Astyanax armandoi, n. sp. from Chiapas, Mexico (Pisces, Ostariophysi: Characidae) with a Comparison to the nominal species **A. aeneus** and **A. mexicanus.**

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ABSTRACT.

A new species of characid fish, **Astyanax armandoi,** is described from Penjamo, near Palenque, Chiapas, Mexico. The species can be diagnosed by the unique combination of characters: lower lip a wide flaplike, internally papillose expansion; the flat profile of the snout forming an acute angle with upper lip; the termination of the anal fin base along the vertical line through the posterior border of the adipose fin; orbitosphenoid clubshaped, with its ventral process posterior profile with discrete angles in the proximal third, and flat in the distal two thirds, this process anteriorly gently curved and concave. The nomenclatural history of the genus **Astyanax** in Mexico, is summarized and **A. armandoi** is compared to **A. aeneus,** its presumed close relative, and. **A. mexicanus,** the two wide ranging forms in Mexico.

Key words: Fishes, Freshwater, Characidae, **Astyanax, Astyanax armandoi,** Nova species, Rio Usumacinta, Chiapas, Mexico.

RESUMEN.

Se describe una nueva especie de pez carácido, **Astyanax armandoi,** de Pénjamo, Palenque, Chiapas, México. La nueva especie se puede diagnosticar por su única combinación de características; labio inferior con amplias extensiones, internamente papilosas; rostro con perfil plano, que forma un ángulo agudo con el labio superior; base de la aleta anal termina bajo una vertical del borde posterior de la aleta adiposa; apófisis ventral del orbitosfenoides en forma de clava, su perfil posterior en forma de escalera en el tercio proximal, y con una suave curvatura cóncava en el borde anterior. Se incluye una historia bibliográfica nomenclatorial del género **Astyanax** en México, y **A. armandoi** se compara con **A. aeneus,** postulado su pariente mas cercano, y **A. mexicanus,** las dos formas mas ampliamente distribuidas en México.

Palabras Clave: Peces, Dulceacuícolas, Characidae, **Astyanax, Astyanax armandoi,** Nova species, Río Usumacinta, Chiapas, México.

The fishes of the characid genus **Astyanax** are very complex taxonomically, and have not been revised since early in the century. In Mexico the genus **Astyanax** occurs in most drainages except the rivers of the NE and central plateau. The Mexican forms are not well diagnosed and the state of the taxonomy of the genus is very poor. Filippi (1853) described **Te-**

tragonopterus mexicanus, with a type locality "Valley of Mexico", where it has never subsequently been collected. Baird and Girard (1855), described **Astyanax argentatus** as new genus and species, from the Rio Nueces, Texas. Gunther (1860), described **Tetragonopterus aeneus** from Oaxaca (most probably referring to the city, not the state). Bocourt (1868) named **T. oaxacanensis** from Oaxaca, **T. nitidus** from Tasco (Tasco), **T. fulgens** from Cuernavaca, and **T. finitimus** from Orizaba. Jordan and Evermann (1896), recognized for Mexico: **T. aeneus** from Oaxaca, **T. scabripinnis** from the Rio Jamapa (doubtfully equivalent to that species, described by Jenyns, 1842, from Río Janeiro, Brazil), **T. mexicanus** from the Valley of Mexico, and **T. argentatus** from Southern Texas and Rio Grande system. Meek (1904) recognized only two species in Mexico, **T. mexicanus** and **T. aeneus**. Regan (1908), described **T. macrophthalmus** from Motzorongo (Veracruz), **T. angustifrons** from "Mexico", and recognized **T. mexicanus** northward from Río Papaloapan and Rio Balsas, and **T. aeneus** southward from Rio Papaloapan and Oaxaca into Central America. Eigenmann (1918-21) recognized **A. angustifrons** in some parts of Mexico, A. fasciatus macrophthalmus from Southern Mexico (Motzorongo), **A. f. aeneus** from Panama to Mexico, and **A. mexicanus** from the Rio Grande, Balsas and Papaloapan Basins.

In 1935, Hubbs referred all these forms to **Astyanax fasciatus**, and later (1936) described **A. f. altior** from around Progreso, Yucatan, assigning specimens from the Rio Champoton to **A. f. aeneus**. Alvarez (1950), included in his keys **A. f. aeneus, A. f. mexicanus, A. f. macrophthalmus** and **A. f. altior**; in a second paper (1970), his keys included only **A. fasciatus**, although he mentioned some taxa as subspecies. More recently, several authors have used **A. mexicanus** for the Northern form (Robins et al., 1980; Contreras et al., 1976; Contreras, 1978; Miller, 1978; Birkhead, 1978), **A. aeneus** for the widespread Mexican tropical form (Contreras and Rivera, 1985; Lozano and Contreras, 1987), although Miller (1966-1986), Miller and Smith (1986), and Velazco (1976), still refer only to **A. fasciatus**. Other authors refer to the Northern form as **A. f. mexicanus** (Minckley, 1978).

It is interesting that the bases for the diverse nomenclature are never discussed. Finally we should note that our summary excludes the cave forms formerly assigned to **Anoptichthys**, which has more recently variously been regarded as conspecific with **A. mexicanus**, as subspecies of that species, as **A. fasciatus**, or as distinct species (Reddell, 1981).

Recently, while carrying out surveys of the continental fish faunas of Chiapas (Lozano and Contreras, 1987), and of Oaxaca (Contreras, Lozano and Aguilar, in process), we became aware of the existence of one local (this paper) and 2 widely distributed forms of **Astyanax** in Chiapas extending into Guatemala (Contreras, Lozano, Guerra, and Garcia, 1988), and another species in a spring in Oaxaca. For use in our studies, we decided to call the common southern Mexican form **A. aeneus**, which occupies most of Chiapas, except the extreme southeastern Pacific drainages, where a recognizable but undescribed form replaces it in that region, and extends at least to south central Guatemala. The third form, described herein, is regarded as closely related to **A. aeneus**. It inhabits an unnamed arroyo that flows through the town of Penjamo (N 10°27'; W 91° 36'), in the municipality of Palenque, NE Chiapas (Fig. 1). Several morphological and osteological characters distinguish it. Study of the form from Oaxaca continues.

METHODS

Measurements and counts were made following the methods of Hubbs and Lagler (1947), except the last two dorsal fin rays are counted as separate rays when they have separate bases. Some osteological characters not considered formerly were found useful in characterization of species, and are regarded as probably diagnostic. These characters are illustrated. For meristic data, the counts in Table I are followed by mean number in parenthesis. Holotype counts are in boldface in Table 2.

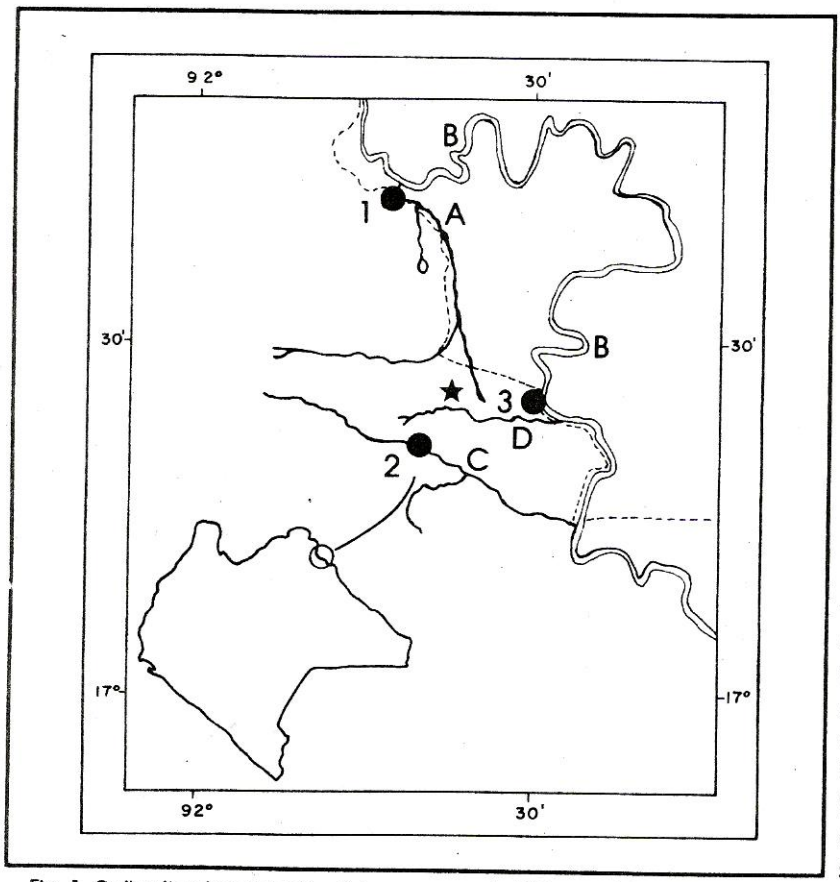

Fig. 1. Collecting localities for **Astyanax spp.** in Chiapas, Mexico: Star: TL for **A. armandoi** n. sp., at Penjamo. solid circles = **A. aeneus**. La Libertad (1), near mouth of Rio Chacamax (A), on Rio Usumacinta (B); Chancala (2), on Rio Chancala (C); Boca del Cerro (3), on Rio Usumacinta (B), near mouth of Rio Chiquenija (D). Dashed line: state border, Chiapas (SW) and Tabasco (NE).

Institutional acronyms follow Leviton et al. (1985).

Astyanax armandoi n. sp.
Figs. 2-9, Tables 1-3
Sardina labiosa de Penjamo

Astyanax sp., Lozano and Contreras, 1987:228 (mention, as new form; locality).

DIAGNOSIS. A form of **Astyanax** differing from all known Mexican species by the following combination of characters; lower lip expanded, with internally papillose flaps; snout flat in profile, forming an acute angle with the upper lip and gape: orbitosphenoid ventral process clubshaped, with its anterior profile concave, gently curved; proximal third of the posterior profile of the orbistosphenoid with two discrete angles, flat on its distal two third; anal base ending under a vertical from the adipose fin posterior border.

TYPE MATERIAL

Holotype, UANL 6380, a mature male 61.2 mm SL; from unnamed creek flowing through Penjamo, near Palenque, Chiapas, Mexico; Topoparatypes: Type series UANL 6202 (19:46.8-80.1 mm SL), and UANL 6378 (6:57.2-82.1 mm SL, cleared and stained), same data as holotype, coll. M.L. Lozano et al.; UANL 6346 (13:41.3-76.9 mm SL), and UANL 6381 (1:75.0 mm SL; cleared and stained), Coll. M.L. Lozano et al., 6 April, 1985. Non-Type Material: UANL 6225 (45:15.4-45.4 mm SL): Coll. M.L. Lozano et al.; 3 August, 1981. From the last series 2 paratypes are being deposited at the following Museums: USNM 308113: UMMZ 215480; Tulane University, 157268: AMNH 47835; UNAM (IBCMLP) 3240; TNHC 17640. Institutions that have not yet provided accesion numbers: IPN (ENCB) P; BMNH and MNHN.

DESCRIPTION

A large species of **Astyanax** (maximum known SL 82.1 mm.), illustrated in Fig. 2. Body relatively high and strongly compressed, its greatest depth 2.5 -2.8 in SL. Dorsal and particularly ventral profiles strongly convex. Often a slight depression at the nape, and a second one at the posterior portion of dorsal base. The profile flattens somewhat between dorsal and adipose fins, and along the anal base. Both profiles are slighthly concave along caudal peduncle. Dorsal profile of head steep anteriorly.

Dorsal fin origin over a point between pelvic and anal fin origins, closer to the pelvics. Pecto-

Table 1. Comparison of **Astyanax armandoi** n. sp., with **A. aeneus** and **A. mexicanus** from Mexico in thousandths of the standard length.

	armandoi		**aeneus**	**mexicanus**
	Holo-type	Paratypes		
Standard length (mm)	61.2	41.3-82.1	39.0-77.4	58.0-81.6
Head length	287	272(302.2)325	276(296.7)323	256(272.9)287
Predorsal length	505	481(513.2)549	492(515.3)545	484(503.3)518
Postdorsal length	529	511(530.4)556	508(529.2)550	516(534.4)549
Body depth	366	337(374.2)400	328(358.9)399	300(327.7)355
Caudal Peduncle least depth	122	117(126.0)138	113(119.2)128	109(115.9)122
Caudal peduncle length	92	84(99.4) 113	80(98.2) 119	112(121.8)134
Eye length	80	68(87.4) 95	72(83.7) 93	61(69.0) 79
Interorbital width	110	100(106.5)116	86(99.1) 111	93(98.7) 109
Snout	90	76(89.6) 97	74(82.3) 90	77(82.2) 88
Postorbital length	135	115(134.7)155	130(142.2)170	123(131.2)145
Dorsal Origin to Adipose Fin	252	232(244.8)260	215(238.5)260	221(239.0)270
Pelvic to Anal Fin Origin	170	170(192.4)205	174(187.8)208	165(192.8)205
Pectoral Fin length	220	214(226.6)243	202(222.5)243	181(198.1)213
Pelvic Fin length	176	153(176.4)191	150(169.5)198	145(158.7)176
Adipose Fin length	79	61(77.2) 86	61(71.0) 81	69(77.8) 87
Dorsal Fin base	147	134(145.7)156	131(147.1)159	122(141.3)151
Anal Fin base	327	292(308.6)335	249(290.1)320	226(247.0)287
Dorsal Fin rays	10	10(10.0) 11	10(10.0) 11	9(9.6) 10
Pectoral Fin rays	14-14	12(13.1) 15	12(13.3) 15	12(13.2) 14
Pelvic Fin rays	8-8	6(7.9) 8	8(8.0)	6(8.0) 8
Lower arch gillrakers	13	11(13.0) 14	12(13.0) 14	9(10.3) 12
Predorsal scales	12	10(11.2) 12	10(11.1) 13	11(12.0) 13
Transversal scales	16	15(16.0) 17	15(15.7) 16	14(14.4) 15

Table 2. Frequency distributions of some meristic characters in three species of **Astyanax** from Mexico (*= Holotype)

Fin rays	Anal													
	19	20	21	22	23	24	25	26	27	28	N	X	SD	SE
armandoi						12	16	19	7	4*	58	25.6	1.2	.15
aeneus					5	14	17	8	6		50	24.9	1.2	.16
mexicanus	1	3	7	10	4						25	21.5	1.0	.2

GILL RAKERS	Upper						
	7	8	9	N	X	SD	SE
armandoi		8*	50	58	8.9	.34	.04
aeneus	9	19	22	50	8.3	.75	.10
mexicanus	4	17	4	25	8.0	.6	.10

Table 2. Cont.

SCALES	Lateral Line								
	34	35	36	37	38	N	X	SD	SE
armandoi	8	27*	18	4		57	35.3	.8	.1
aeneus		5	20	22	2	49	36.4	.7	.1
mexicanus	4	16	5			25	35.0	.6	.1

	Around Midbody									
	30	31	32	33	34	35	N	X	SD	SE
armandoi			7	19*	12	11	49	33.5	1.0	.14
aeneus	1	6	9	11	8	4	39	32.8	1.3	.21
mexicanus	3	12	10				25	35.0	.6	.1

Table 3. Comparison of selected characters in three species of **Astyanax** from Mexico.

CHARACTER	**A. armandoi**	**A. aeneus**	**A. mexicanus**
Anal			
Origin	End of D base	End of D base	Behind D base
Snout			
Profile	Flat	Convex	Convex
Nostril shape	Elongate	Round	Egg-Shaped
Lips meeting	Acute angle	Straight	Straight
Lower lip			
Position	Prognathous	Included	Even to Upper lip
Flaps	Present	Absent	Absent
Papilae	Present	Absent	Absent
Orbitosphenoid			
Process shape	Pyramidal	Pyramidal	Bioconcave
Apex	Club shaped	Hooked	Squarish
anterior profile	Concave, Not notched	S Shaped, Slighthly notched	Concave Strongly notched
Posterior profile			
Base	2 step, stairlike	1 step, stairlike	Not stairlike
Distal	Flat	Flat	S Shaped
Mouth			
Gape openig	Above Mideye	Below pupil	Above mideye
Gape profile	Flat Horizontal	nearly horinzontal	Oblique
Premaxillary			
Anterior profile	Angled	Angled	Not angled
Process position	Over 2nd tooth behind main cusp.	Over 2nd tooth over main cusp.	Over 1st tooth behind main cusp
Posterior process	Convex	Concave	Flattish
Maxillary			
Ant. arm shape	Diamond	Rod shaped	Rod shaped

Table 3. cont.

CHARACTER	**A. armandoi**	**A.aeneus**	**A. mexicanus**
Posterior arm, shape	Simitar	Triangular	Similar
Terminus	Short diamond	Long diamond	Short diamond
Jaw			
Retroarticular	Heart shaped	Roughly quadrangular	Roughly triangular
Angulo-Articular			
(Palmate)	2 pointed	3 pointed	3 pointed
Upper process	Flat, 2 angled	Single angle	Single angle
Middle process	Slender, straight	Wide	Slender, curved
Posterior socket	Shallow angled	Shallow semilunar	Deep round
Dentary			
Mental process	Strong, notched	Strong, single	Slight, single
Foramina			
First, anterior	Anterior to chin notch, under 2nd tooth.	Posterior Under 3rd tooth.	Posterior Under 3rd tooth

ral fins extend beyond pelvic fin origins. Pelvic fin reach anal fin origin in males, to anus in females. Dorsal fin origin closer to snout tip than to hypural joint by a distance about equal to pupil diameter. Anal fin originates along vertical line through posterior terminus of dorsal fin. Anal fin rays extend to a vertical from the end or behind adipose fin.

Lateral line present, complete, slightly decurved on first 6-8 scales, then straight to hypural joint. Head relatively small, with anterior region more or less pointed. Snout nearly flat in profile, meeting upper lip at a marked acute angle around 65°. Mouth small, prognathous, with lower lip characteristically expanded into irregular and variable flaps with internal surface covered by irregular rows of papillae (Fig. 3a).Gape opens above the level through mid eye. Teeth typical for **Astyanax:** premaxillary with 4 teeth in the outer row, and 4 large plus 1 small in the inner row; inner row large teeth pentacuspid, all others tricuspid (Fig. 4a). One to 3 maxillary teeth, penta to heptacuspid (Fig. 5a). Dentary teeth in one row, first 4 teeth large, penta to heptacuspid, followed by 7 (6-8) graded teeth, first and largest often pentacuspid, next 4-5 tricuspid, and rest smaller, conical to rounded. No diastemmas at least between anterior teeth; other teeth not always in contact; outer secondary teeth usually separate (Fig. 6a).

Anterior profile of premaxillary convex, angled, flat on its distal third. Premaxillary ascending process acute, its dorsal apex above posterior third of second primary tooth or behind it; its anterior profile flat except angled near tooth base. Premaxillary posterior apex bulging, round to very slighthly pointed backwards. Three foramina on the sides of premaxilla; first and largest elongated, nearly vertical, above first tooth. Two smaller openings above interspace between teeth 2-3, and over middle of third tooth, both closer to the dorsal profile of bone than to bases of teeth (Fig. 4a.).

Maxilla simitar-shaped, with anterior arm short and relatively wide, diamond-shaped; posterior arm leaf-like, with lower border convex, except at its diagonally truncate tip, hence its simitar shape. Maxilla width 21.8 % of its length (Fig. 5a.).

Lower jaw massive, high, widest about 2/3 of lenght posteriorly. Symphysis more or less square. Lower profile slighthly convex. The retroarticular (Fig. 6a-1) aproximately heart shaped, with the point toward the front; the angulo-

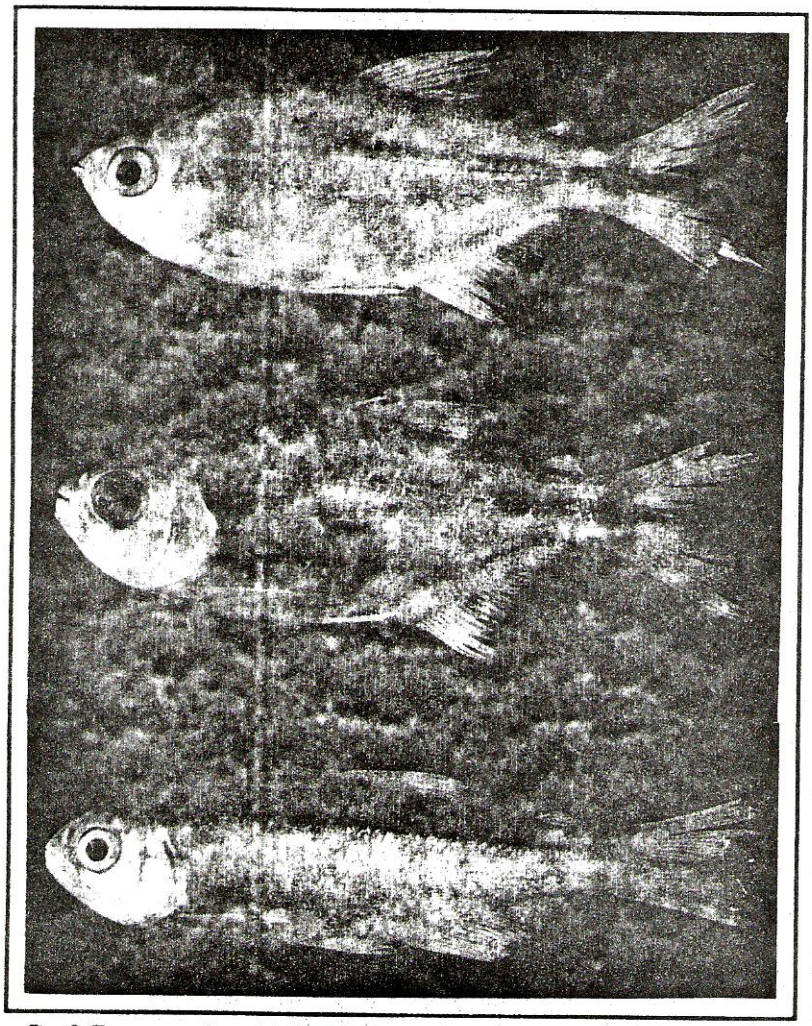

Fig. 2. Three species of **Astyanax** from México. Above: **Astyanax armandoi** n. sp., female paratype, UANL 6346 (56.0 mmSL); Unnamed Creek, Pénjamo, Chiapas; coll, MLLV and AJCB; 6-IV-86. Middle: **Astyanx aeneus**, UANL 6376 (56.1 mm SL); Río Chacamax at La Libertad, Chiapas; coll. SCB, MLLV, and Armando J. Contreras-Balderas, 13-14-II-80. Below **A. mexicanus** (Filippi), UANL 1931 (58.0 mm SL); Río Santa Catarina, Nuevo León, under Col, Valle bridge (Río San Juan of Río Bravo basin); coll. SCB and studentes; 10-IV-68. Photos by José Luis Gibaja-González.

articular (Fig. 6a-2) is roughly palmate, with two anterior processes, the upper is like a square flap. The lower process is slender, pointed and longest, covering more than two thirds of the lengh of the jaw. The concave articular socket for the quadrate is deep and angular, relatively narrow, with strong upper and lower rims. The dentary (Fig. 6 a-3) has a mental process, usually of two close protuberances, and a strong notch between the process an remainder of bone. Two foramina open in its inner face: one anterior to chin notch, under anterior portion of second primary tooth the other under posterior area of fourth primary tooth. Replacement teeth sometimes visible in cleared and stained specimens, although the insertion ridge is usually present (Fig. 6a).

Ventral process of the orbitosphenoid with distinct angles along posterior ventral surface, forming two steps at its base, then flat to its apex; its anterior profile concave; process apex club shaped (Fig. 7a).

Proportional measurements in thousands of SL and counts are in Table 1, and frequency distributions of counts in Table 2. A photograph of a paratype is shown in Fig. 2a.

Recently, Winemiller (1989) reported on the development of dermal lip (all inferior) protuberances for aquatic surface respiration in thirteen characids (one of them **Astyanax bimaculatus),** more or less rectangular from upper view, fleshy, bulging, composed of edematous tissues. These protuberances were occasional, related to hypoxia and correlated with amount of dissolved oxygen. This does not seem to be the case in **A. armandoi** n. sp., given that all collections show the expanded lips at all ages. Some specimens of three poeciliid fishes from the same locality showed an expanded lower lip, possibly caused by oxygen depletion, but they are represented by a low number of individuals, mixed with normal specimens, and the condition is not associated to differences in skeleton, as it is in **A. armandoi** n. sp.; in this later case, in **Gambusia eurystoma** Miller (1975), **Poecilia sulphuraria** (Alvarez, 1948), and one unreported case being studied by the writers, may represent adaptations at the species level. It may be that the character first appears as a result of acclimation to hypoxia, but selection of the

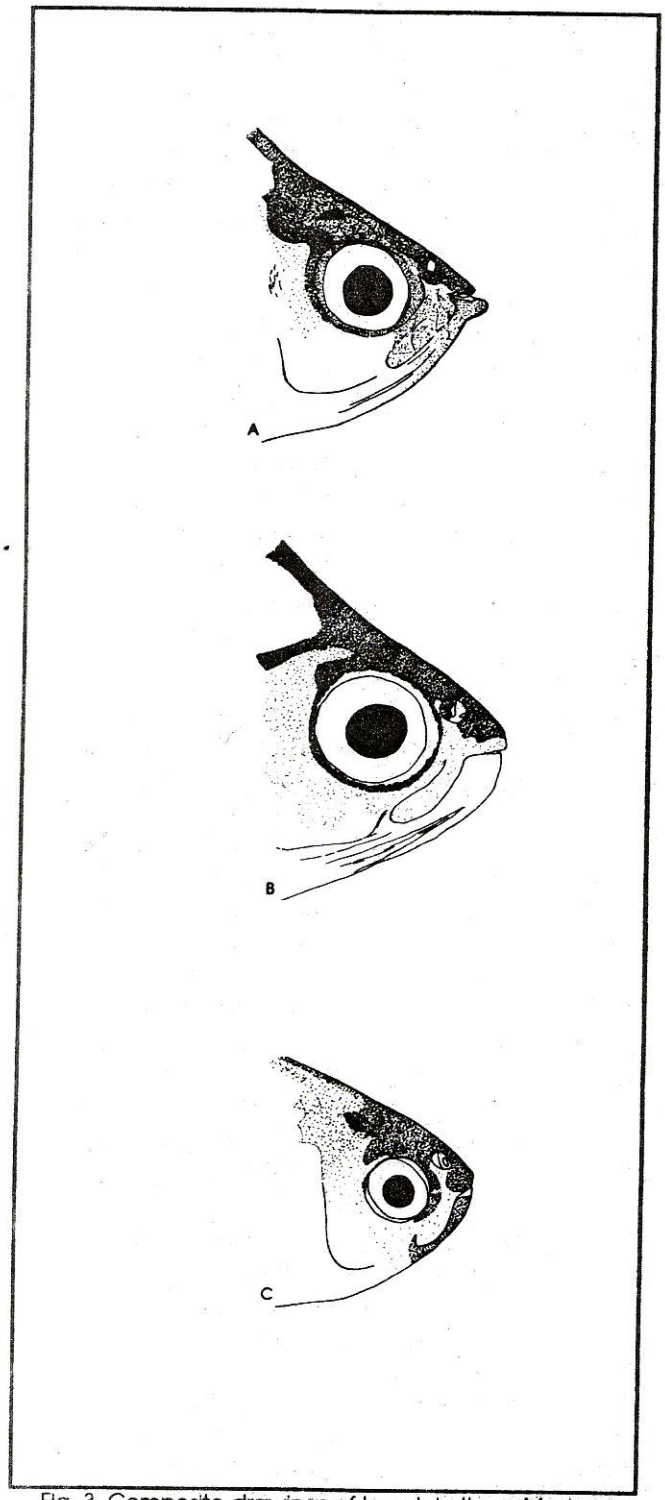

Fig. 3. Composite drawings of heads in three Mexicanus characid fishes, genus **Astyanax:** (A) **A, armandoi** n. sp., (B) **A. aeneus** from Río Usumacinta, and (C) **A. mexicanus** from Río Bravo.

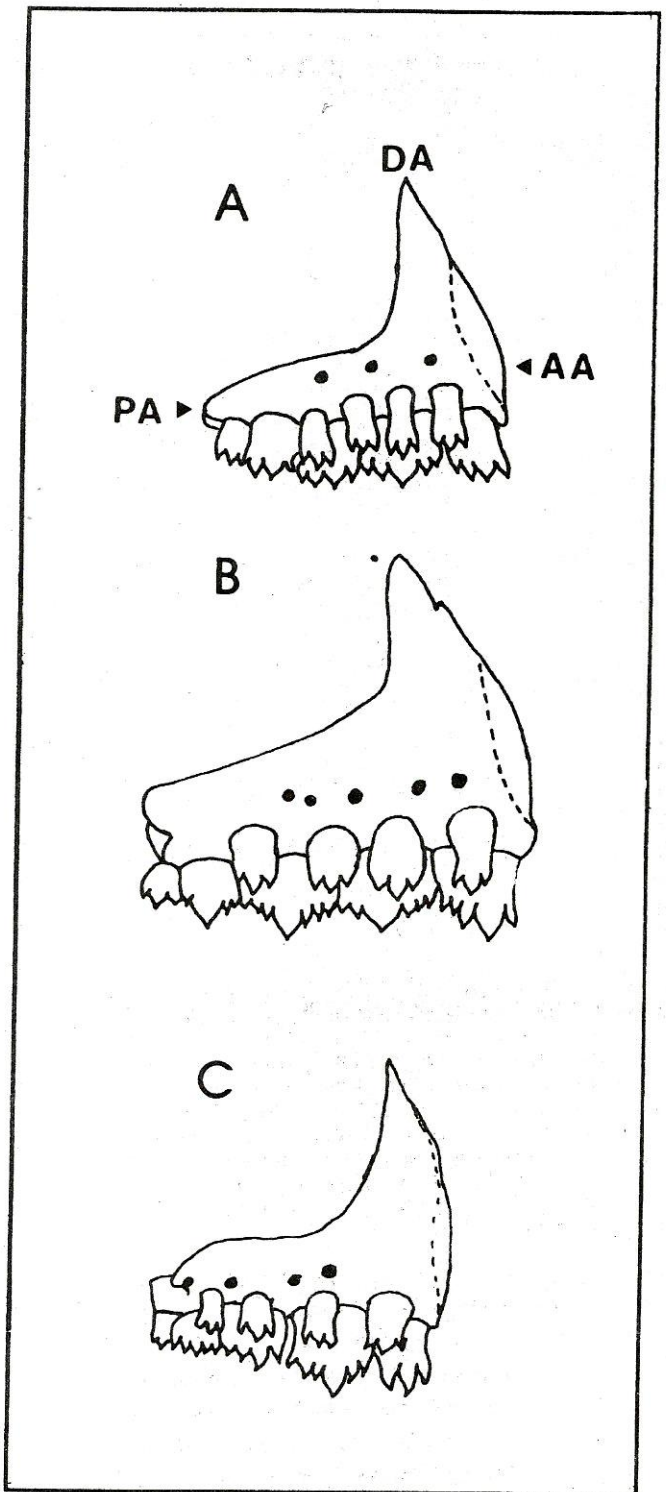

Fig. 4. Premaxillary bones of three mexican characid fishes, genus **Astyanax**. (A) **A. armandoi** n. sp., (B) **A. aeneus** and (C) **A. mexicanus.**
(A): AA = Anterior: DA = Dorsal; PA = Posterior
Composite outline drawings. Anterior view, right side.

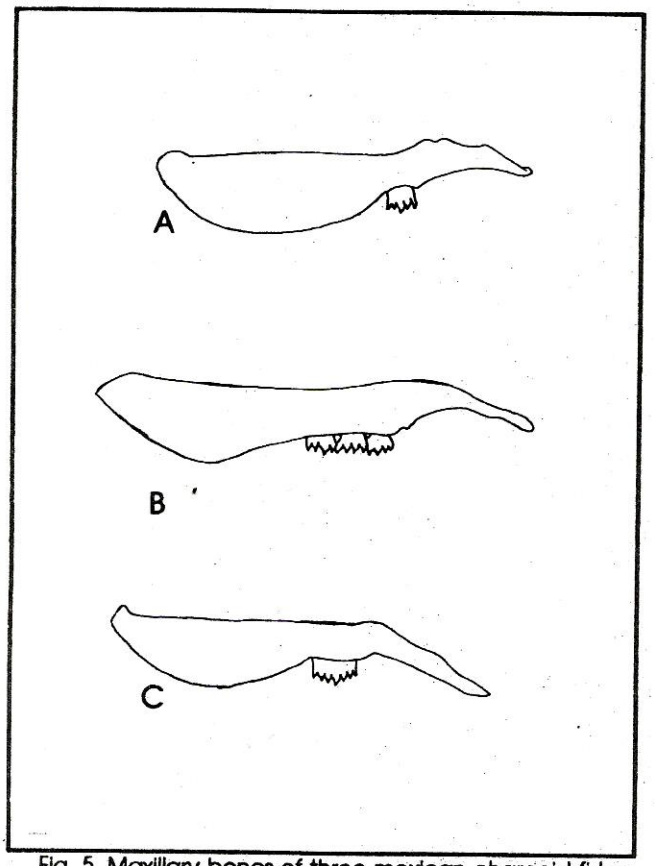

Fig. 5. Maxillary bones of three mexican characid fishes genus **Astyanax**. (A) **A. armandoi** n.sp., (B) **A. aeneus**, and (C) **A. mexicanus**.
Composite outline drawings, Lateral view, right side.

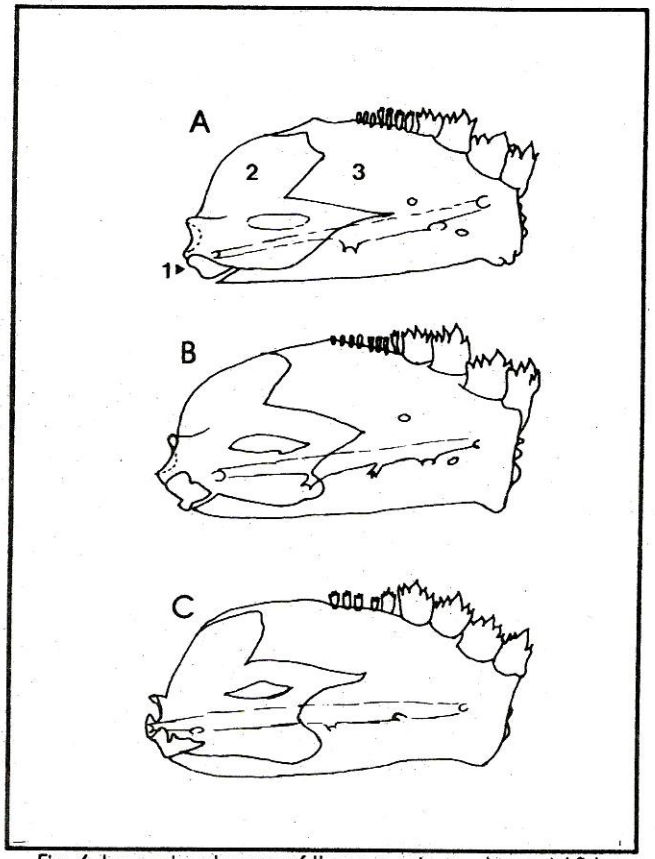

Fig. 6. Lower jaw bones of three mexican characid fishes, genus **Astyanax**. (A) **A. armandoi** n. sp., (B) **A. aeneus**, and (C) **A. mexicanus**.
1.- Angular. 2.- Articular, 3.- Dentary. Composite outline drawings.
Lateral view, right side.

most responsive specimens may result in adaptation and may be hypotesised as a preadaptation, easily fixed genetically when subject to strong selection pressures, as in certain populations in harsh environments. A paper is in process to report several cases of lower lip expansion hypothetically caused by hypoxia, besides the three asociated species mentioned above (Contreras, Obregon and Lozano, MS).

Habitats and associated species. The type locality of **A. armandoi** is 2.5 to 4 m wide and 0.3 to 0.4 m deep; water temperatures were 27°C in both August 1981 and April 1985, despite air temperatures of 25-37°C; these temperatures indicate it must be the discharge of an stenothermal spring, that could not be located. Flow was nearly even, over coarse gravel bottom, with small areas of sand and mud; it was muddier upstream to the collecting area limits. Associated fish species were the pimelodid **Rhamdia guatemalensis**, the poeciliids **Poecilia mexicana, Xiphophorus maculatus, X. helleri**, and **Heterandria bimaculata**, and the cichlids **Cichlasoma octofasciatum** and **Petenia splendida**.

Relationships and comparisons. Characid fishes of the genus **Astyanax** are inhabitants of most of Mexico (except NW) and southward to Argentina. Taxonomically and nomenclaturally they are complex, and have not been revised recently. The mexican forms are in a state of confusion, as described above; pending revisionary work, we provisionally recognize at least the following as probably valid: **A. mexicanus** Filippi, with doubtful type locality, from Central Texas and the Rio Bravo south to the Upper Rio Papaloapan, **Astyanax** sp. from the Nazas-

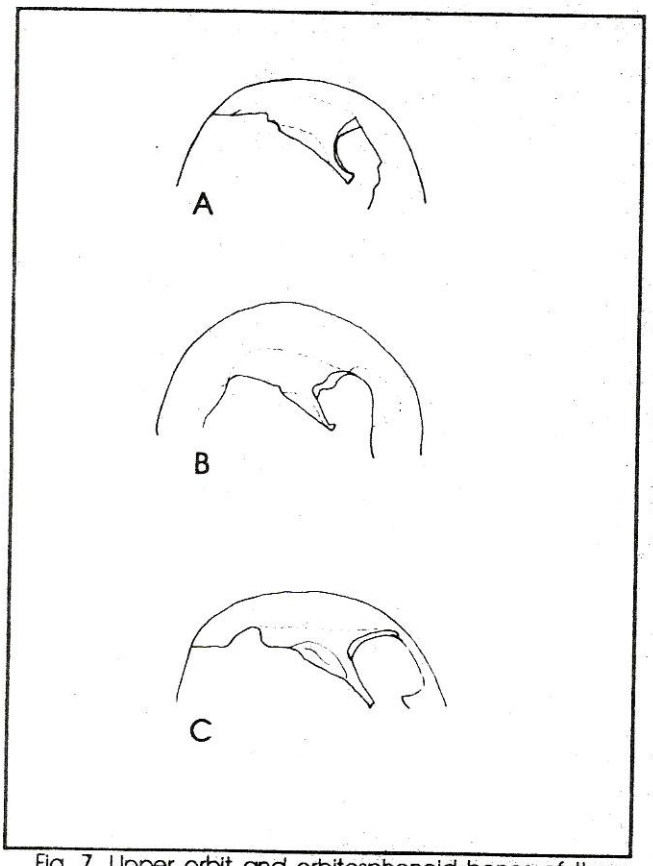

Fig. 7. Upper orbit and orbitosphenoid bones of three mexican characid fishes, genus **Astyanax** (A) **A. armandoi** n.sp., (B) **A. aeneus**, and (C) **A. mexicanus**. Composite outline drawings. Lateral view, right side.

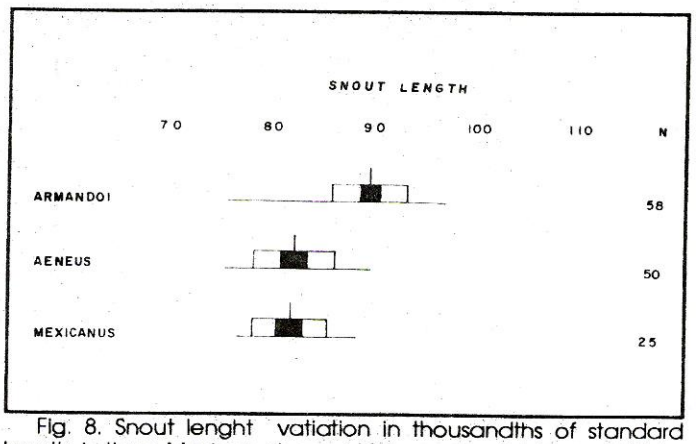

Fig. 8. Snout lenght vatiation in thousandths of standard length, in three Mexican characid fishes, using Hubbs and Hubbs (1953) graphic presentation showing range, mean, standard deviation, and two standard errors on each side of the mean: (A) **Astyanax armandoi** n. sp.; (B) **A. aeneus**, and (C) **A. mexicanus**.

Aguanaval complex, **A. aeneus** from lower Rio Papaloapan and Colima south to some place in Central America, **Astyanax** sp. from a spring in the Upper Rio Balsas, one form related to **A. aeneus** occupying coastal streams from Central Chiapas to Central Guatemala at least, and **A. armandoi** n. sp.; we defer any opinion on **A. f. altior** Hubbs inhabiting most of the Yucatan Peninsula and on the troglobitic forms formerly assigned to the genus **Anoptichthys**, that have been recognized as a distinct genus with three species, or the 3 as subspecies either of **A. fasciatus** or **A. mexicanus** as summarized by Reddell (1981:238-243), to whom the reader is referred for detail.

We recognize the difficulties of evaluating a new form in a genus that is complex, speciose, with very similar species, wide ranging, where no recent revision has been published. It seems very remote that someone may take the revisonary task in **Astyanax**, perhaps for many years. That should not stop taxonomists from describing new forms, especially endemics, unless we want to take a swamping attitude, in a time of fast development actions that may cause extinctions, and leave us only with a few museum specimens of some unusual species. Besides, taking controversial actions is part of science, is its main base. This is in reference to the significance of one of the main characters of our new form: the expanded lips, that may be similar in appearance to a temporary and reversible condition caused by hypoxia. Permanent skeleton changes could be caused by temporary hypoxia during development; if the population is subject to that seasonal condition, it should have specimens with and without the character, and should appear polymorphic, regardless of isolation. If the population is isolated, and all specimens have similar characters, then it is most probable that they are genetically controlled. The examination of specimens of several nearby localities, all characteristically **A. aeneus**, surrounding the area where **A. armandoi** lives, points to at least a semispecies level.

The new **A. armandoi** is more similar to **A. aeneus**, with numerous characters in common or slighthly differentiated. Most probably it is its derivative, product of a single invasion of the

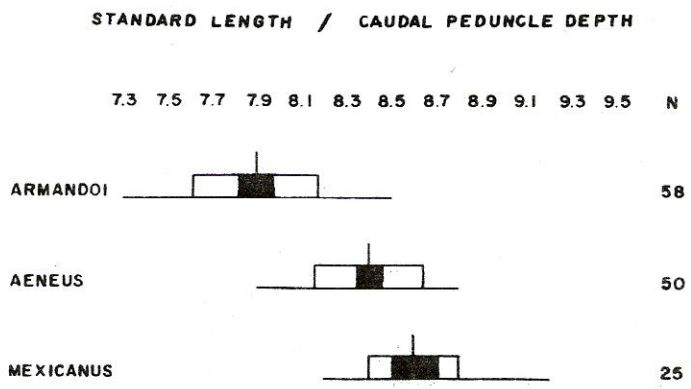

Fig.9 Times caudal peduncle length enters SL variation in trhee mexican characid fishes, genus **Astyanax**, using Hubbs and Hubbs (1953) graphic presentation showing range, mean, standard deviation and two standard errors on each side of the mean (A) **A. armandoi** n. sp.; (B) **A. aeneus** and (C) **A. mexicanus.**

ancestral **Astyanax** to Northern Central America and Mexico, hence we have made comparisons with it, and with the other wide ranging Mexican form, **A. mexicanus**, for taking a panoramic view or base line, and to leave information to whom in the future wants to revise the genus. It is also true that some of the characters in the diagnosis may be found in other Astyanax or similar forms; however it is the local combination of characters that distinguishes this form. If they are found in any other more or less distant species, taxonomically or geographically, then it most probably is not closely related. Also we reject, based on considerations of parsimony, the possibility that **A. armandoi** may be a relict of a different southern invasion, or of a different ancestral type besides the **aeneus** line, which also could be hypothesized.

We recognize the need of revisionary work on **Astyanax**, in Mexico and elsewhere, given its high geographic variability, and that many of those forms may merit taxonomic recognition. While such task is taken, we justify the distinctness of **A. armandoi** based on the unique known combination of expanded papillose lips, peculiar shape of the orbitosphenoid process and of the premaxila, pointed snout, narrow symphysis, and apparent geographic restriction. Numerous other characters, mainly osteological have a difference in shape between all three species considered, often contrasted, mostly in degree, considered fairly constant, since usually no deviation was observed in cleared and stained specimens, except as noted.

Comparison between the new **A. armandoi** and **A. aeneus** and **A. mexicanus** is in Figs. 2 to 9, Tables 1-3, in sufficient detail that is not repeated here.

Etymology. The specific epithet is in the genitive case, and is dedicated to Biol. Armando J. Contreras-Balderas, one of the original collectors, for untired support in the field, and for assistance in discussions and in the characterization of the new form, hence it is named **A. armandoi.**

OTHER MATERIAL EXAMINED

Numerous material from throughout Mexico was used for some comparisons, but it is not listed; data for the statistics and tables was derived from the following:

Astyanax aeneus. Rio Usumacinta, Chiapas: UANL 6194 (280: 41.4 - 64.5 mm SL) and UANL 6377 (3: 56.1 - 64.5 mm SL; cleared and stained), Rio en Boca del Cerro, limits of Tabasco/Chiapas; M.L. Lozano and A. J. Contreras; May 7, 1980. UANL 5818 (250: 53.9 - 77.4 mm SL) and UANL 6376 (3: 59.6 - 77.4 mm SL, cleared and stained); Rio Chacamax at La Libertad; S. Contreras, M.L. Lozano, and A. Contreras; 13-14 February, 1980. UANL 6210 (10: 39.0 73.6 mm SL) and UANL 6379 (3: 54.4 - 63.0 mm SL; cleared and stained); Rio Chancala at Chancala; M.L. Lozano and A.J. Contreras; 8 May, 1980 .

Astyanax mexicanus. Rio San Juan, Nuevo Leon: UANL 1931 (690; 58.0- 81.6 mm SL), and UANL 6375 (2: 65.5 - 67.0 mm SL, cleared and stained). Rio Santa Catarina, under bridge on Col. del Valle, Basin of Rio San Juan (Atlantic slope); S. Contreras and students on FCB; 10 April, 1968 .

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