



THE FUSILIERFISHES (FAMILY : CAESIONIDAE) OF ANDAMAN AND NICOBAR ISLANDS

P.T. RAJAN AND C.R. SREERAJ

Zoological survey of India, Andaman Nicobar Regional Centre
Haddo, Port Blair-744102

Email - rajanptandaman@rediffmail.com

INTRODUCTION

Fusiliers are tropical Indo-Pacific marine perciform fish of the family Caesionidae and they are most associated with the reefs. Within the family there are 4 genera and 21 species (Carpenter, 1988 and Allen & Erdmann, 2008). They are colourful fishes; many have bright yellow stripes and patches. The caesionidae are related to the family Lutjanidae, the snapper fishes. The fusiliers possess unique morphological features characteristic of their feeding mode. They are specialized for planktivorous feeding, while their nearest relatives, the snappers are typically benthic carnivores. The fusiliers possess a jaw morphology and body shape. They have a highly protrusible upper jaw which is an adaptation for picking zooplankton from the water column. Genus *Caesio* have a single postmaxillary process on the premaxilla and in the remaining genera *Dipterygonotus*, *Gymnocaesio* and *Pterocaesio* there are 2 postmaxillary processes. The additional process presumably allows greater control, and perhaps extent, of jaw protrusion. Another trend within the fusiliers relating to planktivory is the reduction of dentition. Fusiliers feed primarily on zooplankton and there is no need for a well developed dentition to seize and hold prey. They have small, weak teeth and some species lack teeth on the vomer, palatines and premaxillaries. Fusiliers are planktivorous, schooling fishes. Their schooling behaviour relates to predation pressure and they are actively preyed upon by groupers, snappers, jacks and tunas. Fusiliers

often school in mixed species aggregations. It is common to see a school of 3-4 species of fusiliers. Species with similar markings, especially caudal markings, tend to be found most often in the same school. Fusiliers with a dark blotch at the tip of each caudal lobe, such as most species of *Pterocaesio* and the species of *Gymnocaesio*, often school together. The species with a black streak inside the caudal lobes, such as *Caesio caeruleaurea*, *C. varilineata* and *C. pterocaesio* may be found in the same school. *Caesio cunning* and *C. xanthonota* with yellow caudal fins sometimes aggregate with one another. *Dipterygonotus balteatus* aggregate together with sardines, anchovies and other nearshore pelagic species.

MATERIAL AND METHOD

Samples of Fusiliers (Family : Caesionidae) were collected from the fish landing centers of the Andaman Islands in the fishing season during 1992-2012. Samples were separated into 12 different species and the specimens were preserved in 10% buffered formaldehyde and deposited in the reference collection of Zoological Survey of India, Port Blair, vide registration number ZSI, ANRC: 2282, 3342, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810 and 3811. SCUBA gears are used for surveying, underwater observation and photography of fusiliers. Morphometric characters were measured with a caliper. Meristic characters that vary among species are referred to in the diagnoses and compared the number of dorsal fin spines, pectoral fin rays, peduncular scale rows, lateral line scales and lateral transverse scales. Colour

TABLE 1

Genera	Species
<i>Caesio</i> Lacepede, 1801	<i>Caesio caeruleaurea</i> Lacepede, 1801
	<i>Caesio cuning</i> (Bloch, 1791)
	<i>Caesio lunaris</i> Cuvier, 1830
	<i>Caesio xanthonota</i> (Bleeker, 1845)
<i>Dipterygonotus</i> Bleeker, 1849	<i>Dipterygonotus balteatus</i> (Valenciennes, 1830)
<i>Gymnocaesio</i> Bleeker, 1876	<i>Gymnocaesio gymnoptera</i> (Bleeker, 1856)
<i>Pterocaesio</i> Bleeker, 1876	<i>Pterocaesio chrysozona</i> (Cuvier, 1830)
	<i>Pterocaesio marri</i> Schultz, 1953
	<i>Pterocaesio pisang</i> (Bleeker, 1853)
	<i>Pterocaesio tessellate</i> Carpenter, 1987
	<i>Pterocaesio tile</i> (Cuvier, 1830)
	<i>Pterocaesio trilineata</i> Carpenter, 1987

photographs for each species were taken with Nikon D 300 camera.

RESULTS

There are 21 species in four genera are reported in the world; 12 species and all the four genera are reported from Andaman and Nicobar Islands.

Genus *Caesio* Lacepede, 1801

Caesio caeruleaurea Lacepede, 1801

Blue and Gold Fusilier

1801. *Caesio caeruleaurea* Lacepede, *Hist. Nat. Poiss.*, 3: 85 (Type locality, Moluccas).

1988. *Caesio caeruleaurea*: Carpenter, *FAO Fish. Synop.*, 8 (125): 35.

Diagnostic features: D. X, 15; A. III, 12 P. 20-21; V. I, 5; Ll. 59-62. Ltr. 9/16. Post maxillary process single; peduncular scale rows; upper 11, lower 15; 22-24 predorsal scales; dorsal and anal fins scaled; supratemporal bands of scales interrupted at dorsal midline. Body bluish, lower sides bluish-white; an yellow stripe bordered by a white stripe above lateral line; caudal lobes with a black median streak; dorsal fin light blue, edge black; other fins white; axil and upper base of pectoral black.

Habitat : Found around coral reef areas in groups.

Distribution : Indo-West Pacific, from Red Sea, east coasts of Africa to Japan and Australia to Samoa Island.

Caesio Cuning (Bloch, 1791)

1791. *Sparus cuning* Bloch, *Nat. Ausland Fische.*, 5: 31; pl. 263 (Type locality, Indonesia).

1988. *Caesio cuning*: Carpenter, *FAO Fish. Synop.*, 8 (125): 37, pl. 1, fig. 44a & b.

D. X, 15; A. III, 11; P. 18; V. I, 5; Ll. 47-50. Ltr. 9/15-16. Post maxillary process single; peduncle scale rows; upper 9, lower 13; scale rows on cheek 5; 21-23 predorsal scales; supratemporal band of scale rows confluent at dorsal midline; dorsal and anal fins scaled. Body greenish-blue; lower sides and belly pinkish white; caudal peduncle and fin yellowish; dorsal fin yellowish-blue; other fins white; axil and upper base of pectoral fin black.

Habitat: Found over rocky and reef areas below 6mt depth.

Distribution: Eastern Indian Ocean to Western Pacific, from east coast of India to Australia.

Caesio lunaris Cuvier, 1830 Lunar Fusilier

1830. *Caesio lunaris* Cuvier, *Hist. Nat. Poiss.*, 6: 441 (Type locality, New Ireland).

1988. *Caesio lunaris*: Carpenter, *FAO Fish. Synop.*, **8** (125): 38, pl. 111, fig. 51a & b.

D. X, 14; A. III, 11 P. 20; V. I., 5; Ll. 53. Ltr. 8 + 1 + 8, Body fairly deep; post maxillary process single; supratemporal band of scales interrupted at dorsal midline; 21 predorsal scales; dorsal and anal fins scaled. Body bluish, belly paler; tip of caudal lobes, axil of pectoral fins black; ventral, and and caudal fins white to pale blue.

Habitat: Found in reef areas.

Distribution : Indo-Pacific, from east coast of Africa to coasts of India, Andaman Is., Sri Lanka to Ryukyu Is., and New Guinea to Solomon Island.

Caesio xanthonota (Bleeker, 1845)

Yellowback Fusilier

1845. *Caesio xanthonotus* Bleeker, *Nat. Tijds. Ned. Indie.*, **4**: 466 (Type locality, Indonesia).

1988. *Caesio xanthonota*: Carpenter, *FAO Fish. Synop.*, **8** (125): 45, pl. 1, fig. 43a & b.

D. X, 14; A. III, 12; P. 21; V. I., 5; Ll. 59. Ltr. 10 + 1 + 18. Single post maxillary process; 4 scales rows on cheek; 21 predorsal scales; dorsal and anal fins scaled; supratemporal scales interrupted at dorsal midline of narrow scaleless zone. Upper third of body yellowish, sides of body bluish and lower sides white; axil and upper base of pectoral black; dorsal and caudal fins yellow; other fins white.

Habitat: Found around coral reefs.

Distribution : Indian Ocean, from Zanzibar to coasts of India, Andaman Is., Christmas and Indonesia.

Genus ***Dipterygonotus*** Bleeker, 1849

Dipterygonotus balteatus (Valenciennes, 1830)

Mottled Fusilier

1830. *Smaris balteatus* Valenciennes. *Hist. Nat. Poiss.*, **6**: 424 (Type locality, Sri Lanka).

1988. Carpenter, *FAO Fish. Synop.* **8** (125): 47, pl. 1, fig. 42.

D. XIV, 9; A. III, 9; P. 18; V. I. 5; Ll. 76. Ltr. 10 + 1 + 16. Body slender, two post maxillary processes; palatines edentate; caudal peduncular scale rows; upper 13, lower 16; cheeks with 6 scale rows; 32 predorsal rows; dorsal and anal fins without scales. Body brownish above, silvery white below; a thin yellowish black stripe of one scale width

above lateral line from orbit to caudal, above this two interrupted stripes of the same colour; all fins light pinkish; axil of pectoral fin black.

Habitat : Found near shallow reefs in coastal waters.

Distribution : Indo-West Pacific, from east coast of Africa to coasts of Indi, Andaman Is., Sri Lanka to South China Sea and New Guinea to Samoa Island.

Genus ***Gymnocaesio*** Bleeker, 1876

Gymnocaesio gymnoptera (Bleeker, 1856)

Slender Fusilier

1856. *Caesio gymnopterus* Bleeker, *Nat. Tijds. Ned. Indie.*, **10**: 372 (Type locality, Ternate, Indonesia).

1988. *Gymnocaesio gymnoptera* Carpenter, *FAO Fish. Synop.*, **8** (125): 49, pl. IV, fig. 56.

D. X, 15; A. III, 12 P. 20-21; V. I., 5; Ll. 69-70; Ltr. 8 + 1 + 13. Body slender, two post maxillary processes; palatines and premaxilla edentate; 23-24 predorsal scales; dorsal and anal fins without scales. Body bluish green, silvery white ventrally; an yellow stripe, about one scale width, along lateral line; axil of pectoral fin black; caudal fin dusky, tips of lobes black.

Habitat : Found in reef areas in large groups.

Distribution : Indo-West Pacific, from Red Sea, east coast of Africa to coasts of India, Andaman Is., Sri Lanka to Fiji.

Genus ***Pterocaesio*** Bleeker, 1876

Pterocaesio chrysozona (Cuvier, 1830)

Goldband Fusilier

1830. *Caesio chrysozona* Cuvier, *Hist. Nat. Poiss.*, **6**: 440 (Type locality, Indonesia).

1988. *Pterocaesio chrysozona* : Carpenter, *FAO Fish. Synop.*, **98** (125): 52, pl. IV. Fig. 54a, b.

D. X, 15; A. III, 12; P. 17-19; V. I, 5; Ll. 65-68. Ltr. 8/14-15. Two post maxillary processes; predorsal scale 23-25; dorsal and anal fins scaled. Body bluish-brown above, whitish pink below; a bright yellow band below lateral line form eye to base of caudal fin; all fins white; axil of pectoral black; tip of caudal fin lobes black.

Habitat : Found around coral reef areas.

Distribution : Indo-West Pacific, from Red Sea, east coast of Africa to coasts of India, Andaman Is., Si Lanka to South China Sea and New Guinea and Australia.

***Pterocaesio marri* Schultz, 1953**
Marr's Fusilier

1953. *Pterocaesio marri* Schultz, *U. S. Natl. Mus. Bull.*, **202**: 545 (Type locality, Bikini Atoll, Marshall Islands).

1988. *Pterocaesio marri*: Carpenter, *FAO Fish. Synop.*, **98** (125): 56, pl. V. Fig. 60a, b.

D. X, 15; A. III, 12; P. 22-24; V. I, 5; LI. 70-74. Body fusiform and compressed; caudal fin forked. Body bluish green dorsally, white ventrally; two longitudinal stripes, upper running along dorsal profile ending on caudal peduncle and the other along lateral line; margin of dorsal fin dusky; all fins white to light pink; axil of pectoral fin and tips of caudal lobes black. Attains 30 cm.

Habitat : Found around coral reefs in small schools.

Distribution : Indo-West Pacific.

***Pterocaesio pisang* (Bleeker, 1853)**
Banana Fusilier

1853. *Caesio pisang* Bleeker, *Nat. Tijds. Ned. Indie.*, **4**: 113 (Type locality, Ambon, Molucca Islands).

1988. *Pterocaesio pisang* Carpenter, *FAO Fish. Synop.*, **8** (125): 58, pl. III, fig. 52a & b.

D. X, 15; A. III, 12, P. 19; V. I., 5; LI. 66. Ltr. 9/14. Body elongate and compressed; two post-maxillary processes; vomer and palatines dentate; 4 scale rows on cheek; 23 predorsal scales; dorsal and anal fins scaled; caudal peduncular scale rows; upper 11, lower 1.5. Body dark reddish silvery, paler ventrally; lateral line scales darker; axil of pectoral fin black; tip of caudal fin lobes dark red to black.

Habitat : Found around coral reef areas in shallow waters.

Distribution : Indo-West Pacific, from Zanzibar to coasts of India, Andaman Is., Sri Lanka to Fiji.

***Pterocaesio tessellate* Carpenter, 1987**
One - stripe Fusilier

1987. *Pterocaesio tessellate* Carpenter, *Indo-Pacific Fishes.*, (15): 47 (Type locality, Philippines).

1988. *Pterocaesio tessellate* Carpenter, *FAO Fish. Synop.*, **8** (125): 60, pl. V, fig. 58a & b.

D. X, 15; A. III, 12; P. 21; V. I. 5; LI. 70. Ltr. 9/16. Two post maxillary processes; palatines edentate; 5 scale rows on cheek; 29 predorsal scales; dorsal and anal fins scaled; supra-temporal band of scales confluent at dorsal mid-line. Body light bluish green, whitish to pink below; a longitudinal yellow stripe about one scale width covering lateral line; pectoral, ventral and anal fins pinkish; axil and pectoral fin black; dorsal fin light bluish green; caudal fin dusky, tip of lobes black.

Habitat : Found in reef areas.

Distribution : Eastern Indian Ocean, from east coast of India, Andaman Is., Sri Lanka to New Hebrides.

***Pterocaesio tile* (Cuvier, 1830)**
Dark - banded Fusilier

1830. *Caesio tile* Cuvier, *Hist. Nat. Poiss.*, **6**: 428 (Type locality, Caroline Islands).

1988. *Pterocaesio tile* Carpenter, *FAO Fish. Synop.*, **8** (125): 61, pl. II, fig. 48a & b.

D. XI, 19; A. III, 13; P. 24; V. I, 5; LI. 71. Two post maxillary processes; 4 scale rows on cheek; 29 predorsal scales; dorsal and anal fins scaled. Scales above lateral line bluish-green; a black stripe about one scale row width along lateral line; below the stripe a brilliant blue zone; lower third of body white to pinkish; axil and upper base of pectoral black; dorsal light pinkish; caudal with black streak in each lobe, the upper streak continuous with the lateral stripe.

Habitat : Found around coral reef areas.

Distribution : Indo-Pacific, from Zanzibar to coasts of India, Andaman Is., Sri Lanka to Ryukyu Island and Mariana to Tuamotu.

***Pterocaesio trilineata* Carpenter, 1987**
Three-stripe fusilier

1987. *Pterocaesio tessellate* Carpenter, *Indo-Pacific Fishes.*, (15): 43 (Type locality, Fiji).

1988. *Pterocaesio tessellate* Carpenter, *FAO Fish. Synop.*, **8** (125): 63, pl. V, fig. 59a & b.

DX-XI, 14-16; A III, 11 - 12. 4-5 cheek scales; 20-30 predorsal scales; supra temporal scale band

confluent at dorsal midline; scaled dorsal and anal fins; postmaxillary processes 2; posterior end of maxilla tapered; upper peduncular scale rows usually 11; lower peduncular scale rows usually 15. Body silver with three yellowish to brownish stripes alternate with three bluish stripes on back; dark tail tips. Form aggregations, often mix with other fusiliers. Attains 20 cm.

Habitat : Inhabits shallow coastal, lagoon, steel slopes and seaward reefs.

Distribution : Indo-Pacific.

DISCUSSIONS

The fusiliers were formerly included in Lutjanidae but (Johnson, 1980) recognized them as distinct family. These fishes are characterized by a slender, streamlined body, a small mouth with a very protrusible upper jaw, 1-2 bony processes on the upper edge of the side of the premaxilla, small and conical teeth (absent in the genus *Dipterygonatus*), a single dorsal fin with IX-XV slender spines and 9-12 soft rays, anal fin with III spines and 9-13 rays, a deeply forked caudal fin, and a band of scales across the forehead separated by a narrow scaleless area. The Fusiliers is moderately important in coastal fisheries, and is common in markets of Andaman Islands and are caught by many fishing methods. They are midwater, schooling fishes and therefore most likely to be caught by nets. In terms of overall biomass, they are one of the most important groups of coral reef fishes. They are harvested over reefs by gill nets and over soft bottom by trawl nets. They feed on zooplanktons which make them unlikely candidates for hook-and-line

fisheries. In certain areas however, fusilier are routinely taken by hook-and-line. In Andaman and Nicobar Islands blast-fishing is a common method used by foreign poachers. Fusiliers are caught by explosives in the remote islands from the reef by foreign poachers, mainly from Indonesia, Thailand and Burma. In blast fishing, a bomb was thrown into a school of reef fishes over a reef slope. Blast fishing is a significant threat when targeted at large schools of fish. Despite it being an illegal fishing method, it is still widespread through the Andaman and Nicobar Islands (Rajan 2003). However caesionids has a broad geographic range, is only fished in parts of its range, and is resilient to moderate levels of harvest therefore these threats are not considered to pose a significant threat to the global population at present. The development of reef fisheries in a particular area will largely determine the fishing methods to be used and the importance of fusiliers to total fisheries production. In Andaman Islands reef fisheries are composed of numerous small engine driven wooden canoes using gillnets and hook-and-line. These fishermen use small hooks and special techniques to catch fusiliers. Their flesh is excellent eating and several species are common in the markets of Andaman Islands where they command a medium range price (Rs. 80/per kg.).

ACKNOWLEDGEMENTS

We thank Dr K. Venkataraman, Director, Zoological Survey of India, Kolkata and Dr C Raghunathan, Officer-in-Charge, Zoological Survey of India, Port Blair for facilities and encouragement.

REFERENCES

- Allen, G.R. and Erdmann, M., 2008. "*Pterocaesio monikae*, a new species of fusilier (Caesionidae) from western New Guinea (Papua and Papua Barat provinces, Indonesia). *Aqua (Miradolo Terme)* **13** (3-4): 163-170.
- Carpenter, K.E., 1988. FAO species catalogue. Vol. 8. Fusilier fishes of the world. An annotated and illustrated catalogue of Caesionid species known to date. FAO Fish Synop., (125) Vol. 8: 75p.
- Johnson, G.D. 1980. The limits and relationship of the Lutjanidae and associated families. *Bulletin of Scripps Institute of Oceanography*, **24**: 1-114.
- Rajan, P.T., 2003. *Field Guide to Marine Food Fishes of Andaman and Nicobar Islands*. (Published-Director, ZSI, Calcutta), 260pp.

Plate - 1

*Caesio caerulaurea* Lacepede, 1801*Caesio cuning* (Bloch, 1791)*Caesio cuning* (Bloch 1791) (underwater photo)*Caesio lunaris* Cuvier, 1830*Caesio xanthonota* (Bleeker, 1845)*Caesio xanthonota* (Bleeker, 1845) (underwater photo)*Gymnocaesio gymnoptera* (Bleeker, 1856)*Pterocaesio chrysozona* (Cuvier, 1830)

Plate - 2



Pterocaesio marri Schultz, 1953



Pterocaesio pisang (Bleeker, 1853)



Pterocaesio tessellate Carpenter, 1987



Pterocaesio tile (Cuvier, 1830)



Pterocaesio tile (Cuvier, 1830) (underwater photo)



Pterocaesio trilineata Carpenter, 1987 (underwater photo)



Pterocaesio trilineata Carpenter, 1987