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South Pacific Commission *Handbook* No. 23 (1983)

A guide to the common tuna baitfishes of the South Pacific Commission area by A.D. Lewis, B.R. Smith and C.P. Ellway

Page 55

Please note that the two line drawings (*Selar* spp.) on this page should be transposed.

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A GUIDE TO THE COMMON TUNA BAITFISHES OF THE SOUTH PACIFIC COMMISSION AREA

A.D. Lewis[○]
B.R. Smith[⊕]
C.P. Ellway[•]

○ Principal Fisheries Officer, Fisheries Division, Ministry of Agriculture and Fisheries, Suva, Fiji

⊕ Fisheries Adviser, South Pacific Commission, Noumea, New Caledonia

• Fisheries Scientist, Tuna and Billfish Assessment Programme, South Pacific Commission, Noumea, New Caledonia

South Pacific Commission
Noumea, New Caledonia
July 1983

Original text: English

Prepared for publication at
South Pacific Commission headquarters, Noumea, New Caledonia
and printed at Commission headquarters, 1983

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ACKNOWLEDGMENTS

This handbook is the distillation of the experience of many people, who delighted us with their willingness to assist on this project. We would especially like to thank Peter Whitehead (British Museum), Walter Ivantsoff (Macquarie University, Sydney) and William Smith-Vaniz (Academy of Natural Sciences, Philadelphia), who not only identified specimens and provided encouragement, but also contributed unpublished keys to this guide. If our adaptation of their work to suit the guide's format has introduced flaws, the fault is ours alone.

Walter Fischer (Food and Agriculture Organization (FAO), Rome) kindly gave permission to utilise the excellent FAO species identification sheets, and they provided the basis for many illustrations in this handbook, all of which were drawn by Susan Kerr. We also found Thosaporn Wongratana's comprehensive unpublished thesis, *Systematics of clupeoid fishes of the Indo-Pacific region,* extremely useful. Wayne Baldwin (University of Hawaii) assisted greatly with some *Dussumieria* and *Stolephorus* problem species, and Patricia Kailola (formerly Fisheries Division, Papua New Guinea) has provided assistance in many ways over the years.

Since the early days of our involvement in the field of baitfish taxonomy, many people have contributed material and time to assist in our endeavours. The various South Pacific Commission Skipjack Survey and Assessment Programme officers and former colleagues in Papua New Guinea are only some of these. In particular, the encouragement and assistance provided by Bob Kearney (South Pacific Commission Tuna Programme Co-ordinator) is gratefully acknowledged.

INTRODUCTION

Tuna baitfish are a diverse group of small schooling fishes that are used as live bait in pole-and-line fisheries for skipjack and other tunas in most tropical and subtropical areas. They are captured in sheltered coastal waters by a variety of gears, including drive-in nets, traps, beach seine and surround nets, but in Pacific Island fisheries are most commonly taken at night using lights and dip-nets (bouki-ami). The catch is kept alive onboard fishing vessels or in pens (keepers) until required for use.

Different species of tuna baitfish vary widely in their handling and survival characteristics in confined conditions, and also in their attractiveness as tuna bait. Because of their small size (5-10 cm), identification of baitfish species has frequently caused problems for fisheries workers. The changing and often confused state of the taxonomy of some of the more important groups certainly has not helped in this regard. Correct identification of bait species enables bait catches to be apportioned among the different species and the eventual understanding of the biology of each species. With such knowledge, the problems of large catch fluctuations, which often confront managers of baitfish resources, are more easily overcome. Drawing on our own experiences, most recently during the South Pacific Commission Skipjack Survey and Assessment Programme, this guide attempts to simplify the task of identifying the common baitfishes of the South Pacific Commission (SPC) region (see map inside front cover).

A large number of species (over 300) have been recorded from baitfish catches in the region (see for example, Lewis, Smith and Kearney, 1974), but the majority of these can be regarded as incidental captures. In this field-guide only those families and species that make regular and significant contributions to night dip-net catches are featured. Species taken in beach seining operations during the day are briefly mentioned. For a useful guide to species taken by drive-in nets in coral reef situations, Jones (1964) and Matsuda, Araga and Yoshino (1975) are recommended.

The guide assumes some experience with taxonomy, but has been kept as simple as possible without compromising accuracy. Generic and species keys are based on published information or pending publications, and, in most cases, recognised experts in the various taxonomic fields have been approached directly for comments and criticism of the keys. By selecting usually reliable characteristics that are readily observable in the field, this guide attempts to simplify the often tedious task of identifying the common bait species of the region. In some cases, however, it may be necessary to use a binocular microscope to ensure correct identification where key characters are small or of complex structure. Important material that proves difficult to identify should be preserved (10 per cent formalin) and stored with accurate collection details, together with notes on colours in life to assist subsequent identification. Most published keys are based on such preserved material.

The guide is organised as follows:

(i) A list of tuna baitfish families of the South Pacific Commission area with a pictorial guide highlighting diagnostic features.

(ii) Major baitfish families are treated in turn with generic and species keys where applicable. Each family section also contains brief notes on the behaviour, biology and usefulness of commonly captured bait species. Food and Agriculture Organization (FAO) or common English names favoured by the authors are used. In view of the involvement of several countries in joint-venture operations, we have tried to provide Japanese names for baitfishes where possible. Pacific Island names that are in widespread use are provided as a matter of interest. Species distributions according to SPC records and authors' experience are appended to each family section.

(iii) Families of minor importance are briefly mentioned, and common day bait families, not usually taken in night bait catches, are illustrated.

(iv) Annotated list of useful taxonomic references.

(v) Notes on the preparation of baitfish specimens for shipment, and a list of taxonomic authorities to whom specimens can be sent.

For additional information on the taxonomy and distribution of baitfish species, the user is also referred to publications such as the FAO Species Identification Sheets for clarification of technical terms. The format used in these very useful sheets has, with the approval of FAO, been partly adopted in this guide. It should be noted that, as our knowledge of the various groups increases, scientific names may change periodically, as many have in fact done during the preparation of this guide. Where a new name has replaced a widely known, well-established one, both are mentioned.

1. TUNA BAITFISH FAMILIES OF THE SOUTH PACIFIC COMMISSION AREA

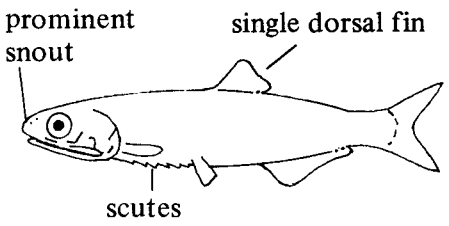
Species from the families listed below are commonly represented in night baitfish catches. Families in bold type contain the species of major commercial importance and have been treated in detail in this guide (Sections 3 to 10).

Engraulidae	Anchovies
Dussumieriidae	Sprats, round herrings
Clupeidae	Sardines, herrings
Atherinidae	Silversides, hardyheads
Apogonidae	Cardinalfish
Carangidae	Trevallies, scads, horse mackerel
Caesionidae	Fusiliers, bananafish
Scombridae	Tunas, mackerels, bonitos
Leiognathidae	Ponyfish, slipmouths
Sphyraenidae	Barracudas
Siganidae	Rabbitfish, spinefoots
Myctophidae	Lanternfish

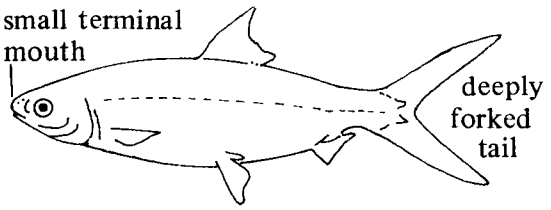
Three of the above families (Clupeidae, Atherinidae and Dussumieriidae) also dominate day bait catches. Other families which make contributions to day bait catches are listed below and are treated briefly in Section 13.

Mugilidae	Grey mullets
Mullidae	Goatfish
Gerreidae	Silver biddies
Chanidae	Milkfish

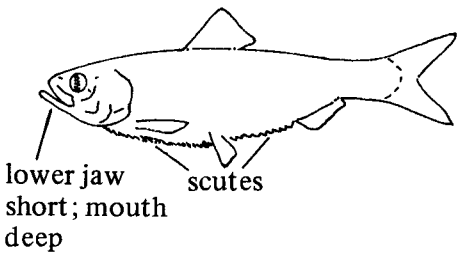
2. PICTORIAL GUIDE TO TUNA BAITFISH FAMILIES



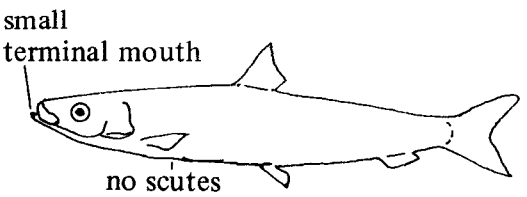
Engraulidae



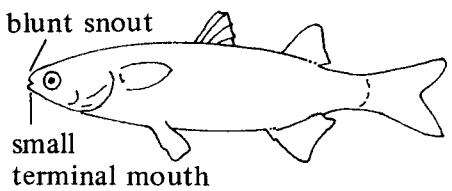
Chanidae



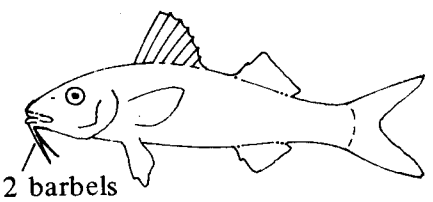
Clupeidae



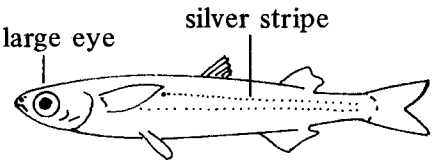
Dussumieriidae



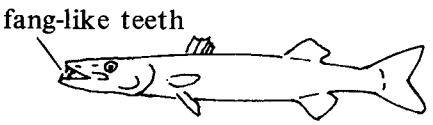
Mugilidae



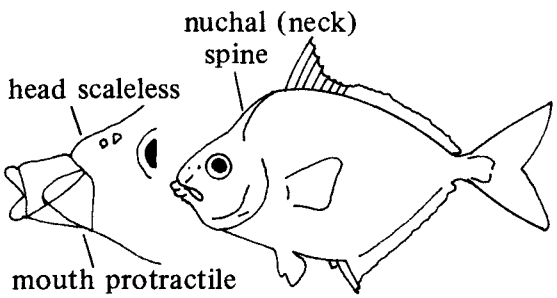
Mullidae



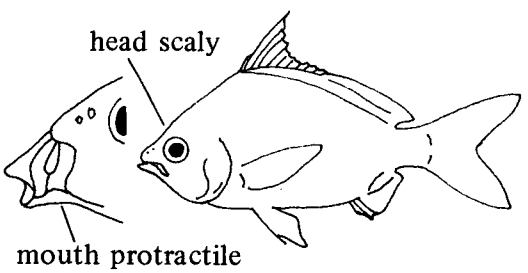
Atherinidae



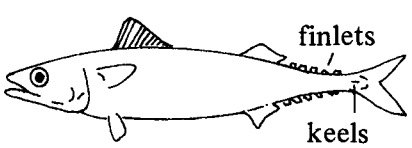
Sphyraenidae



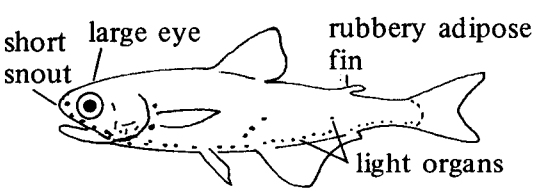
Leiognathidae



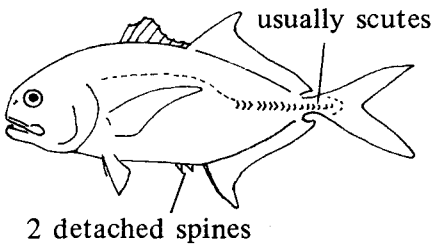
Gerreidae

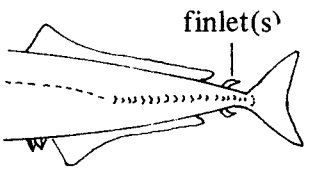


Scombridae

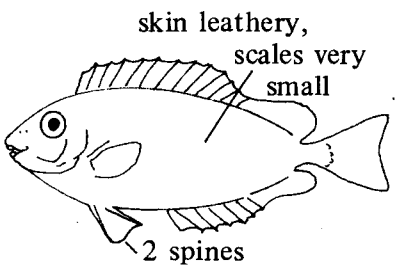


Myctophidae

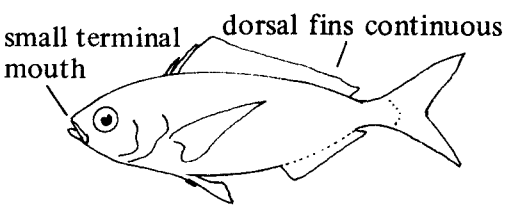




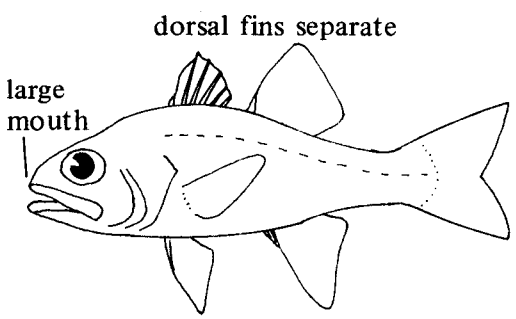
Carangidae



Siganidae



Caesionidae

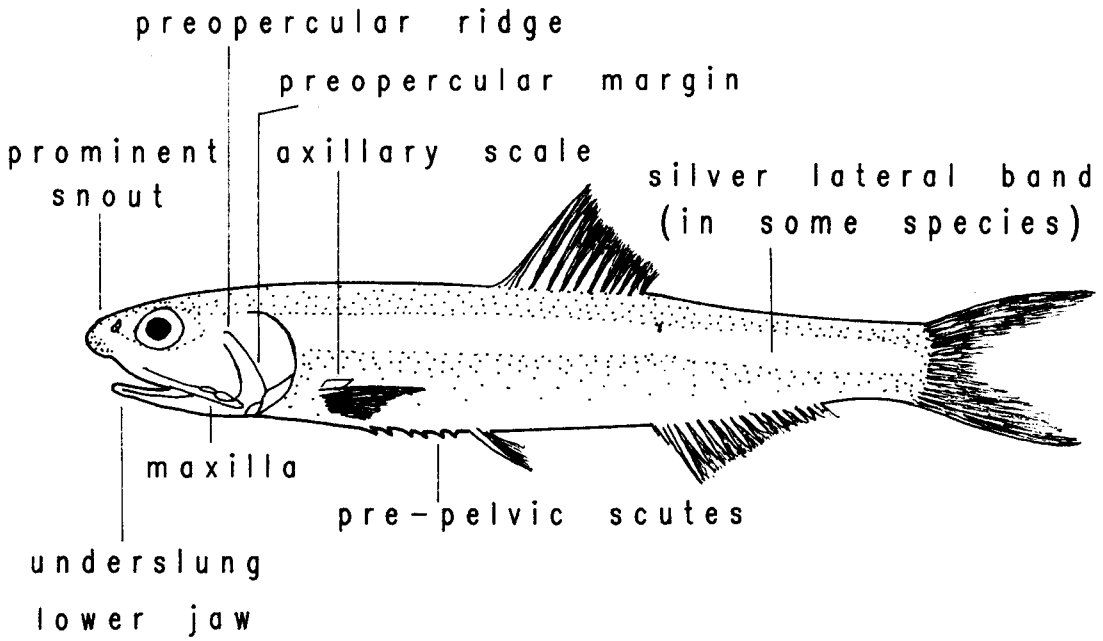


Apogonidae

3. FAMILY ENGRAULIDAE

(Anchovies)

Small silvery schooling fishes of estuarine and coastal waters, although one species often occurs far offshore. Snout prominent with an underslung lower jaw. One dorsal fin. Scutes along belly. Scales smooth to touch and easily shed in most species. Many with a brilliant silver mid-lateral band.

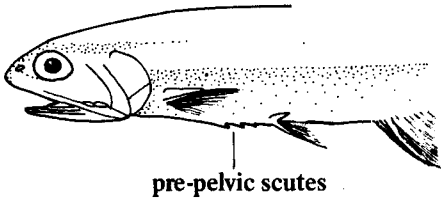


Key to Genera

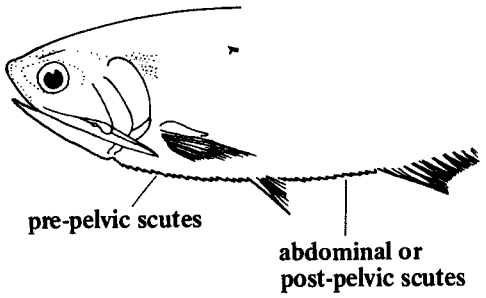
A large family with many genera worldwide, only two of which, *(Stolephorus, Thrissina)*, commonly occur in the area. Another two genera, *Engraulis* in Australia and New Zealand, and *Thryssa* in Papua New Guinea and Solomon Islands, have more restricted distributions. Other Pacific genera *(Setipinna, Coilia, Lycothrissa)* are confined to the estuarine and fresh waters of South-East Asia.

1. **No abdominal scutes or spines** ..... ***Engraulis***

2. **Scutes in front of pelvic fins only** ..... ***Stolephorus***



3. **Scutes before and behind pelvic fin**



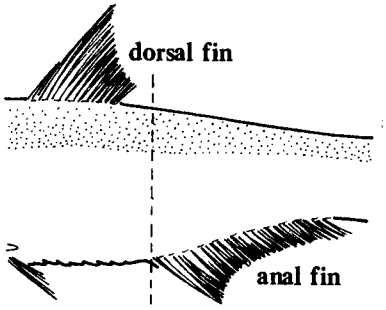
4a. **Keeled scutes along entire belly from isthmus to anal fin origin** ..... ***Thryssa***

4b. **Scutes weak, occurring behind pectoral fins, sometimes one or two pre-pectoral scutes** ..... ***Thrissina***

Key to Species

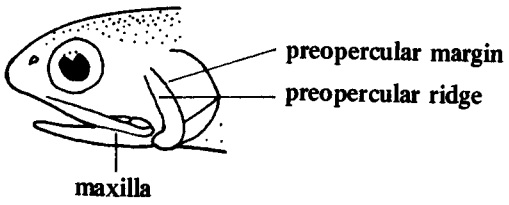
STOLEPHORUS

1a. **Anal fin origin directly under or behind last dorsal ray; eggs elliptical without knob** ..... *Encrasicholina** proposed new genus



2a. **Maxilla short, truncated posteriorly, not reaching preopercular ridge** ..... ***punctifer*** (previously *buccaneeri*)

(*purpureus*, a very similar species, occurs in Hawaii and possibly the Marquesas Islands)



2b. **Maxilla pointed posteriorly, reaching beyond preopercular ridge and bearing prominent recurved teeth distally**

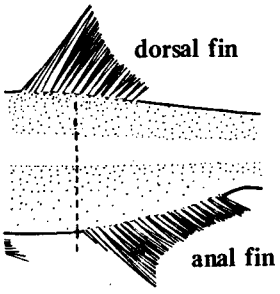
3a. **Maxilla length 5.7-6.2 in standard length; silver lateral band usually with very clear dark blue line defining its top edge; back blue** ..... ***heterolobus***

3b. **Maxilla 5.1-5.6 in standard length; lateral band gold with a less distinct margin, especially near head; back golden** ..... ***devisi***

---

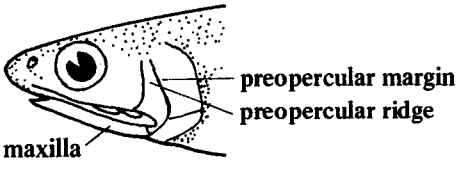
* Whitehead (personal communication) and Nelson (1983) have recently proposed splitting the genus *Stolephorus* into two genera: the new genus *Encrasicholina* (five species) and *Stolephorus* (the remaining species). We have retained the old name here. The first division in the above species key effectively separates the two genera.

1b. Anal fin origin under dorsal fin base; eggs with distinct knob ..... *Stolephorus* (retained genus)



4a. Maxilla short; tip reaches just beyond preopercular ridge ..... *indicus*

4b. Maxilla longer; tip reaches to or beyond preopercular margin



5a. Anal fin origin below anterior part of dorsal fin, usually under 4-6th dorsal fin ray ..... *tysoni*

5b. Anal fin origin below centre of dorsal fin, usually under 8-9th dorsal fin ray

6a. Double pigment line on back from nape to dorsal fin (Note 1) ..... *commersonii*

6b. No pigment lines on back

7a. Lower gill rakers 23 or less; maxilla long and slender, often reaching posterior margin of operculum ..... *insularis* (previously *bataviensis*)

7b. Lower gill rakers 27-30; maxilla shorter, reaching to, but not beyond, preopercular margin; never reaches opercular margin (Note 2) ..... *apiensis*

NOTES:

1. In juvenile *commersonii,* the maxilla is shorter, reaching only as far as the pre-opercular margin or less. The pigment lines are, however, unique.

2. The species tentatively referred to as *apiensis* is a shallow-water species, rare in bait catches. Another shallow-water species from Guam and Kosrae is currently being described (Baldwin, personal communication).

3. Two additional species have been described recently by Wongratana (1983), both of which are likely to be rare in bait catches.

   (i) *S. brachycephalus*, similar to *S. commersonii*, but lacking pigment lines on back. To date, only recorded from Papua New Guinea (Gulf of Papua).

   (ii) *S. oligobranchus* which resembles *S. devisi*, but has fewer gill rakers (13-14 + 17-18, cf. 19-21 + 21-26) and lacks recurved teeth on maxilla. It has tentatively been identified from Fiji (Baldwin, personal communication) as well as from the Philippines (Wongratana, 1983).

THRISSINA

Considered a monotypic genus until the recent description of a new species, *T. encrasicholoides*, by Nelson (1983); its distribution apparently overlaps that of *T. baelama* and it has been recorded from Queensland.

Rear end of maxilla pointed, 1 or 2 pre-pectoral scutes; 27-30 branched anal rays ..... ***baelama****

Rear end of maxilla blunt, no pre-pectoral scutes; 25-27 branched anal rays ..... ***encrasicholoides***

* *Thrissina baelama* has recently been placed in the genus *Thryssa* by Wongratana (1983) as *Thryssa baelama*.

General Notes

Stolephorus punctifer (ocean anchovy, purple anchovy)
J. taiyo tarekuchi, taiwan ainoko iwashi

An oceanic species often found hundreds of miles from the nearest land, but which sometimes produces good catches in deep coastal harbours. School movements around bait lights often produce a characteristic zig-zag sounder trace. Grows to 7 cm, responds well to dimming, and is arguably the most attractive anchovy as bait. Previously referred to as *S. buccaneeri.*

S. purpureus (nehu, Hawaiian anchovy)

Closely related to *punctifer.* Included here only because it may occur in the Marquesas Islands. Biology and handling characteristics have been well studied in Hawaii.

S. heterolobus (blue anchovy)
FAO short-head anchovy J. tarekuchi, katekuchi, mizusururu

Difficult to distinguish from *devisi* at small sizes (< 40 mm) and in preserved material. In life, the distinct blue upper edge to the lateral stripe is very characteristic. This species grows larger than *devisi* (8 cm) and is more often found in deep bays under oceanic influence, although curiously, *devisi* appears the more common species in isolated island situations. Excellent bait and probably more robust than *devisi.*

S. devisi (gold anchovy)
J. tarekuchi, katekuchi

Probably the most abundant anchovy throughout the area, with only the very similar *S. heterolobus* rivalling it in importance. Occasionally seen schooling in shallow water. Its appearance around bait lights often indicated by individuals flicking on the surface at the edge of the illuminated zone. Appears reddish under lights and is usually positioned above *heterolobus* in the vertical profile. Responds well to light dimming. Grows to 7 cm, and, while delicate, is excellent bait if handled carefully.

*S. **indicus*** (Indian anchovy)
J. indo ainoko iwashi

A large anchovy, reaching 15 cm in size and long-lived relative to the preceding species. The only species (other than *punctifer*) to reach French Polynesia. More solitary in habit. Very fragile and generally unsuitable as a baitfish.

S. tysoni

This estuarine species has only recently been described (Wongratana, 1983) and being similar to *S. insularis* in appearance and habitat, may have been regularly misidentified. It has been recorded from Papua New Guinea (Gulf of Papua) and Queensland (Moreton Bay) and may well be widely distributed in the region.

*S. **commersonii*** (double-lined anchovy)

An estuarine shallow-water species rarely taken in dip-nets, but common in beach seine catches. Does not appear to occur east of Solomon Islands.

*S. **insularis*** (gold estuarine anchovy)

Similar in colouration to *devisi;* grows to at least 10 cm; occurs in more estuarine conditions, often with *indicus.* Slightly more robust than that species, but still very fragile and must be handled carefully. Previously referred to as *S. bataviensis.*

*S. **apiensis*** (Samoan anchovy)

Only recently recognised, previously grouped with *S. commersonii.* Similar in habit to that species and appears to replace it in the Western Central Pacific.

Thrissina baelama (little priest)
FAO baelama anchovy J. ainoko iwashi

Another estuarine species which, however, does move out into deeper water. Grows to 10 cm or more. Scales are not deciduous, making it a very hardy species; hence the Japanese name 'half-caste sardine'. Has the habit of jumping when being bucketed and it is often necessary to dry-scoop it into the tanks or into half-filled buckets. Tends to swim away from the boat when broadcast and is often squeezed (and stunned) during chumming to prevent this.

Thrissina encrasicholoides

Not detected by us; known to occur in Queensland, Philippines and Indonesia (Nelson, 1983).

Thryssa setirostris (longjaw thryssa)

Found only in Papua New Guinea and Solomon Islands in estuarine conditions. Handling characteristics are similar to *Thrissina*.

Distribution of anchovy species based on South Pacific Commission records

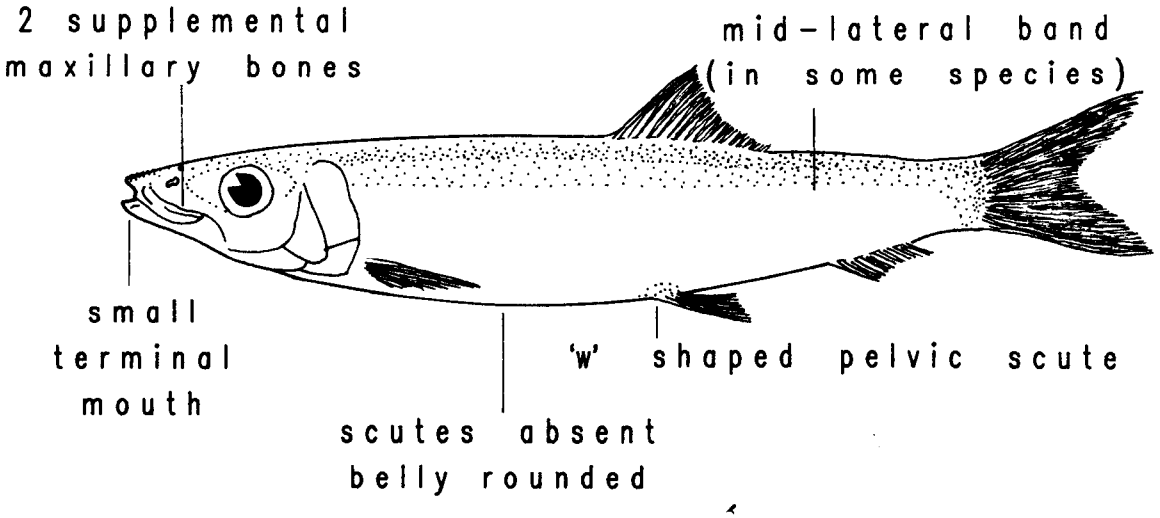
Country	*Stolephorus devisi*	*Stolephorus heterolobus*	*Stolephorus indicus*	*Stolephorus punctifer*	*Stolephorus insularis*	*Stolephorus commersonii*	*Stolephorus apiensis*	*Thrissina baelama*	*Thryssa setirostris*	*Engraulis australis*
PNG	*	*	*	*	*	◇		*	*	
Solomon Is.	*	*	*	*	*			*	*	
Vanuatu	*		*		*					
New Caledonia	*	*	*	*	*			*		
Fiji	*	*	*	*	*		◇	*		
Tonga	*		*					*		
Wallis/Futuna	*									
W. Samoa	*		*		*		◇			
A. Samoa	*		*	*						
Palau		*						*		
Yap		*	*		*					
Truk	*	*								
Ponape	*	*	*		*					
Kosrae	*	*	*		*					
Marshall Is.										
Kiribati										
Tuvalu										
Tokelau										
N. Cook Is.										
Society Is.			*	*						
Marquesas										
Tuamotus										
NE. Qld.	*		*							
S. NSW										*
NZ										*

◇ Records known to us, but not on SPC files.

4. FAMILY DUSSUMIERIIDAE

(Sprats, round herrings)

Small schooling fishes of coastal waters. More rounded in cross-section than anchovies and not bearing scutes on the belly. Mouth small and terminal; maxilla with two supplemental bones. Scales large, cycloid, and easily shed.



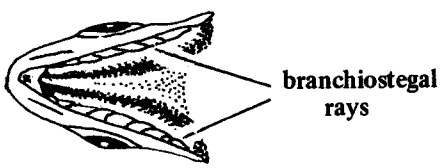
NOTE: Most authorities would now be in agreement in placing this family within the Clupeidae. We have followed Munro (1967) in maintaining it as a separate family here only for the sake of clarity and simplicity; the clupeid keys are already quite lengthy.

Key to Genera

Only two genera: *Dussumieria* and *Spratelloides.*

1a. **Dorsal fin origin nearer tail base than snout tip; branchiostegal rays 14-19*** ..... ***Dussumieria***

head from below



1b. **Dorsal fin origin nearer snout tip than tail base; branchiostegal rays 4-8** ..... ***Spratelloides***

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* Branchiostegal rays - bony rays supporting the gill membranes behind the lower jaw.

Key to Species

DUSSUMIERIA

Until recently, only one species, *Dussumieria acuta,* had been recognised. Two new species have been identified from examinations of Fijian and New Caledonian material, and await formal description.

1a. **Horizontal striae* on the hind margin of body scales** ..... ***acuta***
(probably does not occur in the region)

1b. **No striae on hind margin of body scales**

2a. **Body moderately deep, 4.0-4.2 in standard length; lower gill rakers 27-30; caudal with distinct dark margin** ..... ***Dussumieria* sp. A**

2b. **Body slender, 5.8-6.0 in standard length; lower gill rakers 19-22; caudal margin dusky rather than distinctly dark** ..... ***Dussumieria* sp. B**

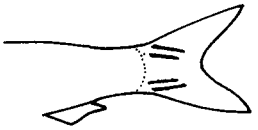
SPRATELLOIDES

1a. **Silver mid-lateral band; no prominent markings on caudal base; anal rays 11-13**

2a. **Silver band distinctly defined along its length; back steely blue (pyloric caecae 11-14)** ..... ***gracilis***

2b. **Silver band fades anteriorly; colour especially on belly, turquoise rather than blue (pyloric caecae 8-10)** ..... ***lewisi***

1b. **No lateral band; 2 pairs of dark lines on caudal base; anal rays 9-11** ..... ***delicatulus***



* Striae - narrow bands, streaks, lines, grooves or canals.

General Notes

Dussumieria spp. (sharp-nosed sprat, weak herring)
J. urume iwashi, gin iwashi

Because of the uncertainty over species identity and the relevance of previous records, only general comments can be made. The species group is widely distributed, but does not reach French Polynesia. Responds well to dimming. Scales very deciduous, mortality during handling very high, and hence this species of little value as bait. Form A appears to be slightly more estuarine in habit (Conand, personal communication) and is more common in Fiji bait catches. Probably grows to 15 cm.

Spratelloides gracilis (silver sprat)
J. kibinago

A very important species in the Papua New Guinea and Solomon Islands fisheries. Gathers in wheeling clouds around the light, not far below the surface. Excellent bait, but needs careful handling. As with *delicatulus*, found in clear coastal waters, often near coral reefs. Grows to 7 cm.

*S. **lewisi*** (turquoise sprat)

Only recently described (Wongratana, 1983); probably restricted mainly to Papua New Guinea and Solomon Islands. Distinguished from *gracilis* by the more diffuse lateral band and turquoise shading on the abdomen. Maximum size, biology, handling characteristics and behaviour not documented.

*S. **delicatulus*** (blue sprat)
J. minami kibinago, baka iwashi

A widely distributed species but, unlike its cogener *gracilis*, apparently not reaching French Polynesia. Gathers around the light near the surface and is easily captured. The most important species by volume in the Fiji fishery. With its erratic motion and silvery lustre, makes very good bait, but needs careful handling in tropical waters. Grows to 6 cm.

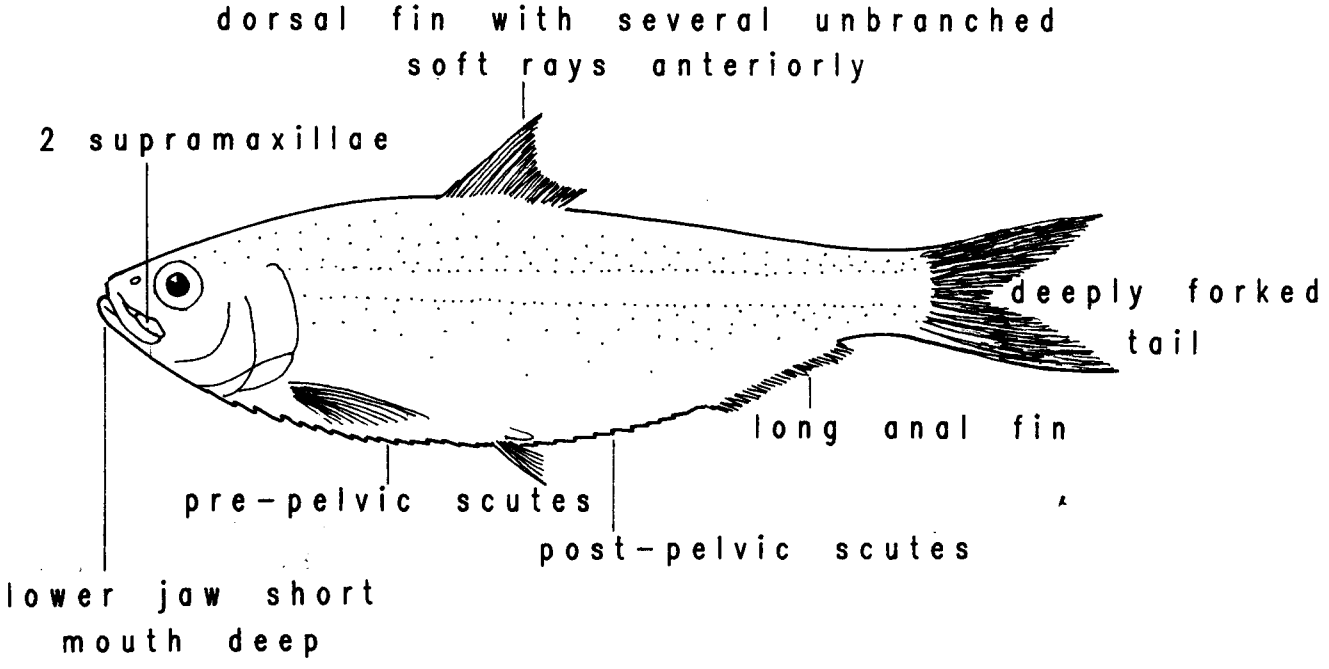
Distribution of sprats based on South Pacific Commission records

Country	*Spratelloides delicatulus*	*Spratelloides gracilis*	*Spratelloides lewisi*	*Dussumieria* spp.
PNG	*	*	*	*
Solomon Is.	*	*	*	*
Vanuatu	*	*		*
New Caledonia	*	*		*
Fiji	*	*		*
Tonga	*	*		*
Wallis/Futuna	*			*
W. Samoa	*	*		*
A. Samoa	*	*		
Palau	*	*		*
Yap				*
Truk	*			*
Ponape	*			*
Kosrae				*
Marshall Is.	*			
Kiribati	*			*
Tuvalu	*			
Tokelau	*			
N. Cook Is.	*			
Society Is.		*		
Marquesas				
Tuamotus		*		
NE. Qld	*	*		*
S. NSW				
NZ				

5. FAMILY CLUPEIDAE

(Sardines, herrings)

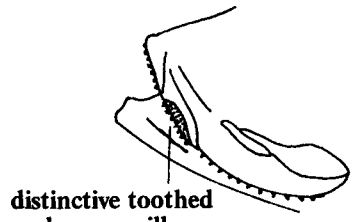
A diverse family of mostly small (10-20 cm) silvery fishes, with body shape ranging from elongated to strongly compressed (oval). Scutes along the belly. Lower jaw short and deep, upper jaw (maxilla) with two supplemental bones (supramaxillae). Anal fin much longer than dorsal, ventral fins normally opposite dorsal. Usually blue/green on back, silvery on sides.



Key to Genera

Relatively few of the large number of genera occurring in the Indo-Pacific area are found in the SPC region. Only four genera make regular contributions to baitfish catches.

1a. **Anal fin very long, with 3-4 unbranched rays, 31-38 branched rays; mouth pointing upward, lower jaw projecting, distinctive toothed hypomaxilla**



distinctive toothed hypomaxilla

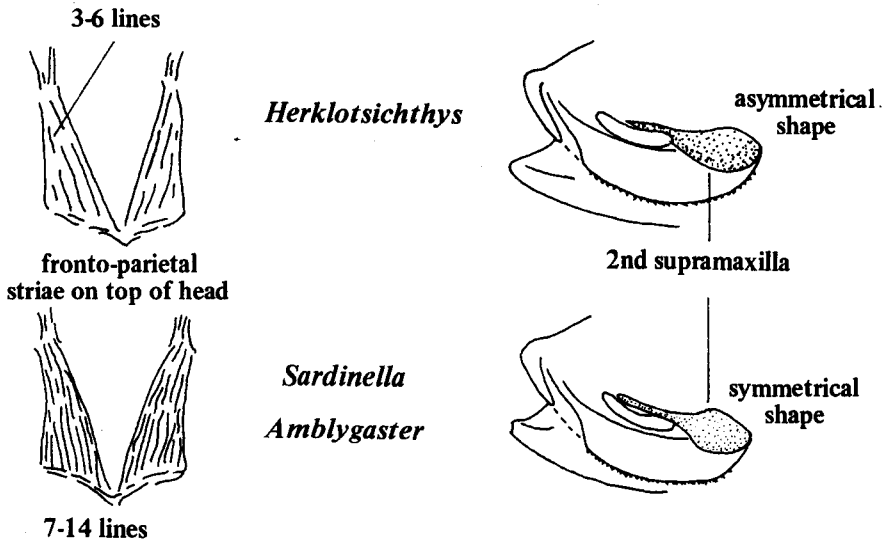
. . . . . ***Pellona***

1b. **Anal fin short, 3 unbranched rays, 12-20 branched rays; jaws about equal**

2a. **No dark spot at origin of dorsal fin; few (3-6) fronto-parietal striae* on top of head, second supramaxilla asymmetrical (lower portion of lobe longer than upper portion)** . . . . . ***Herklotsichthys***

* Striae - narrow bands, streaks, lines, grooves or canals.

2b. Usually black spot present at origin of dorsal fin; many (7-14) fronto-parietal striae, second supramaxilla symmetrical



3a. Belly rounded; lower gill rakers 26-42; single median row of pre-dorsal scales ..... *Amblygaster*

3b. Belly sharp-edged; lower gill rakers 30-140; double row of pre-dorsal scales (some species with a few median ones) ..... *Sardinella*

Key to Species

PELLONA

A single species *P. ditchela* in the Western Pacific. A second species, *P. dayi*, has recently been described from Indian waters (Wongratana, 1983).

HERKLOTSICHTHYS

Problems remain with this genus. Although several deep-bodied species *(koningsbergeri, castelnaui)* are found in Northern Australian and Papua New Guinea estuaries, only one species, *H. quadrimaculatus*, is known from the SPC area. Recently, Conand (personal communication) has distinguished two forms from New Caledonia as in the key below. Their status still requires clarification.

Two gold spots posterior to the operculum; back grey-green in colour ..... ***quadrimaculatus***

One gold spot posterior to the operculum; back steely blue in colour ..... ***Herklotsichthys* sp.**

AMBLYGASTER

1a. Spots along flanks (gold, turning black); lower gill rakers 31-43; dorsal fin yellowish ..... *sirm*

1b. No spots; lower gill rakers 27-31; dorsal fin dusky ..... *clupeoides*

SARDINELLA

Seven probable species; difficult to identify some with certainty.

1a. Lower gill rakers 87-134 ..... *fijiensis*

1b. Lower gill rakers less than 85

2a. Caudal tips jet black ..... *melanura*

2b. Caudal tips plain

3a. Post-pelvic scutes usually 15; total scutes 32-34 (usually 33) ..... *gibbosa*

3b. Post-pelvic scutes usually 12-13; total scutes 29-33 (usually 29-31)

4a. No dark spot at dorsal origin ..... *marquesensis*

4b. Dark spot at dorsal origin

5a. Body deep, 2.5-3.3 in standard length; scale striae overlap or meet at centre ..... *brachysoma*

5b. Body usually 2.9-4.0 in standard length; scale striae not meeting at centre

6a. Scales densely perforated, not produced posteriorly ..... *albella*

6b. Scales slightly perforated, hind edge produced in adults ..... *fimbriata*

General Notes

Pellona ditchela (Ditchelee herring)
FAO Indian pellona

Frequently taken during baiting operations in areas adjacent to estuaries. Not encountered east of Solomon Islands. Very hardy and makes excellent bait because of its habit of skipping across the surface when pursued. Grows to 20 cm; rarely taken in large numbers.

Herklotsichthys quadrimaculatus (gold spot herring)
FAO spotted herring J. mangrove iwashi, mizun

A widespread species previously known under the names *Harengula ovalis* and *Herklotsichthys punctatus;* the present name refers to the two gold opercular spots on each side of the fish. Schools near mangroves and along beaches, as well as in deeper water. Important in some coastal areas both as a primary food source and also as an attractant for larger predators when schooling near shore. A relatively robust species, moderately attractive as bait. Grows to 15 cm.

Herklotsichthys **sp.** Found in New Caledonia and probably occurs in other Western Pacific countries.

Amblygaster sirm (spotted pilchard)
FAO spotted sardinella J. ma iwashi

In adults, a row of golden spots along the flanks, turning black in death. Usually much more abundant than its cogener *clupeoides.* Makes an important contribution to the Fiji fishery, but not especially favoured as bait because of its large size and relative fragility. Juveniles (< 10 cm) are more highly rated. Grows to at least 20 cm.

A. ***clupeoides*** (blue pilchard)
J. ma iwashi, yamato mizun

Can be distinguished from *sirm* by its lack of spots, dusky rather than yellow dorsal fin, and stouter body. Probably reaches a larger size (25 cm). Similar to *S. leiogaster* which probably does not occur in the region (Whitehead, personal communication).

Sardinella fijiensis (Fijian sardine)

An estuarine/brackish water species which is only very occasionally captured during baiting operations. Currently known only from Fiji, New Caledonia and Papua New Guinea, but probably also occurs in Solomon Islands and Vanuatu. Can be distinguished from *melanura* by its distinct black dorsal fin tip and dusky, rather than distinct jet black, caudal tips. Probably reaches 20 cm.

*S. **melanura*** (blacktip sardine)
FAO blacktip sardinella J. oguro iwashi

Common on sandy beaches, near reefs and sometimes around shore installations, but not often taken by dip-net. The jet black caudal tips, usually preceded by a white patch, are very distinctive. Robust and very good bait. Grows to 15 cm.

*S. **marquesensis*** (Marquesan sardine)

Endemic to the Marquesas where is widespread among the islands. Dominant species in both bouki-ami and beach seine hauls. Similar in habits to *H. quadrimaculatus.*

Other ***Sardinella*** species
J. sappa

The remaining *Sardinella* species appear to be restricted to Papua New Guinea. *S. albella* was taken once during the SPC survey. It is, however, quite abundant in some Papua New Guinea harbours, as is *S. fimbriata.* Both *gibbosa* and *brachysoma* have been encountered less commonly, and only in Papua New Guinea.

Distribution of clupeid species based on South Pacific Commission records

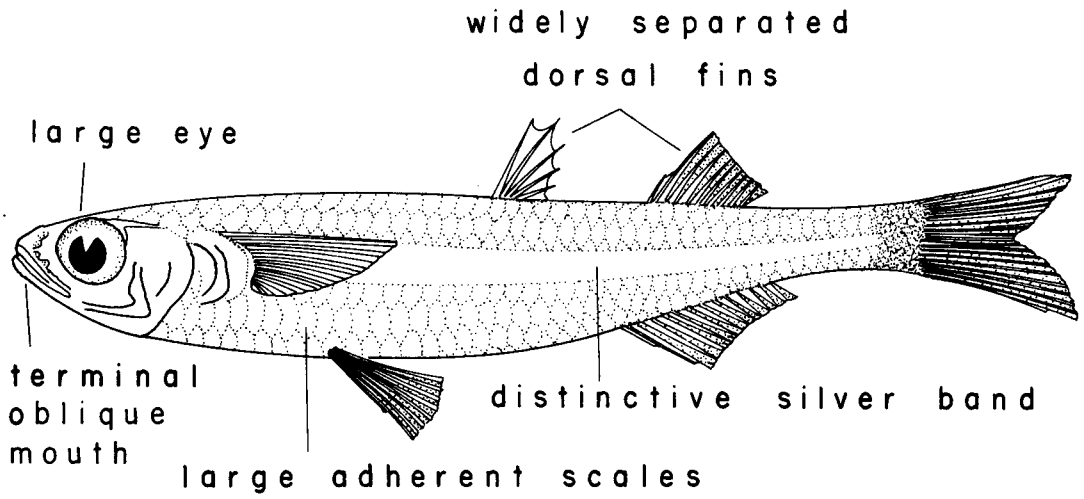
Country	*Herklotsichthys quadrimaculatus*	*Pellona ditchela*	*Amblygaster clupeoides*	*Amblygaster sirm*	*Sardinella melanura*	*Sardinella fijiensis*	*Sardinella marquesensis*	*Sardinella albella*	*Sardinella brachysoma*	*Sardinella fimbriata*	*Sardinella gibbosa*
PNG	*	*	*	*	*	◇		*	◇	◇	◇
Solomon Is.	*	*		*	*			*			
Vanuatu	*		*	*							
New Caledonia	*		*	*	◇	◇					
Fiji	*		*	*		◇					
Tonga	*			*	*						
Wallis/Futuna	*			*							
W. Samoa	*		*	*	*						
A. Samoa	*			*	*						
Palau	*		*	*							
Yap				*							
Truk	*			*							
Ponape	*		*	*							
Kosrae	*			*							
Marshall Is.	*			*							
Kiribati	*		*								
Tuvalu											
Tokelau											
N. Cook Is.											
Society Is.					*						
Marquesas							*				
Tuamotus											
NE. Qld			*	*							
S. NSW											
NZ											

◇ Records known to us, but not in SPC files.

6. FAMILY ATHERINIDAE

(Silversides, hardyheads)

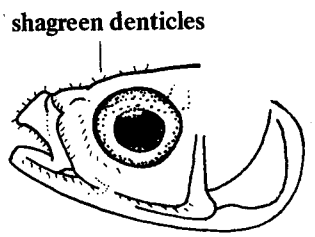
Small silvery fishes schooling in coastal waters. Some species enter fresh water. Sub-cylindrical in shape, with two widely separated dorsal fins. Scales large and stout. Mouth terminal, oblique, and moderately protractile. Distinct silvery mid-lateral band.



Key to Genera

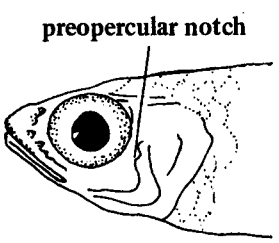
Four marine genera in the region, three of which regularly occur in dip-net hauls.

1a. **Preopercular notch absent; shagreen denticles outside mouth; spinules on head**

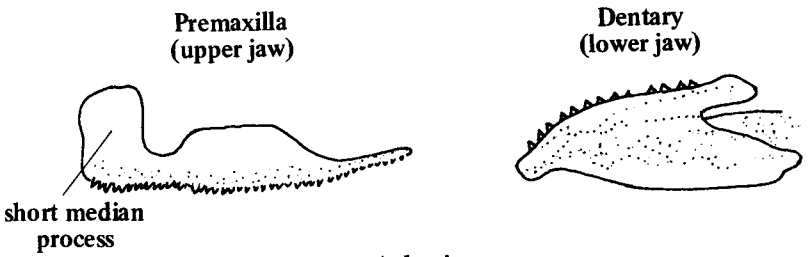


. . . . . *Atherion*

1b. **Preopercular notch present; no denticles or spinules on mouth, head**

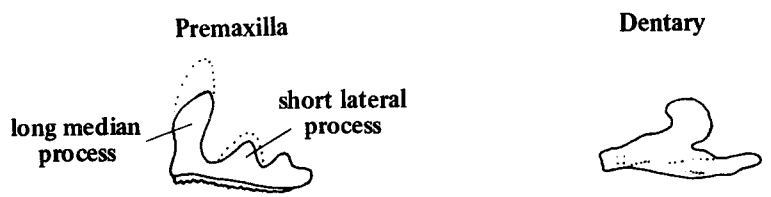


2a. Median process of premaxilla short, broad; lateral process absent; dentary (lower jaw) sloping gently upwards and backwards ..... *Atherinomorus* (previously *Pranesus*)



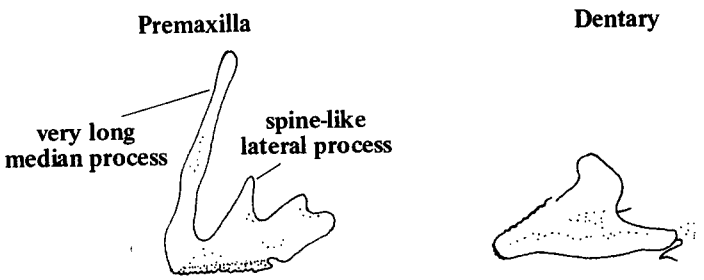
Atherinomorus

2b. Median process of premaxilla long and narrow; lateral process short, broad and scarcely conspicuous; dentary highly elevated posteriorly ..... *Hypoatherina* (previously *Allanetta*)



Hypoatherina

2c. Median process of premaxilla very long, almost equal to eye diameter; lateral process spine-like; dentary highly elevated posteriorly ..... *Stenatherina*



Stenatherina

Key to Species

ATHERION

One species *(elymus)* apparently widespread throughout the region (Ivantsoff, personal communication); another, *(macullochi)*, endemic to Lord Howe Island.

ATHERINOMORUS

1a. Mid-lateral band wide, greater than one scale width; mid-lateral scales 39-44; dentary almost flat ..... ***lacunosus*** (previously *pinguis*)

1b. Mid-lateral band narrow, about one scale width; mid-lateral scales 39 or less; dentary slopes upwards

2a. Scales highly crenulated (scalloped); pectoral fin very long, 3.3-4.0 in standard length ..... ***crenolepis*** (not seen by us)

2b. Scales entire; pectoral 4-7 in standard length

3a. Lower gill rakers 21-25; no spots below mid-lateral band; dentary with knob-like prominence (tubercle) at posterior end ..... ***duodecimalis***

3b. Lower gill rakers 18-22; two rows of spots usually present below mid-lateral band; dentary without a tubercle (slight prominence seen in some) ..... ***endrachtensis***

HYPOATHERINA

Five species, two of which appear rare.

1a. Scales crenulated (body rough to touch); body robust; anus 2.5-4.0 scales in front of ventral fin tips ..... *valenciennesi* (not seen by us)

1b. Scales smooth; body slender; anus near ventral fin tips

2a. Mid-lateral band wide (2.3-3.2) in maximum body depth; pectoral fins 11-14 rays; lower gill rakers 15-18; anus always behind ventral fin tips ..... *barnesi*

2b. Mid-lateral band narrow (2.8-7.1); pectoral fin 14-18 rays; lower gill rakers 18-25

3a. Premaxillary process long; anal fin 8-11 rays; anus 0.5-2.0 scales in front of ventral fin tips; mid-lateral band 4.0-7.1 in maximum depth ..... *ovalaua*

3b. Premaxillary process moderate; anal fin 10-13 rays; mid-lateral band 2.8-5.1 in maximum depth

4a. Lower gill rakers 18-20; premaxillary process short, 2.2-3.7 in eye diameter ..... *cylindrica* (rare)

4b. Lower gill rakers 21-25; premaxillary process 1.7-2.5 in eye diameter; often orange spot on premaxillary process ..... *temminckii*

STENATHERINA

Only one species, *Stenatherina panatela;* maximum size 90 mm; rarely captured during the SPC survey.

General Notes

Silversides readily congregate at the surface around bait attraction lights where they are easily captured and form conspicuous elements of the bait catch. They are very hardy, but because of their sluggish swimming, are generally regarded as poor bait. The more slender species *(Stenatherina, Hypoatherina)* sometimes give better results. Two species, *A. lacunosus* and *H. ovalaua,* normally dominate catches and for this reason, the other less common species are usually overlooked; hence the patchy distributional data. General Japanese name: togoro iwashi.

Stenatherina panatela (crescent silverside)

A species taken in numbers only in outlying island harbours and lagoons. Readily distinguished by its slender shape, very long inter-maxillary process and the black crescentic mark on the snout. Grows to 10 cm. Previously known as *S. temminckii.*

Atherion elymus (bearded silverside)

Well represented in shore collections from the region, but never encountered by us in dip-net collections. Presumably a shore-hugging species. The bearded appearance of the head is characteristic.

Atherinomorus lacunosus (broad-banded silverside)

This common, widespread species was previously known as *Pranesus pinguis.* It is particularly slow moving and not well regarded as bait. Grows to 10 cm, and forms conspicuous schools in inshore waters.

A. crenolepis

Like *Atherion,* it is represented in shore collections, but has not been seen by us.

A. endrachtensis (striped silverside) and ***A. duodecimalis*** (western silverside)

Both species not common outside Papua New Guinea and probably often confused with the more abundant *lacunosus.*

Hypoatherina ovalaua (Ovalaua silverside)

A common, widespread species which is of some value as bait. Less common along beaches than *lacunosus.* Grows to 8-10 cm.

H. barnesi (Barnes' silverside)

A relatively rare species encountered in lagoons of outlying islands and atolls. The wide lateral band is characteristic.

H. temminckii

Probably quite common, but usually grouped with *ovalaua*. An orange spot frequently found on the premaxillary process can sometimes allow a rapid positive identification.

H. cylindrica

Only recently recognised and possibly quite rare.

Distribution of silversides based on South Pacific Commission records

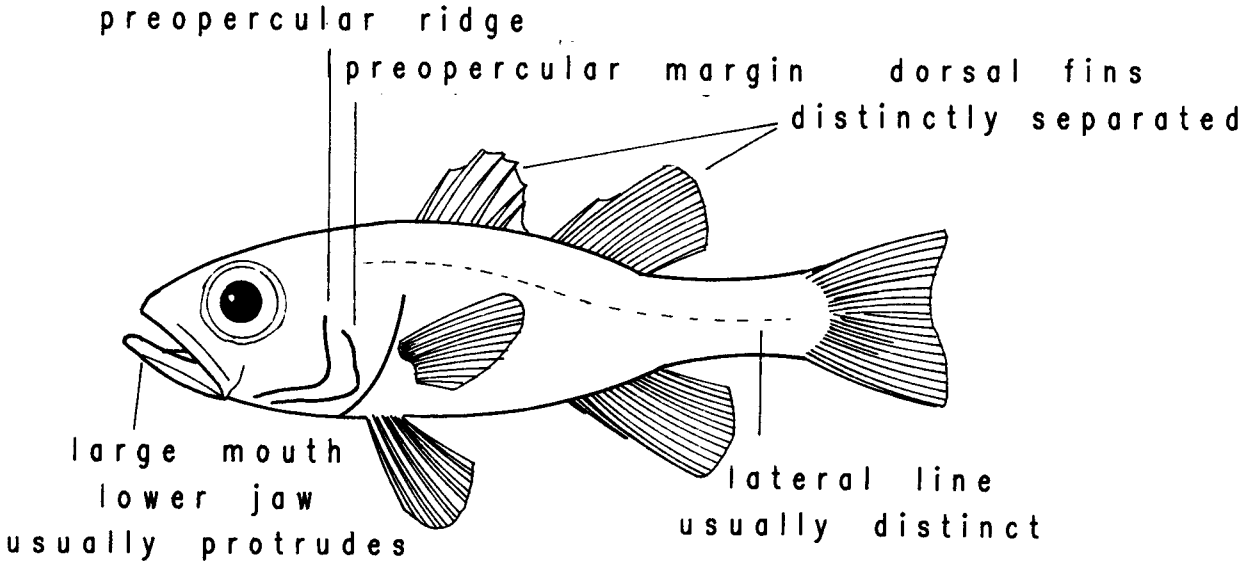
Country	*Stenatherina panatela*	*Atherinomorus lacunosus*	*Atherinomorus duodecimalis*	*Atherinomorus endrachtensis*	*Hypoatherina ovalaua*	*Hypoatherina temminckii*	*Hypoatherina barnesi*	*Hypoatherina cylindrica*
PNG	◊	*	*	◊	*	◊	*	
Solomon Is.	*	*	*	*	*	*		
Vanuatu		*			*			
New Caledonia		*	*	*	*			
Fiji	*	*			*	*	*	
Tonga		*			*			
Wallis/Futuna		*			*			*
W. Samoa		*				*		
A. Samoa		*						
Palau		*			*	*		
Yap		*				*		
Truk		*			*			
Ponape		*	*		*	*		*
Kosrae		*	*	*	*			
Marshall Is.		*			*			
Kiribati		*			*			
Tuvalu	*	*						
Tokelau								
N. Cook Is.	*					*	*	
Society Is.								
Marquesas								
Tuamotus								
NE. Qld								
S. NSW								
NZ								

◊ Records known to us, but not in SPC files.

7. FAMILY APOGONIDAE

(Cardinalfish)

Small carnivorous fishes found in a variety of habitats, but common around coral reefs. In most species, the male carries eggs and youth in its mouth. Two distinctly separated dorsal fins. Head and mouth large, lower jaw usually protrudes. Often brightly coloured.



Key to Genera

At least nineteen genera and more than one hundred species are known, but very few species are commonly used as bait. The nomenclature of Fraser (1972) has been employed in the keys presented here.

1a. No canine teeth in jaws

2a. Prominent silvery tubular gland from head to tail along belly on each side ..... ***Siphamia***

2b. No ventral silvery tubular gland present

3a. Anal fin count II, 9-13; colour pink ..... ***Rhabdamia****

3b. Anal fin count II, 8-10, wide colour range ..... ***Apogon***

3c. Anal fin count II, 12-18 ..... ***Archamia***

1b. Canine teeth present in jaws

4a. Body scaled ..... ***Cheilodipterus***

..... ***Pseudamia*** (rare)

4b. Body scaleless ..... ***Gymnapogon*** (rare)

..... ***Pseudamiops*** (rare)

---

* *Rhabdamia* is the only apogonid genus containing species of significance as bait in this area.

Notes on species of interest

Cardinals appear to be more abundant when baiting near reef on rough bottom. Although they tend to hug the bottom, they can be induced to rise by careful dimming of the light. They are relatively robust and are highly rated as bait.

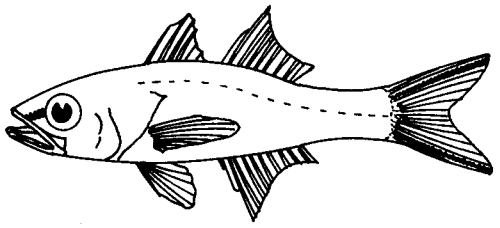
Siphamia

Considered a monotypic genus, but probably contains several species; this easily recognised genus needs more work at the species level.

Rhabdamia

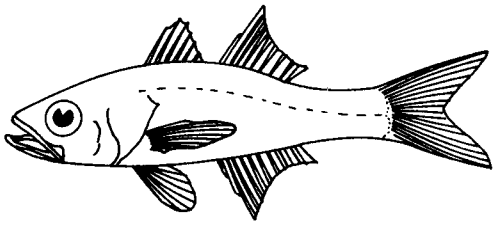
Two widely distributed species commonly occur and on occasion form an important component of bait catches. Although *cypselurus* is generally the more abundant, *gracilis* dominates catches in some countries (e.g. Fiji).

Rhabdamia cypselurus (blacknose cardinal)
J. (general) aka-esa, tenjikudai



Pink body colour with black bar from snout to eye, black bar along each caudal lobe. Snout yellowish. Specimens are sometimes seen with a black caudal spot; these may constitute a third species.

R. gracilis (pink cardinal)
J. (general) aka-esa, tenjikudai



Body colour uniform pink colour, sometimes with two lines along side. No other markings.

Apogon

A large genus with many species, but only a few regularly occur in the bait catches.

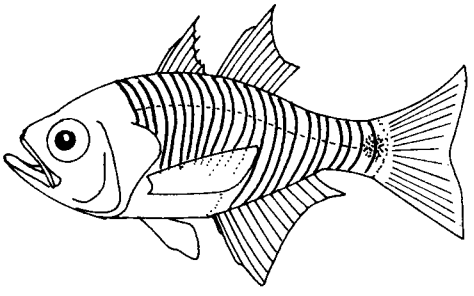
Apogon fragilis

This species is not well known outside the Indian Ocean, but is apparently quite common in the SPC area. Frequently taken with *Apogon leptacanthus* and *A. fraenatus*, it is of little importance as bait.

Archamia

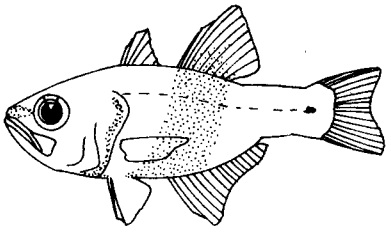
Probably not more than five or six widely distributed species.

Archamia lineolata/fucata (bronze-streaked cardinal)
J. atochiki tenjikudai



15-20 bronze stripes across body; diffuse black spot on tail base. Two species are often separated on the basis of anal ray counts (e.g. Smith, 1961), but we have found such forms similar in colour and habit; hence they have been grouped here. Common, but not often taken in quantity. Widely distributed, though apparently not occurring in French Polynesia.

A. zosterophora (black sash cardinal)



Broad black transverse band on body, black spot on tail base. Locally common but, like the previous species, never really abundant.

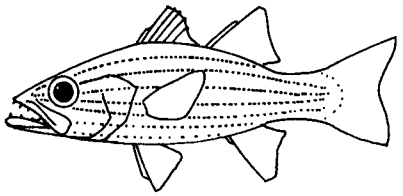
A. biguttata

Two diffuse black spots, one on tail base, other on top corner of operculum. Rare in dip-net hauls.

Cheilodipterus

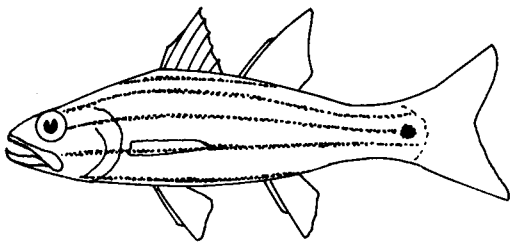
Several species in the Indo-Pacific, but only two commonly occur always in small numbers and are of no importance as bait.

Cheilodipterus macrodon (eight-lined or tiger cardinal)
J. ryukyu yarai ishimochi



5-8 brown longitudinal bands from snout to tail; black spot surrounded by yellow on tail in young, becoming a dusky band with age.

C. ***quinquelineata*** (five-lined cardinal)



Yellowish-tan in colour with five narrow horizontal bands from snout to tail base; brownish-black spot on tail.

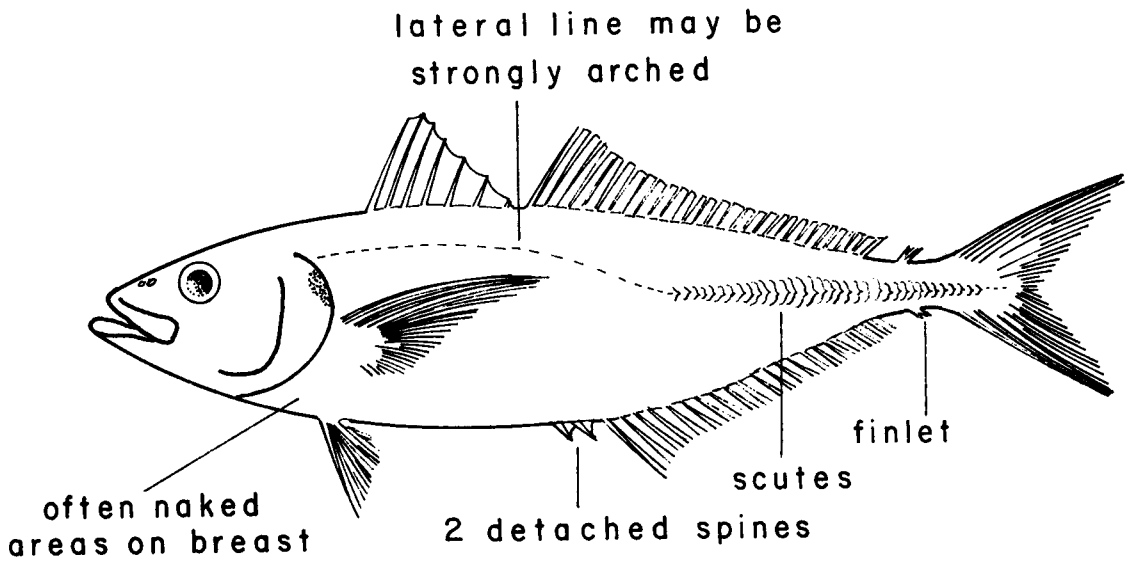
Distribution of cardinalfish based on South Pacific Commission records

Country	*Rhabdamia gracilis*	*Rhabdamia cypselurus*	*Archamia lineolata*	*Archamia zosterophora*	*Apogon fragilis*	*Cheilodipterus macrodon*
PNG	*	*	*	*	*	*
Solomon Is.	*	*	*	*	*	*
Vanuatu		*	*	*		
New Caledonia	*	*	*	*	*	*
Fiji	*	*	*			*
Tonga		*	*			*
Wallis/Futuna	*		*		*	*
W. Samoa		*	*			
A. Samoa			*			
Palau		*	*	*		*
Yap			*	*		
Truk		*	*			*
Ponape		*	*		*	*
Kosrae		*	*		*	
Marshall Is.		*				
Kiribati		*	*		*	*
Tuvalu			*			
Tokelau						
N. Cook Is.						
Society Is.	*					*
Marquesas		*				
Tuamotus						*
NE. Qld			*			
S. NSW						
NZ						

8. FAMILY CARANGIDAE

(Trevallies, scads, horse mackerel)

A diverse family of active, fast-swimming fishes, usually of coastal waters. Some attain large size, and are important food fish. Scales usually small and inconspicuous. Lateral line often strongly arched and armed with keeled scutes posteriorly. Always two detached spines before anal fin. Finlet(s) behind soft dorsal and anal in some species.



Key to Main Genera

Baitfish genera are asterisked.

1a. At least some scutes along lateral line

2a. Scutes along entire lateral line ..... *Trachurus** (Australia and New Zealand only)

2b. Scutes on posterior part only

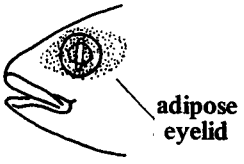
3a. One or more finlets behind soft dorsal and anal fins

4a. A single dorsal and anal finlet ..... *Decapterus**

4b. 8-9 dorsal and anal finlets ..... *Megalaspis*

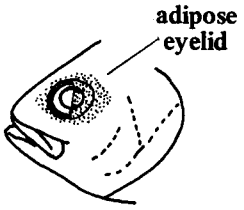
3b. No finlets

5a. Teeth present in both jaws

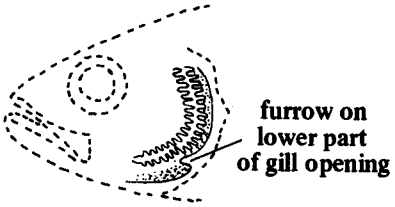


6a. Adipose tissue of eye, covering all but a central slit ..... *Atule**

6b. Adipose tissue leaving anterior half of eye exposed



7a. A deep furrow on lower part of gill opening ..... *Selar**



7b. No furrow on lower part of gill opening

8a. Jaw teeth in a single series ..... *Alepes*

8b. Teeth in band in upper jaw; single series or band in lower jaw ..... *Caranx/Carangoides*

5b. No teeth in upper jaw

9a. Single series of minute teeth in lower jaw ..... *Selaroides**

9b. No teeth in either jaw ..... *Gnathanodon*

1b. **No scutes along lateral line**

10a. **Soft dorsal and anal fin bases about equal in length; body slender; scales elongated or needle-like** ..... ***Scomberoides***

10b. **Anal fin base much shorter than soft dorsal fin base** .... ***Elagatis/Seriola*** etc.

Key to Species

Excluding the temperate genus *Trachurus*, only two of the baitfish genera occurring in the region contain more than one species: *Decapterus* (four species) and *Selar* (two species).

DECAPTERUS

1a. Straight part of lateral line with 14-35 scales and 46-68 total scales and scutes; upper jaw without teeth; pectoral 58-75 per cent of head length

2a. Posterior end of upper jaw concave above, rounded and produced below (Fig. a); oral valve (membrane) at symphysis of upper jaw, dusky or transparent ..... *macrosoma*

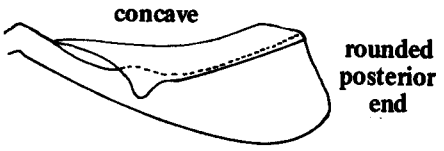


Fig. a

2b. Posterior end of upper jaw straight above, moderately rounded to slanting anterio-ventrally; oral valve white in life (Fig. b) ..... *macarellus*
(probably does not occur in the region)

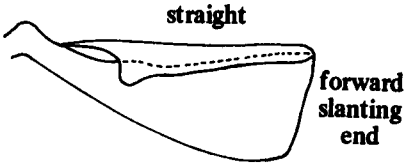


Fig. b

1b. Straight part of lateral line with 0-4 scales and 46-48 total scales and scutes; upper jaw with minute teeth; pectoral fin 71-105 per cent of head length; posterior end of upper jaw vertical (Fig. c)

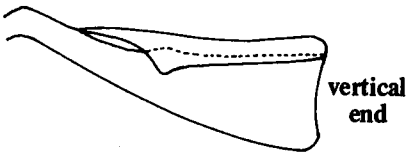


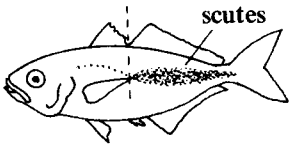
Fig. c

3a. Caudal fin tinged red in life; lower gill rakers usually 26-32, segmented anal rays (including finlet) 22-26 (rarely 26) ..... *kurroides*

3b. Caudal fin not red, lower gill rakers usually 32-39, anal rays (including finlet) 25-29 (rarely 25) ..... *russelli*

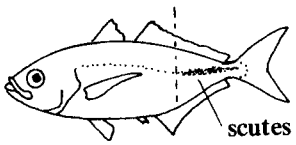
SELAR

1a. Scutes 32-38, beginning below the middle of the soft dorsal fin; largest scute 9-10 times in the body depth



..... *crumenophthalmus*

1b. Scutes 44-46, beginning below the origin of the soft dorsal fin; largest scute 4 times in body depth



..... *boops*

General Notes

***Decapterus* spp.** (scads)
J. aji (general), maruaji *(D. russelli)*, oakamuro *(D. kurroides)*, moro *(D. macrosoma)*

Unlike *Trachurus*, their counterparts in temperate waters, *Decapterus* species rarely dominate baitfish catches in the region, although they do make significant contributions from time to time. During the SPC survey, only two species *(D. russelli, D. macrosoma)* were recorded. No other species of *Decapterus* were observed. *D. kurroides*, a distinctive large species, has been taken by handline in deeper water in Fiji, and *D. macarellus* probably does not occur in the region. At smaller sizes, *Decapterus* are hardy and of moderate attractiveness as bait. Probably grow to 30 cm, but adults are rarely captured in dip-nets. *D. macrosoma* appears the more widely distributed of the two species (i.e. *D. russelli* and *D. macrosoma).*

Selar crumenophthalmus (bigeye scad, atule)

Although commonly taken and one of the more widely encountered baitfish species (see following distribution table), it is frequently too large to use as bait when it is scooped out for table use or for handline bait. Grows to at least 25 cm.

S. boops (oxeye scad)

Possibly restricted to the western parts of the region, although there are records from the northern Cook Islands. Apparently either less common than its cogener or less susceptible to dip-netting. Grows to 20 cm or more.

Atule mate (yellowtail scad)

Occasionally contributes to the catch, but not commonly seen.

Selaroides leptolepis (yellow-lined scad)
J. hosohira aji

Recorded only from Papua New Guinea, where 5 kg or so per set were sometimes captured. Recognised by a golden lateral band, opercular spot, and by the absence of teeth.

***Scomberoides* spp.**
J. ike katsuo

Juveniles regularly captured, but noteworthy only because their stout erectile dorsal spines cause problems for chummers. The most common and certainly most widely distributed species is *S. lysan*, previously known as *S. tolooparah.*

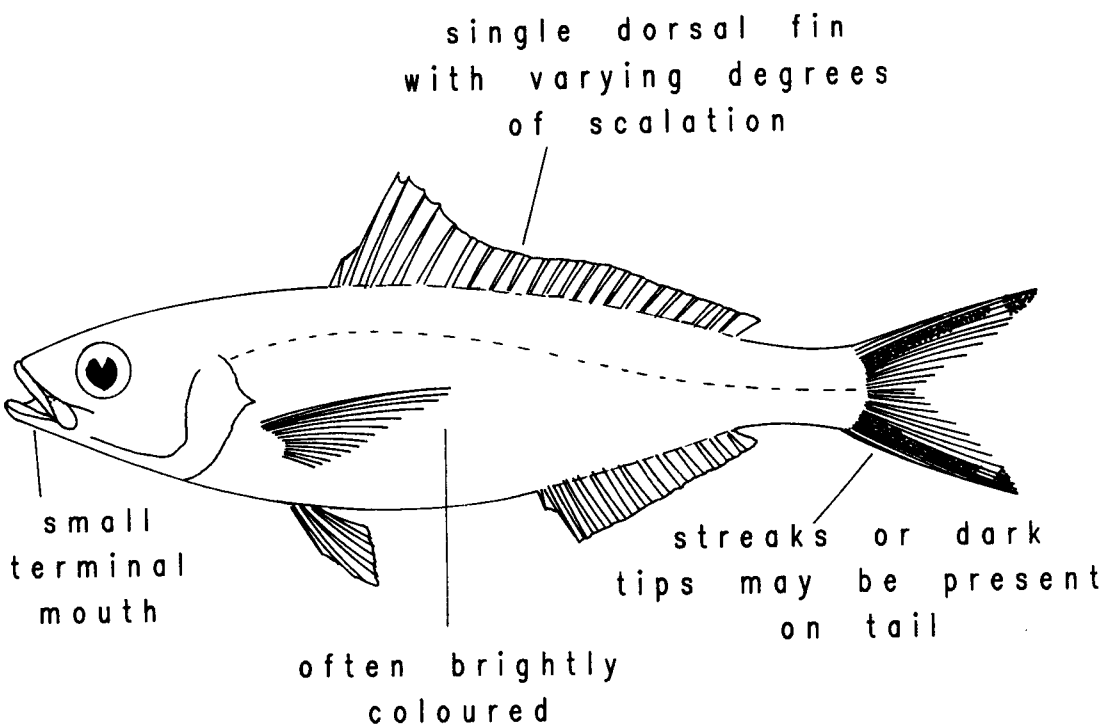
Distribution of carangid baitfish based on South Pacific Commission records

Country	*Decapterus macrosoma*	*Decapterus russelli*	*Selar crumenophthalmus*	*Selar boops*	*Atule mate*	*Selaroides leptolepis*	*Scomberoides* spp.	*Trachurus* spp.
PNG	*	*	*	*	*	*	*	
Solomon Is.	*	*	*	*	*		*	
Vanuatu	*		*	*			*	
New Caledonia	*	*		*	*		*	
Fiji	*	*	*		*		*	
Tonga	*		*		*		*	
Wallis/Futuna			*				*	
W. Samoa			*				*	
A. Samoa								
Palau	*	*	*					
Yap								
Truk			*					
Ponape	*		*	*			*	
Kosrae			*				*	
Marshall Is.			*					
Kiribati	*		*				*	
Tuvalu	*		*				*	
Tokelau								
N. Cook Is.			*	*				
Society Is.	*		*				*	
Marquesas	*	*	*				*	
Tuamotus	*		*					
NE. Qld		*						
S. NSW							*	*
NZ							*	*

9. FAMILY CAESIONIDAE

(Fusiliers, bananafish)

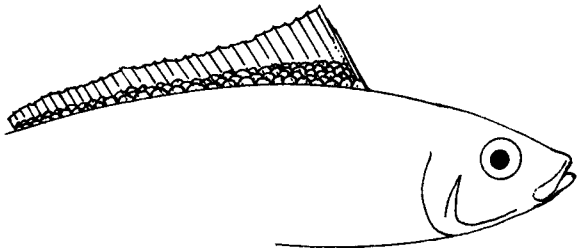
Small to moderate size fishes which school in the vicinity of coral reefs; usually brightly coloured. A single continuous dorsal fin, anal with three weak spines, caudal strongly forked. Lateral line prominent; mouth small and terminal. Closely related to the Lutjanidae (snappers, sea perches) and still placed in that family by some authors.

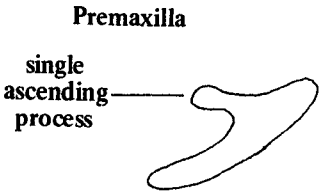


Key to Genera

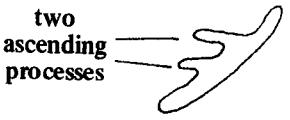
Four genera in the region, all of some importance as baitfish. Usually brightly coloured.

1a. Premaxilla with one ascending process; dorsal fin partly covered with scales ..... *Caesio*





1b. Premaxilla with two ascending processes; dorsal fin may or may not be scaled



2a. Dorsal fin at least partly covered with scales; dorsal spines usually 10 or 11 (occasionally 12, 13); scales on dorsal fin base sometimes extending half-way up fin ..... *Pterocaesio*

2b. Dorsal fin naked

3a. Dorsal spines 10, rays 15 or 16; body slender ..... *Gymnocaesio*

3b. Dorsal spines 15, rays 10; teeth in jaws minute, usually not visible in preserved material ..... *Dipterygonotus*

Key to Species

The taxonomy of fusiliers, at the specific level, is rather confused. In our experience, seven 'species' commonly occur in bait hauls although many others occur in the area. Colour notes and distinguishing features of these species are briefly discussed in the following general notes.

General Notes

Fusiliers, like cardinalfish, are taken in greatest abundance near reefs and are important baitfish in many areas. They are usually the mainstay of 'drive-in' (oikomi-ami) fisheries. They are robust and highly regarded as bait. As with cardinals, careful dimming of the light is often necessary to induce them to rise off the bottom. Adults are rarely taken by dip-net, the usual size captured being 5-12 cm. *Caesio* and *Dipterygonotus* are of lesser importance than the other two genera. Fusiliers are apparently more common in the western parts of the region. General Japanese name: akamuro.

Caesio caerulaureus (gold-band fusilier)
FAO gold and blue fusilier J. sasamuro

The only *Caesio* commonly taken, and the only species of that genus with dark streaks along each caudal lobe. A prominent black mark in the pectoral axil and broad yellow band following above the lateral line. Adults of this species sometimes taken.

Pterocaesio pisang (bananafish, red fusilier)
J. takasago, issen takasago

The commonest species of the genus in catches; variable in colour, but usually reddish and always with distinct blood-red or blackish caudal tips. Indistinct lighter longitudinal lines in life.

P. tile (blue-back fusilier)
J. kumasasa hanamuro

Like *caerulaureus*, a dark streak through each caudal lobe and prominent black mark in the pectoral axil, but easily separated on the basis of its very high, soft dorsal ray count (20-22, cf. 14-15). A distinct brown-olive mid-lateral band with numerous smaller longitudinal lines dorsally when fresh. Very common around reefs in the area, but not often taken in dip-netting. Probably reaches at least 30 cm.

P. diagramma (banded fusilier)
J. takasago

Two distinct yellow lines on side, one roughly following below the lateral line, the other well above the lateral line. Dark caudal tips, as in *P. pisang*. Moderately common.

Pterocaesio **sp.** (double-lined fusilier)

An undescribed species, with two distinct lilac or lime-green lines above lateral line, one beginning on upper edge of eye and ending at the tail and the other running from the snout just below the dorsal fin to end at the distal end of the second dorsal. Caudal lobes with dusky streaks. Moderately common in Fiji and New Caledonia.

Gymnocaesio gymnopterus (slender fusilier)

Only member of this genus recorded during the Programme survey. Shows tremendous variation in colour even at one locality and may comprise more than one species. The name *gymnopterus* is tentative only. Probably the dominant species in bait catches, but not well known. A small species, possibly attaining 20 cm.

Dipterygonotus balteatus (white-lined fusilier)
J. rosoku chibiki

An apparently monotypic genus which has often been placed in a different family (Emmelichthyidae). *D. leucogrammicus* is a junior synonym. Encountered only in the western part of the region and never abundant. Probably commonly confused with other fusiliers, despite its uniquely high dorsal spine count. Three narrow whitish longitudinal lines above lateral line.

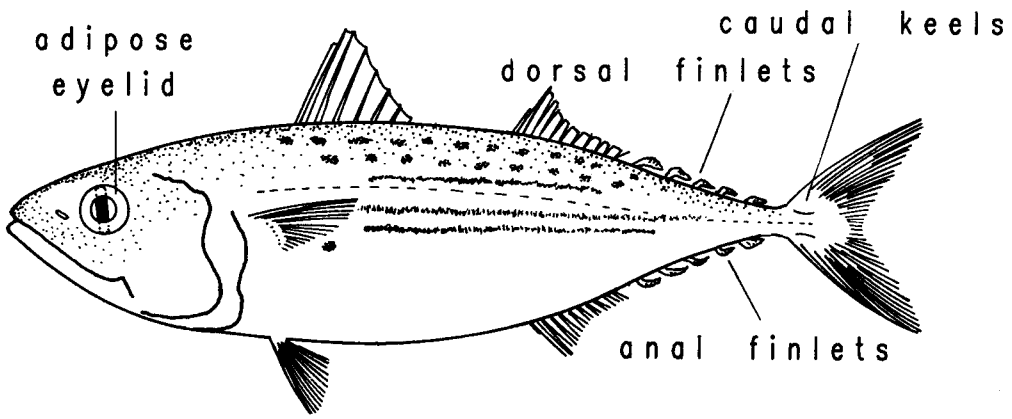
Distribution of fusilier species based on South Pacific Commission records

Country	*Caesio caerulaureus*	*Pterocaesio pisang*	*Pterocaesio tile*	*Pterocaesio diagramma*	*Pterocaesio* sp. nov.	*Gymnocaesio gymnopterus*	*Dipterygonotus balteatus*
PNG	*	*	*	*		*	*
Solomon Is.	*	*	*	*		*	*
Vanuatu		*		*			
New Caledonia	*	*		*	*	*	*
Fiji	*	*	*	*	*	*	*
Tonga							
Wallis/Futuna				*			
W. Samoa	*			*			
A. Samoa							
Palau	*	*					*
Yap							*
Truk							
Ponape		*		*			
Kosrae							
Marshall Is.							
Kiribati	*	*	*	*			
Tuvalu				*			
Tokelau							
N. Cook Is.							
Society Is.							
Marquesas							
Tuamotus							
NE. Qld				*			
S. NSW							
NZ							

10. FAMILY SCOMBRIDAE

(Tunas, mackerels, bonitos)

In this large, commercially very important family, only two genera of mackerels are important as baitfish: *Scomber,* the essentially temperate water mackerels which were used as live bait in New South Wales (Australia) and New Zealand, and *Rastrelliger,* the chub mackerels of tropical waters.



Key to Genera

The two bait genera, which can be distinguished from other scombrids by the possession of two small keels on the caudal peduncle (as opposed to three), are separated as follows:

1. **Vertically zig-zag or wavy lines on back, anal spine fairly stiff; strong teeth present on roof of mouth** ..... *Scomber*

2. **Two horizontal rows of spots on each side of back, anal fin spine thin, rudimentary; no teeth on palate** ..... *Rastrelliger*

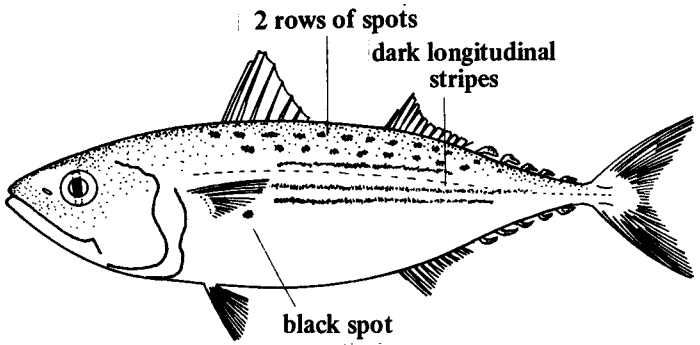
Key to Species

RASTRELLIGER

Three *Rastrelliger* species occur in the area. A brief description and drawing highlighting distinguishing features are presented for each below.

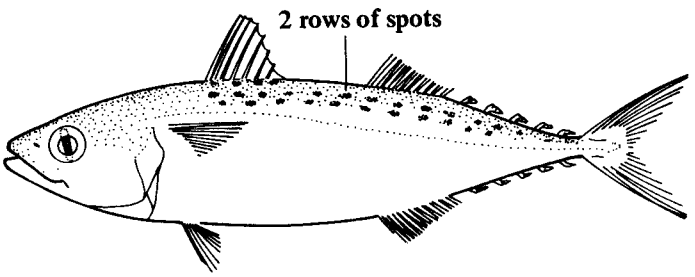
Rastrelliger kanagurta

Body slim, depth at margin of gill cover 4.0-4.8 in standard length; 30-46 gill rakers on lower limb of first gill arch; black spot in axil of pectoral fin; dark longitudinal stripes on flanks.



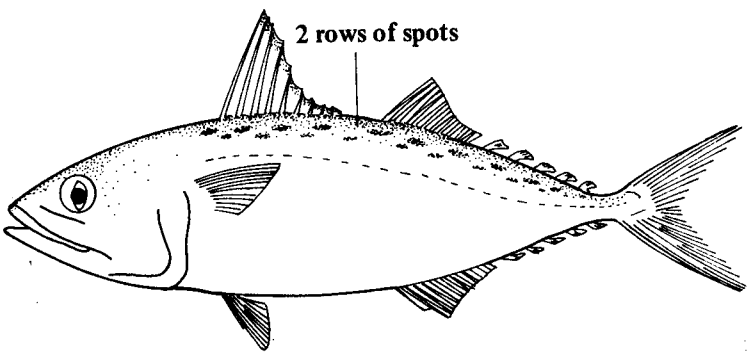
Rastrelliger faughni

Body slim, depth about 5.0 times in standard length; 21-25 gill rakers on lower limb of first gill arch; double row of black spots on each side above lateral line; no black spot in pectoral axil and no lines on flanks.



Rastrelliger brachysoma

Body deeper than either preceding species, depth 3.7-4.0 in standard length; 30-46 gill rakers on lower limb of first gill arch; double row of elongated black spots above lateral line on each side.



General Notes

Scomber australasicus (slimy or blue mackerel)
J. goma saba

Although basically a temperate water species, individuals are occasionally seen in tropical areas. Can be regarded as rare between 15°N and 15°S, at least in the SPC region. Very abundant in southern Australia and New Zealand where it has considerable commercial potential.

Rastrelliger kanagurta (Indian mackerel)
J. gurukuma

The most common of the three species, with juveniles occurring regularly in catches, sometimes in quantity. Relatively robust, but value as bait reduced by its habit of swimming away from boat. Sometimes this is counteracted by squeezing and partially stunning the bait as it is being broadcast. Adults not commonly captured, but can disrupt baiting by unsettling or preying on smaller species.

R. faughni (Faughn's mackerel)

A recently described species which was recorded only in Solomon Islands during the survey. It has since been recorded from Fiji (Collette, personal communication). Probably overlooked on many occasions.

R. brachysoma (short-bodied mackerel)

A more estuarine species, only occasionally captured during baiting operations.

Distribution of mackerels based on South Pacific Commission records

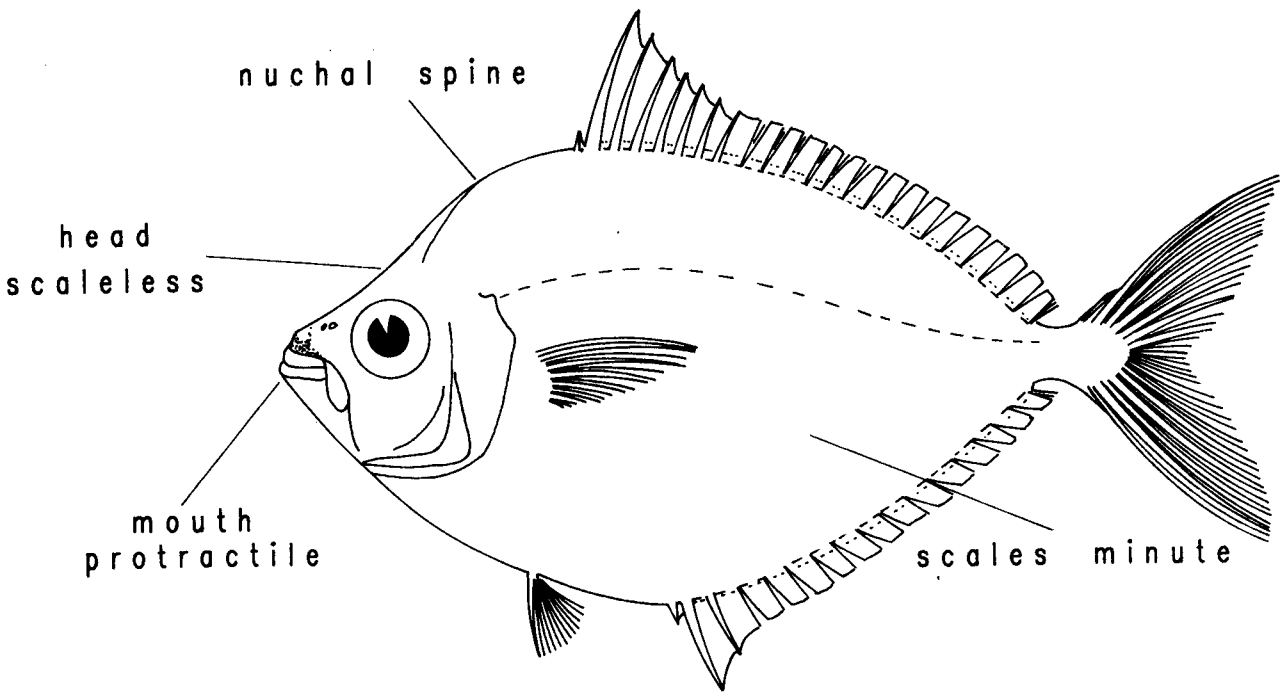
Country	*Rastrelliger kanagurta*	*Rastrelliger brachysoma*	*Rastrelliger faughni*	*Scomber australasicus*
PNG	*	◇	◇	(◇)
Solomon Is.	*	*	*	
Vanuatu				
New Caledonia	*			
Fiji	*	*	◇	
Tonga	*			
Wallis/Futuna	*			
W. Samoa	*	*		
A. Samoa	*			
Palau	*	*		
Yap				
Truk				
Ponape	*			
Kosrae				
Marshall Is.	*			
Kiribati	*			
Tuvalu				
Tokelau				
N. Cook Is.				
Society Is.				
Marquesas				
Tuamotus				
NE. Qld				
S. NSW				*
NZ				*

◇ Records known to us, but not in SPC files.

11. FAMILY LEIOGNATHIDAE

(Ponyfish, slipmouths)

Ponyfish rarely make more than minor contributions to bait-fish catches, and treatment here is limited.



Key to Genera

1a. **Distinct canine teeth present; protracted mouth points forward** ..... *Gazza*

1b. **No canine teeth**

2a. **Protracted mouth points upward** ..... *Secutor*

2b. **Protracted mouth points forward or downwards** ..... *Leiognathus*

Good colour illustrations of all the common species can be found in the FAO sheets for the Eastern Indian Ocean and Western Central Pacific. The three species most commonly encountered during the Skipjack Programme surveys were *Gazza minuta, Leiognathus bindus* and *Leiognathus elongatus.*

Distribution of ponyfish based on South Pacific Commission records

Country	*Gazza minuta*	*Leiognathus bindus*	*Leiognathus berbis*	*Leiognathus elongatus*	*Leiognathus equulus*	*Leiognathus smithhursti*	*Secutor ruconius*	*Secutor insidiator*
PNG	*	*	◇	*	◇		*	*
Solomon Is.	*	*	*	*				*
Vanuatu	*			*				
New Caledonia	*	*		*				
Fiji	*	*		*				
Tonga	*	*						
Wallis/Futuna				*				
W. Samoa	*			*				
A. Samoa	*		*	*				
Palau	*	*		*				
Yap		*						
Truk								
Ponape	*	*						
Kosrae	*	*			*	*	*	
Marshall Is.								
Kiribati								
Tuvalu								
Tokelau								
N. Cook Is.								
Society Is.								
Marquesas								
Tuamotus								
NE. Qld								
S. NSW								
NZ								

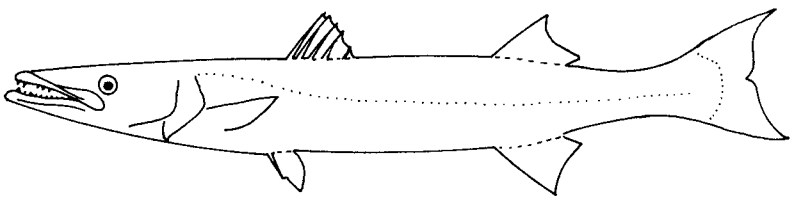
◇ Records known to us, but not in SPC files.

12. FAMILIES OF MINOR IMPORTANCE

Numerous other families are frequently taken in hauls, but in small quantities only. Those included here occasionally contribute to catches and are briefly mentioned below.

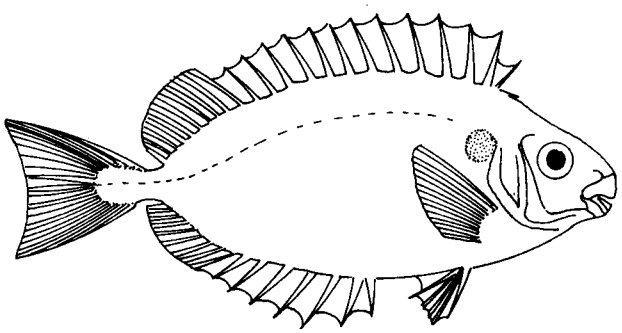
F. Sphyraenidae (barracudas)
J. kamasu sawarra

Commonly captured and can cause problems in the net and in bait tanks as predators of baitfish; *Sphyraena fosteri* and *S. bleekeri (= putnamiae)* believed to occur regularly; taxonomy of this family remains confused, at least with the smaller species.



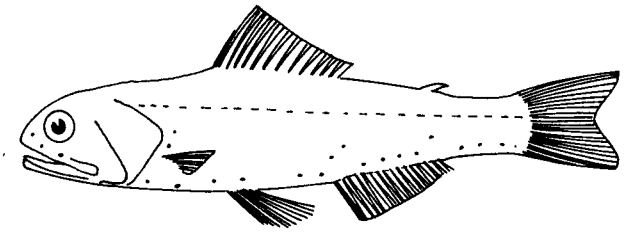
F. Siganidae (rabbitfish, spinefeet)
J. aigo

Occasionally large hauls of juveniles are made, and are used reluctantly as bait, since the slightly venomous spines cause chummers some discomfort.



F. Myctophidae (lanternfish)

Lanternfish, especially *Benthosema* spp., sometimes provide large catches in deep harbours on steeply shelving coastlines. Respond very well to dimming, but show extremely poor survival in bait tanks, especially after sunrise.

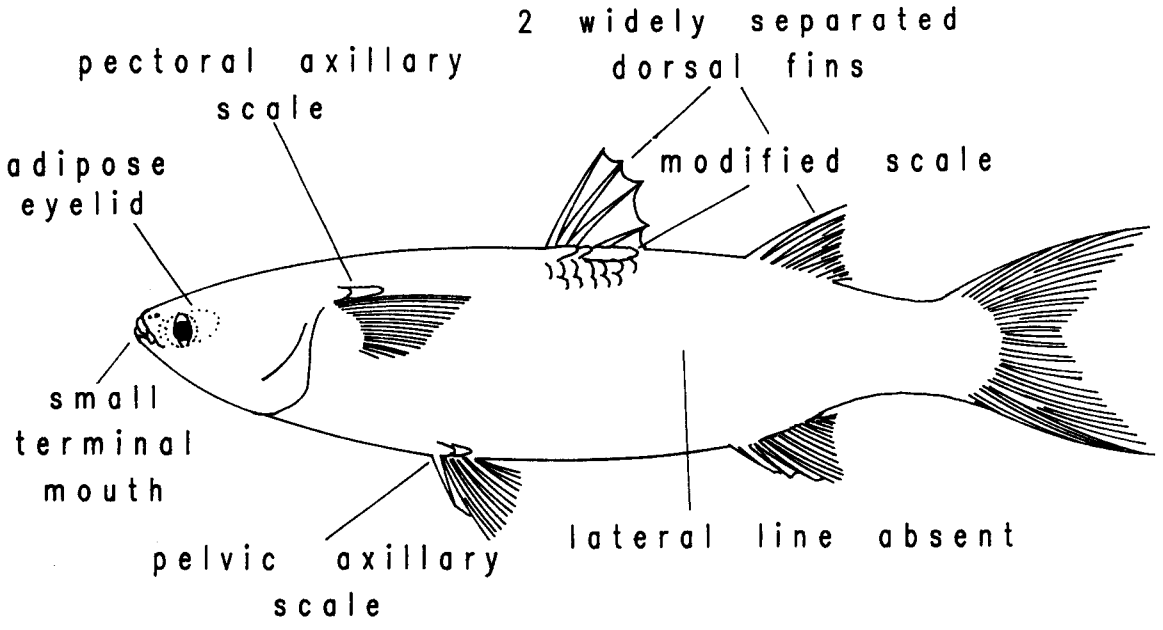


13. COMMON DAY BAIT FAMILIES

Three families, Clupeidae (sardines), Dussumieriidae (sprats), and Atherinidae (hardyheads) formed the major component of day bait catches by beach seine during the Skipjack Programme survey and have been discussed in detail in earlier sections. Four other families made minor contributions: Mugilidae (mullets), Mullidae (goatfish), Gerreidae (silver biddies) and Chanidae (milkfish). The taxonomy of all except the monotypic Chanidae still requires considerable clarification.

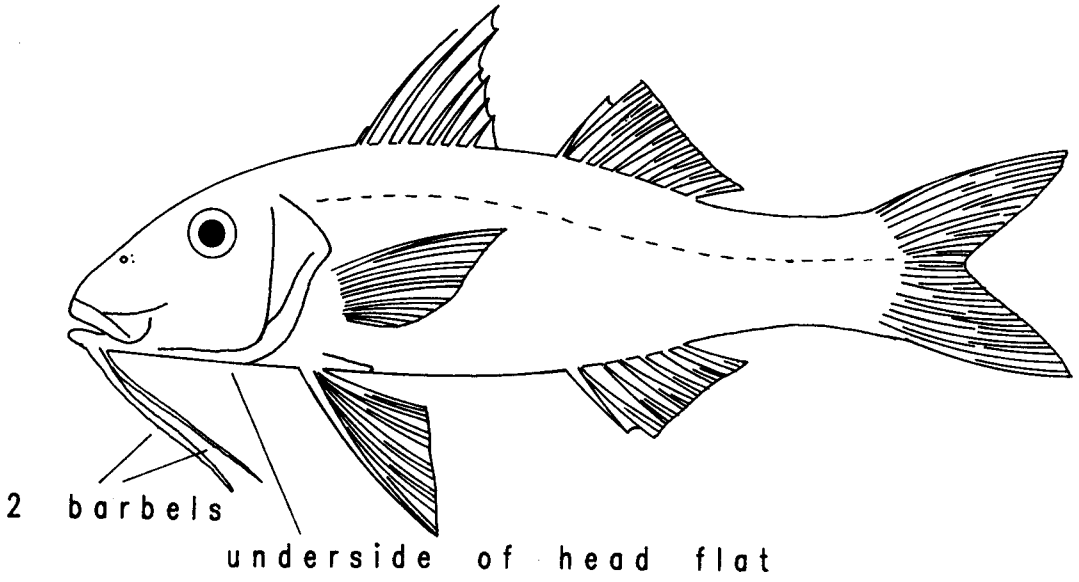
F. Mugilidae (mullets)

Elongated silvery fish with broad blunt head, small terminal mouth and widely separated dorsal fins. Adipose tissue often covers the eye. Form small surface swimming schools in inshore areas, rarely in large concentrations. The most common species taken in beach seine hauls during the SPC survey was *Valamugil seheli.*



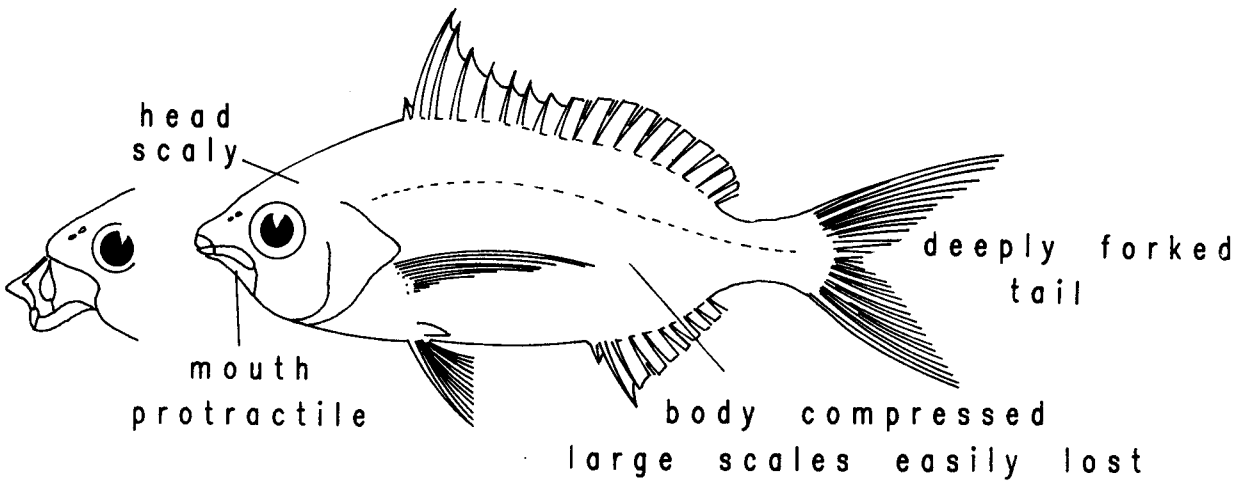
F. Mullidae (goatfish)

Brightly coloured, often red or gold; bottom dwellers; easily recognised by the barbels on the chin. Very dispersed; usually found in small schools in sandy inshore areas, and while common, do not contribute significantly to bait catches. The major species taken was *Upeneus vittata.*



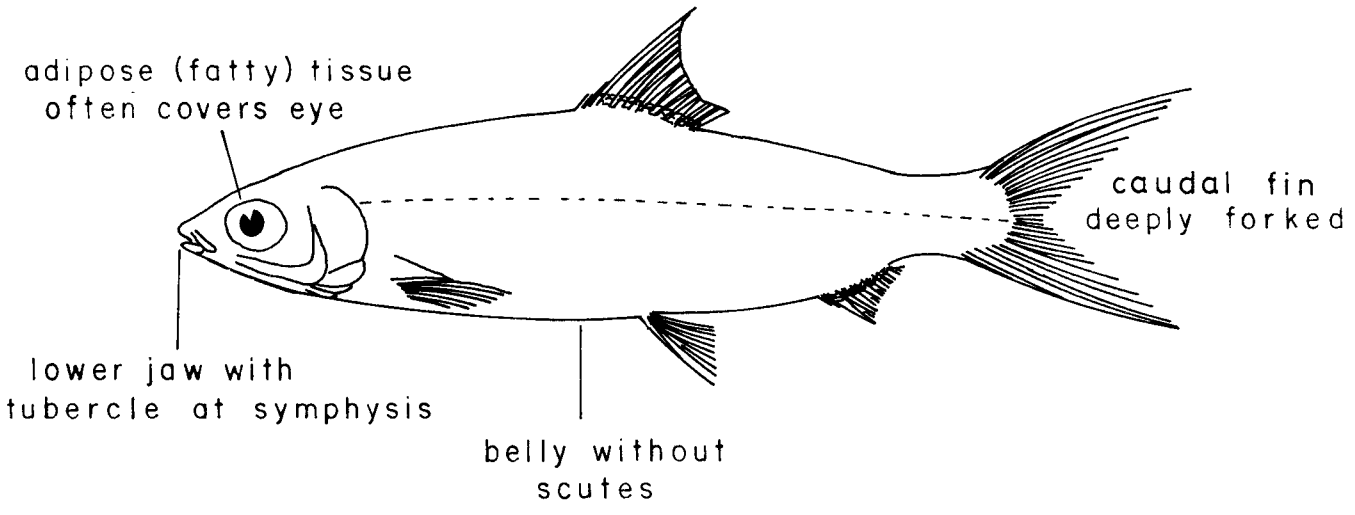
F. Gerreidae (silver biddies)

Small silvery fish which superficially resemble ponyfish (Leiognathidae), but which are readily distinguished by the large, deciduous body scales, scaly head, and lack of nuchal spine. Mouth points down when protracted. Three tentatively identified species commonly taken are: *G. argyreus, G. oyeana* and *G. abbreviatus.*



F. Chanidae (milkfish)

Elongated silvery fish with a small terminal mouth and a deeply forked tail. The single dorsal spine separates this family from the Mugilidae (mullets). A monotypic family represented by the widely distributed milkfish *Chanos chanos*. Juveniles (5-12 cm) are hardy, easily handled and have proven an excellent bait species. They are cultured in the region both as a valuable food species and as bait.



14. USEFUL TAXONOMIC REFERENCES

General References

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Specific References

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WONGRATANA, T. (1983). Diagnoses of twenty-four new species and proposal of a new name for a species of Indo-Pacific clupeoid fishes. *Japanese Journal of Ichthyology* 29 (4): 385-407.

15. PREPARATION OF BAITFISH SPECIMENS

Important material which proves difficult to identify with certainty should be preserved in 10 per cent formalin and stored with accurate collection details together with notes on colours in life. Such specimens can then be forwarded to taxonomic specialists for accurate identification. Usually ten to fifty specimens, depending on size, should be preserved and enclosed in perforated plastic bags together with full collection details. Specimen bags should be wrapped in formalin-soaked cloth and placed in an airtight container for shipment to interested specialists.

Persons to whom material may be sent

The following taxonomists are specialists in one or more of the baitfish families covered by this handbook, and are willing to receive baitfish material which requires accurate identification.

ENGRAULIDAE
CLUPEIDAE
DUSSUMIERIIDAE

Dr Peter Whitehead
British Museum of Natural History
Cromwell Road
London SW7 5BD
ENGLAND

Dr Thosaporn Wongratana
Department of Biology
Faculty of Science
Chulalongkorn University
Bangkok
THAILAND

ATHERINIDAE

Dr Walter Ivantsoff
School of Biological Science
Macquarie University
Balaclava Road
North Ryde
New South Wales
AUSTRALIA

CAESIONIDAE

Kent Carpenter
East-West Center
Box 1103
1777 East-West Road
Honolulu
HAWAII 96848

CARANGIDAE

Dr William F. Smith-Vaniz
Associate Curator
Department of Ichthyology
Academy of Natural Sciences
Nineteenth and Parkway
Philadelphia, Pennsylvania 19103
UNITED STATES OF AMERICA

SCOMBRIDAE	Dr Bruce Collette National Marine Fisheries Service Systematics Laboratory United States National Museum Washington D.C. 20560 UNITED STATES OF AMERICA
GENERAL	Dr John Randall Bernice P. Bishop Museum P.O. Box 19000-A Honolulu HAWAII 96819