

THE WESTERN AUSTRALIAN NATURALIST

Vol. 5

OCTOBER 11, 1955

No. 2

FRESHWATER ATHERINES FROM WESTERN AUSTRALIA

(*Pisces : Atherinidae*)

By G. P. WHITLEY, F.R.Z.S., Curator of Fishes,
The Australian Museum, Sydney.

Contribution from the Australian Museum, Sydney.

Atherines (family Atherinidae) are small fishes, found in most parts of the world; though the majority of the many genera and species are marine, some of them have a marked preference for brackish or even fresh water. In Australia they are known as Hardyheads, Silversides, Pinheads and Fly-specks (or in old books as Saueelets and Roserets). They are related to the mullets but have more numerous vertebrae and only one weak spine before the anal fin as against two or three strong anal spines in the mullets. Most atherines grow to between 2½ and 3½ inches long, but some exceed 6 inches. There is usually a silvery, black, orange or yellow band along the side, brilliant in nuptial display or when the fish is agitated. Atherines swim in schools and are easily netted; sometimes they have the habit of "leap-frogging" over floating objects, such as sticks. They are fed upon by other fishes and by some birds, such as cormorants and spoonbills.

The present resume is concerned with the distinguishing of the few Western Australian species which have been found living in fresh water. I have excluded the related sunfish (*Melanotaenia*) and also *Nannatherina* which is not an atherine but a pereoid fish. Once the species have been classified, it is hoped that field-workers or aquarists will find out more about these fishes, their food, habits, life-histories and distribution. At present, practically nothing is known about these subjects. The eggs are probably spherical with filaments on their surfaces and the species may be short-lived.

Figure 1 shows the structures of importance in identifying atherines. A key to the marine and freshwater genera of Australian atherines was provided in the *Proceedings of the Linnean Society of New South Wales*, vol. 68, 1943, p. 132. The freshwater ones of Western Australia, so far as known, are referred to two genera and four species which may be distinguished as follows:—

- A.—Gill-rakers slender and numerous, 13 or more on lower limb of first gill-arch. Maxillary usually reaching below or beyond front of eye. Fine teeth on jaws, sometimes present on vomer. Rami of mandibles not, or very slightly, elevated. Anus near tips of ventral fins, when these are pressed down. Between 37 and 45 scales between head and hypural joint (the fold at the root of the tail when the latter is bent sideways)
 Genus *Atherinosoma* Castelnau, 1872
- B.—Maxillary not reaching below eye. Teeth distinct. Scales 40 to 42 (38 to 40 along lateral band). Gill-rakers about 12 to 15 on lower part of first gill-arch
 (Subgenus *Atherinosoma*)
- C.—Base of ventral fin before level of first dorsal fin. Lateral streak silvery. Swan River - system
 *A. edelensis* (Castelnau, 1873) (Syn. *obscurus* Cast.)
- CC.—Ventral base partly under first dorsal fin. Lateral streak golden or orange. Lakes and inlets from Rockingham to Bunbury
 *A. rockinghamensis* Whitley, 1943
- BB.—Maxillary reaching to or beyond level of orbit. Teeth smaller. Scales 45 to 49 (40 or more along band). Gill-rakers crowded and more numerous
 (Subgenus *Taeniomembras* Ogilby, 1898)
 Species from southern waters of Western Australia
 *A. (T.) elongata* (Klunzinger, 1879)
- AA.—Gill-rakers short (see Figure 1), less than 13 along lower limb of first gill-arch. Mouth small, rarely reaching below front of eye. Teeth microscopic on jaws, none on vomer. Rami of mandibles steeply elevated or gently rising. Anus between adpressed ventrals. Between 25 and 38 scales in a row between head and hypural joint
 Genus *Craterocephalus* McCulloch, 1912
 Species from Murehison River - system
 *C. cunciceps* Whitley, 1944

Brief descriptions of these species are given below. I have not sufficient material to compare them in detail anatomically. However, Mr. Roy Mackay, of the Australian Museum, prepared alizarin-stained transparent specimens of several *Atherinosoma rockinghamensis*, enabling me to compare its osteology with characters stressed by Klunzinger (Fische des rothen Meeres, Stuttgart, 1884, pp. 129-130, pl. xi, figs. 2-4), Starks (Proc. U.S. Nat. Mus. 22, 1899, pp. 1-10), Borsieri (Ann. Agric. 1902, Lav. Piscicoltura. Roma (1904), pp. 131-216, pls. vi-x), Schultz (Proc. U.S. Nat. Mus. 98, 1948, p. i, pls. i-ii, text-figs. 1-9) and other workers on Atherine morphology.

There are 42 vertebrae; haemal spines are not sufficiently distinct to indicate the end of the thoracic and the beginning of the caudal vertebrae, but the first haemal arch occurs on the 20th

vertebra. Rudimentary interdorsal interneurals suggest that the ancestors of the atherines had united dorsal fins with more spines and rays than in Recent species. Some of the scales of the silvery band each have a vertical row of small perforations centrally as a vestigial lateral line. The body-cavity does not end abruptly behind as in *Craterocephalus* but tapers into the first few haemal arches, whose hypophyses are not notably broadened (cf. Schultz, *loc. cit.*).

Family *ATHERINIDAE*

Genus *ATHERINOSOMA* Castelnau, 1872

Atherinosoma Castelnau, Proc. Zool. Acclim. Soc. Vict. 1, 1872, p. 138. Haplotype, *A. vorax* Castelnau, from Victoria.

Taeniomembras Ogilby, Proc. Linn. Soc. N.S. Wales 23, 1898, p. 41. Orthotype, *Atherina microstoma* Gunther, from Tasmania.

Pranesella Whitley, Vict. Nat. 50, 1934, p. 241. Orthotype, *P. endorae* Whitley, from Victoria.

ATHERINOSOMA EDELENSIS (Castelnau)

Atheriniehthys edelensis Castelnau, Proc. Zool. Acclim. Soc. Vict. 2, 1873, p. 134. Fremantle district, Western Australia.

Atheriniehthys obscurus Castelnau, Res. Fish. Austr., 1875, p. 31. Swan River, W.A.

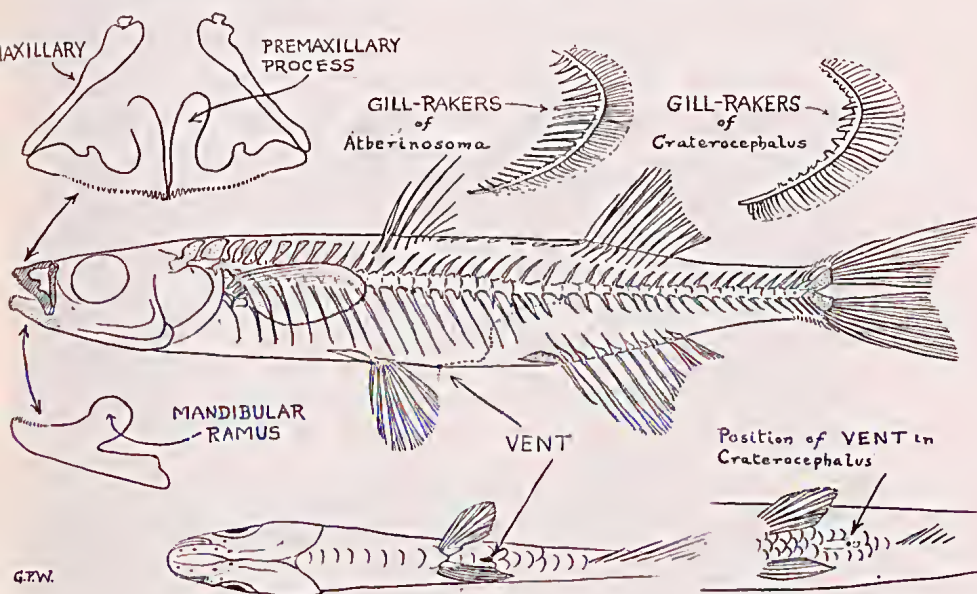


Figure 1.

Diagrams, variously magnified, showing some of the structures important in the classification of atherines. The central figure and those linked with it show *Atherinosoma roekinghamensis*. Dotted line indicates end of body-cavity and swim-bladder entering haemal arches. Insets show the gill-rakers and position of vent in typical *Craterocephalus (fluviatilis)* in comparison.

—G. P. Whitley, del.

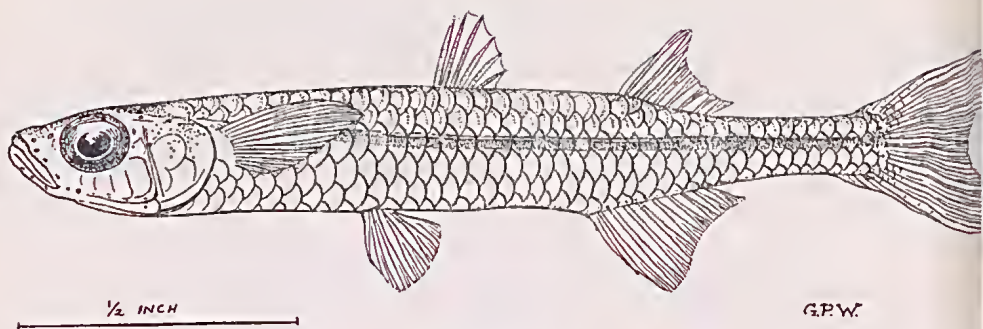


Figure 2.

Atherinosoma edelensis (Cast.). Northam. Australian Muscum registered no. IB.1643.

—G. P. Whitley, del.

Hepsetia edelensis Jordan & Hubbs, Stanford Univ. Publ., Stud. Ichth., 1919, p. 33. *Id.* McCulloch, Mem. Austr. Mus. 5, 1929, p. 108.

Craterocephalus obscurus McCulloch, Mem. Austr. Mus. 5, 1929, p. 110. *Id.* Whitley, Proc. Linn. Soc. N.S. Wales 58, 1943, p. 135, fig. 10, no. 5.

Craterocephalus edelensis Whitley, W.A. Nat. 1, 1947, p. 53.

Atherinosoma edelensis Main, W.A. Nat. 4, 1954, p. 170.

A specimen collected by Mr. V. Serventy at Northam, Western Australia, is here figured. Although "Edel's Land" is in the vicinity of Shark Bay, the type-locality of Castelnau's *A. edelensis* was Fremantle and his species is evidently the one found in the Swan River-system. I have collected a *marine* species in the Abrolhos Group, Shark Bay, and Yardie Creek, North-west Cape, which has been recorded as "*Craterocephalus edelensis*", but it has the vent far forward, near the ventral fin-bases, and will be named as a new species elsewhere. Judging from the numerous fine gill-rakers, *edelensis*, as now recognized from the Swan system, is evidently an *Atherinosoma*. The species has fewer rays than *A. rockinghamensis*, mouth reaching below eye, ventral base well in advance of level of first dorsal's origin, and reduced dentition.

D. vi-vii ?/6? - 8; A. i, 8 - 10; P. i, 11. Se. 39-41. Tr. 6-7. Predorsal se. 14; interdorsal 5-6; preventral median se. 11. Head about 4, depth 6-7 in standard length. Maxillary reaching below eye. Premaxillary processes short. Teeth invisible on jaws or vomer. Mandibular ramus elevated. About 14 gill-rakers on lower half of first gill-arch. Anal base 1-1½ in its distance to caudal. Lateral band silvery, on 3rd to 4th scale-rows. Vent near ventral fin-tips. Ventral origin well in advance of level of first dorsal's origin. Reports of this fish having 13 to 16 anal rays are obviously erroneous. Length to nearly 2½ inches. Dr. D. L. Serventy tells me the life-colours were green-grey on the back, "with a silvery lateral line streak, quite different from the golden streak of *rockinghamensis*."

ATHERINOSOMA ROCKINGHAMENSIS Whitley

Atherinosoma rockinghamensis Whitley, Proc. Linn. Soc. N.S. Wales 58, 1943, p. 132. Lakes near Rockingham, W.A. *Id.* Whitley, Proc. Roy. Zool. Soc. N.S. Wales 1952/3 (1954), p. 24, fig. 2 (holotype).

D. v/10-11; A. i, 10-12; P. i, 11-13. Sc. 37-40. Tr. 6-7. Pre-dorsal sc. 13-14. Interdorsal 6-7. Maxillary barely reaching eye. Teeth on jaws and vomer. General characters as in *edclensis*, of which it may ultimately prove to be a cline. The first dorsal and ventral origins are almost opposite in the holotype, but the ventral fins are farther forward (3 or 4 scales distant) in some specimens. Vent between ends of adpressed ventrals. Anatomical features have been given above and are shown in figure 1 in comparison with typical *Craterocephalus (fluviatilis)* from inland New South Wales.

The life-colours of *rockinghamensis*, collected by Dr. D. L. Serventy and myself on August 26, 1954, at White Lake (Cooloongup) in very slightly brackish water, were as follows: General colour light olivaceous with pale greenish tinge along back and lower sides of abdomen; silvery white on sides of head and thorax. Eyes and lateral band bright golden-yellow. Dark chromatophores along dorsal fin-ray bases. Two patches of dark chromatophores over snout. Brain milky-white with green and orange spots and a V-shaped dark patch of chromatophores anteriorly. Vent and inner parts of middle caudal rays proximally grey.

ATHERINOSOMA (TAENIOMEMBRAS) ELONGATA (Klunzinger)

Atherina elongata Klunzinger, Sitzungsab. Akad. Wiss. Wien 80, 1879, p. 394, pl. iii, fig. 4. King George Sound, W.A. *Id.* Regan, Ann. Mag. Nat. Hist. (7) 18, 1906, p. 451. *Id.* Jordan & Hubbs, Stanford Univ. Publ., Stud. Ichth., 1919, p. 42. And of Australian lists.

This species, from the southern shorelines of Western Australia, is slenderer than the others and has a slight increase in the numbers of gill-rakers, vertebrae (44) and fin-rays.

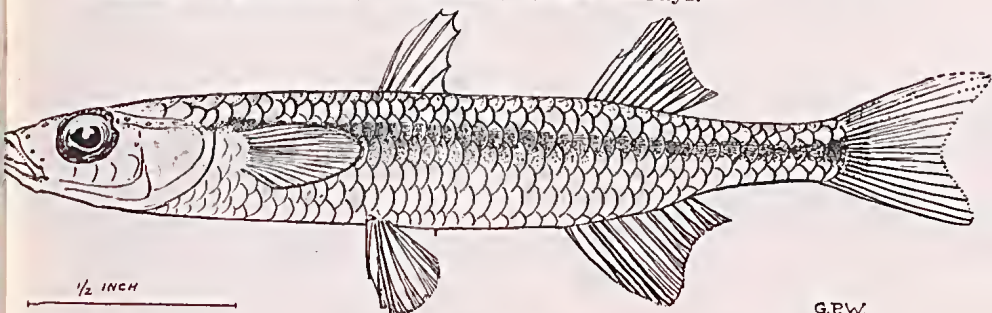


Figure 3.

Atherinosoma rockinghamensis Whitley. Holotype from near Rockingham. Austr. Mus. regd. no. IA.7710.

—G. P. Whitley, del.

D. v-vii/10-12; A. i, 11-12; P. i, 13-14. Sc. 40-44. Tr. 7. Predorsal sc. 14-16. Interdorsal 8. More than 15 gill-rakers on lower half of first arch. Head more than 4, depth $7\frac{1}{2}$ to 8 in standard length. Maxilla reaching below eye. Premaxillary processes short. Mandibular rami elevated. Vent between ventral fin-tips. Origin of first dorsal little behind level of that of ventral and nearer snout than tail. Straw-coloured with silvery lateral stripe. Body-cavity similar to that of *roekinghamensis*. Like all the other species dealt with here, *elongata* grows to about $2\frac{1}{2}$ to $2\frac{3}{4}$ inches long.

Western Australian students might try interbreeding the various kinds of *Atherinosoma* to test how distinct they really are.

Genus *CRATEROCEPHALUS* McCulloch, 1912

Craterocephalus McCulloch, Proc. Roy. Soc. Qld. 24, 1912, p. 48.
Orthotype, *C. fluviatilis* McCulloch, from New South Wales.

Certain features of typical *Craterocephalus* (*fluviatilis*) are shown in Figure 1 in comparison with *Atherinosoma roekinghamensis*. The Western Australian *C. euneiceps* has the dorsal fins closer together than in *Atherinosoma*, the body is deeper, the anal base shorter (2 in its distance from caudal), and there are more thoracic scales. Other distinguishing characters are given in the key.

CRATEROCEPHALUS CUNEICEPS Whitley

Craterocephalus euneiceps Whitley, Austr. Zool. x, 3, 1944, p. 266.
Bclele Station, via Meekatharra [Murehison river-system],
Western Australia. *Id.* Whitley, W.A. Nat. 1, 1947, p. 53.
Craterocephalus sp. Shipway, W.A. Nat. ii, 1950, p. 75. Murehison
River.

Besides the types I have seen other examples in the Western Australian Museum from the Murehison River, about thirty miles upstream from its mouth, near the Mount Curious district, from which locality the Australian Museum, Sydney, has two specimens. Due to wartime exigencies, I was unable to correct proofs of the 1944 paper in which this species was originally described and it seems that some errors crept into the description. On page 267,

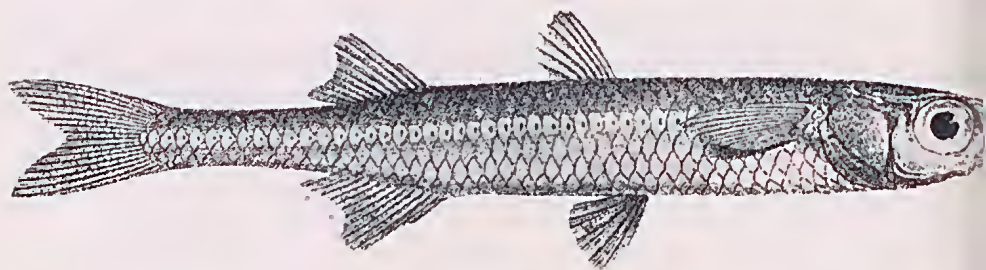


Figure 4.

Atherinosoma (*Taeniomembras*) *elongata* (Klz.). Holotype from
King George Sound.

—After Klunzinger.

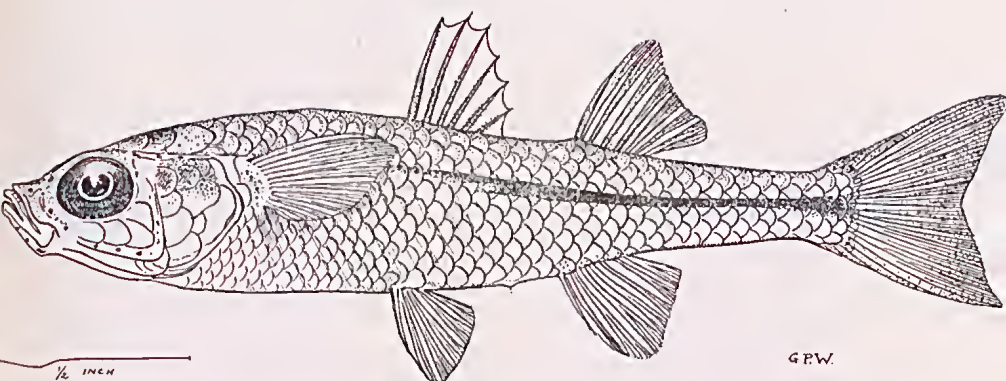


Figure 5.

Craterocephalus cuneiceps Whitley. Mount Curious district, Murehison River. Austr. Mus. regd. no. IB.3205.

—G. P. Whitley, del.

second line, "anal origin" should have read "dorsal origin" and the species has about 30 scales between head and hypural joint instead of 38 as printed. The species is here figured for the first time from the largest specimen in the Australian Museum, presented by Dr. D. L. Serventy. The following characters and variation are noteworthy:

D. vi/i, 7; A. i, 7; P. i, 11-13. Sc. 29-32. Tr. 9-10. Predorsal se. 10-14. Interdorsal 3-4. Head about 3.4 to 3.6, depth between 4 and 5 in standard length. Eye less than interorbital and than depth of caudal peduncle. Mouth not reaching eye. Mandibular rami gently elevated. One row of cheek-scales. About 8-10 short gill-rakers on lower part of first branchial arch. Vent between, or near, tips of adpressed ventral fins. Dorsal originating over ventral rays or over ventral-anal interspace, either nearer snout than tail-root or equidistant from those. No dark spots below lateral band which is below fourth seale-row.

Craterocephalus capreoli Rendahl, 1922, from Roebuck Bay, differs from *cuneiceps* in having A. i, 9; Tr. 7; height 19.2% of standard length (23 in *cuneiceps*); and ventrals well ahead of level of first dorsal origin.

OBSERVATIONS ON THE LITTLE SHEARWATER AT THE NEST

By JOHN WARHAM, Albany, W.A.

The most northerly breeding colonies of the Little Shearwater (*Puffinus assimilis*) known in Western Australia are on the Arolhos Islands; south of these the birds breed near Jurien Bay, on Rott-nest Island, on Eelipse Island near Albany, and on the Archipelago of the Recherche (Serventy and Whittell, 1951). Alexander (1928) gives the world range as the Atlantic, Indian and Pacific Oceans and many sub-species have been described. The Western Australian race (*P. assimilis tuncnyi*) was named from skins collected in