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DISTRIBUTIONAL AND ECOLOGICAL NOTES ON THE HALFBEAKS OF EASTERN GULF OF MEXICO, WITH A PROVISIONAL KEY FOR THEIR IDENTIFICATION.

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ABSTRACT Several fishes of the halfbeak genus *Hyporhamphus* occurring in the Mexican Gulf of Mexico and Caribbean Sea have been misidentified or confused in the literature. Most of it has centered around the taxonomic status of *H. unifasciatus* (including its synonym *H. roberti*), which is shown to comprise a complex of three species, *H. unifasciatus*, the recently described *H. meeki*, from the western Atlantic region, and an undescribed species from the eastern Pacific Ocean. Another eastern Mexico halfbeak is the freshwater form *H. mexicanus*. Using Banford and Collette (1993), we examined specimens from collections at UANL, UNAM, IPN, and ECOCH and have clarified the Mexican distribution of these species. We here report additional Mexican records of *H. meeki*, previously known only from United States waters and from the coast of Yucatán, clarify the distribution of *H. unifasciatus*, and provide the first marine record of the freshwater species *H. mexicanus*. A distribution map and keys for identification of the eastern Mexican species are provided.

KEY WORDS: hemiramphines, halfbeaks, México, fish distribution, fish ecology.

INTRODUCTION

The recent description of the new hemiramphine fish species *Hyporhamphus meeki* Banford and Collette (1993), mostly from northern Gulf of Mexico and western north Atlantic, makes it necessary to correct the records of the eastern Mexican members of the *Hyporhamphus* complex. Banford and Collette (1993), when describing their new species had examined 60 specimens in seven lots from only four localities in Mexican waters. Published records from the Mexican Gulf coast have been relatively few, compared to the well sampled Atlantic and Caribbean areas. Banford and Collette (1993) gave the distribution of the new *H. meeki* as Passamaquoddy Bay to Florida, Galveston (Texas), and Yucatán. They constrained the name *H. unifasciatus* (and its synonym *H. roberti*), to the northern form ranging from Florida, then south to the southern Gulf of Mexico, West Indies and Uruguay. One species, *H. mexicanus*, was formerly known only from freshwaters of Río Coatzacoalcos and Río Usumacinta. Records of *H. unifasciatus* from the oriental Pacific Ocean were regarded as an undescribed species of the genus (Banford and Collette 1993). Re-identification of such records should await the description of the new species and a future paper shall analyze their Mexican distribution.

The records from Tamaulipas (Gómez-Soto and Contreras-Balderas 1988) are a composite of *H. unifasciatus* and *H. meeki*, based upon re-examination of specimens at UANL. *H. unifasciatus* and *H. roberti*,

were recorded from the coasts of Veracruz (Castro-Aguirre 1976; Reséndez 1979; 1981, 1991; Reséndez and Kobelkowsky 1983; Lozano-V. García-R. and Contreras-B. 1993), and often included in their samples also *H. meeki*. Some of the specimens of said authors were re-identified, as shown in the synonymy and materials sections, under each species. Other records cannot be assigned to either species, unless they can be related to specific samples in the catalog of UNAM, such as *H. unifasciatus* from Pueblo Viejo, La Mancha, Mandinga and Términos (Reséndez, 1991; Reséndez and Kobelkowsky 1983); and *H. roberti* from Tamiagua, Mandinga, and Alvarado (Reséndez 1991; Reséndez and Kobelkowsky 1983).

MATERIALS AND METHODS

Fish Collections referred to in this paper were those housed at Universidad Autónoma de Nuevo Leon (Facultad de Ciencias Biológicas, Monterrey) as UANL, Universidad Nacional Autónoma de Mexico-Instituto de Biología (basis of some published records) as UNAM-P, Instituto Politecnico Nacional/Escuela Nacional de Ciencias Biológicas as IPN(ENCB-P), both from Mexico City, and Colegio de la Frontera Sur/Unidad Chetumal, Quintana Roo, are referred to by their acronyms, recognized as official (Leviton et al. 1985; Leviton and Gibbs 1988), except the last one, for which the institution uses ECO-CH (J. Schmitter 1996: pers. com.). Methods used were the standard methods of Hubbs and Lagler

(1947), as reported diagnostic for the species by Banford and Collette (1993), such as total gill rakers on first and second arches, pectoral rays, and ratio of preorbital length to orbit diameter; scales in lateral series and anal rays, are used in the taxonomic comments and in constructing the accompanying identification keys. Meristic ranges are presented as total (usual counts in parenthesis). A reliable field character is the width of longitudinal streak, as related to the orbit diameter. The distribution records appear on Figure 1.

MATERIAL EXAMINED

Species Accounts.

Hyporhamphus unifasciatus (Ranzani 1842).

H. roberti, Lozano-V., Garcia-R. and Contreras-B. 1993 (distr.). *H. unifasciatus*, Gomez-Soto and Contreras-B. 1988 (distr.); Lozano-V., Garcia-R., and Contreras-B., 1993 (distr.); Banford and Collette 1993 (descr., distr., comp.).

Specimens examined. Tamaulipas: UANL 7880 (2: 155-163 mm SL) and UANL 7897 (1: 149 mm SL), both Isla Vaca, Laguna Madre. Veracruz: UNAM-P 278 (5: 138-167 mm SL), Estero Cucharas and Ensenada Tigre in Laguna Tamiahua. UANL 10986 (1:162 mm SL), Mocambo Beach. UNAM 5410 (1:173 mm SL), Sontecomapan. UNAM-P 5324 (2:123-143 mm SL), Monte Pío, Los Tuxtlas. Campeche: UNAM-P 4620 (1: 143 mm SL), Muelle Los Piratas, Ciudad Campeche. Yucatan: UNAM-P 3189 (3:124-148 mm SL), Playa Margaritas, Celestún. UNAM-P 3161 (4:181-202 mm SL), Celestun.

Recognition. *H. unifasciatus* is recognized by the following combination of characters: dorsal and anal fins covered with scales; low gill raker count on first arch 26-35 (28-32), on second arch 19-28 (21-26); pectoral rays usually 9-12 (10-11); anal rays 14-18 (15-17); shorter lower jaw 150-310, ratio of preorbital length to orbit diameter <0.70. The longitudinal streak widens gradually towards the tail from pupil to eye diameter.

Ecological notes. Euryhaline species. Localities from Tamaulipas, Veracruz and Yucatan, are coastal lagoons or estuaries, except Mocambo, and all have relatively turbid waters. The locality from Campeche is open and sandy, with strong influence of submerged phreatic freshwater springs, usual around the Yucatan Peninsula, hence equivalent to brackish water.

Distribution. This is a southern species, ranging south from Laguna Madre (Tamaulipas México), around the Gulf of México to eastern and southwestern Florida Peninsula, through the Caribbean Sea, south to Rio de la

Plata, Uruguay. Figure 1 shows only records from Mexican institutions.

Size. Maximum 205 mm SL.

Hyporhamphus meeki Banford and Collette 1993.

Hemirhamphus unifasciatus, Reséndez, 1981:267-268 (Laguna Panlau, Camp., char.). *Hyporhamphus meeki* Banford and Collette 1993 (orig. descr., distr. comp.)

Specimens examined. Tamaulipas: Laguna Madre at Carbonera. UANL 7701 (10:138-164), same locality. UANL 7724 (2:38-43). UANL 10429 (1:148), same locality. UANL 10393 (2:40-63), same locality. UANL 7670 (2:149-152), Laguna Madre at Boca de Catán. UANL 11898 (3:38-76), Laguna Madre at Mezquital. UANL 7478 (1:156), Mouth, Río Soto La Marina. Veracruz: UNAM P 7308 (5:138-167), Ensenada Cucharas and Ensenada El Tigre. UNAMP 2420 (2:147-154), Juan Román, Laguna de Tamiahua. UNAMP 2425 (1:144), Canal de Isla, Tamiahua. UNAMP 2718 (1:129), El Higuerón, Laguna de Tamiahua. UANL 788 (1, 177), Isla Lobos. UANL 10961 (1, 186), Casitas. UNAMP 529 (1:216), Between Tauche and El Real, Sontecomapan. IPN/ENCB P 2478 (1:232), Barra de Sontecomapan (N de la laguna). Yucatan: UNAM P 7708 (1:125), Playa Margaritas, Celestún. UNAM P 798 (1:154), Puerto Progreso. Quintana Roo: ECO-CH 3086 (1:145), Playa El Arenal, Laguna de Bacalar.

Literature records. Reséndez (1981) reported as *H. unifasciatus* a specimen from Laguna Panlau (Campeche) as having 37 gill rakers on the first arch, which is well within the range of *H. meeki*. Banford and Collette (1993) listed and mapped (slightly misplaced to the west) two Mexican records, Progreso and the nearby Chixchulub, Yucatan. Other literature records, are unidentifiable, and probably a mixture of species.

Recognition. *H. meeki* is easily recognized by having the dorsal and anal fins covered with scales; total gill rakers on first arch, 31-43 (32-39); pectoral rays usually 10-13 (11-12); anal rays 14-18 (15-17); longer lower jaw 206-351; ratio of preorbital length to orbit diameter >0.70. The longitudinal streak is as wide as pupil and widens abruptly to twice its width just before and below dorsal fin.

Ecological notes. The coralline Isla de Lobos is the only Mexican record of *H. meeki* from strictly marine and reef waters; the Yucatan Peninsula records are from areas with freshwater influence, as explained above; all other collections are from coastal lagoons or estuaries, with usually turbid waters.

Distribution. *H. meeki* is mostly northern in distribution, occurring through the Gulf of México

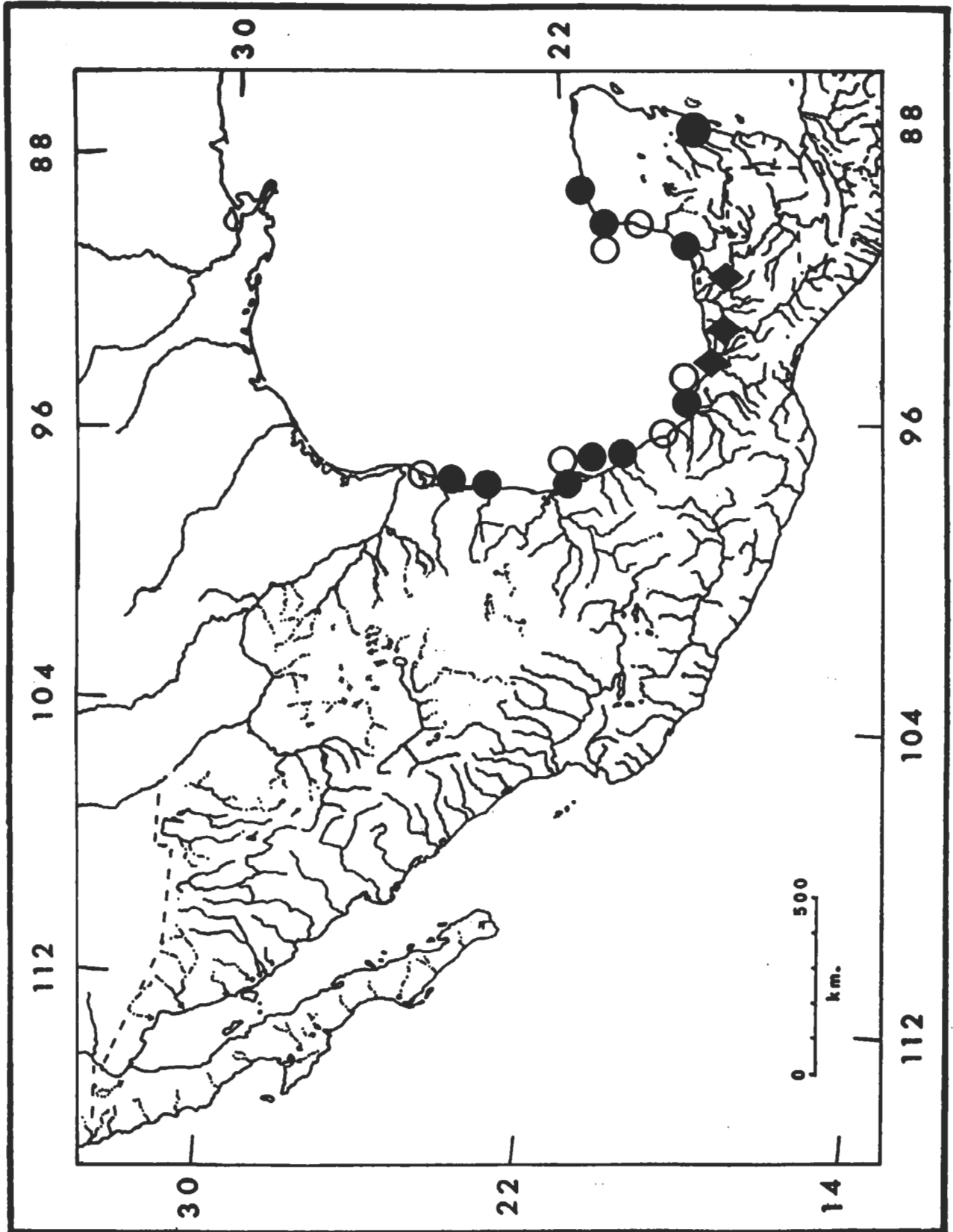


Figure 1. Distributions of eastern México Hemiramphine fishes of the genus *Hyporhamphus* based on Mexican collections only:
 ● *H. meeki* ○ *H. unifasciatus* ◆ *H. mexicanus*
 Paired symbols indicate sympatry.

(most Mexican states, not yet recorded from Tabasco, México), around Florida, and north to Camcook, Passamaquoddy Bay, New Brunswick, Carolina. Here recorded for the first time from the Caribbean region at Laguna Bacalar, Quintana Roo, México. Figure 1 shows only records from Mexican institutions.

Remarks. Gill raker count is increased to a maximum of 43 (UANL 7724, Laguna Madre at Boca de Catán).

Size. Maximum 232 mm SL (IPN P-2478, Barra de Sontecomapan, north of the lagoon).

Hyporhamphus mexicanus Alvarez 1959.

Hyporhamphus mexicanus Alvarez 1959 (orig. descr., comp.), Río Coatzacoalcos, Santa María Chimalapa, Chiapas. Miller 1966 and 1976 (distr.) Lozano-Vilano and Contreras-Balderas 1987 (list.)

Specimens examined. Veracruz: UANL 2416 (1: 188); pool 1 km E from mouth of Río Coatzacoalcos (marine beach). Tabasco: UANL 2339 (1:55); San Fernando, Río Usumacinta. Chiapas: UANL 5804 (7: 52-87); Lago Catazajá, Río Usumacinta.

Recognition. Dorsal and anal fin interradi al membranes without scales; total gill rakers on first arch 19-20; pectoral rays 10-11; anal rays 12-14; scales in lateral series 52-59.

Ecological notes. This species, all previous records of which are from freshwater, is here recorded from probably marine water (very salty to taste, salinity not measured), based on capture of a single specimen from a beachside pool, just below the high tide mark, on the Gulf coast 1 Km E of the mouth of Río Coatzacoalcos. No source of freshwater (creek or bayou) was in the immediate vicinity. This halfbeak might be incidentally collected in marine waters of this region, near river mouths. The catch included nine euryhaline species and one barracuda.

Distribution. Ríos Coatzacoalcos and Usumacinta, and neighboring Gulf of México. Figure 1 shows records from Mexican collections only.

Size. This is a small species, maximum SL 118 mm.

DISCUSSION

The presence of two halfbeak species in the genus *Hyporhamphus* in coastal waters of México has not been recognized until recently (Banford and Collette 1993) and three in this paper. *H. meeki* and *H. unifasciatus* are euryhaline and roughly sympatric in the Gulf of México. They occur in the same lagoon, as evidenced by records at Laguna Madre, Tamaulipas, Laguna Tamiahua and Laguna Sontecomapan, Veracruz. They have also been taken together at Indian River Lagoon, Florida (Banford and

Collette 1993), and two Mexican localities: Ensenada Cucharas and Ensenada Tigre (Laguna Tamiahua, Veracruz), and Playa Margaritas, Celestún (Yucatán). Some specimens cited in published records were reidentified either as *H. unifasciatus* or *H. meeki*. Most literature records for the Gulf of México, under the synonym names *H. unifasciatus* or *H. roberti*, may probably comprise that species and *H. meeki*, but can not be evaluated since they are not represented by published museum accessions. *H. mexicanus* hitherto known only from fresh water, is recorded for the first time from a marine tide pool locality and a few new inland localities.

Key To Eastern Mexican Hemiramphid Fish Species Of The Genus *Hyporhamphus*.

- 1a.- Dorsal and anal fin interradi al membranes with numerous lines of scales.
 - 2a. Total gill rakers 26-35 (28-32); pectoral fin rays 9-12 (10-11); lateral band nearly even in width throughout its length, wider than pupil..... *H. unifasciatus*.
 - 2b. Total gill rakers 31-40, usually 32-37; pectoral rays 10-13 (11-12); lateral band as wide as pupil on most of the body, doubling its width just before and below dorsal fin..... *H. meeki*.
- 1b.- Dorsal and anal fin interradi al membranes without scales. Total gill rakers 19-20; pectoral rays 10-11; lateral band similar to *H. unifasciatus*, being more slender; *H. mexicanus*.

RESUMEN

Varios peces hemirámfidos del género *Hyporhamphus* del Golfo de México y Mar Caribe mexicanos han sido mal identificados o confundidos en la literatura. La mayoría de estos casos está centrada alrededor de la situación taxonómica de *H. unifasciatus* (incluyendo su sinónimo *H. roberti*), que se sabe está compuesto por un complejo de tres especies, *H. unifasciatus*, el recientemente descrito *H. meeki* del Océano Atlántico occidental y una especie indescrita del Océano Pacífico oriental. Aplicando Banford y Collette (1993), re-examinamos ejemplares de las colecciones de UANL, UNAM, IPN, y ECOCH y hemos aclarado la distribución mexicana de estas especies. Aquí registramos localidades adicionales de *H. meeki*, anteriormente conocido sólo de Estados Unidos y de las costas de Yucatán, aclaramos la distribución de *H. unifasciatus*. Otra especie de mediopico del México oriental es la forma de agua dulce *H. mexicanus*, para la cual aportamos su primer registro marino. Se presenta un mapa distribucional y una clave de identificación de las especies estudiadas.

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