confluence with the Orteguaza River (method of capture: Traditional fishing). Celis (2010) reported it for the Quebrada la Venado tributary of the Bodoquero River (Morelia-Caquetá). In the same way, it is located in the Amazon basin (MOJICA *et al.*, 2005; MALDONADO-OCAMPO *et al.*, 2008; WWW.SINCHI.org.co/2011).

Discussion

Due to the few works developed on fish composition in the Colombian Amazonian Andean region, particularly in the Piedmont region of Caquetá, its wealth has been underestimated. In fact, the only investigations for the Hacha River Basin that address fish composition are that of Chaves (2011) for the order Siluriformes and Perdomo *et al.* (2012), this last author reported 13 species for the order Characiformes, of which he didn't report for the Characidae family. Fowler (1943, 1945) reported 5 species for Caquetá, referenced in the present work. Likewise, 5 species of the Characidae family coincide with the reports made by Galvis *et al.* (2007) for the department (Annex C). Therefore, the 18 species collected in this basin can predict that

the richness for the order Characiformes can reach 30 species, since they would increase by more than 10 species.

This research is a good approximation to the total number of species of the Characidae family present in the basin, considering the size of the basin, the explored places, the scarce records of species and the uncertainties that arise over existing identifications (CHERNOFF *et al.*, 1999). In relation to the abundance and composition of the Characidae family (459 ind/18sp) it is the one with the greatest contribution to the Characiformes order, since from the global study it showed only 70 individuals belonging to 11 species (families: Anostomidae, Crenuchidae, Curimatadae, Erytrinae, Hemiodontidae, Parodontidae, Prochilodontidae) coinciding with other authors in several systems of the Amazon basin (SILVANO *et al.*, 2000, LASSO *et al.*, 2004).

Fishing in the municipality of Florencia is directly related to economic (income) and social activities (population growth vs. food) (POMCA, 2005). However, according to the observation in the field and conversation with members of the community, it was identified that most of the species are used in subsistence fishing; young fish are usually caught, which leads to the interruption of the reproductive cycle of the species and the consequent decrease in their populations. Among the main methods used for fishing are hooks, trammel nets, fishing guns and cast nets.

Also, other factors that threaten the ichthyofauna are agricultural, domestic and industrial pollution; these actions, added

to the limited distribution ranges, place the fish at extinction risk levels. Therefore, of the 18 species referenced the only one that is in danger (vulnerable national category: A2c, d) according to Trehe Red Book of Freshwater Fishes of Colombia is *Salminus cf. affinis* (MOJICA *et al.*, 2012). Consequently, even though *Salminus cf. Affinis* is in vulnerable danger, at the local level it is unknown that other species of fish may be in the same situation due to lack of studies.

Finally, it is urgent that research programs on the biology of species and the state of aquatic ecosystems be encouraged. Also, it is feasible to propose as conservation measures for the Hacha river basin the compliance with the regulation on the minimum sizes of capture and in general of the fishing and commercialization activity, through total or partial closures during the reproduction periods.

As a conclusion, it can be indicated that the richness of species is high, particularly in the lower basin of the Hacha River. The most abundant and most widely distributed species was *Hemibrycon* sp. (151), *Boehlkea*

cf. fredcochui (88), *Creagrutus amoenus* (50) and *Creagrutus cochui* (35). Also, of the 18 species collected, all are new reports for the basin, 12 in the department and one (1) in the Colombian Amazon.

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ANNEXES

Annexes A: Data on the composition of the habitat in the sampling stations of the Hacha river basin.

Station	Altitude	Location	Riparian Vegetation	Littoral Vegetation	Transparency (Water)	Bottom Type (Substrate)
1	2112	Hacha River (Ruidosa)	Intervened Natural Forest	Present (Shading 70%)	Total	Rocky, sandy, pebble
2	1341	Hacha River (Tarqui)	Intervened Natural Forest	Present (Shading 50%)	Total	Big rocks, pebble
3	890	Hacha River (Sucre)	Intervened Natural Forest	Present (Shading 50%)	Total	Big rocks, pebble
4	635	Hacha River (Paraiso)	Stubble	Present (Shading 30%)	Turbid	sandy, gravel, pebble
5	375	Hacha River (San Luis)	Stubble	Present (Shading 40%)	Total	Sandy, small rocks
6	296	Hacha River (Primer Puente)	Grasses	Partial (Shading 20%)	Total	Sandy, small rocks
7	262	Hacha River (Floresta)	Grasses, Stubbles, Colonized	Partial (Shading 20%)	Turbid	Gravel, sandy, small rocks
8	261	Hacha River (Puente López)	Grasses, Stubbles, Colonized	Partial (Shading 20%)	Turbia	Sandy, detritus, gravel
9	253	Hacha River (Aeropuerto)	Grasses, Stubbles, Colonized	Absent	Turbid	Sandy, detritus
10	248	Hacha River (Venecia)	Grasses, Stubbles	Absent	Turbid	Sandy, detritus

Annex B: Composition and abundance of species of the Characidae Family in the Hacha River Basin.

Description of sampling stations		1								10	
		Ruidosa	Tarqui	Sucre	Paraíso	San Luis	1 Pte.	Floresta	Pte. López	Aeropuerto	Desembocadura
Altitude		2112	1341	890	635	375	296	262	261	253	248
N°	Species	Total									
1	<i>Astyanax fasciatus</i>							7	4		11
2	<i>Astyanax symmetricus</i>							4	2		6
3	<i>Boelkea cf. fredcochui</i>				10	39	35	4			88
4	<i>Creagrutus cf. amoenus</i>				7	25	4	11	1	1	50
5	<i>Creagrutus cocui</i>			18	4	3	1	6		1	35
6	<i>Ctenobrycon cf. hauxwellianus</i>									2	13
7	<i>Cynopotamus amazonum</i>										1
8	<i>Hemibrycon sp.</i>			9	2	39	59	6	15	12	151
9	<i>Hemibrycon sp. 2.</i>				1	4	3	4		6	25
10	<i>Hemibrycon sp. 3.</i>							15			15
11	<i>Hyphessobrycon sp.</i>									1	3
12	<i>Knodus carlosi</i>							15	1	3	22
13	<i>Moenkhausia robertsi</i>				3		2				5
14	<i>Odontostilbe cf. caquetae</i>								1	4	14
15	<i>Salminus cf. affinis</i>			2	5		1			1	9
16	<i>Pristobrycon calmoni</i>						1		1	1	4
17	<i>Serrasalmus hombeus</i>					1			1	3	5
18	<i>Tetragonopterus argenteus</i>							1			2
Number of Individuals		0	0	29	32	110	107	73	26	32	50
Number of species per station		0	0	4	7	5	9	10	8	10	12

Annex C: Species of the Characidae Family (order: Characiformes) reported in the Colombian Amazon, Caquetá.

	Ortegaaza (CAQ)	Ortegaaza (CAQ)	Amazonia (COL)	Amazonia (COL)	Ortegaaza (2007)	Amazonia (COL)	Amazonia (COL)	Amazonia (COL)	Amazonia (COL)	Florencia (CAQ)	1St. Report
	Fowler, 1943	Fowler, 1945	Mojica, 2005	Maldonado, Ocampo, 2006	Galvis, 2007	Maldonado, Ocampo, 2008	www. sinchi.org. co/, 2011	Roman- Valencia et al., 2013	Remicio, 2014		
N° SPECIES											
1	<i>Astyanaxfasciatus</i>	X		X	X	X	X				X HACHA BASIN
2	<i>Astyanaxsymmetricus</i>										X C. AM. COLOM, CAQ, HACHA
3	<i>Boehlkea cf. fredcochui</i>				X		X				X BASIN CAQUETA, HACHA
4	<i>Creagrutus cf. amoenus</i>	X			X	X	X				X BASIN HACHA BASIN
5	<i>Creagrutuscochui</i>			X	X	X	X	X			X HACHA BASIN
6	<i>Ctenobrycon cf. hauxwellianus</i>		X	X	X		X	X			X HACHA BASIN
7	<i>Cynopotamusamazonum</i>						X	X			X CAQUETA, BASIN
8	<i>Hemibryconsp.</i>				X	X	X				X HACHA BASIN
9	<i>Hemibryconsp2.</i>				X		X				X HACHA BASIN CAQUETA, HACHA
10	<i>Hemibryconsp3.</i>				X		X				X BASIN CAQUETA, HACHA
11	<i>Hyphessobryconsp.</i>				X		X				X BASIN CAQUETA, HACHA
12	<i>Knoduscarlosi</i>								X		X BASIN CAQUETA, HACHA
13	<i>Moenkhausiarobertsi</i>			X	X		X	X			X BASIN CAQUETA, HACHA
14	<i>Odontostilbe cf. caquetae</i>	X	X			X					X BASIN, HACHA
15	<i>Salminusaffinis</i>			X	X		X	X			X BASIN CAQUETA, HACHA
16	<i>Pristobryconcalmoni</i>			X	X		X				X BASIN CAQUETA, HACHA
17	<i>Serrasalmusrombeus</i>			X	X		X	X			X BASIN CAQUETA, HACHA
18	<i>Tetragonopterusergenteus</i>			X			X	X			X BASIN CAQUETA, HACHA BASIN