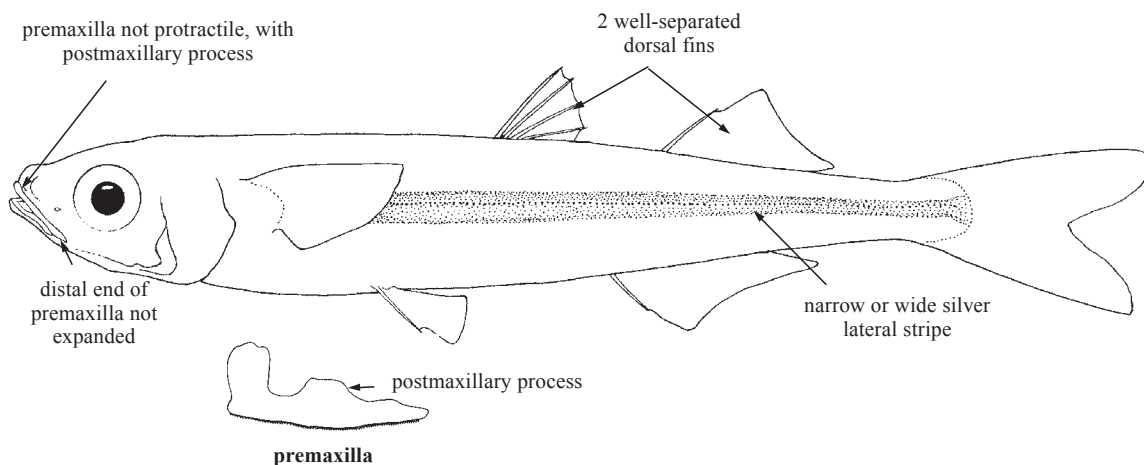


Order **ATHERINIFORMES****ATHERINIDAE****Silversides**

B. Chernoff, Department of Zoology, Field Museum, Chicago, Illinois, USA

Diagnostic characters: Small fishes less than 100 mm standard length. Terminal mouth, **premaxilla not protractile; distal end of premaxilla not expanded; premaxilla with a postmaxillary process**; small teeth present on both jaws and sometimes the vomer; gill rakers generally large; large eyes; opercular bones without spines. Lateral line sensory system not complete; **anterior infraorbital sensory canal connected to preopercular canal**. Two **well-separated dorsal fins**, the first with 2 to 5 spines, the second with a single anterior spine; anal fin with a single anterior spine; pelvic fin inserted high on body, above midlevel of eye; pelvic fin abdominal with 1 spine and 5 soft rays; caudal fin forked. Scales cycloid; moderately imbricated with smooth, crenate, or lacinate posterior margin. **Colour:** translucent or green-yellow on dorsal surface with dark mid-dorsal stripe; pale to slightly yellowish ventrally; **narrow or wide silver lateral stripe**.

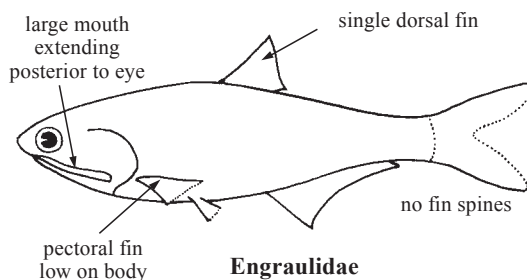
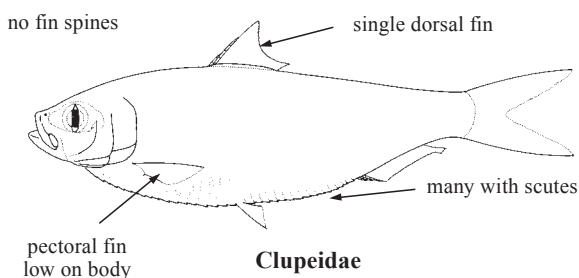


Habitat, biology, and fisheries: The true silversides often form large schools. These are generally omnivorous fishes but tend to consume many organisms in the plankton or those close to the surface. These are principally marine forms and estuarine forms but a few, such as the *Alepidomus evermanni*, also live in fresh water. Other species live among reefs and in surge channels of reefs and rocky coasts where it has been suggested that their silvery bodies are cryptic in the roiled waters of the surf. The economic importance of the true silversides has dwindled where they are now minimally consumed by people but are still used as bait.

Similar families occurring in the area

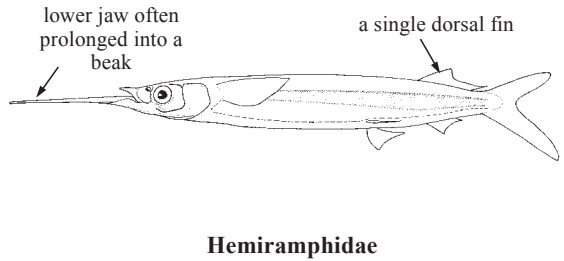
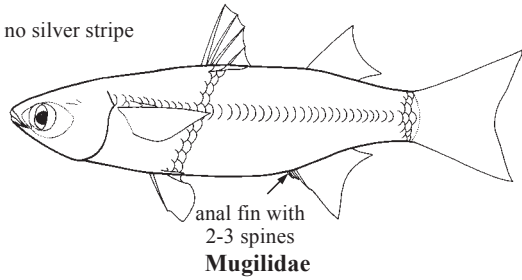
Clupeidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on the body; many species possess midventral scutes.

Engraulidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on the body; large mouth extending posterior to eye with a well-rounded, overslung snout.

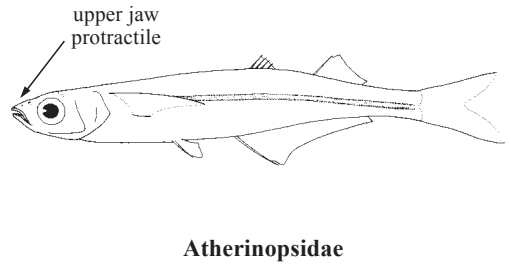


Mugilidae: anal fin with 2 or 3 spines (only 1 in Atherinidae); 24 to 26 vertebrae (more than 30 in Atherinidae); lacking a lateral silver stripe; much larger, exceeding 150 mm standard length.

Hemiramphidae: lower jaw often very prolonged into a beak; only a single dorsal fin; lateral line present and runs along the lower portion of the body, just above the pelvic and anal fins.



Atherinopsidae: upper jaw almost always protractile with a fleshy labial ligament (not protractile and ligament slender in Atherinidae); distal end of premaxilla usually very expanded (narrow and pointed in Atherinidae); premaxilla lacking a postmaxillary process (present in Atherinidae); preopercular sensory canal connects to mandibular canal (connects to anterior infraorbital canal in Atherinidae).



Key to the species of Atherinidae occurring in the area

- 1a. Anterior part of breast to gular region naked; scale rows from side of anal fin to mid-dorsal row 10; gill rakers on first arch less than or equal to 21; lateral silver stripe less than or equal to half scale height below dorsal fin (Fig. 1) *Alepidomus evermanni*
- 1b. Anterior breast to gular region fully scaled; scale rows from side of anal fin to mid-dorsal row less than or equal to 7; gill rakers on first arch greater than or equal to 24; lateral silver stripe greater than or equal to 3/4 of scale height below dorsal fin. → 2

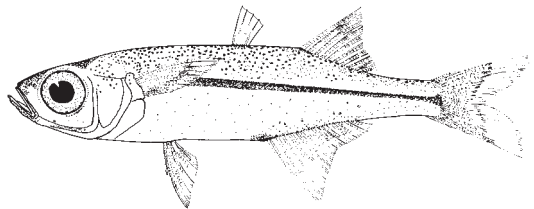


Fig. 1 *Alepidomus evermanni*

- 2a. Coronoid process of mandible not elevated; patch of teeth in mandible projecting anteriorly near mental symphysis; vomerine and metapterygoid teeth numerous; bases of dorsal and anal fins scaled (Fig. 2) *Atherinomorus stipes*
- 2b. Coronoid process of mandible elevated; no patch of teeth on mandible projecting anteriorly; vomerine and metapterygoid teeth few or absent; bases of dorsal and anal fins not scaled (Fig. 3) *Hypoatherina harringtonensis*

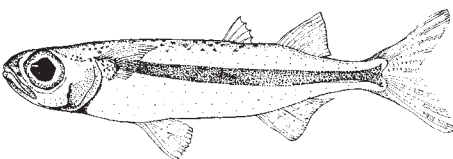


Fig. 2 *Atherinomorus stipes*

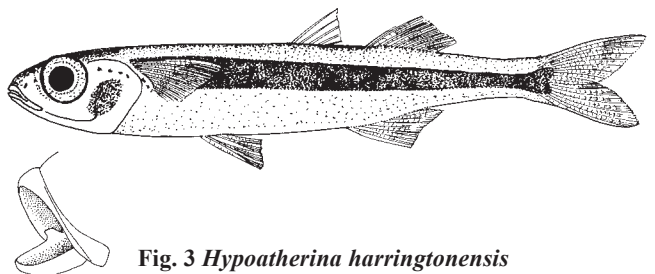




Fig. 3 *Hypoatherina harringtonensis*

List of species occurring in the area

The symbol  is given when species accounts are included.

 *Alepidomus evermanni* (Eigenmann, 1903).

 *Atherinomorus stipes* (Müller and Troschel, 1848).

 *Hypoatherina harringtonensis* (Goode, 1877).

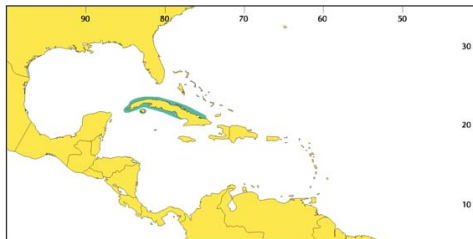
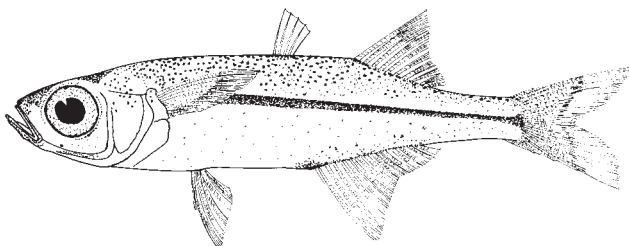
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- Chernoff, B. 1986. Phylogenetic relationships and reclassification of menidiine silverside fishes, with emphasis on the tribe Membradini. *Proc. Acad. Nat. Sci.*, 138:189-249.
- Dyer, B. and B. Chernoff. 1996. Phylogenetic relationships and reclassification of atheriniform fishes. *Zool. J. Linnean Society*, 117:1-69.
- Schultz, L.P. 1948. A revision of six subfamilies of atherine fishes, with descriptions of new genera and species. *Proc. U.S. Nat. Mus.*, 98(3220):1-48.

***Alepidomus evermanni* (Eigenmann, 1903)**

En - Cuban silverside.

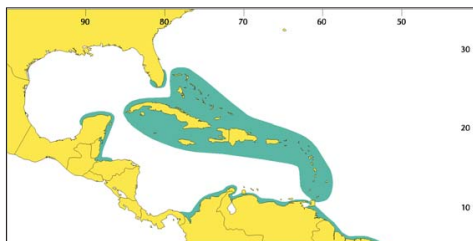
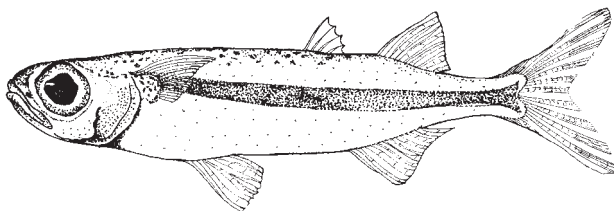
Maximum length 50 mm standard length; commonly 35 mm standard length. Very lightly coloured; lateral stripe thin. Primarily fresh water but occasionally found in estuaries or on the coast near mouths of rivers and in flooded mangroves. Known only from Cuba.



***Atherinomorus stipes* (Müller and Troschel, 1848)**

En - Hardhead silverside; **Fr** - Athérine tête-dure; **Sp** - Tinícalo cabezón.

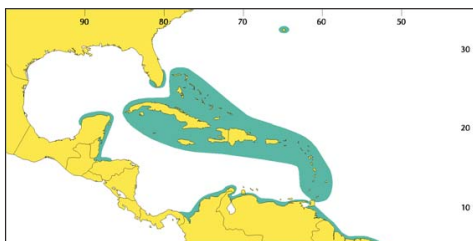
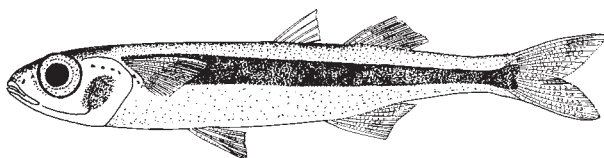
Maximum length 100 mm standard length; commonly 60 mm standard length. Olivaceous above with pale or translucent lower sides; dorsum and upper sides strongly crosshatched; caudal lobes often black in large specimens. One of the most abundant silverside species occupying pelagic coastal habitats, especially over turtle grass beds and along the upper portions of coral reefs. Ranges from south Florida across the Caribbean to the Yucatán and down to Argentina.



***Hypoatherina harringtonensis* (Goode, 1877)**

En - Reef silverside; **Fr** - Athérine des récifs; **Sp** - Tinícalo de arrecife.

Maximum length 100 mm standard length; commonly 60 mm standard length. Colour in life is greenish dorsally to silver ventrally; upper sides and dorsum darkly peppered and occasionally crosshatched; silver stripe very wide and bordered dorsally by black. This species often lives in dense schools and is pelagic in coastal and off-shore environments, entering turtle grass beds in the evening. Ranges from Bermuda, southern Florida, across the Caribbean to the Yucatán and down to Argentina.

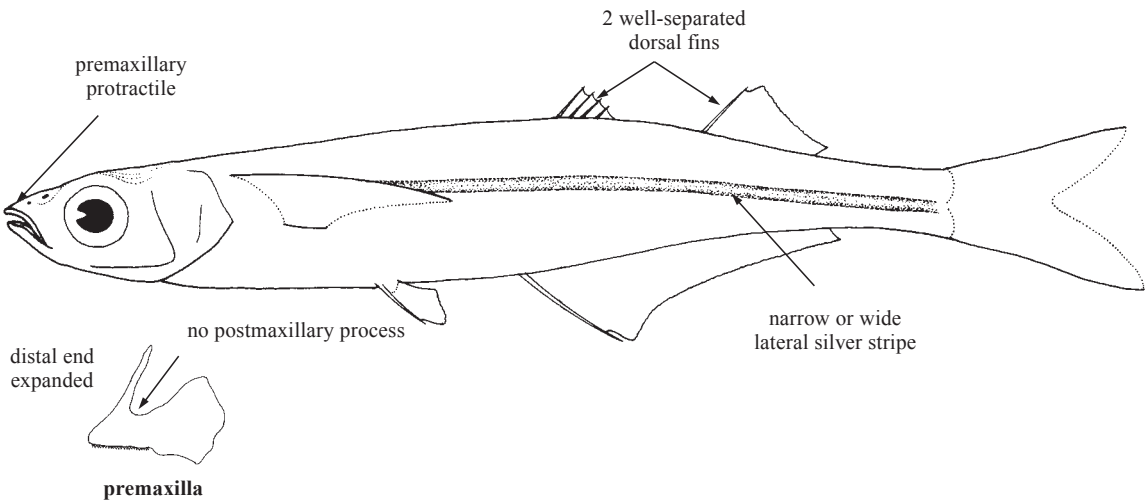


ATHERINOPSIDAE

New World silversides

B. Chernoff, Department of Zoology, Field Museum, Chicago, Illinois, USA

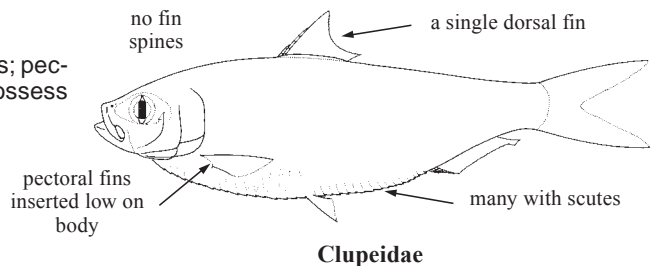
Diagnostic characters: Mostly small fishes less than 150 mm standard length though some species in the eastern Pacific exceed 1 m. Terminal mouth, **premaxillary protractile**, usually highly protractile; **distal end of the premaxilla expanded**, reduced slightly in a few species; **premaxilla lacks postmaxillary process**; small teeth present on both jaws and sometimes on vomer and under the eyes on the mesopterygoid; gill rakers generally large; large eyes; opercular bones without spines. Lateral line sensory system not complete; **mandibular sensory canal connected to preopercular canal**. Two **well-separated dorsal fins**, the first with 2 to 9 spines, the second with a single anterior spine; anal fin with a single anterior spine; pelvic fin inserted high on body, above midlevel of eye; pelvic fin abdominal with 1 spine and 5 soft rays; caudal fin forked. Scales cycloid, moderately imbricated with complete, crenate, or lacinate posterior margins. **Colour:** translucent or green-yellow on dorsal surface with dark middorsal stripe; pale to slightly yellowish ventrally; **narrow or wide lateral silver stripe**.



Habitat, biology, and fisheries: The New World silversides often form large schools but a number of species live in smaller groups. These are generally omnivorous fishes but tend to consume many organisms in the plankton or those close to the surface; a few species are piscivorous. These are marine, estuarine and fresh-water forms that mostly live at sea level or low elevation; some members of the family have penetrated the highlands of Mexico, Guatemala, and Chile. Other species have a more pelagic and surf zone existence and can live at the edges of reefs and along rocky coasts. The economic importance of the marine and estuarine atherinopsids of the Western Central Atlantic has dwindled where they are now minimally consumed by people but are still used as bait; however, either purely fresh-water species (e.g., *Chirostoma estor*, *Atherinella sardina*) or marine members outside the area of coverage (e.g., *Atherinops*, *Odontesthes*) are commercially important as foodfishes.

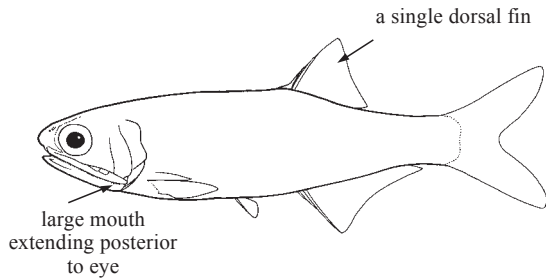
Similar species occurring in the area

Clupeidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on body; many species possess midventral scutes.

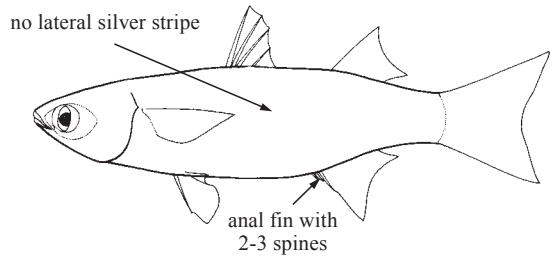


Engraulidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on body; large mouth extending posterior to eye with a well-rounded, overslung snout.

Mugilidae: anal fin with 2 or 3 spines (only 1 in Atherinopsidae); 24 to 26 vertebrae (more than 30 in Atherinopsidae); lacking a lateral silver stripe; much larger, exceeding 150 mm standard length.



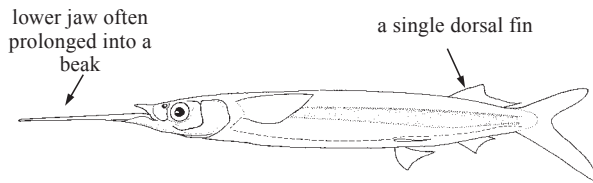
Engraulidae



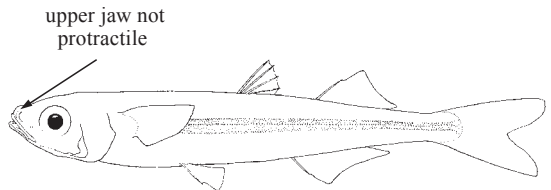
Mugilidae

Hemiramphidae: lower jaw often very prolonged into a beak; only a single dorsal fin; lateral line present and runs along lower portion of body, just above pelvic and anal fins.

Atherinidae: upper jaw never protractile with a thin labial ligament (usually highly protractile and ligament fleshy in Atherinopsidae); distal end of premaxilla narrow and pointed (usually expanded in Atherinopsidae); premaxilla with a postmaxillary process (absent in Atherinopsidae); preopercular sensory canal connects to anterior infraorbital canal (connects to mandibular canal in Atherinopsidae).



Hemiramphidae



Atherinidae

Key to the species of Atherinopsidae occurring in the area

- 1a. Spines of first dorsal fin 6 to 9; soft rays of second dorsal fin 15 to 19, rarely 14; mullet-like in appearance (Fig. 1) *Melanorhinus microps*
- 1b. Spines of first dorsal fin 2 to 4, rarely 5; soft rays of second dorsal fin 12 or fewer; elongate; not mullet-like in appearance → 2

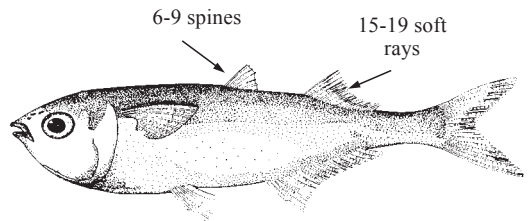


Fig. 1 *Melanorhinus microps*

- 2a. Rostral sensory system absent, lacking pits, pores, or tubes; lateral axillary scale of pelvic fin absent or poorly developed, less than or equal to 1/4 length of fin; spinous dorsal fin always anterior to origin of anal fin (Fig. 2a) → 3
- 2b. Rostral sensory system present with pits, pores, depressions, or tubes; lateral axillary scale of pelvic fin well developed, greater than or equal to 1/3, usually greater than or equal to 1/2 length of fin; origin of spinous dorsal fin anterior or posterior to anal-fin origin (Fig.2b) → 9

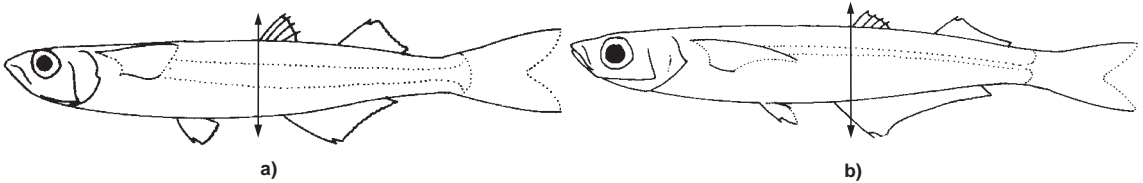


Fig. 2 relative position of dorsal and anal fins

- 3a. Origin of spinous dorsal fin posterior to vertical through anus; segmented anal-fin soft rays 20 to 27, rarely 19; lateral scales 39 to 47, rarely 38 (Fig. 3) *Menidia menidia*
- 3b. Origin of spinous dorsal fin anterior to vertical through anus; segmented anal-fin soft rays 8 to 19, rarely 20; lateral scales 28 to 41, rarely 42 or 43 → 4

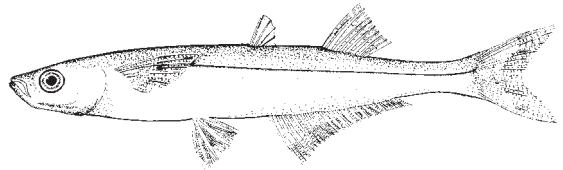


Fig. 3 *Menidia menidia*

- 4a. Horizontal distance between spinous dorsal and anal fins 7.0 to 18.0% standard length; posterior extension of swimbladder into urosome short and opaque. → 5
- 4b. Horizontal distance between spinous dorsal and anal fins 1.2 to 8.3% standard length, usually less than 7% standard length; posterior extension of swimbladder into urosome long and transparent or opaque → 8
- 5a. Spinous dorsal fin originates over or posterior to distal quarter of pelvic fin, bases of posterior dorsal-fin spines behind tips of pelvic fin; segmented anal-fin soft rays 13 to 19; lateral scales 34 to 43 (Fig. 4) *Menidia peninsulae*
- 5b. Spinous dorsal fin originates over midpoint of pelvic fin, entire base of spinous dorsal fin over pelvic fin; segmented anal-fin soft rays 8 to 15; lateral scales 28 to 34. → 6

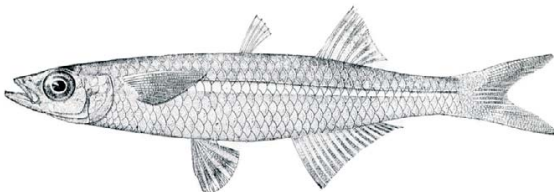


Fig. 4 *Menidia peninsulae*

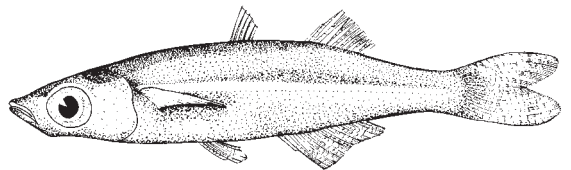


Fig. 5 *Menidia conchorum*

- 6a. Scale rows from insertion of pelvic fin to origin of spinous dorsal fin 8; on scale row below lateral stripe, lateralis pits begin on sixth scale behind pectoral-fin base (Fig. 5) . *Menidia conchorum*
- 6b. Scale rows from insertion of pelvic fin to origin of spinous dorsal fin 7; lateralis pits begin on third or fourth scale beyond pectoral-fin base on scale row below lateral stripe → 7

- 7a. Lateral scales 32 to 34; segmented anal-fin soft rays 10 to 14 (Fig. 6) *Menidia* sp.
- 7b. Lateral scales 28 to 31; segmented anal-fin soft rays 8 to 12 (Fig. 7) *Menidia colei*

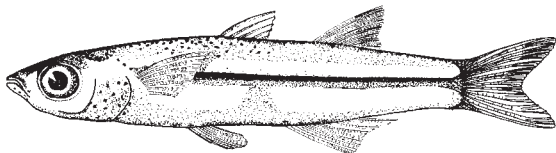


Fig. 6 *Menidia* sp.

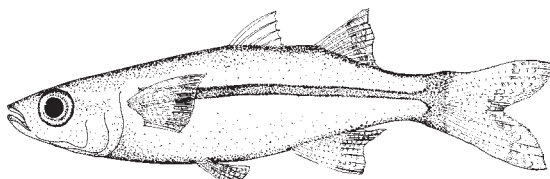


Fig. 7 *Menidia colei*

- 8a. Second dorsal-fin soft rays usually 9; posterior extension of swimbladder into urosome long and transparent with smoothly rounded tip; males and females (Fig. 8) *Menidia beryllina*
- 8b. Second dorsal-fin soft rays usually 8; posterior extension of swimbladder into urosome long and opaque with slightly blunt tip; females only (Fig. 9) *Menidia clarkhubbsi*

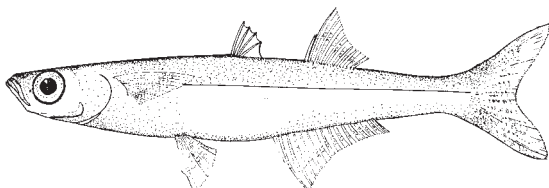


Fig. 8 *Menidia beryllina*

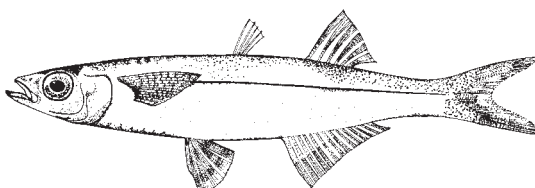


Fig. 9 *Menidia clarkhubbsi*

- 9a. Rostral sensory system with 4 large quadrangular depressions at anterior margin of frontal bones (Fig. 10a); spinous dorsal fin anterior to origin of anal fin → 10
- 9b. Rostral sensory system with pits, tubes, and excavations but lacking quadrangular excavations at anterior margin of frontal bones (Fig. 10b); spinous dorsal fin posterior to origin of anal fin → 13

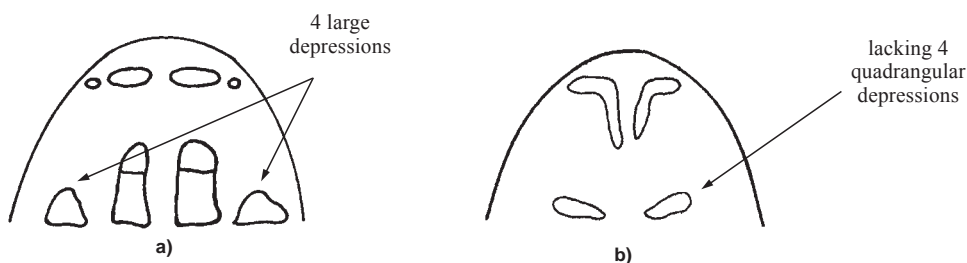


Fig. 10

- 10a. Anus located closer to origin of anal fin than base of pelvic fin; tips of pelvic fins not reaching anterior margin of vent; posterior margins of scales lacinate; exceeding 60 mm standard length (Fig. 11) *Membras martinicia*
- 10b. Anus positioned about midway between origin of anal fin and base of pelvic fin; tips of pelvic fins extending to or beyond anterior margin of vent; posterior margins of scales smooth or lacinate. → 11

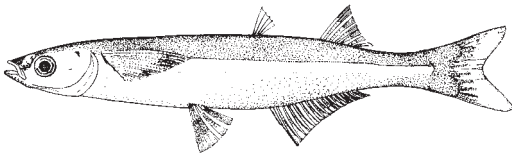


Fig. 11 *Membras martinicia*

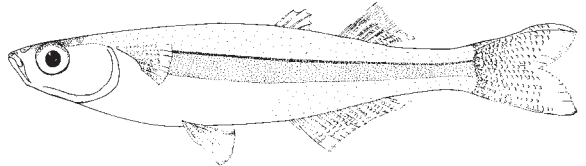


Fig. 12 *Membras argentea*

- 11a. Posterior margins of predorsal and lateral scales strongly lacinate (Fig. 12). *Membras argentea*
- 11b. Posterior margins of predorsal and lateral scales smooth or irregular. → 12
- 12a. Least depth of caudal peduncle greater than 8.5% standard length; body depth greater than 15.7% standard length; total gill rakers on first arch 18 or fewer, usually 15 to 17 (Fig. 13) *Membras analis*
- 12b. Least depth of caudal peduncle less than 8.5% standard length; body depth less than 15.8% standard length; total gill rakers on first arch 16 or more, usually 18 or 19 (Fig. 14). *Membras* sp.

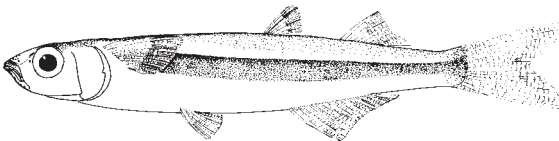


Fig. 13 *Membras analis*

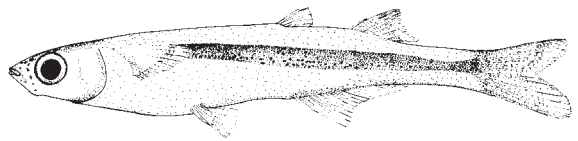


Fig. 14 *Membras* sp.

- 13a. Anal-fin sheath extends entire length of anal fin as a single large row of scales; lateral scales 43 to 54; body circumferential scales 25 to 27 (Fig. 15). *Atherinella blackburni*
- 13b. Anal-fin sheath, if present, not extending beyond midpoint of fin; lateral scales 35 to 44, rarely 45; body circumferential scales 17 to 25 → 14

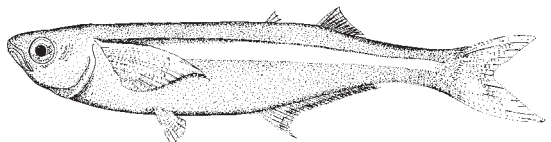


Fig. 15 *Atherinella blackburni*

- 14a. Transverse scale rows 6; body circumferential scales 17 to 20 → 15
- 14b. Transverse scale rows 7 to 9; body circumferential scales 20 to 25 → 17

- 15a. Gill rakers on lower limb of first arch 13 to 16; segmented anal-fin soft rays 17 to 20; anal fin sheath over first several segmented rays or absent → 16
- 15b. Gill rakers on lower limb of first arch 18 to 22; segmented anal-fin soft rays 19 to 23; anal fin sheath extending to midpoint of fin (Fig. 16) *Atherinella beani*

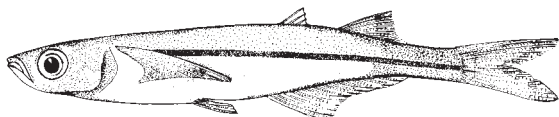


Fig. 16 *Atherinella beani*

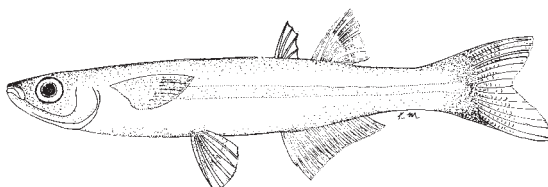


Fig. 17 *Atherinella robbersi*

- 16a. Segmented anal-fin soft rays 17 or 18; pectoral-fin rays 13; spinous dorsal fin originates just posterior to vertical through base of anal-fin spine (Fig. 17) *Atherinella robbersi*
- 16b. Segmented anal-fin soft rays 18 to 20; pectoral-fin rays 14 or 15; spinous dorsal fin originates just posterior to vertical through base of segmented rays 2 to 5 (Fig. 18) *Atherinella cf. brasiliensis*

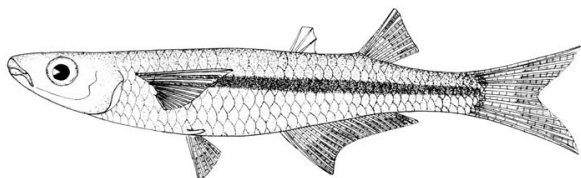


Fig. 18 *Atherinella cf. brasiliensis*

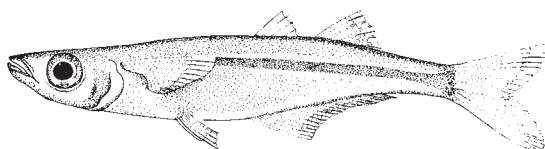


Fig. 19 *Atherinella schultzi*

- 17a. Posterior margin of jaw extending beyond vertical through anterior margin of orbit; gill rakers on first arch 12 to 18 (Fig. 19) *Atherinella schultzi*
- 17b. Posterior margin of jaw curved downwards, not reaching anterior margin of orbit; gill rakers on first arch 20 to 29, rarely 19 → 18

- 18a. Lateral scales 35 to 40, rarely 41; body circumferential scales 18 to 22, rarely 23 (Fig. 20) *Atherinella alvarezii*
- 18b. Lateral scales 40 to 45; body circumferential scales 21 to 25 → 19

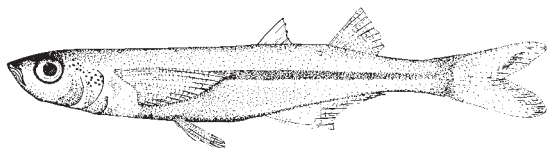


Fig. 20 *Atherinella alvarezii*

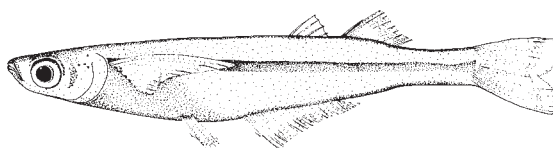


Fig. 21 *Atherinella milleri*

- 19a. Anterior rostral sensory system with 4 separate pits; anal-fin soft rays anterior to spinous dorsal-fin origin 6 to 8, rarely 5; anal-fin soft rays anterior to second dorsal-fin origin 16 to 18 (Fig. 21) *Atherinella milleri*
- 19b. Anterior rostral sensory system with L-shaped furrows, fused together or not; anal-fin soft rays anterior to spinous dorsal-fin origin 3 to 6, rarely 7; anal-fin soft rays anterior to second dorsal-fin origin 12 to 16. → 20

- 20a.** L-shaped furrows of anterior rostral sensory system not fused posteromedially, each side remaining separate; alveolar arm of premaxilla with dorsal portion elevated, the distal edge almost symmetric; mesopterygoid teeth usually present; anal-fin sheath to anterior third of fin (Fig. 22). *Atherinella chagresi*
- 20b.** L-shaped furrows of anterior rostral sensory system fused posteromedially; alveolar arm of premaxilla with straight dorsal margin, the distal edge anteroventrally extended; mesopterygoid teeth absent; anal-fin sheath rudimentary (Fig. 23) *Atherinella* sp.

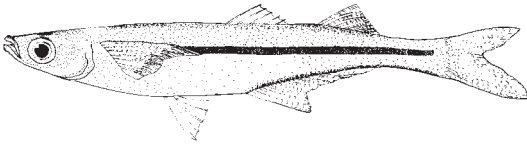


Fig. 22 *Atherinella chagresi*

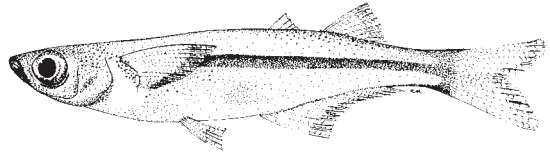



Fig. 23 *Atherinella* sp.

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Atherinella alvarezii* (Diaz-Pardo, 1972).
-  *Atherinella beani* (Meek and Hildebrand, 1923).
-  *Atherinella blackburni* (Schultz, 1949).
-  *Atherinella* cf. *brasiliensis* (Quoy and Gaimard, 1825).
-  *Atherinella chagresi* (Meek and Hildebrand, 1914).
-  *Atherinella milleri* (Bussing, 1979).
-  *Atherinella robbersi* (Fowler, 1950).
-  *Atherinella schultzi* (Alvarez and Carranza, 1952).
-  *Atherinella* sp.
-  *Melanorhinus microps* (Poey, 1860).
-  *Membras analis* (Schultz, 1948).
-  *Membras argentea* (Schultz, 1948).
-  *Membras martinica* (Valenciennes in Cuvier and Valenciennes 1835).
-  *Membras* sp.
-  *Menidia beryllina* (Cope, 1867).
-  *Menidia clarkhubbsi* Echelle and Mosier, 1982.
-  *Menidia colei* Hubbs, 1936.
-  *Menidia conchorum* Hildebrand and Ginsburg, 1927.
-  *Menidia menidia* (Linnaeus, 1766).
-  *Menidia peninsulae* (Goode and Bean, 1879).
-  *Menidia* sp.

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