

Training manual for identification of 100 common species in the deepwater hook-and-line fisheries targeting snappers, groupers, and emperors in Indonesia

TNC IFCP Technical Report

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INTRODUCTION

This identification guide for deepwater fisheries targeting snappers, groupers, and emperors in Indonesia is the result of a partnership between The Nature Conservancy, the Indonesia Ministry of Marine Affairs and Fisheries, and a total of 265¹ captains of fishing vessels operating in Indonesia's archipelagic waters. Focusing on the 100 most common species caught in this fishery, it complements comprehensive taxonomic identification keys such as the FAO's The Living Marine Resources Of The Western Central Pacific², and guides for neighboring seas such as Rome and Newman's North Coast Fish Identification Guide³.

The deepwater fisheries targeting snappers, groupers, and emperors in Indonesia is a diverse fishery using droplines, longlines, traps, and gillnets in waters between 50 and 500 m deep. Fishing vessels range in size from motorized canoes to decked vessels of 150 GT. Fishing trips may last a one day, covering a couple of nautical miles, or up to 2,000 nautical miles for larger vessels who often stay at sea for six months or more. Whereas the catch is usually dominated by snappers (Lutjanidae), groupers (Epinephelidae), and emperors (Lethrinidae), along with these three families the fishery also catches species of many other families, such as jacks (Carangidae), sweetlips (Haemulidae), bigeyes (Priacanthidae), rubyfishes (Emmelichthyidae), and croakers (Sciaenidae). Whereas the total number of species in this fishery may well approach 300, the 100 species presented in this guide represent 99% in numbers of the catches of the 265 fishing vessels that The Nature Conservancy has been monitoring. Nevertheless, this fishery still offers surprises: In 2016, Tucker et al⁴ described one of the groupers that is occasionally caught as a new species (Kupang grouper, *Epinephelus kupangensis*).

The species diversity of this fishery poses a major challenge for stock assessment, a problem that is further exacerbated by complications in the taxonomy of some of the species: For example, one of the more common species in this fishery, the giant ruby snapper, has not yet been described. Catch statistics, which are unreliable even for single-species fisheries in Southeast Asia, are not available for this fishery: The FAO, which reports catch statistics at a higher level of detail than the Indonesia Ministry of Marine Affairs and Fisheries does, reports 135,850 metric tons of "Snappers nei", and 6,860 metric tons of "Jobfishes nei⁵" without further details on the species (data of 2015). One of the most common grouper reported to species level in the FAO statistics is greasy grouper *Ephinephelus tauvina* (13,960 metric tonnes), which is a mis-identification of various brown-colored groupers, some of which are included in this guide. Another grouper reported at species level in the FAO statistics for Indonesia, honeycomb grouper *Ephinephelus merra*, (8,090 metric tons) is also a mis-identification. Even more questionable is the reported catch of chocolate hind, *Cephalopholis boenak*, at a whopping 58,150 metric tons---Chocolate hind is a small reef-dwelling grouper that to our knowledge does not support any major fishery in Indonesia. By far the largest category in FAO catch statistics for Indonesia is "Marine

¹The number of active fishing vessels partnering with The Nature Conservancy is 170 as of 21 February 2018.

²Carpenter, K.E.; Niem, V.H. (eds). 1998. FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Volumes 1-6. Rome, FAO

³Rome, B. M. & Newman, S. J. 2010. North Coast fish identification guide. Department of Fisheries, Perth, Western Australia, Department of Fisheries, Perth, Western Australia.

⁴ Tucker, S. J.; Kurniasih, E. M. & Craig, M. T. A New Species of Grouper (Epinephelus; Epinephelidae) from the Indo-Pacific Copeia, 2016, 104, 658–662

⁵nei: not elsewhere included

fishes nei” at 624,009 metric tons in 2015, which may include some of the groupers presented in this guide. All in all, national statistics, as reported by FAO, do not warrant any more detailed conclusion that Indonesia’s deepwater snapper and grouper fishery may extract about 100,000 metric tons per year, and one must conclude that data collection systems have been insufficient to get species-specific information on Indonesia’s dispersed and diverse fisheries.

It is unlikely that paper-and-pen methods (or even tablet-based methods that require user input) will ever suffice to generate accurate, species-specific data on the deepwater fishery on snappers, groupers, and emperors. There is no market incentive to obtain species-specific data, since only a small part of the market requires species-specific labeling on produce. Port sampling by professional enumerators results in data that are difficult to verify, and species identification skills and commitment of enumerators to get accurate data varies widely---Even directly after a training session, a 50% error rate is not uncommon. Moreover, port sampling requires inspection of the catch at the worst possible moment, namely at offloading when fishers and traders are eager to move the produce while minimizing disruption to cold chain logistics. Port sampling rarely results in accurate data on fishing grounds, especially if the vessel fished multiple locations, as is standard practice in the deepwater snapper, grouper, and emperor fishery. Catch logbooks, which should be filled in at sea by the captain, are usually too complex, and most Indonesian captains are not used to paperwork anyway. We found that logbooks are often handled by shore-based agents who take care of it along with all the other official documents, which means that logbooks do not add much to the shore-based data collection systems that Indonesian government operates.

The Nature Conservancy Indonesia Fisheries Conservation Program (TNC-IFCP) has been developing a data collection method, the Crew-Operated Data Recording System (CODRS), that involves crew of fishing vessels without requiring them to write down or input data input. TNC-IFCP contracted captains to do the following: (a) Deploy a vessel tracker on their boats (Spot Trace), and (b) to take digital pictures of each fish that they catch, with the fish positioned on a measuring board. After the trip, the fishers hand over the storage media with pictures to a technician, who measures each fish on-screen. The pictures as well as the species and length data are stored in an on-line database. Since the pictures remain accessible, verification of data remains possible, enabling scientists to check the primary data if the reported length range appears out of the ordinary for a specific species. In addition, this method allows scientists to study fishing practices at a higher geographic resolution, because the pictures relate to a geographic position through their time stamp. Essentially, this method is a more efficient version of a log-book system, and a basic assumption is that fishers support collecting information on their fishing practices, as long as the process is not too onerous.

Through the CODRS program, TNC-IFCP built a large collection of high-quality pictures of more than 700,000 individual fish directly after capture, with the coloration still intact. As coloration of fish photographed at fish processing plants or at fish markets has usually faded, sometimes showing blotches that are absent on fresh fish, this collection of fish pictures represents a unique resource. The editors of this document used TNC-IFCP’s extensive library of fish pictures to compile this species identification guide. The editors present various pictures of the same species to give an impression of variation in morphology and coloration within one species, and to highlight distinguishing characteristics of each species.

LUTJANIDAE

1. *Aphareus rutilans*

Rusty Jobfish, Lehi

Kurisi Perak, Ikan Tajuk, Tariansan



A



B

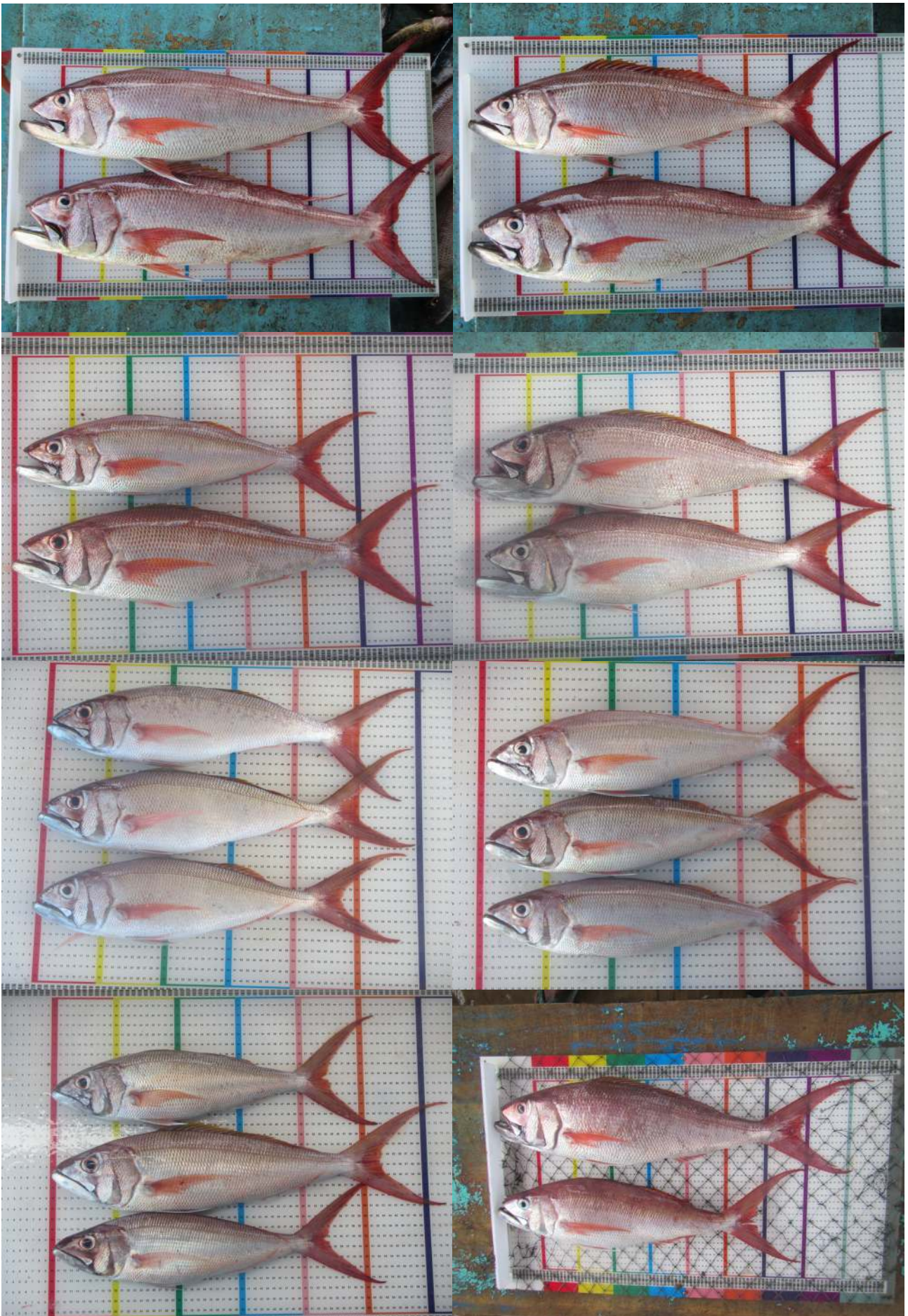


C



D

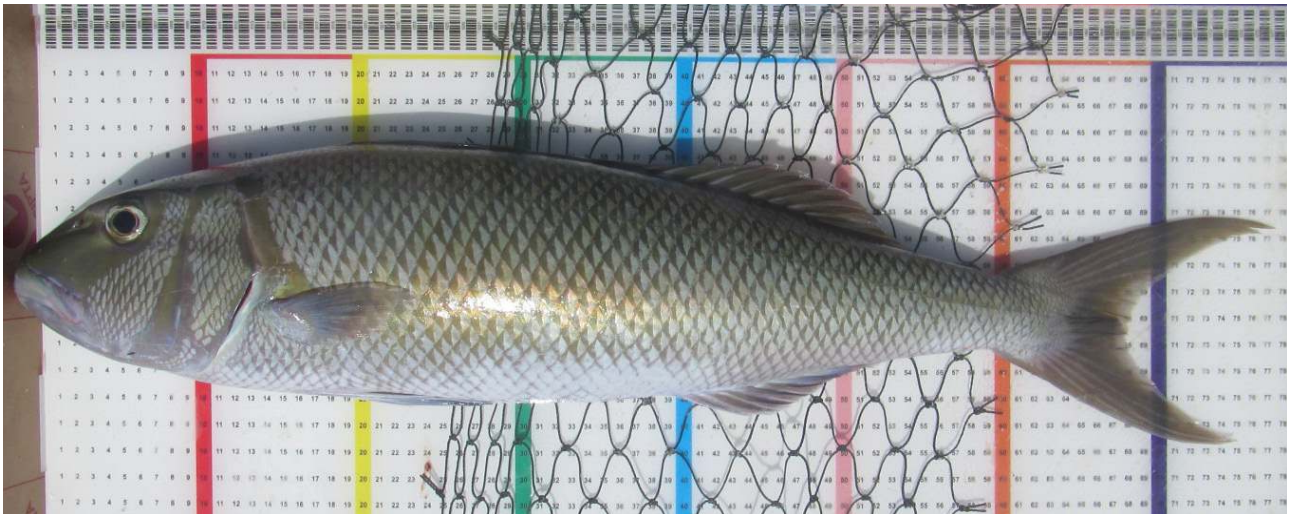
- A: Gill arch and filaments are shining silver
- B: Inside of mouth and gill chamber are silver
- C: Lower jaw protruding
- D: Last soft ray of both dorsal and anal fins are long



2. *Aprion virescens*

Green Jobfish, Uku

Guntur, Kurisi Hijau



A



B



C



D

A: Very distinct horizontal groove on snout from ventral to nostrils

B: Pectoral fins are short, less than 1/2 length of the head

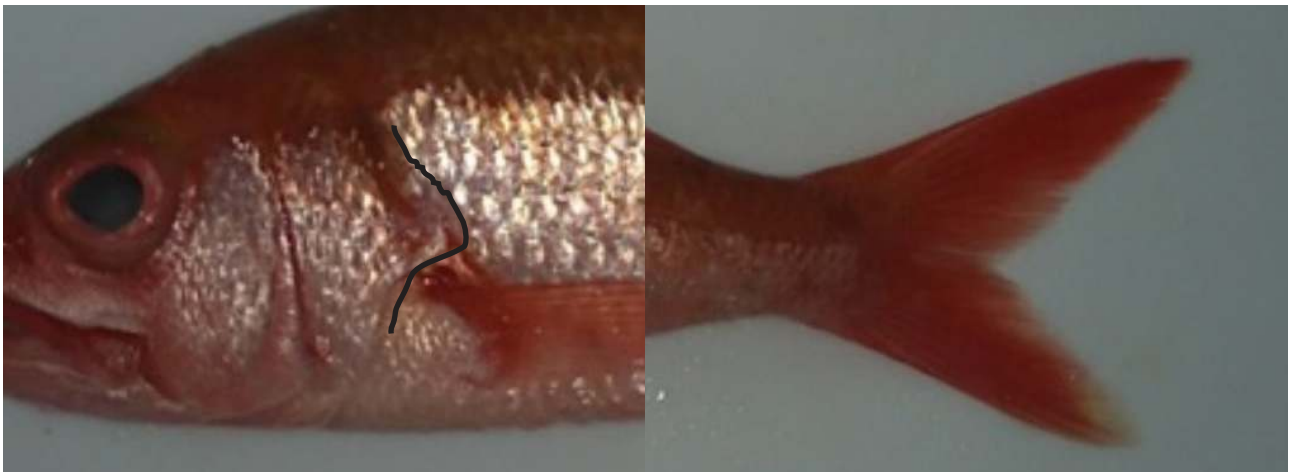
C: Yellowish dorsal and anal fins

D: Lower jaw protruding slightly



3. *Etelis carbunculus*

Ruby Snapper, Ehu
Bagong, Saramia



A

B



C

D

- A: The operculum is more pointed
- B: Does not have a black mark on the upper tail
- C: Pectoral fins fairly long, about 80-90% of head length
- D: Caudal fin forked, the lobes relatively short (about 25 to 30% of standard length) compared with other species of *Etelis*



Comparisons between *Etelis carbunculus* and *Etelis sp.*

Etelis sp.



Etelis carbunculus



Etelis sp.

- a. *Etelis sp.* has a more rounded operculum compared to *Etelis carbunculus*.
- b. *Etelis sp.* has black mark on the upper tail (see blue circle).

Etelis carbunculus

- a. *Etelis carbunculus* has a more pointed operculum compared to *Etelis sp.*
- b. *Etelis carbunculus* does not have black mark on the upper tail.

4. *Etelis sp.*

Giant Ruby Snapper, Ehu
Bagong, Kakap Pasifik, Saramia



A

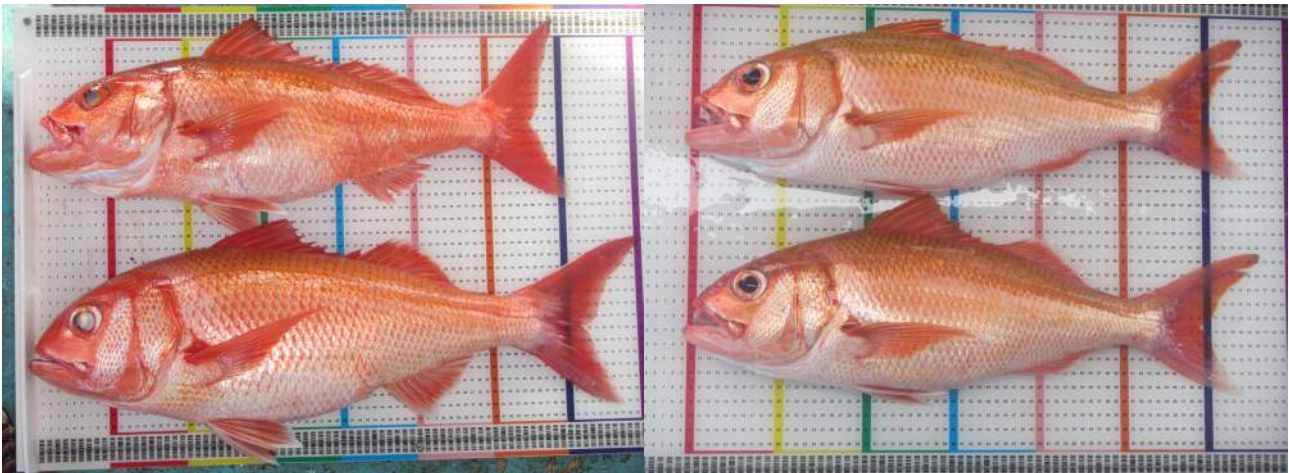
B



C

D

- A: The axil of operculum is more rounded
- B: The upper tail has a black mark/tip
- C: Maxilla is extending to below the centre line of the eye
- D: Head is small, eyes are large (juveniles)



Comparisons between *Etelis carbunculus* and *Etelis sp.*

Etelis sp.



Etelis carbunculus



Etelis sp.

- a. *Etelis sp.* has a more rounded operculum compared to *Etelis carbunculus*.
- b. *Etelis sp.* has black mark on the upper tail (see blue circle).

Etelis carbunculus

- a. *Etelis carbunculus* has a more pointed operculum compared to *Etelis sp.*
- b. *Etelis carbunculus* does not have black mark on the upper tail (see blue circle).

5. *Etelis radiosus*

Pale Snapper

Perak Merah, Kerisi, Palo-palo



A



B



C



D

A: Caudal fin lunate, with a notch at the middle of the distal margin of the fin.

Black tip on the upper lobe and whitish on the lower lobe.

B: Pectoral fins are red.

C: The upper side of body is dark red and lighter on the lower sides of body and belly.

D: Maxilla extending to vertically near posterior margin of eye orbit.

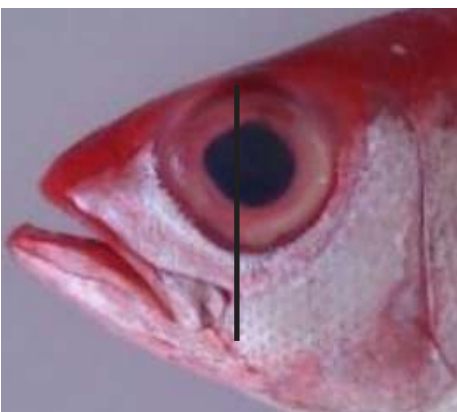


Comparisons between *Etelis radiusus* and *Etelis coruscans*

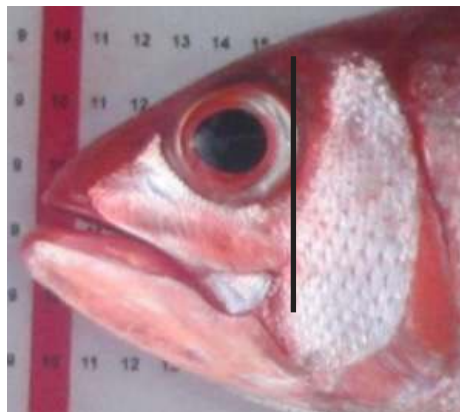


Etelis coruscans

Etelis radiusus



Etelis coruscans



Etelis radiusus

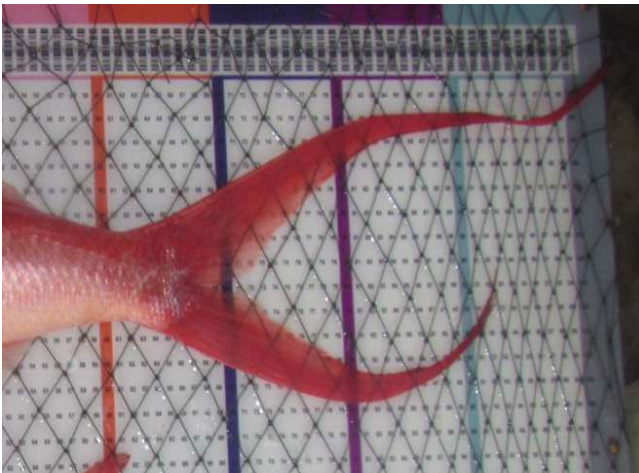
Juveniles of *Etelis coruscans* have same length of the upper and lower caudal fin; sometimes similar to juveniles of *Etelis radiusus*. *Etelis coruscans* and *Etelis radiusus* can be distinguished by the maxilla.

- Etelis coruscans*** : Maxilla extending to below middle of eye
- Etelis radiusus*** : Maxilla extending to vertically near posterior margin of eye orbit

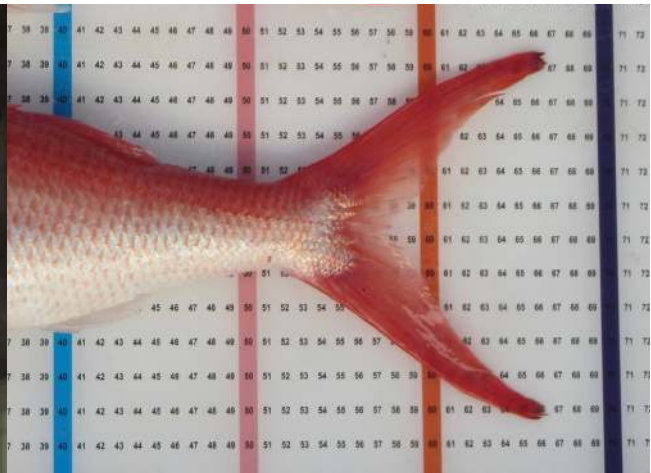
6. *Etelis coruscans*

Flame Snapper, Onaga

Anggoli, Ekor Panjang, Rahiang



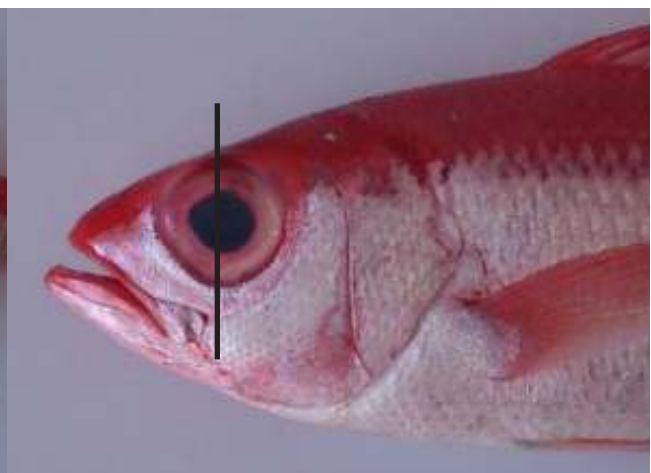
A



B



C



D

A: Upper lobe in caudal fin is extremely long.

B: In smaller size, the upper and lower of caudal fin have same length.

C: Back and upper sides are deep pink to red, lower sides and belly are pink to white, and fins are pink to red.

D: Maxilla extending to below middle of eye.

Intraspecies variations



A



B

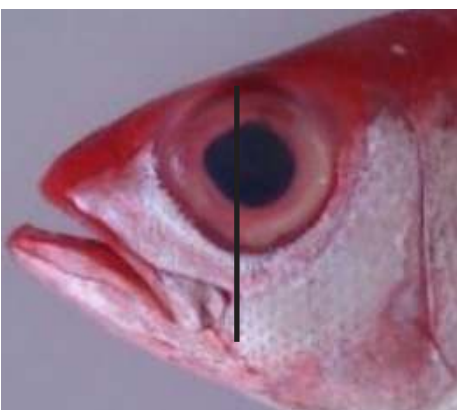
Generally, the upper caudal fin of *Etelis coruscans* is extremely long (A) but juveniles (B) have same length between the upper and lower of caudal fin.

Comparisons between *Etelis radiosus* and *Etelis coruscans*

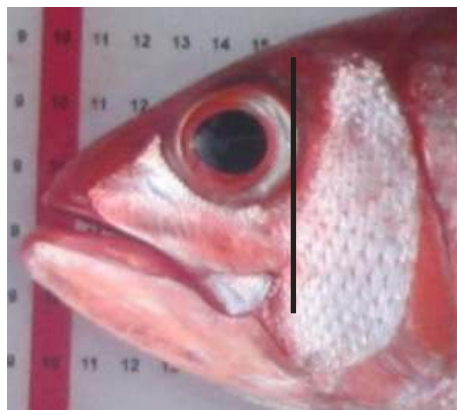


Etelis coruscans

Etelis radiosus



Etelis coruscans



Etelis radiosus

Jjuveniles of *Etelis coruscans* have same length of the upper and lower caudal fin and sometimes similar to *Etelis radiosus*. *Etelis coruscans* and *Etelis radiosus* can be distinguished by the maxilla.

- Etelis coruscans* : Maxilla extending to below middle of eye
- Etelis radiosus* : Maxilla extending to vertical near posterior margin of orbit

7. *Pristipomoides multidens*

Goldband Snapper, Goldband Jobfish
Anggoli Putih, Kerisi, Kurisi



A

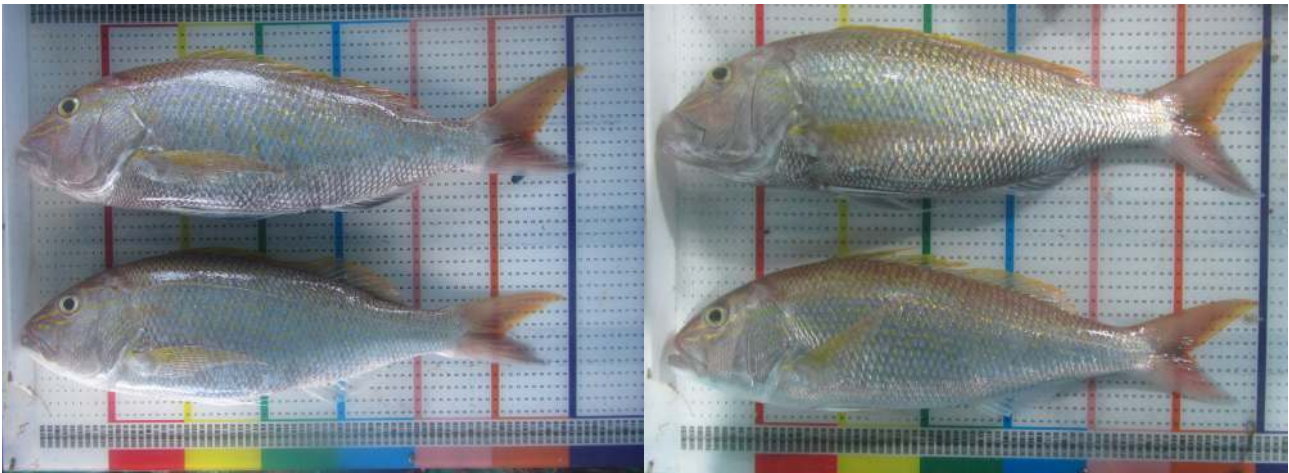
B



C

D

- A: Side of snout and cheek with golden stripes bordered with blue
- B: Dorsal fin has yellow spots
- C: Bright yellow blotches in body
- D: Yellowish caudal fin



Comparisons between *Pristipomoides multidens* and *Pristipomoides typus*

Pristipomoides multidens



Pristipomoides multidens is more yellow.

Pristipomoides typus



Pristipomoides typus is more red.

Pristipomoides multidens

Pristipomoides typus



Gold bands under eyes.



No distinct / faded markings around eyes

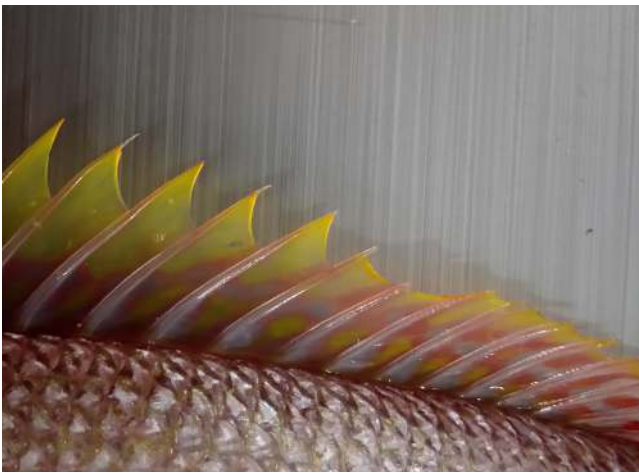


Less distinct yellow markings but none under eyes



8. *Pristipomoides typus*

Sharptooth Jobfish, Red-Tailed Opakapaka
Anggoli Merah, Kurisi Bali, Kerisi



A



B



C



D

A: Dorsal fin with wavy yellow lines

B: Red tailed

C: The top side of head has asimetric yellow lines

D: The upper sides are reddish, the lower sides are white to silver with yellowish pectoral fins



Comparisons between *Pristipomoides typus* and *Pristipomoides multidentis*

Pristipomoides multidentis



Pristipomoides multidentis is more yellow.

Pristipomoides typus



Pristipomoides typus is more red.

Pristipomoides multidentis



Gold bands under eyes.

Pristipomoides typus



No distinct / faded markings around eyes



Less distinct yellow markings but none under eyes

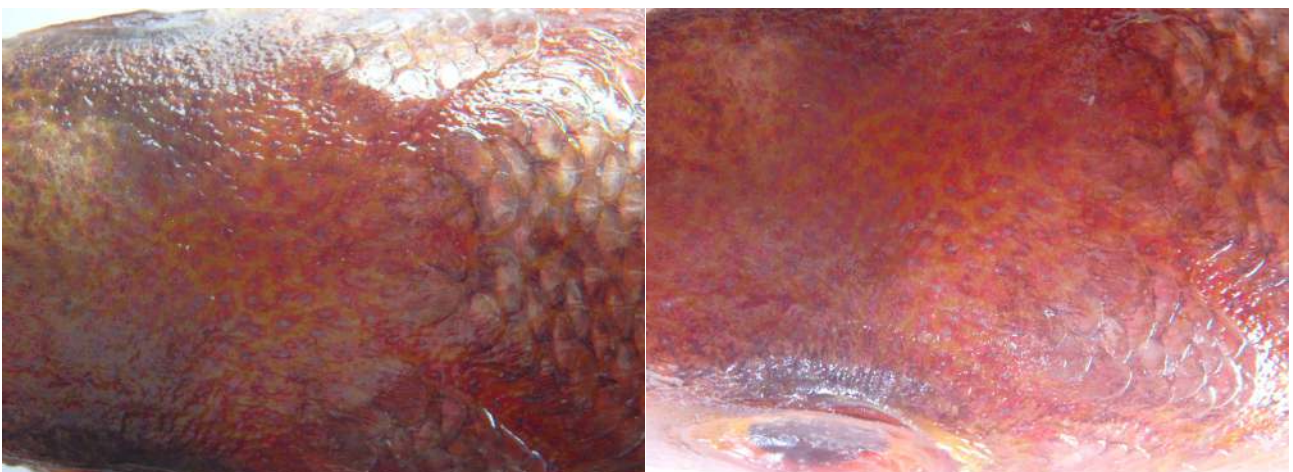


9. *Pristipomoides filamentosus*
Crimson Jobfish, Opakapaka
Kurisi Bali, Tola, Opaka



A

B

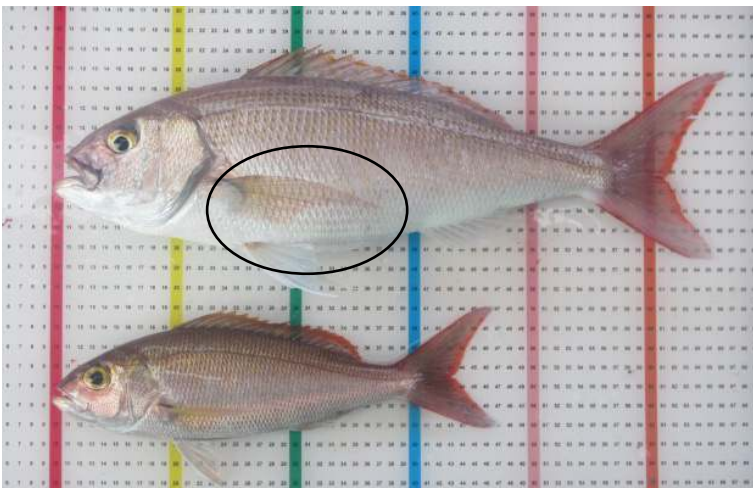


C

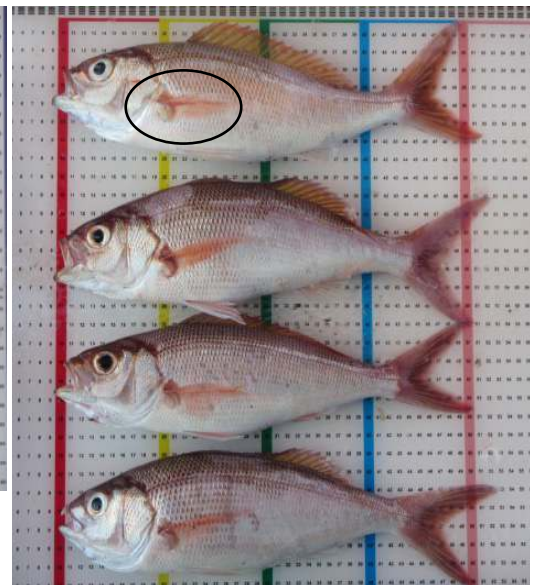
- A: Red margin on caudal fin
- B: Yellowish pectoral fin
- C: Blue spots on the head



Comparisons between *Pristipomoides filamentosus* and *Pristipomoides sieboldii*



Pristipomoides filamentosus



Pristipomoides sieboldii

Small *Pristipomoides filamentosus* look similar to a *Pristipomoides sieboldii*, but *P. filamentosus* can grow to a larger size than *P. sieboldii*.

P. filamentosus has YELLOW pectoral fin (see circle).
P. sieboldii has ORANGE/ RED pectoral fin (see circle).

10. *Pristipomoides sieboldii*

Lavender Jobfish, Kalekale
Kerisi, Kurisi



A



B

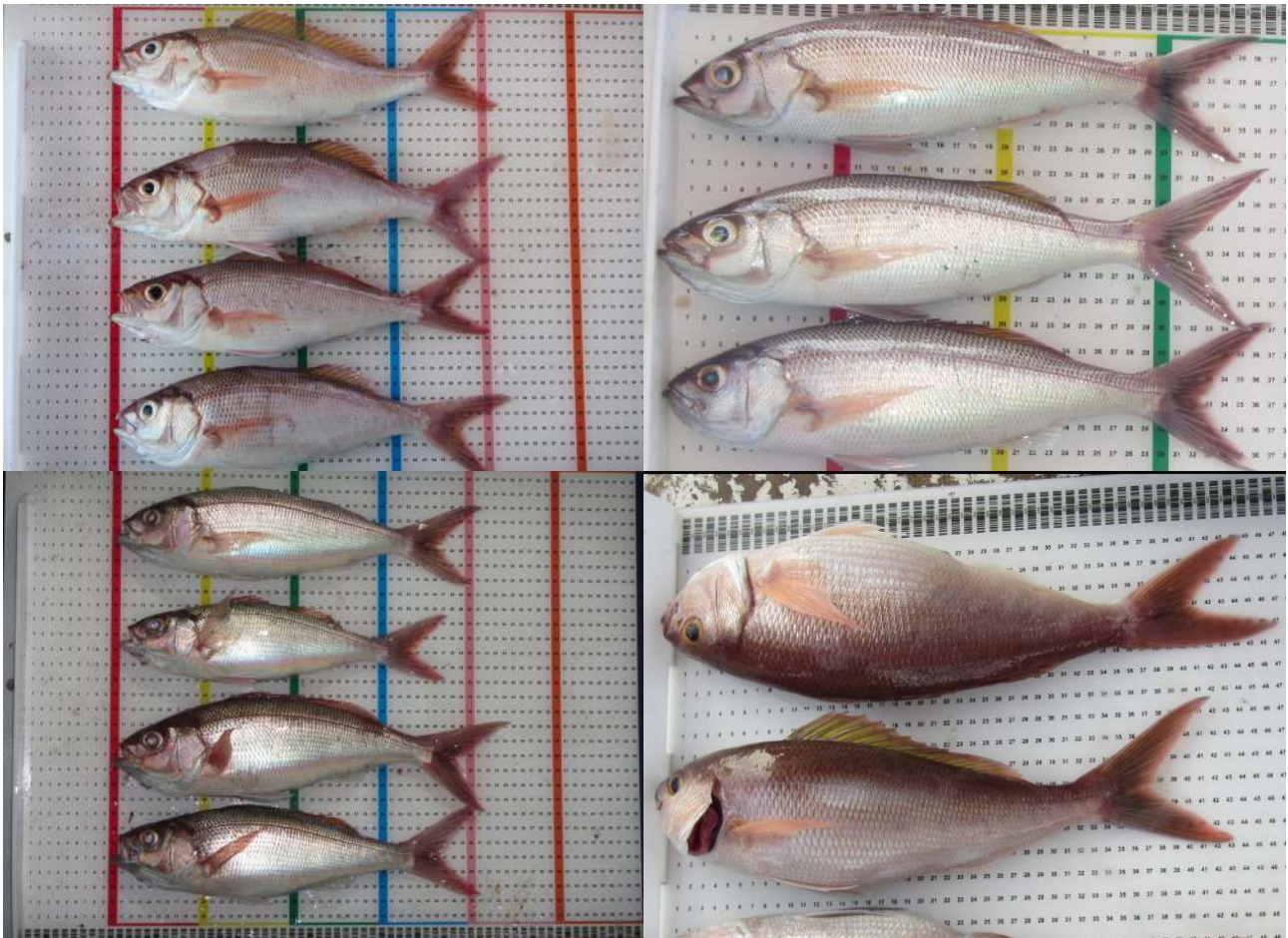


C

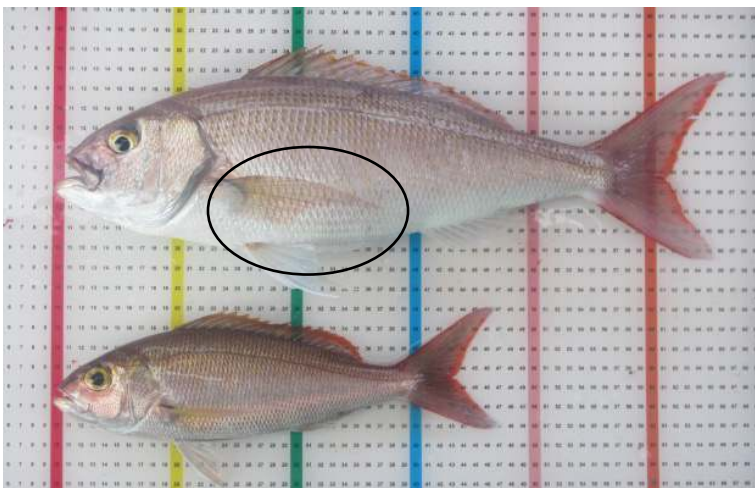


D

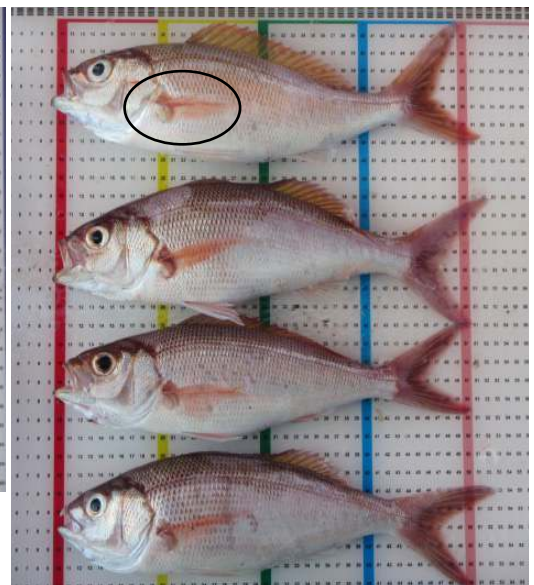
- A: Body light lavender or violet with paler ventrally
- B: Pinkish margin on the tip of dorsal fin
- C: Pinkish pectoral fin
- D: Caudal fin dark lavender with a light margin



Comparisons between *Pristipomoides sieboldii* and *Pristipomoides filamentosus*



Pristipomoides filamentosus



Pristipomoides sieboldii

Small *Pristipomoides filamentosus* look similar to a *Pristipomoides sieboldii*, but *P. filamentosus* can grow to a larger size than *P. sieboldii*.

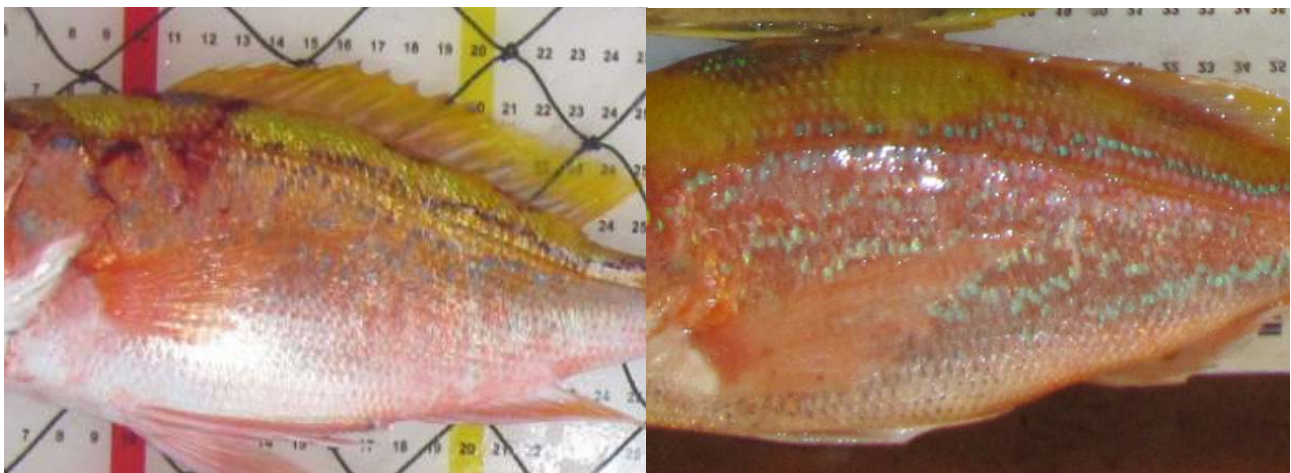
P. filamentosus has YELLOW pectoral fin (see circle).
P. sieboldii has ORANGE/ RED pectoral fin (see circle).

11. *Pristipomoides argyrogrammicus*
Ornate Jobfish, Ornate Snapper
Kurisi



A

B



C

D

- A: Caudal fin is bright yellow with thick white margin
- B: Zigzag line running at about level of lateral line anteriorly and then onto dorsal lateral part of caudal peduncle posteriorly
- C: Back side is mainly bright yellow
- D: Body with many bright blue spots



12. *Pristipomoides zonatus*
Olique-banded Snapper
Kakap Bendera



A



B

C

- A: Alternating oblique red and yellow bars on side of body (4 bright yellow bars)
- B: Caudal fin is bright yellow
- C: Body is overall pink or reddish, dorsal fin is yellow and the other fins are pink



13. *Pristipomoides flavipinnis*

Golden Eye Snapper, Golden Eye Jobfish
Kurisi, Kale-kale



A



B



C



D

A: Caudal fin has thick yellow margin

B: Yellow eyes

C: Dorsal fin has thick yellow margin, the other fins are translucent yellow

D: Yellow blotches on body



14. *Lutjanus bitaeniatus*
Indonesian Snapper
Kakap Merah



A

B



C

D

- A: Caudal fin has white margin
- B: Posterior profile of dorsal and anal fins are rounded and have white margin
- C: Scale rows on back rising obliquely above the lateral line
- D: Snout is pointed



15. *Lutjanus argentimaculatus*

Mangrove Snapper, Mangrove Jack
Ganggrang Eca, Jarang Gigi, Manggar



A



B

Back and sides brown to reddish, belly silvery or whitish

A: Scale rows on back more or less parallel to lateral line, or parallel below spinous part of dorsal fin and sometimes rising obliquely posteriorly, or rarely with entirely oblique rows

B: Profile of dorsal and anal fins are rounded

Intraspecies variations



16. *Lutjanus bohar*

Red Bass

Jarang Gigi, Kantoan, Kakap Baru



A

B



C

A: A deep groove or pit from nostrils to front of eye

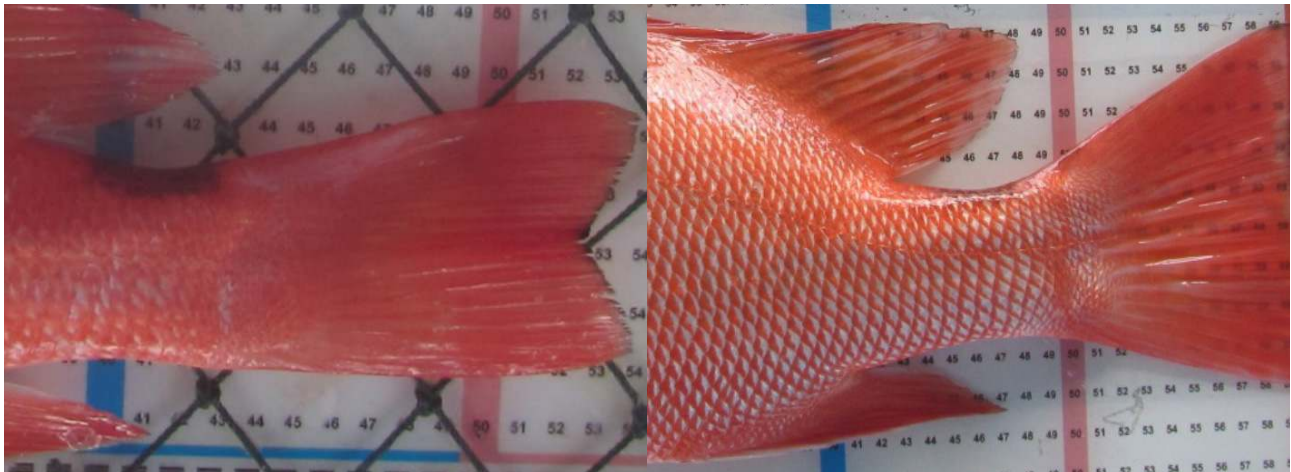
B: Pectoral fins are pink to reddish with dorsal edge prominently black

C: Back and upper sides are dark brown or blackish, lower sides and belly reddish, with darker horizontal stripes (between each scale row)



17. *Lutjanus malabaricus*

Malabar Snapper, Large Mouth Nannygai
Kakap Merah, Kakap Asli, Bambang



A

B



C

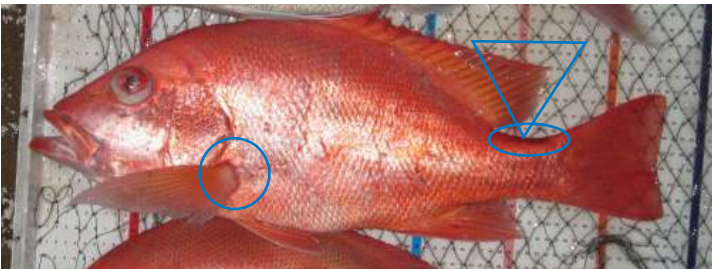
D

- A: Black mark on base of tail
- B: The tip of dorsal and anal fins are pointed
- C: Large mouth
- D: In young also with a series of narrow reddish horizontal lines (sometimes absent) on sides



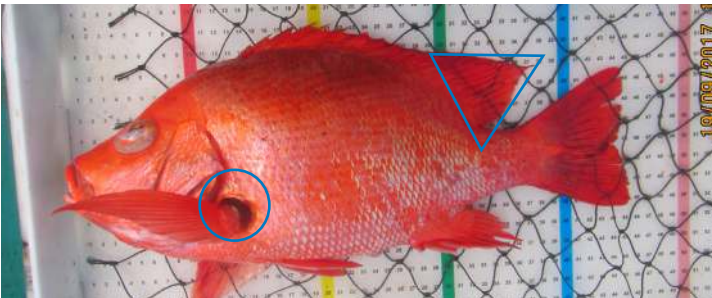
Comparisons between *Lutjanus malabaricus* and *Lutjanus timorensis*

Lutjanus malabaricus



Lutjanus malabaricus has a black saddle on the caudal peduncle (see ellipse).
Lutjanus timorensis does not have a black saddle.

Lutjanus timorensis



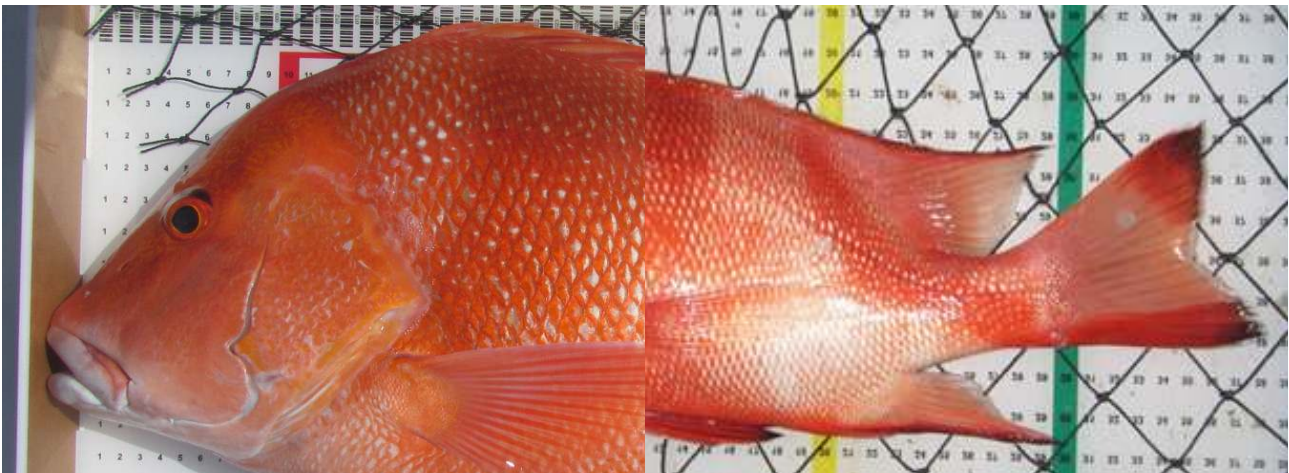
Lutjanus timorensis has black spot present on the pectoral fin axil (see circle).
Lutjanus malabaricus does not have black spot on the pectoral fin axil (see circle).

Lutjanus timorensis has more pointy soft dorsal fin than *Lutjanus malabaricus*. The rear part of the dorsal fin looks triangular (see triangles).

18. *Lutjanus sebae*

Red Emperor

Kakap Bongkok, Kakap Sawu



A

B

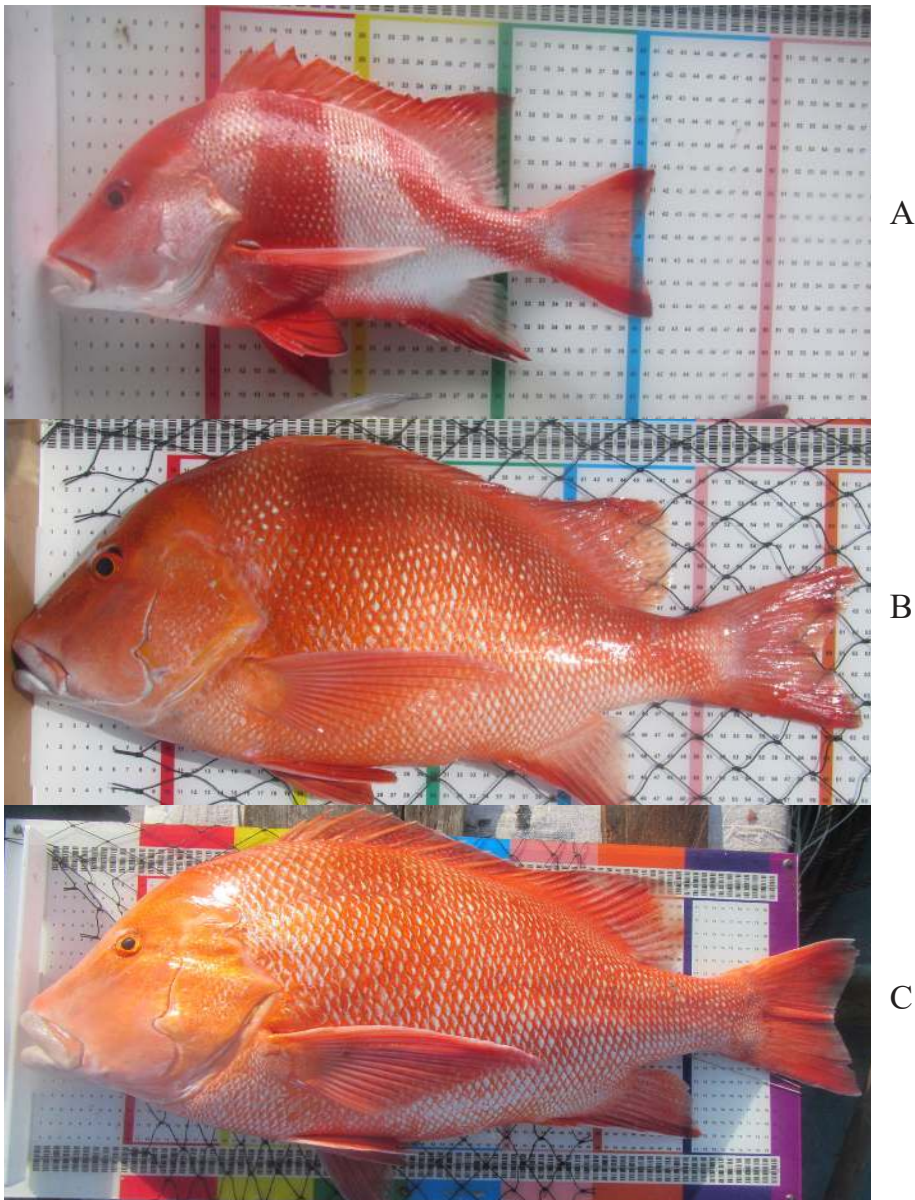


C

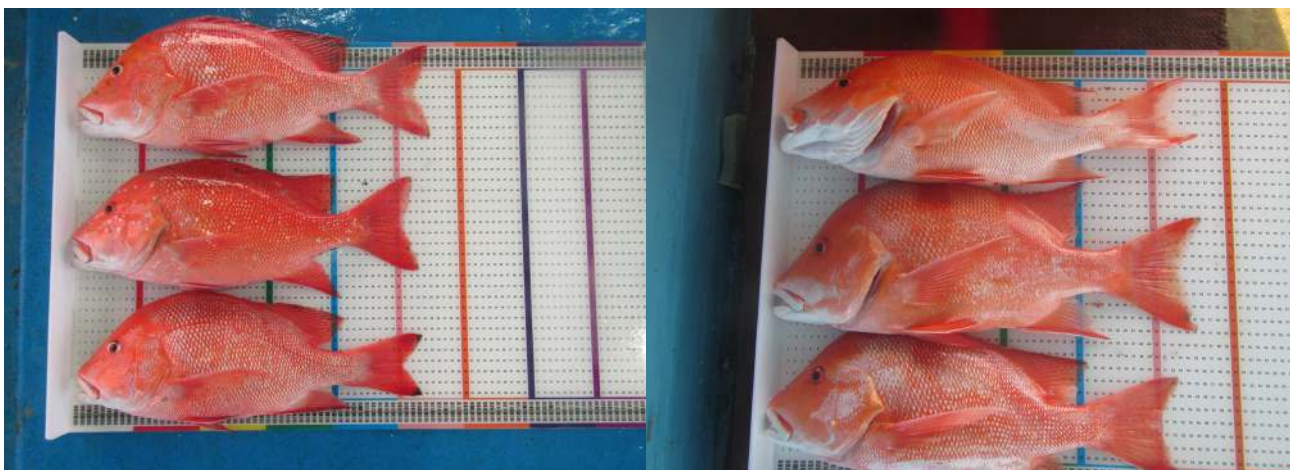
D

- A: Profile of head is steeply sloped
- B: Dorsal and anal fins are pointed
- C: Juveniles and smaller adults pink with 3 dark red bands
- D: Generally red or pink in adults

Intraspecies variations



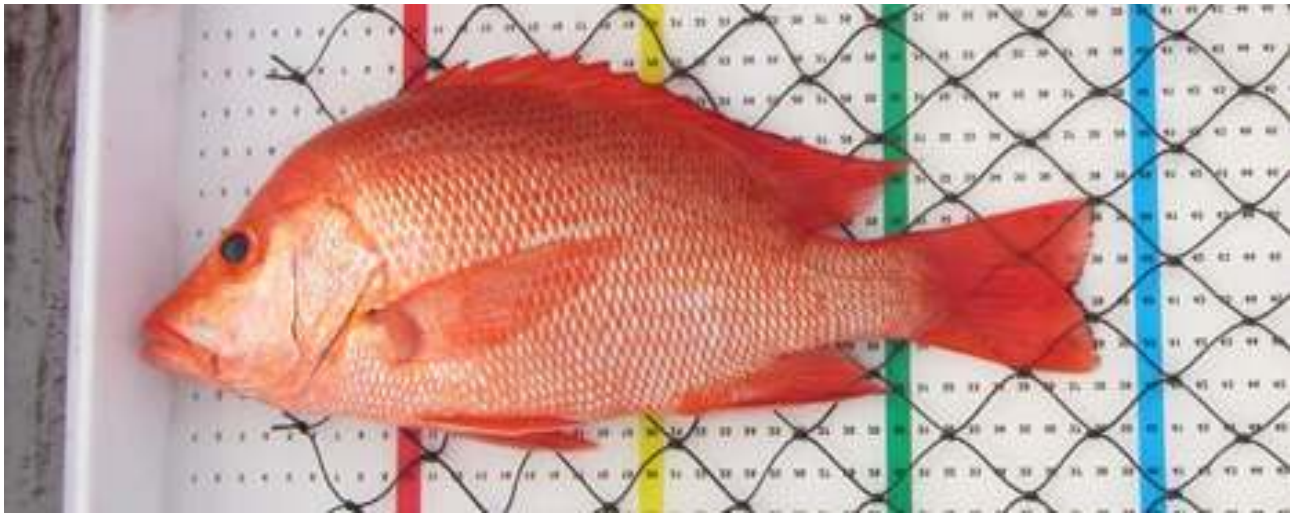
The juvenile of *Lutjanus sebae* (A) has three very clear red bands, will fade as it grows larger or pre adult (B) and will disappear when it is adult (C).



19. *Lutjanus timorensis*

Timor Snapper

Bambangan, Kakap Timor



A



B



C



D

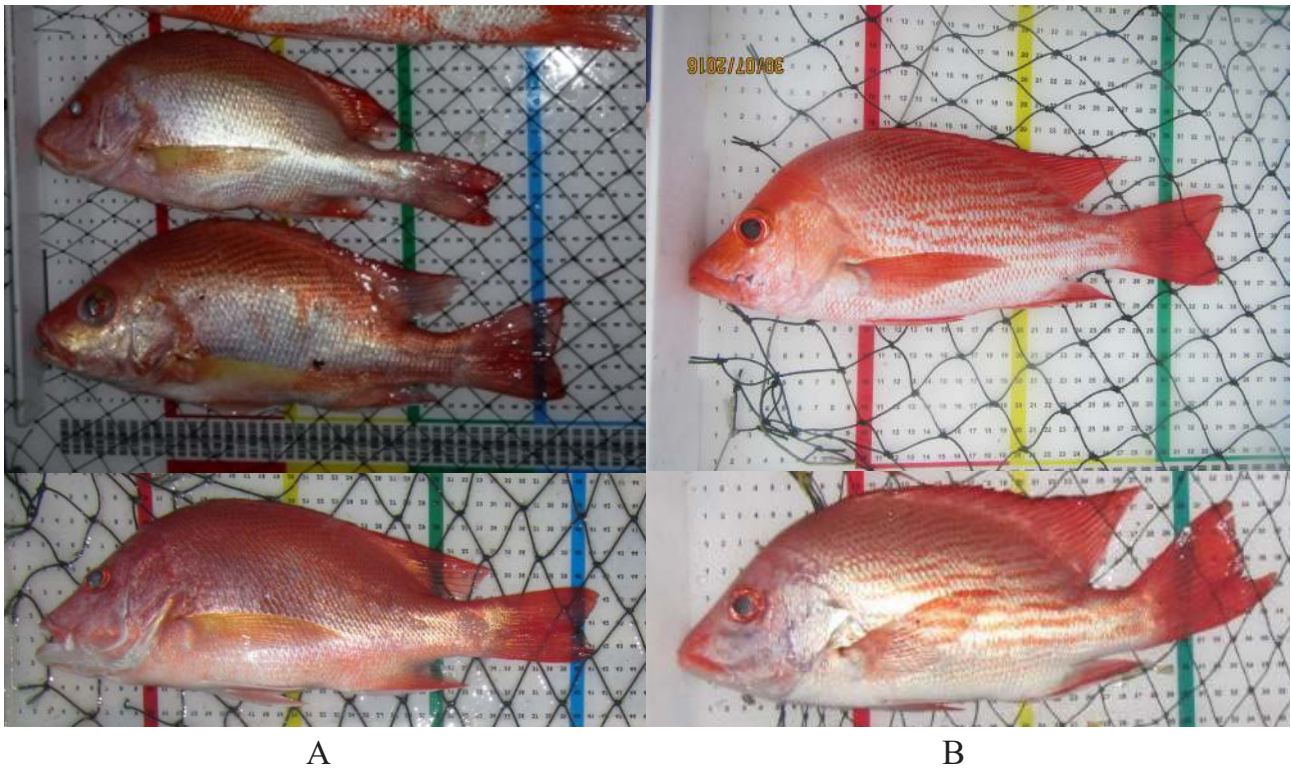
A: Axil of pectoral fin is black

B: Profile of head is steeply sloped

C: Posterior profile of dorsal and anal fins are distinctly pointed

D: Back and upper sides are reddish and lower sides and belly are pinkish to silvery white

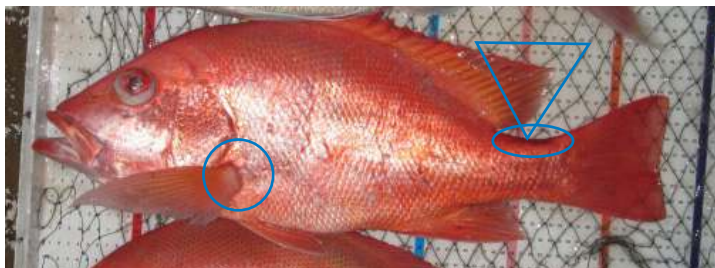
Intraspecies variations



There are *Lutjanus timorensis* with yellowish pectoral fins (A) and sometimes in juveniles there are red horizontal lines on body (B)

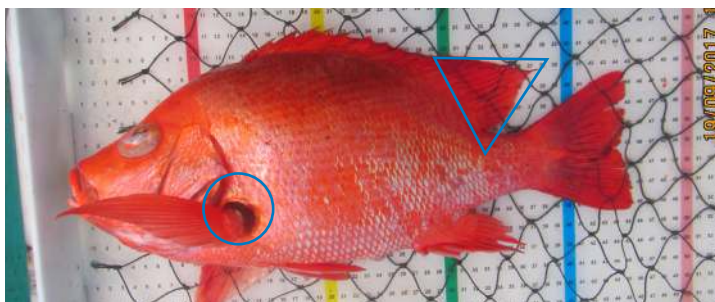
Comparisons between *Lutjanus timorensis* and *Lutjanus malabaricus*

Lutjanus malabaricus



Lutjanus malabaricus has a black saddle on the caudal peduncle (see ellipse). *Lutjanus timorensis* does not have a black saddle.

Lutjanus timorensis



Lutjanus timorensis has black spot present on the pectoral fin axil (see circle). *Lutjanus malabaricus* does not have black spot on the pectoral fin axil (see circle).

Lutjanus timorensis has more pointy soft dorsal fin than *Lutjanus malabaricus*. The rear part of the dorsal fin looks triangular (see triangles).

20. *Lutjanus gibbus*

Paddletail Snapper, Humpback Snapper
Cunding, Jenaha



A

B



C

D

A: The paddle-tailed fin

B: Caudal fin has white margin, also in both of dorsal and anal fins

C: Profile of head is steeply sloped

D: Strong notch, and orange hue on lower part of opercle and in pectoral fin axil



21. *Lutjanus erythropterus*

Crimson Snapper, Small Mouth Nannygai
Bambangan, Nunuk, Kakap Sawu



A



B



C



D

- A: Dorsal and anal fins are more rounded
- B: Small mouth
- C: Several have a large black spot at base of caudal fin
- D: Overall pink or red, including fins



Comparisons between *Lutjanus erythropterus* and *Pinjalo lewisi*

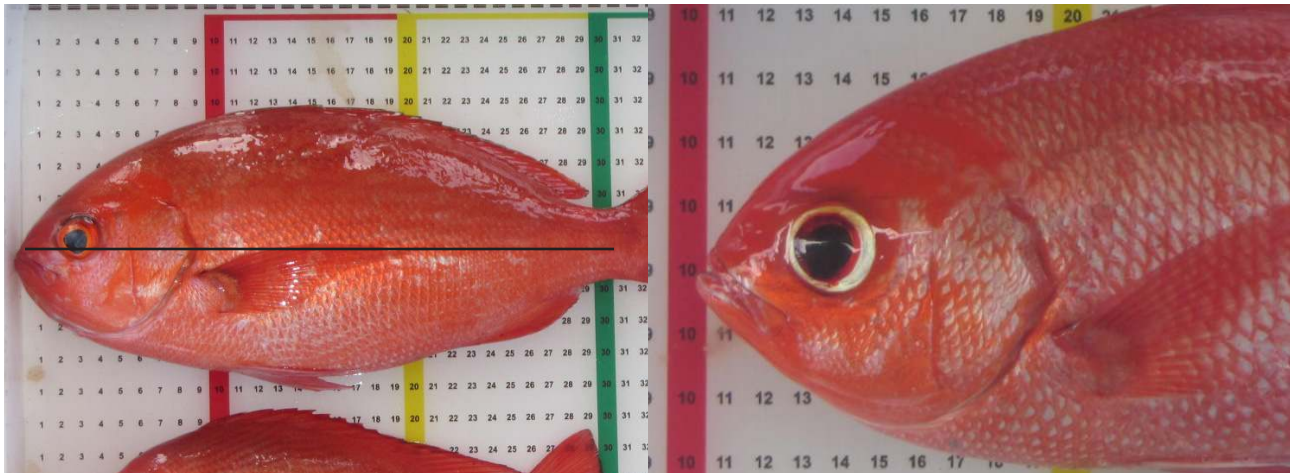
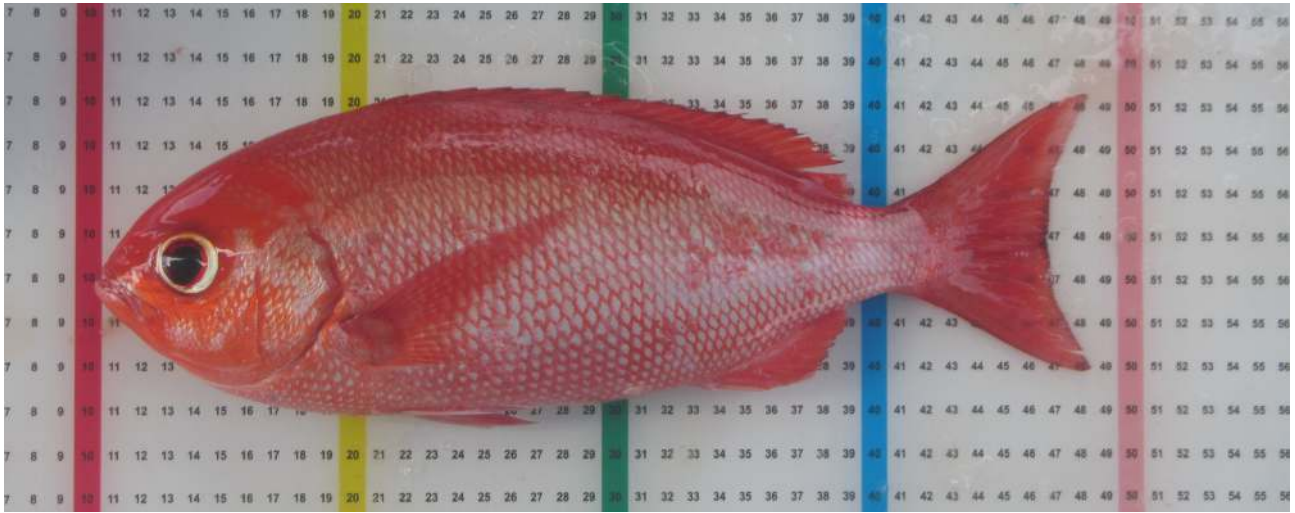


Pinjalo lewisi (A) body shape is symmetrical, with the eye in the middle of head.

Lutjanus erythropterus (B) body shape is NOT symmetrical and the eye is towards the top of the head.

22. *Pinjalo lewisi*

Slender Pinjalo, Red Pinjalo
Kakap Merah, Nunuk



A

B



C

D

A: Symmetrical body shape

B: Head is dark red except areas covered with scales are pinkish white

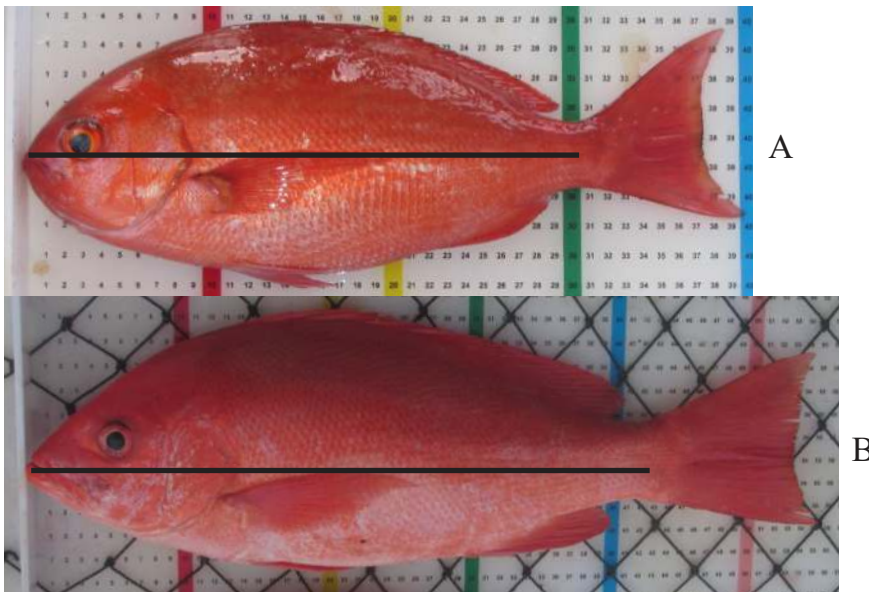
C: No diagonal dark lines on nape and body

Intraspecies variations



Pinjalo lewisi, sometimes shows pale sides with horizontal lines on upper side of body. This effect can also be observed in *Lutjanus timorensis* sometimes

Comparisons between *Pinjalo lewisi* and *Lutjanus erythropterus*



Pinjalo lewisi (A) body shape is symmetrical, with the eye in the middle of head.

Lutjanus erythropterus (B) body shape is NOT symmetrical and the eye is towards the top of the head.

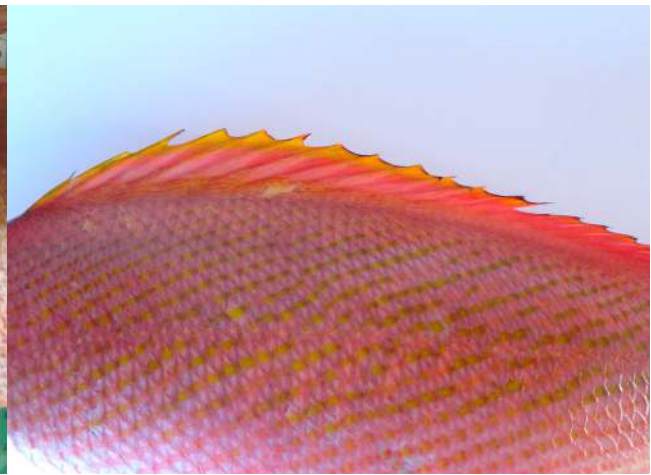
23. *Pinjalo pinjalo*

Pinjalo Snapper

Nunuk Jumbo, Ikan Sulit Merah



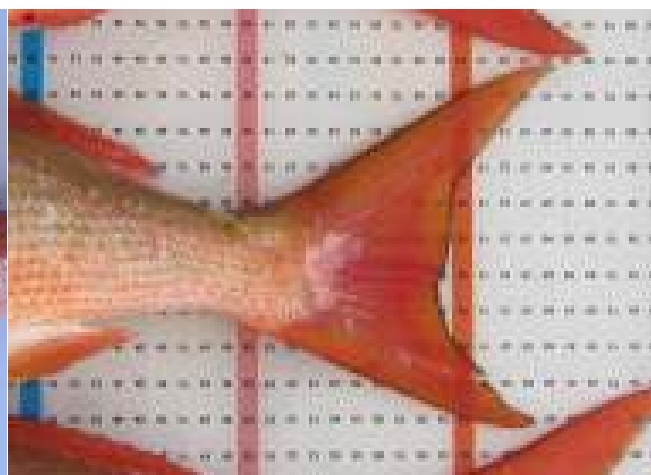
A



B



C



D

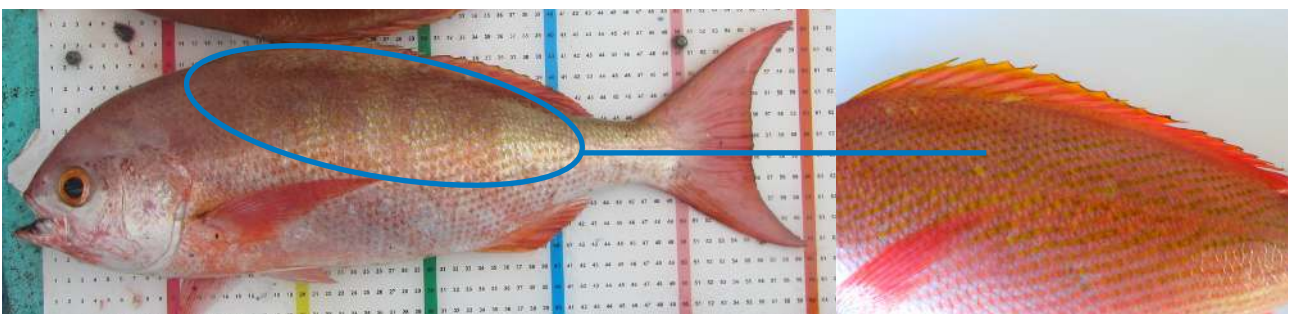
- A: Small mouth, small head compared to body size (disproportionate)
- B: Diagonal yellowish brown lines one-half to two-thirds of body
- C: Anal and pelvic fins are light red to yellow, pectoral fins are light red
- D: Caudal fin is deeply emarginate. The color is reddish with black margin



Comparisons between *Pinjalo pinjalo* and *Pinjalo lewisi*



Pinjalo lewisi



Pinjalo pinjalo

Pinjalo lewisi has a plain body color but sometimes found with horizontal red lines on the upper half of body, from the end of operculum until the caudal peduncle.

Pinjalo pinjalo has diagonal yellowish brown lines one-half to two-thirds of body.

24. *Lutjanus johnii*

Golden Snapper, Fingermark Perch
Kakap Jenaha



A

B



C

D

- A: A round black spot on back, below anterior soft dorsal-rays (sometimes absent in adults)
- B: Center of each scale often with a reddish brown spot
- C: The color of head is often orange brownish
- D: The color of body is generally yellow with a bronze to silvery sheen (golden) but in adults is often golden brownish



Comparisons between *Lutjanus johnii* and *Lutjanus argentimaculatus*



Lutjanus johnii (A) has a round black spot on back, below anterior soft dorsal-rays (sometimes absent in adults). The body color is golden brownish.

Lutjanus argentimaculatus (B) DOES NOT have spot or mark on body. Body color is overall red-dish to brownish.

25. *Lutjanus russelli*

Russell's Snapper, Moses Perch
Tompel, Jangki Tompel, Gorora



A

B



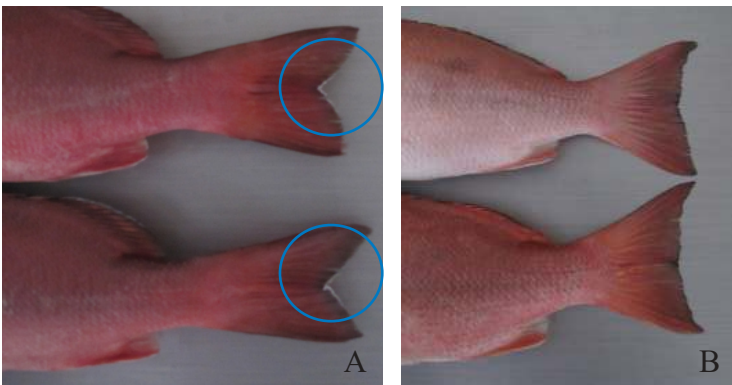
C

D

- A: Back and upper side brownish, lower sides and belly pink to whitish with a silvery sheen.
Pectoral, pelvic and anal fins are yellowish.
- B: Round black spot on upper back but sometimes looks faded
- C: Caudal fin has black margin
- D: Profile of head is steeply to moderately sloped

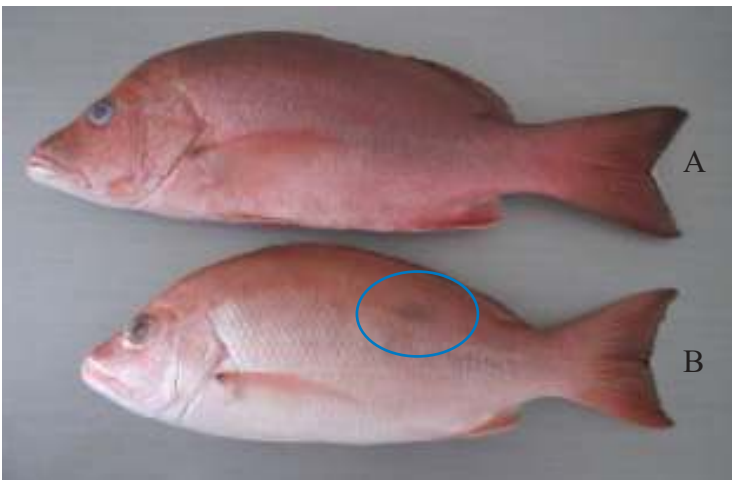


Comparisons between *Lutjanus russelli* and *Lutjanus lemniscatus*



A: *Lutjanus lemniscatus* has a white margin on the tail (see circle).

B: *Lutjanus russelli* DOES NOT have a white margin on the tail.



A: *Lutjanus lemniscatus* has a more elongated snout and a forehead hump. It can come in a variety of body colorations but NO distinct markings.

B: *Lutjanus russelli* has a less pronounced snout and a less pronounced forehead bump. It also has a black spot on the posterior side of the body, but may be absent in some frozen specimens. Sometimes, yellow or orange lines may be visible running horizontally across the body, but is rarely seen in frozen specimens.



Lutjanus lemniscatus has bright orange spots on the side of face. However, spots may fade after prolonged exposure to ice.

Lutjanus russelli does NOT have distinct coloration on the side of face.

26. *Lutjanus lemniscatus*

Darktail Snapper, Maroon Seaperch
Jarang Gigi, Cablikan, Bulobulo Pura



A

B



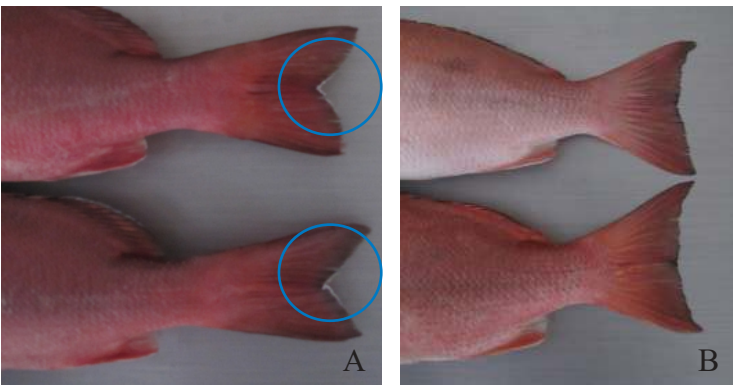
C

D

- A: Body color is generally pink reddish but sometimes grey-brown or olive
- B: Orange spots on cheek
- C: Scale rows on back rising obliquely above lateral line
- D: White margin on caudal fin

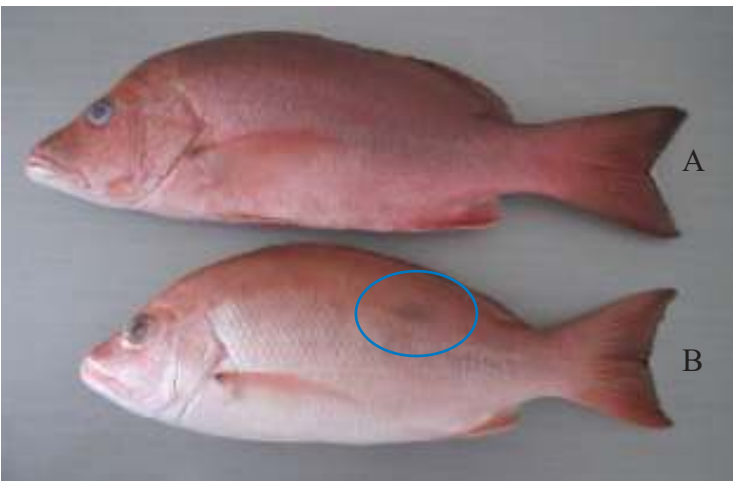


Comparisons between *Lutjanus lemniscatus* and *Lutjanus russelli*



A: *Lutjanus lemniscatus* has a white margin on the tail (see circle).

B: *Lutjanus russelli* DOES NOT have a white margin on the tail.



A: *Lutjanus lemniscatus* has a more elongated snout and a forehead hump. It can come in a variety of body colorations but NO distinct markings.

B: *Lutjanus russelli* has a less pronounced snout and a less pronounced forehead bump. It also has a black spot on the posterior side of the body, but may be absent in some frozen specimens. Sometimes, yellow or orange lines may be visible running horizontally across the body, but is rarely seen in frozen specimens.



Lutjanus lemniscatus has bright orange spots on the side of face. However, spots may fade after prolonged exposure to ice.

Lutjanus russelli does NOT have distinct coloration on the side of face.

27. *Lutjanus vitta*

Brownstripe Snapper, Hussar
Mala, Ikan Pisang, Kuniran



A

B



C

D

- A: A dark brown to blackish stripe along middle of side from eye to upper half of caudal peduncle
- B: Thin brown stripes are oblique above lateral line and are horizontal below the line
- C: Dorsal, anal and caudal fin are yellow greenish with white margin
- D: Pectoral fins are yellow



28. *Lutjanus bouton*

Moluccan Snapper, Goldenlined Snapper
Badur, Kakap



A



B

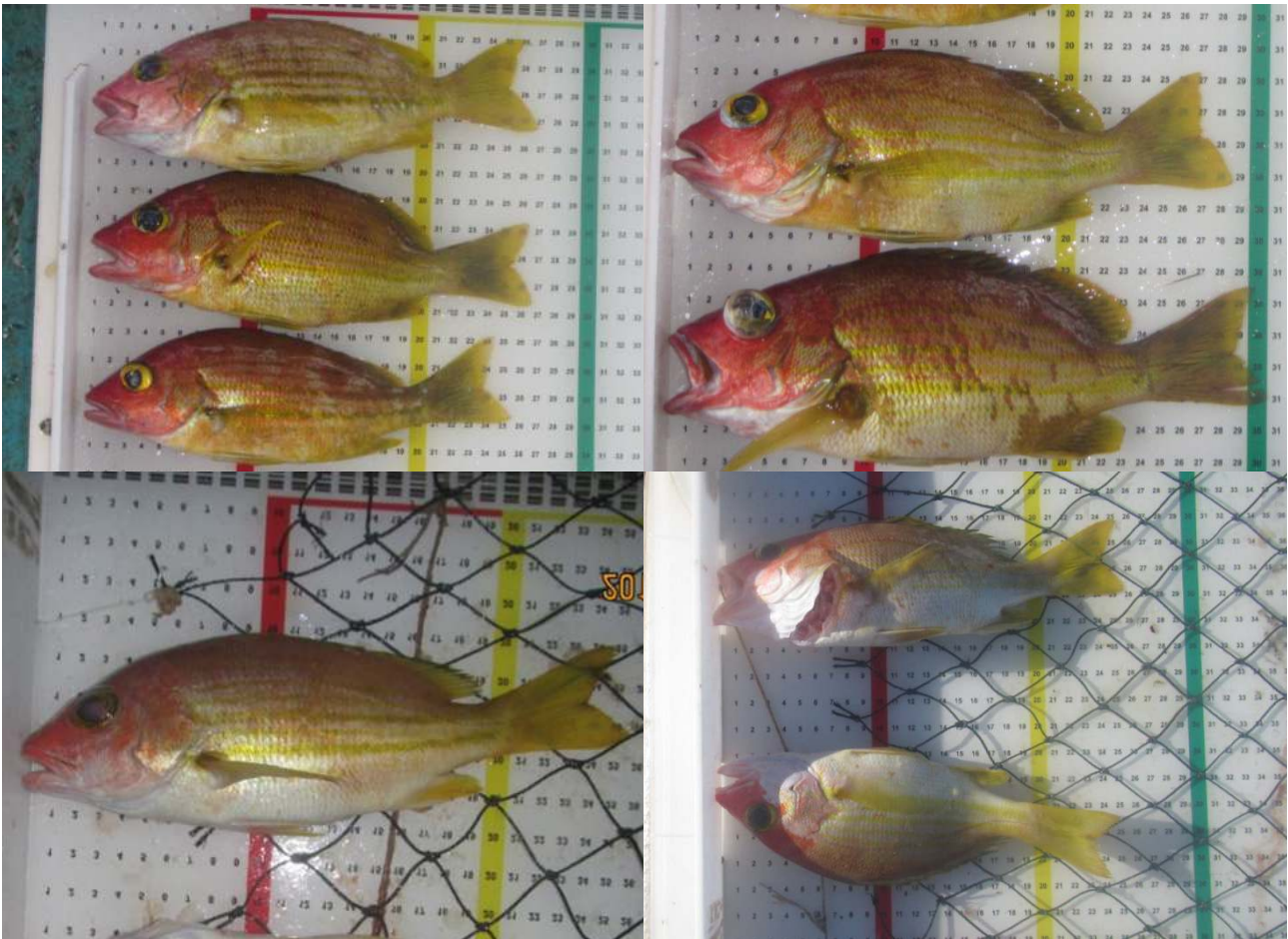


C

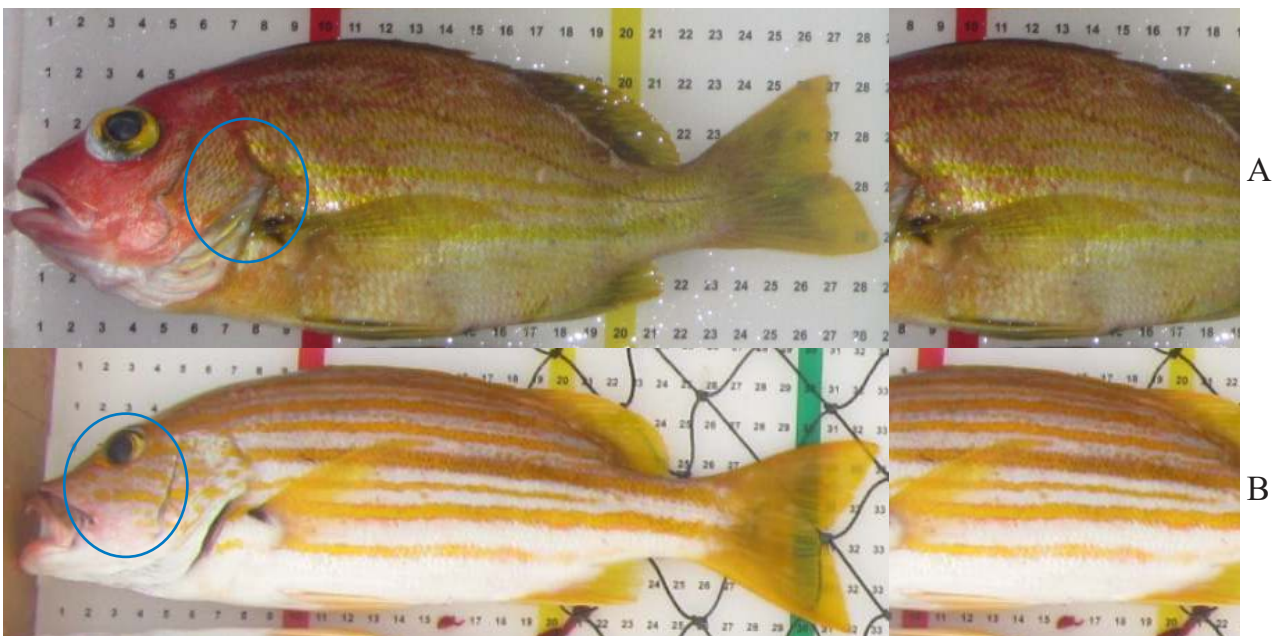


D

- A: Body has 8-12 yellow strips
- B: Head is dusky reddish brown
- C: Lower half of side metallic yellow
- D: Pectoral fins translucent yellow with small brown spot at base of uppermost rays



Comparisons between *Lutjanus bouton* and *Lutjanus carponotatus*



Lutjanus bouton (A)

- The color of head is reddish and metallic yellow on body with yellow stripes.
- The yellow stripes start from the OPERCULUM until caudal peduncle.

Lutjanus carponotatus (B)

- The color of body is silver metallic with bright yellow stripes.
- The bright yellow stripes start from the CHEEK until caudal peduncle.

29. *Lutjanus rivulatus*

Maori Snapper, Speckled Snapper
Kampuh, Kampo, Gaga, Jenaha Konai



A

B



C

A: Head with numerous undulating blue lines and lips greatly thickened in adults
B: Caudal fin with yellow margin. Fins largely yellowish to dusky grey-brown
C: Chalky white spots on body with a broad blackish margin



30. *Lipocheilus carnolabrum*

Tang's Snapper

Padi-padi Kuning



A



B



C



D

A: Upper jaw protruding when mouth closed

B: Adults with a thick fleshy protrusion at anterior end of upper lip

C: Juveniles frequently with about 5 vertical bars

D: The upper side of body is golden brownish and silvery sheen on lower side, caudal fin is bright yellow and the other fins are translucent yellow



31. *Symphorus nematophorus*

Chinaman Fish

Kakap China, Markisa, Mamong, Marpisang



A

B



C

D

- A: The juveniles of *Symphorus nematophorus* have bright blue stripes from head to base of caudal fin
- B: One or more anterior soft rays of dorsal fin produced into long filaments in juveniles
- C: In adults, the bright blue stripes are faded and looks like blue spots, and there is no long soft rays of dorsal fin
- D: Frequently with lighter blotching or white transverse bars

Intraspecies variations



A



B



C

The juvenile of *Symphorus nematophorus* (A) has bright blue stripes on side and long soft rays of dorsal fin. The bright blue stripes will fade as it grows larger or adult and there is no long soft rays of dorsal fin (B). Frequently, with white transverse bars (C).



32. *Paracaesio gonzalesi*

Vanuatu Snapper

Balimong Bencong, Ekor Kuning, Lololi, Lolosi



A

B



C

D

- A: Yellow band running from origin of lateral line obliquely to about middle of dorsal fin
- B: Upper lobe of caudal fin is violet grey and lower lobe is bright yellow
- C: Dorsal fin is yellowish
- D: Upper side is dark grey and the lower side is silver to whitish

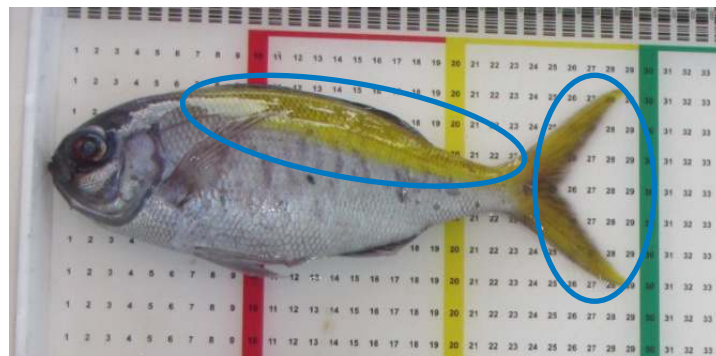


Comparisons between *Paracaesio gonzalesi* and *Paracaesio xanthura*



Paracaesio gonzalesi

Paracaesio gonzalesi has a yellow band running from the operculum until the middle of dorsal fin. The upper of caudal fin is grey and the lower is yellow.

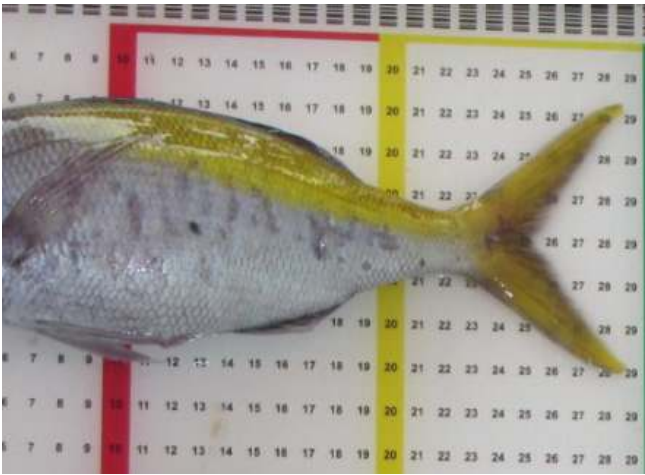


Paracaesio xanthura

Paracaesio xanthura has a yellow band from the beginning of dorsal fin until the caudal fin. The caudal fin is overall yellow.

33. *Paracaesio xanthura*

Yellowtail Blue Snapper, False Fusilier
Balimong Sulir, Lololi, Lolosi



A



B



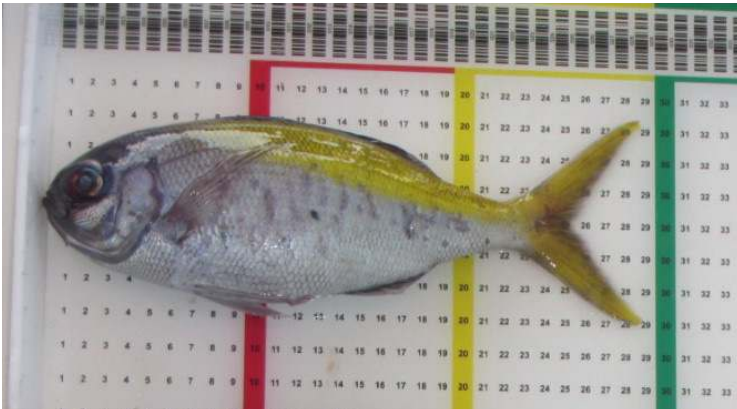
C



D

- A: Broad yellow band on upper side beginning of dorsal fin, continuing over most of caudal peduncle and out onto both lobes of caudal fin
- B: Blue ring on eye and blue tip in base of pectoral fin
- C: Body colour is grey with blue spots, fins are grey to whitish
- D: Sometimes the yellow band is not too visible on caudal fin (greyish caudal fin)

Intraspecies variations



A

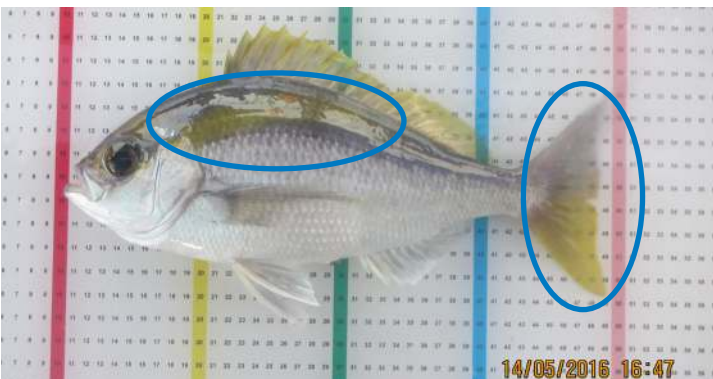
Bright yellow band on upper side beginning of dorsal fin until the caudal fin (A)



B

Sometimes the band is yellowish and not too visible on caudal fin or the caudal fin is greyish (B)

Comparisons between *Paracaesio xanthura* and *Paracaesio gonzalesi*



Paracaesio gonzalesi

Paracaesio gonzalesi has a yellow band running from the operculum until the middle of dorsal fin. The upper of caudal fin is grey and the lower is yellow.



Paracaesio xanthura

Paracaesio xanthura has a yellow band from the beginning of dorsal fin until the caudal fin. The caudal fin is overall yellow.

34. *Paracaesio kusakarii*

Saddleback Snapper

Balimong, Ikan Sulir, Pisang-pisang, Lolosi



A



B



C



D

A: Scales on the maxilla

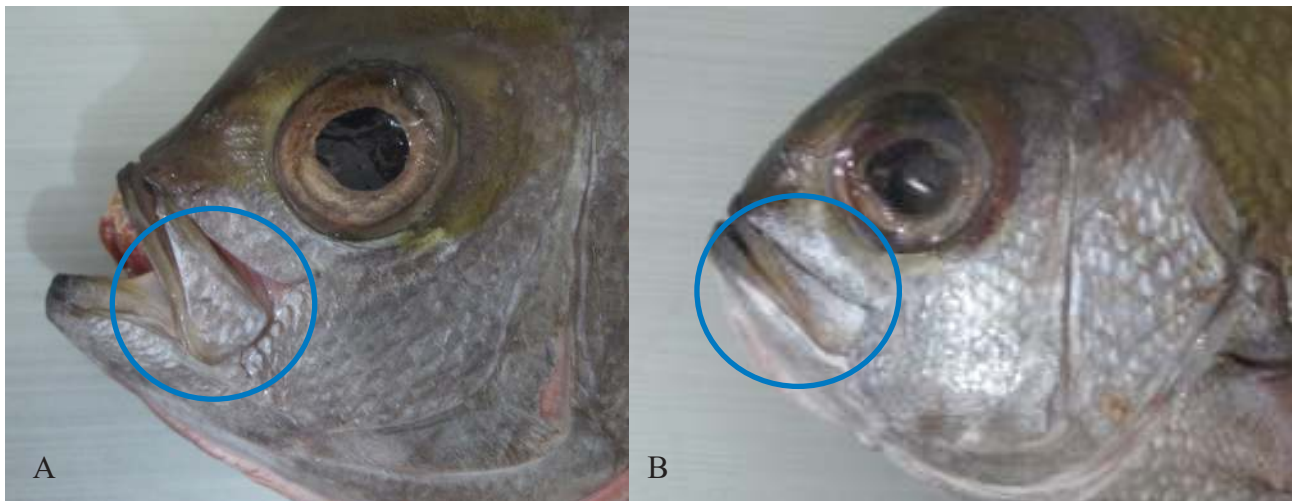
B: 4 broad dark vertical bars on upper side of body (short bars)

C: Fins are greyish, whitish or yellowish

D: Wide forehead



Comparisons between *Paracaesio kusakarii* and *Paracaesio stonei*



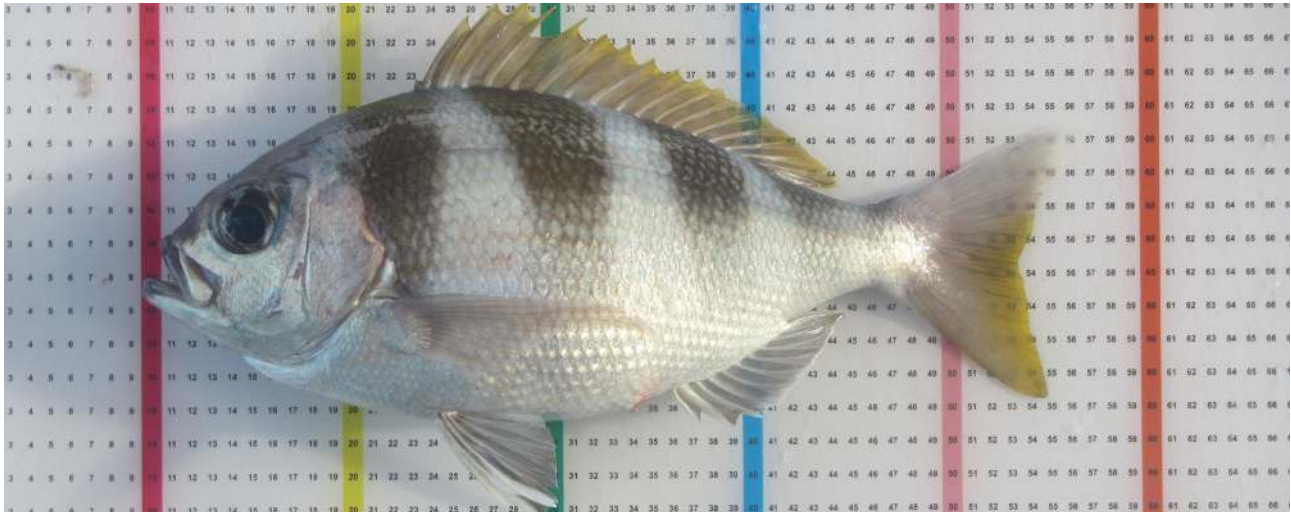
A: *Paracaesio kusakarii* has scales on the maxilla (upper jaw).

B: *Paracaesio stonei* does NOT have scales on the maxilla (upper jaw).

The scales of *Paracaesio kusakarii* can be seen and felt. The scaled maxilla is rough. Scales flake off when rubbed. The scale-less maxilla of *Paracaesio stonei* is smooth.

35. *Paracaesio stonei*

Cocoa Snapper, Stone's Snapper
Balimong Mata Besar, Ikan Sulir, Lolosi



A



B



C



D

A: No scale on the maxilla

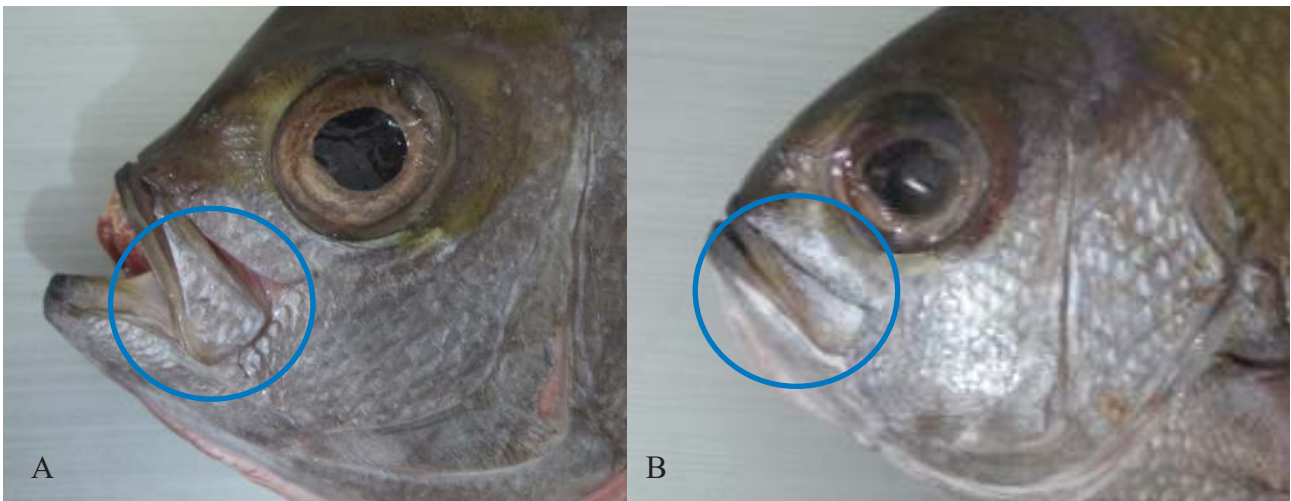
B: 4 or 5 broad brown to dark grey vertical bars on body extending from dorsal surface to below midline laterally (the bars is longer than *Paracaesio kusakarii*)

C: Fins are grey to whitish except dorsal and caudal fins with variable amounts of yellow

D: Forehead is not protruding



Comparisons between *Paracaesio stonei* and *Paracaesio kusakarii*



A: *Paracaesio kusakarii* has scales on the maxilla (upper jaw).

B: *Paracaesio stonei* does NOT have scales on the maxilla (upper jaw).

The scales of *Paracaesio kusakarii* can be seen and felt. The scaled maxilla is rough. Scales flake off when rubbed. The scale-less maxilla of *Paracaesio stonei* is smooth.

EPINEPHELIDAE

36. *Saloptia powelli*

Golden grouper

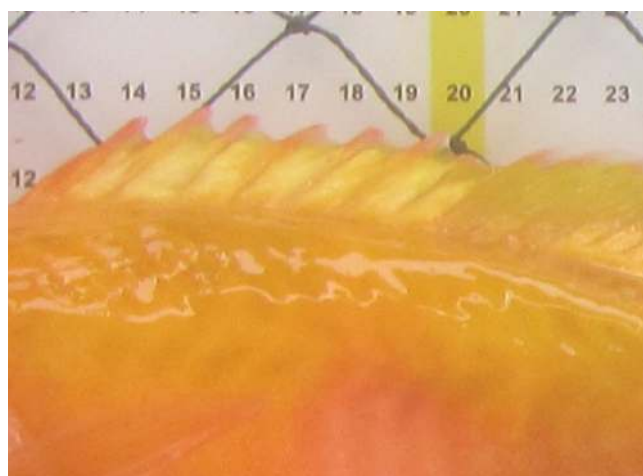
Kerapu orange



A



B



C



D

- A: Snout, lips and dorsal part of head suffused with red
- B: Body yellow to orange-redish shading ventrally to white or pink
- C: Dorsal-fin spines sometimes streak with red
- D: Tail yellow bright



37. *Cephalopholis miniata*

Red Coral Hind, Red Coral Cod
Kerapu, Kerapu Merah



A



B

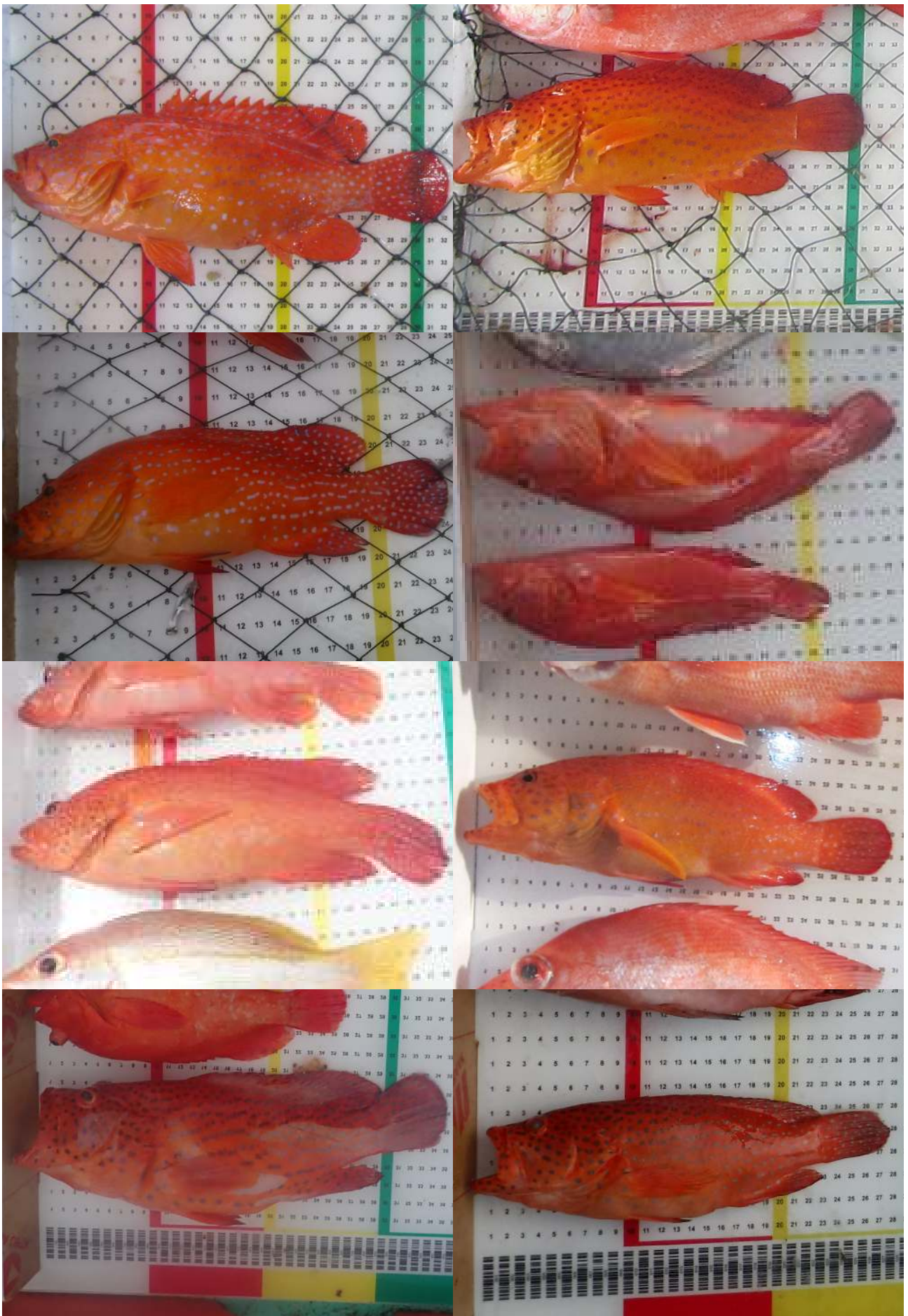


C



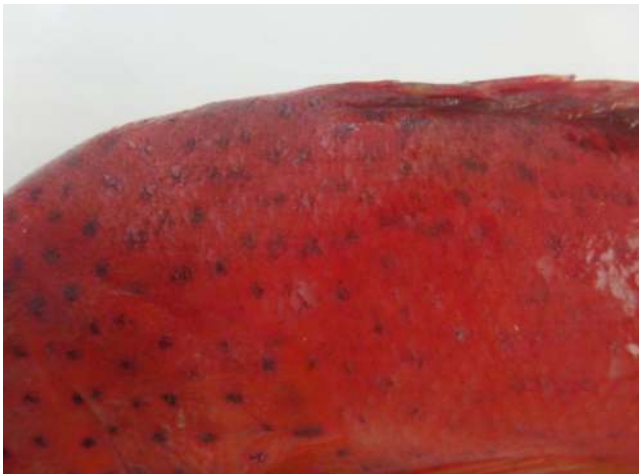
D

- A: Cover with small blue spots
- B: Pelvic fins orange-red with dark-blue margin
- C: Pectoral fins orange-yellow
- D: Soft dorsal, caudal and anal fins with a narrow dark-blue margin



38. *Cephalopholis sexmaculata*

Six-blotch Hind, Six-blotch Rockcod
Kerapu Merah



A



B

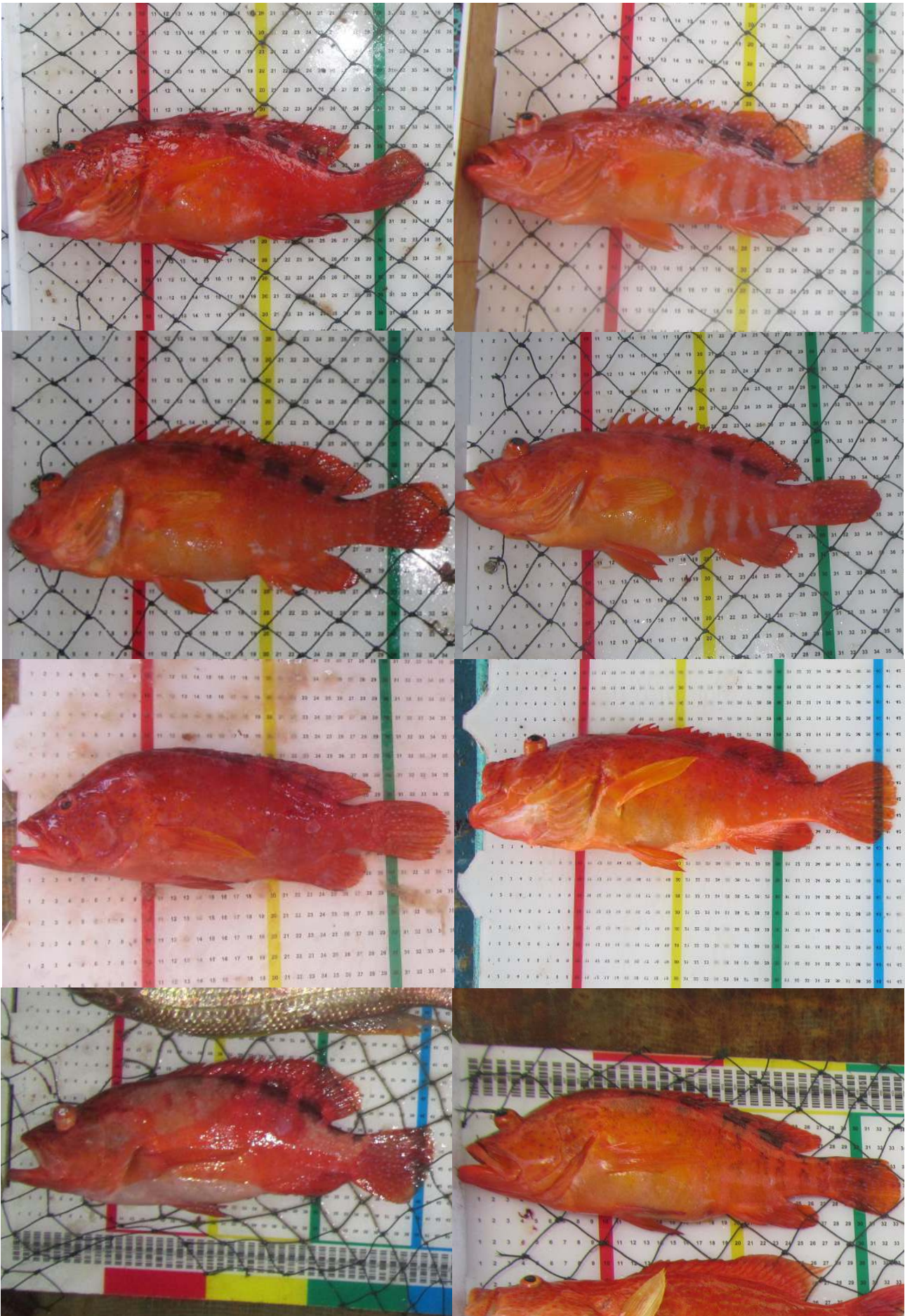


C



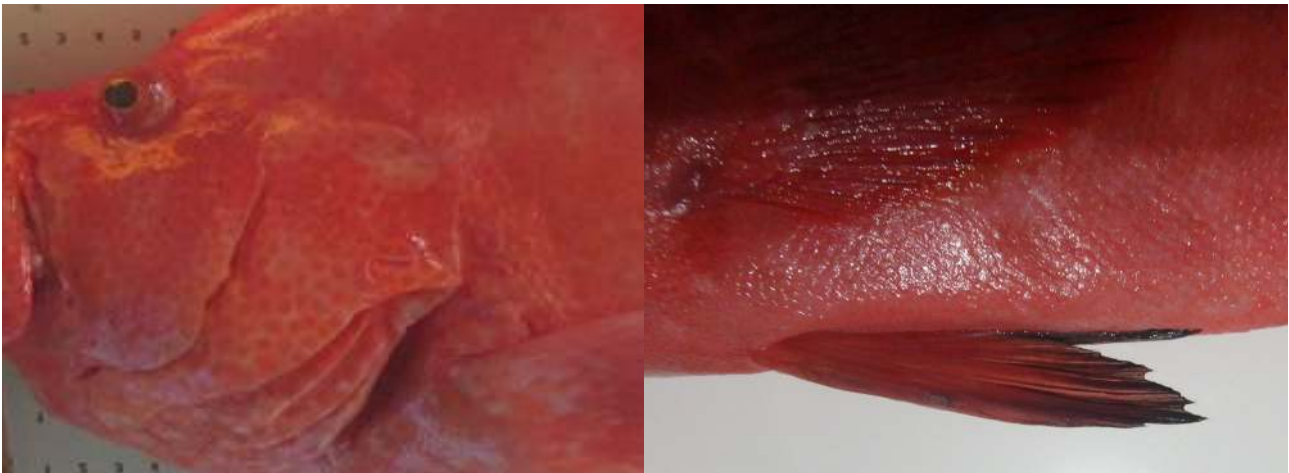
D

- A: Small blue spots sparsely scattered on body
- B: Head with elongated blue spots and lines
- C: Body with 4 dark bars and 2 smaller dark bars on caudal
- D: Pectoral fins orange-red



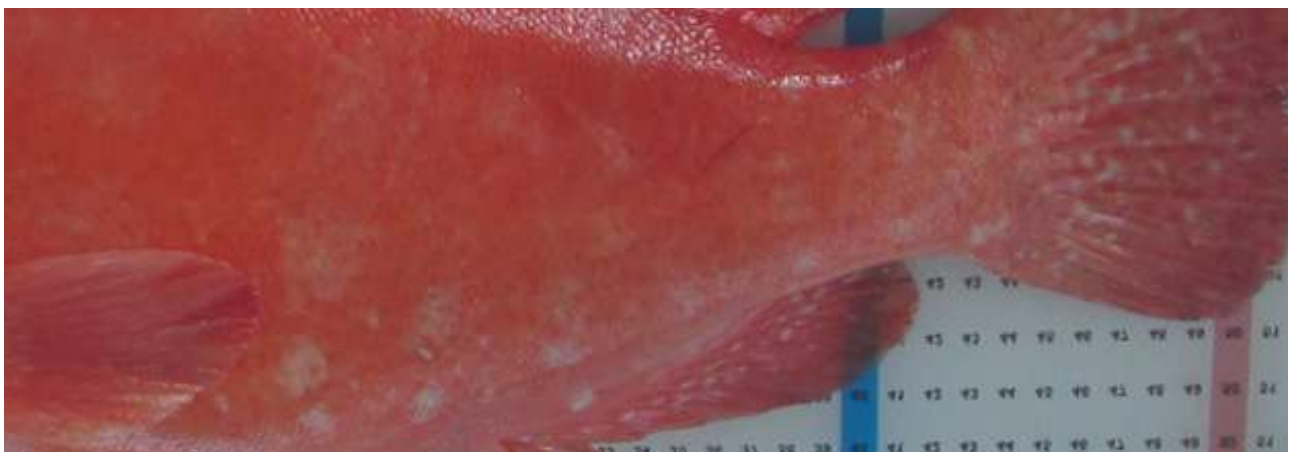
39. *Cephalopholis sonnerati*

Tomato grouper, Tomato Cod
Kerapu Tomat, Angpang, Kwaci Merah



A

B



C

- A : Cover with small red spots
- B : Pelvic-fin tips blackish
- C : Scattered small whitish blotch



40. *Cephalopholis igarashiensis*
Garish Grouper, Goldband Grouper
Kerapu, Kerapu Api

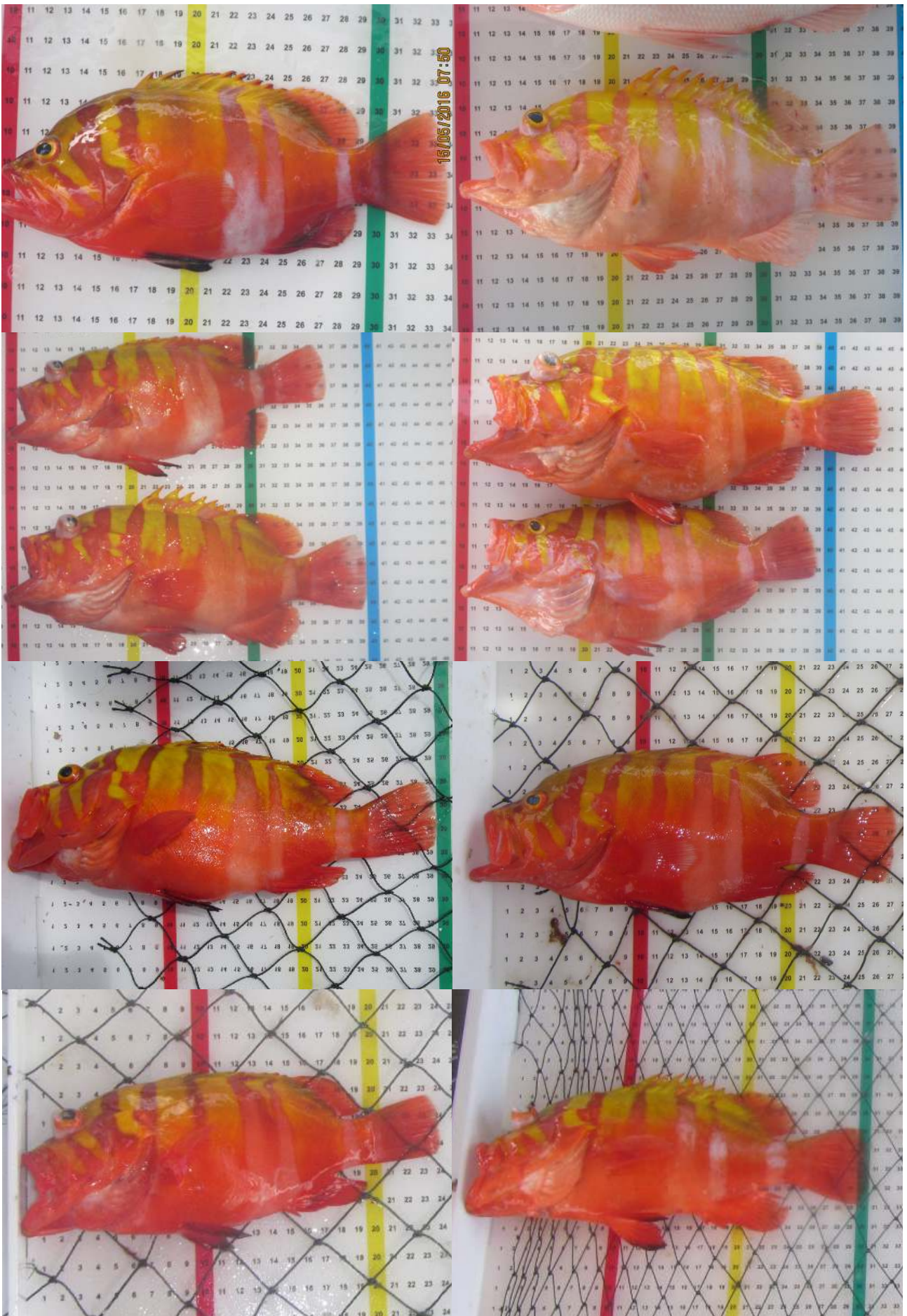


A



B

A : 7 lemon yellow bars on dorsal part of body, extending onto dorsal fin
B : Membrans at tip of dorsal-fin orange



41. *Epinephelus latifasciatus*

Striped Grouper, Banded Grouper
Kerapu, Kerapu Lumpur, Tho Khui



A



B

Head and body uniformly grey

A : Usually has 3 lines formed by spots, more clearly at juvenile

B : Soft dorsal and caudal fin with dark spots

Intraspecies variations



Juvenile



Pre-adult

Colour at juvenil stage is lavender-grey or pale brownish with 2 black-edged white longitudinal bands. White bands disappearing on adults and black edges breaking into dashes and spots.

Comparisons between *Epinephelus latifasciatus* of varying sizes



Distinct spots visible.



Spots become faded black margins. Dots on body become less distinct.



Spots on body are almost all gone.

42. *Epinephelus radiatus*

Radiant Rockcod, Oblique-banded Grouper

Kerapu Minyak, Yau Pan



A



B



C



D

A : 5 oblique dark-edged pale bands, from upper half of eye until caudal peduncle

B : Small dark brown spots between the bands

C : No spots on ventral

D : Dorsal and caudal fin covered with small dark spots



Comparisons between *Epinephelus radiatus*, *Epinephelus morrhua*, and *Epinephelus poecilonotus*



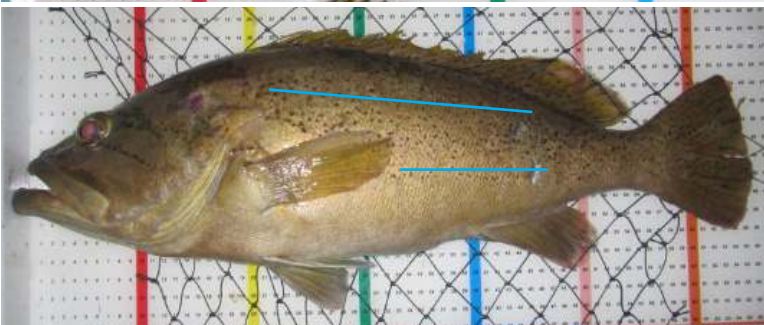
Epinephelus radiatus:

- Banding angle on the body become more vertical towards the tail (see blue)
- Small black dots scattered on the dorsal edge of the body
- Reddish hue on tail, with black dots spreading dorso-ventrally



Epinephelus morrhua:

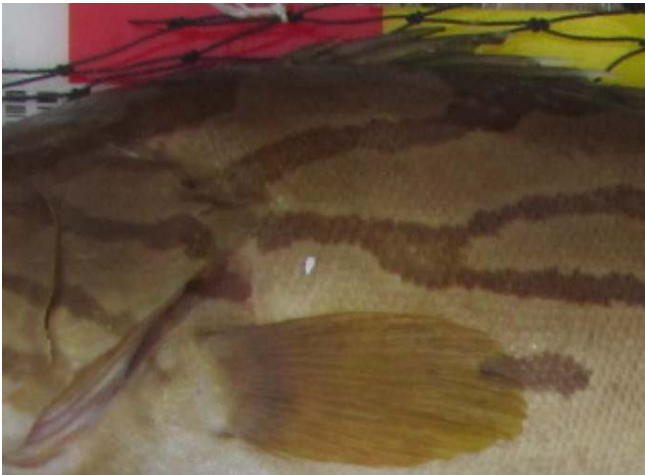
- Banding angle horizontal throughout the whole body (see blue)
- Most ventral band is not continuous (see red)
- Yellow hue on tail



Epinephelus poecilonotus:

- Banding angle horizontal throughout the whole body and is comprised of small dots (see blue)
- Yellow-dark brown hue on tail and dorsal fin

43. *Epinephelus morrhua*
Comer Grouper
Kerapu Minyak, Yau Pan



A



B



C

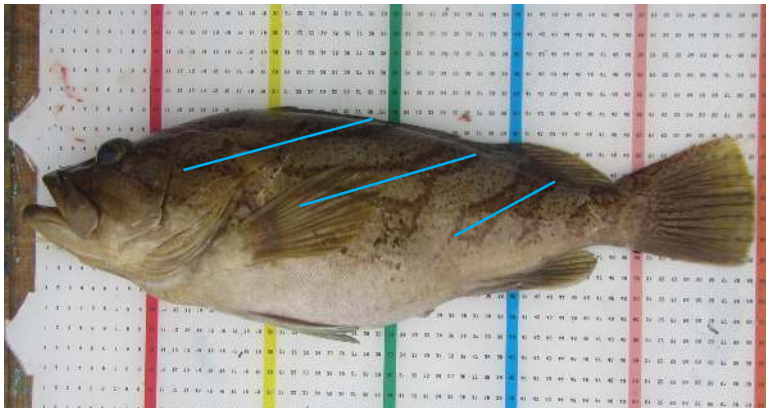


D

- A : Dark bands presents on body
- B : Lower bands on body continue as broken bands
- C : Small dark brown spots often present in pale areas between bands
- D : Fins generally unmarked, pectoral fins hyaline yellow



Comparisons between *Epinephelus morrhua*, *Epinephelus poecilonotus* and *Epinephelus radiatus*



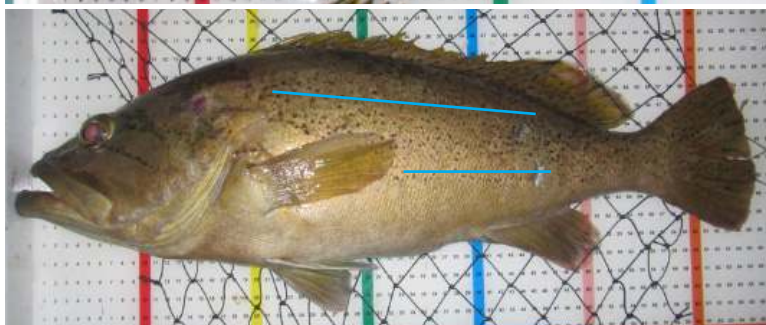
Epinephelus radiatus:

- Banding angle on the body become more vertical towards the tail (see blue)
- Small black dots scattered on the dorsal edge of the body
- Reddish hue on tail, with black dots spreading dorso-ventrally



Epinephelus morrhua:

- Banding angle horizontal throughout the whole body (see blue)
- Most ventral band is not continuous (see red)
- Yellow hue on tail



Epinephelus poecilonotus:

- Banding angle horizontal throughout the whole body and is comprised of small dots (see blue)
- Yellow-dark brown hue on tail and dorsal fin

44. *Epinephelus poecilonotus*
Dot-dash Grouper, Dot-dash Rockcod
Kerapu, Kerapu Minyak



A

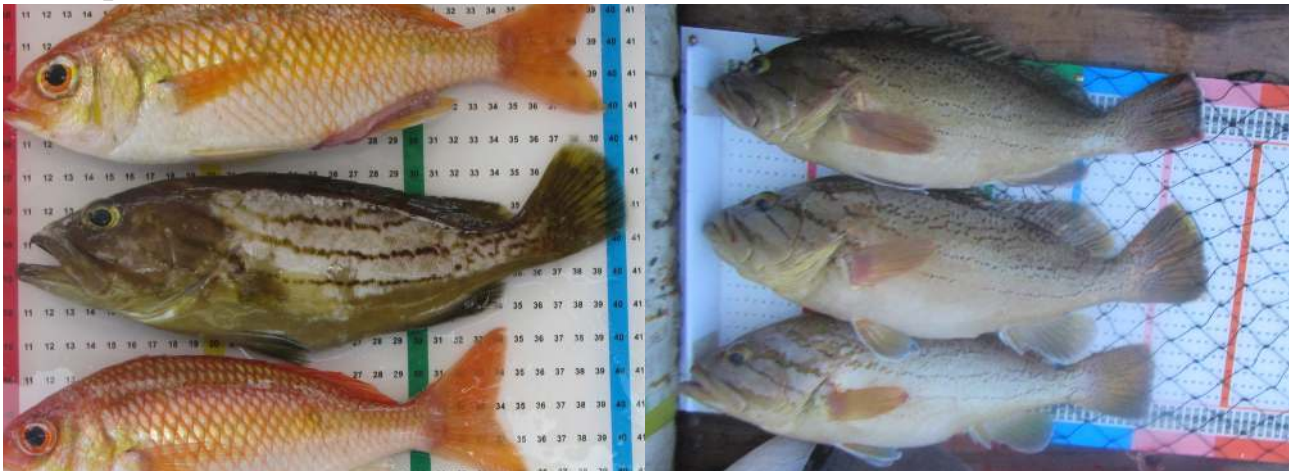


B

C

- A : Fins are yellowish-brown and dark spots on body
- B : Triangular interspinous dorsal fin margins abruptly orange-yellow or brownish yellow
- C : 3 bands mark on head

Intraspecies variations



Juvenile

Adult

Colour at juvenile stage is pale yellowish grey with oval black blotch on the upper side of body near the base of dorsal fin; a semisircular bands passes ventrally round the oval black.

Comparisons between *Epinephelus poecilonotus*, *Epinephelus radiatus* and *Epinephelus morrhua*



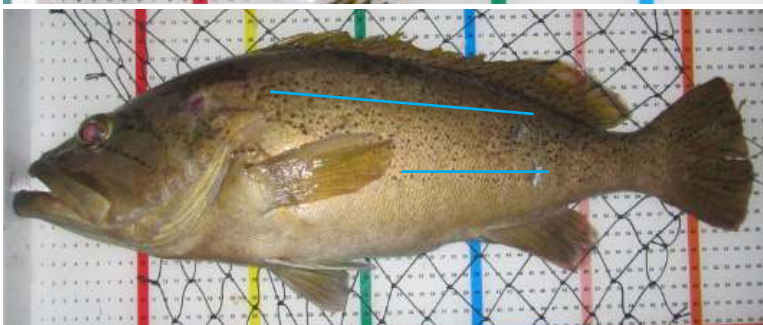
Epinephelus radiatus:

- Banding angle on the body become more vertical towards the tail (see blue)
- Small black dots scattered on the dorsal edge of the body
- Reddish hue on tail, with black dots spreading dorso-ventrally



Epinephelus morrhua:

- Banding angle horizontal throughout the whole body (see blue)
- Most ventral band is not continuous (see red)
- Yellow hue on tail



Epinephelus poecilonotus:

- Banding angle horizontal throughout the whole body and is comprised of small dots (see blue)
- Yellow-dark brown hue on tail and dorsal fin

45. *Epinephelus areolatus*

Areolate Grouper, Squartail Rockcod

Kerapu Macan, Gerape Bandi, Pek Be Kui



A



B

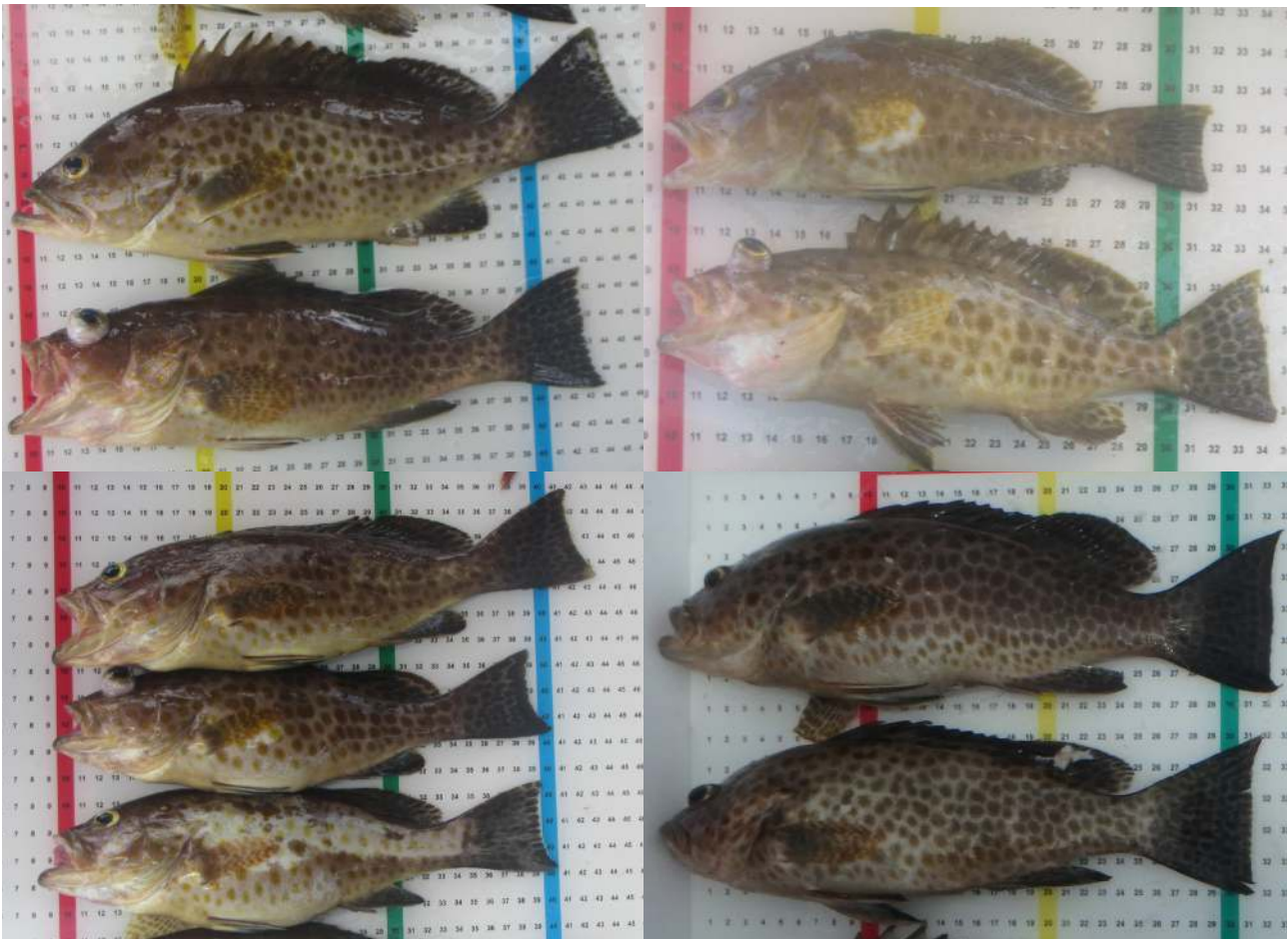


C

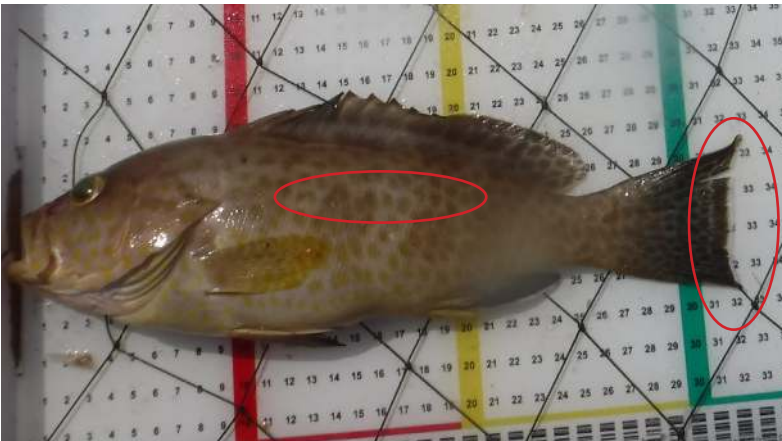


D

- A : Covered with brownish yellow spots, the largest spots is about size of pupil
- B : Size of spots at head smaller than those on opperculum.
- C : White margin on caudal fin and soft dorsal
- D : Pectoral fin pale, with dark spots

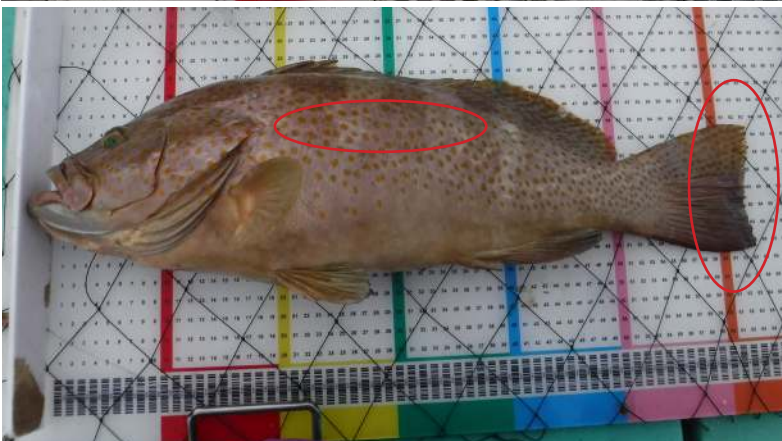


Comparisons between *Epinephelus areolatus* and *Epinephelus bleekeri*



Epinephelus areolatus

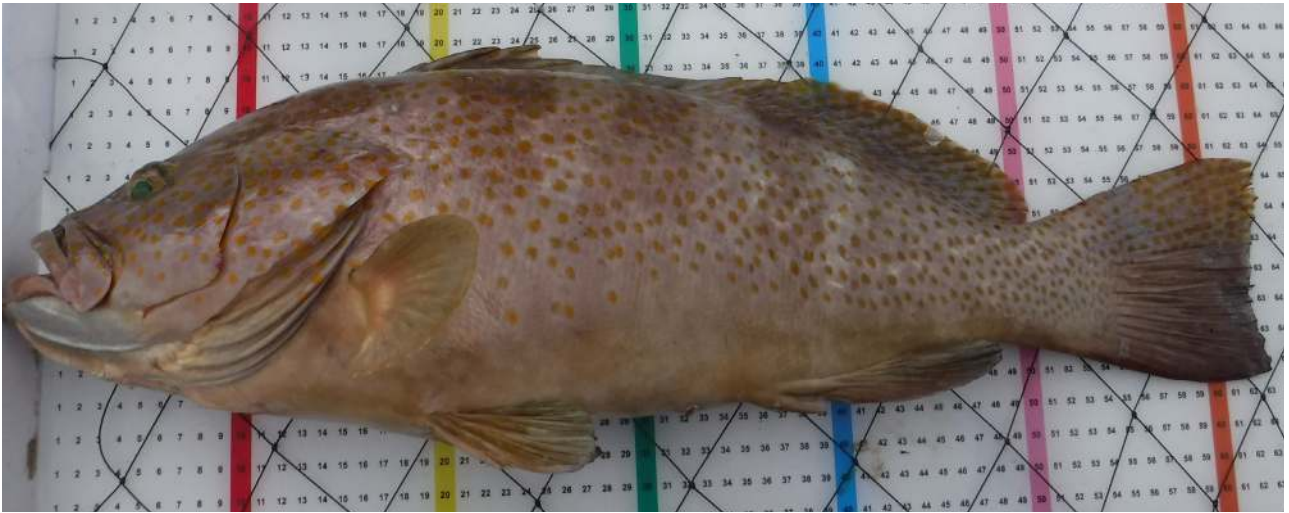
- Colour of spots on body is brownish yellow.
- Caudal fin with white margin.



Epinephelus bleekeri

- Colour of spots on body is orange.
- Caudal fin with two different colour, upper side is yellow, lower side is dusky.

46. *Epinephelus bleekeri*
Duskytail Grouper
Kerapu, Babunjai



A



B

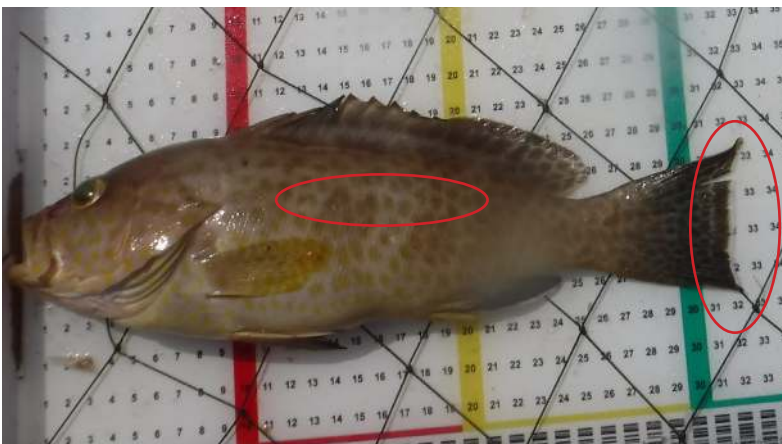


C

- A : Caudal fin with two colours, upper part with spots like those on body, lower part dusky
B : Cover with orange or yellow spots
C : Distal part of median fins dusky



Comparisons between *Epinephelus bleekeri* and *Epinephelus areolatus*



Epinephelus areolatus

- Colour of spots on body is brownish yellow.
- Caudal fin with white margin.



Epinephelus bleekeri

- Colour of spots on body is orange.
- Caudal fin with two different colour, upper side is yellow, lower side is dusky.

47. *Epinephelus miliaris*
Netfin Grouper
Kerapu Minyak



A



B



C

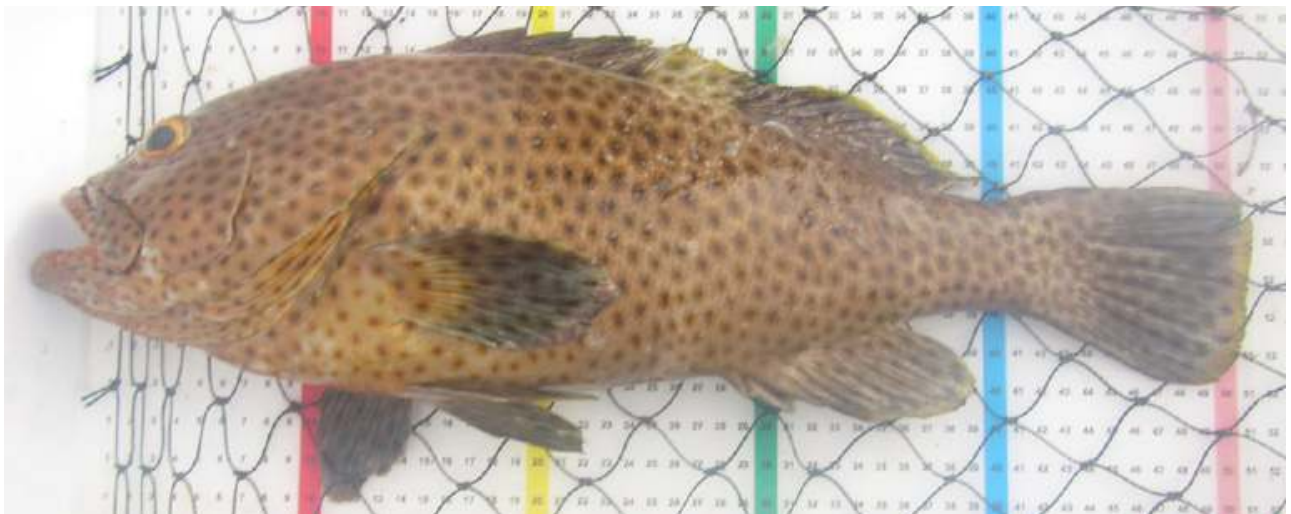
- A : Cover with small, polygonal, dark brown or yellowish brown spots
- B : Forming 4 or 5 oblique dark bars
- C : Fins have similar pattern with body, but darker and larger than on body



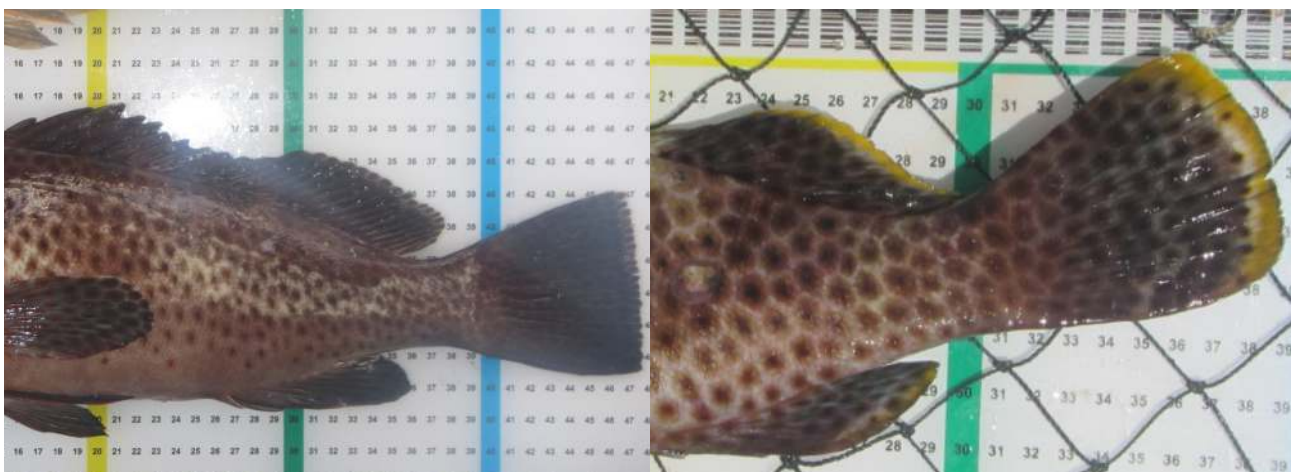
48. *Epinephelus bilobatus*

Frostback Cod

Kerapu, Kerapu Minyak



A



B

C

- A : Head and body coverd with dark orange-brown spots
- B : Dark spots extend onto soft dorsal, caudal and anal fins where the pale interspaces form a network pattern and darker than spots on head and body.
- C : Yellow thik margin on soft dorsal, anal and caudal fin



49. *Epinephelus malabaricus*

Malabar Grouper

Kerapu Lumpur, Kerapu Tutul, Ciok Pan



A



B



C

A : Covered with small, bluish brown spots

B : 5 irregular oblique dark bars

C : Head and body with scattered white spots and blotches (interrupted by pale spots)



Comparisons between *Epinephelus malabaricus* and *Epinephelus coioides*

Epinephelus malabaricus



Epinephelus malabaricus covered with blackish brown spots

Epinephelus coioides



Epinephelus coioides is covered with brownish orange spots

50. *Epinephelus coioides*

Orange-spotted Grouper, Estuary Cod
Kerapu tutul, Geurape Kuneng



A



B

A : Numerous small brownish orange or radish brown spots (orange spots turn brown on exposure to air and become fainter) on body and median fins

B : 5 faint, iregular, dark bars which bifurcate ventrally



Comparisons between *Epinephelus coioides* and *Epinephelus malabaricus*

Epinephelus malabaricus



Epinephelus malabaricus covered with blackish brown spots

Epinephelus coioides



Epinephelus coioides is covered with brownish orange spots

51. *Epinephelus chlorostigma*
Brownspotted Grouper
Kerapu Minyak



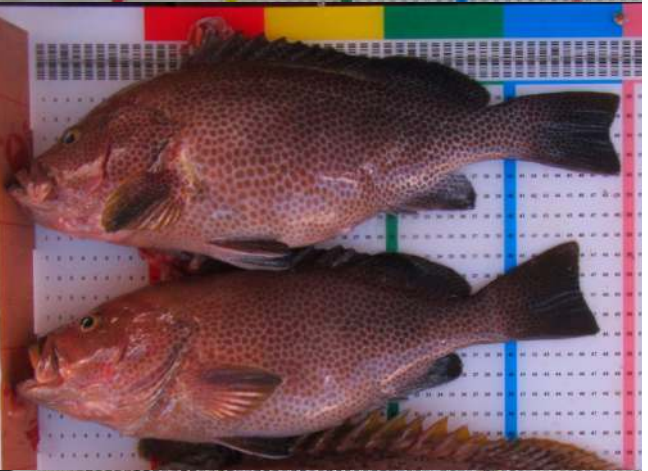
A



B

A : Head, body and fins with irregular dark brown spots pale interspaces form a network pattern

B : Caudal fin with along white margin



52. *Epinephelus retouti*

Red-tipped Grouper, Brownback Cod
Kerapu, Kerapu Minyak



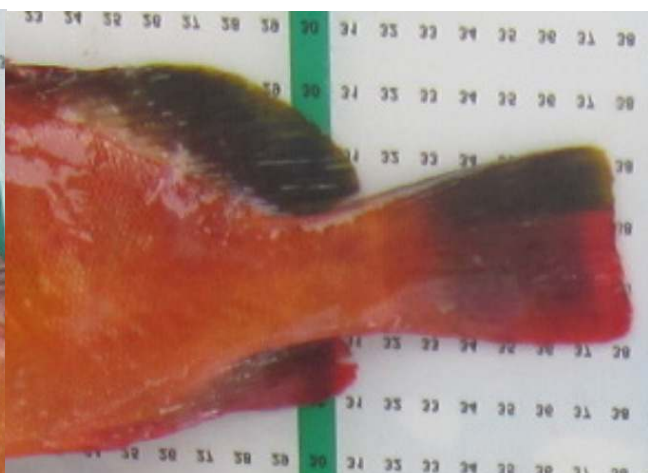
A



B



C



D

- A : 5 faint dark bars on body
- B : Soft-rayed dorsal fin darker than the rest of fin
- C : Triangular part of interspinous membranes dark red
- D : The upper part of caudal fin is dark greenish



53. *Epinephelus heniochus*

Bridled Grouper

Kerapu, Kerapu Karet, Kerapu Minyak



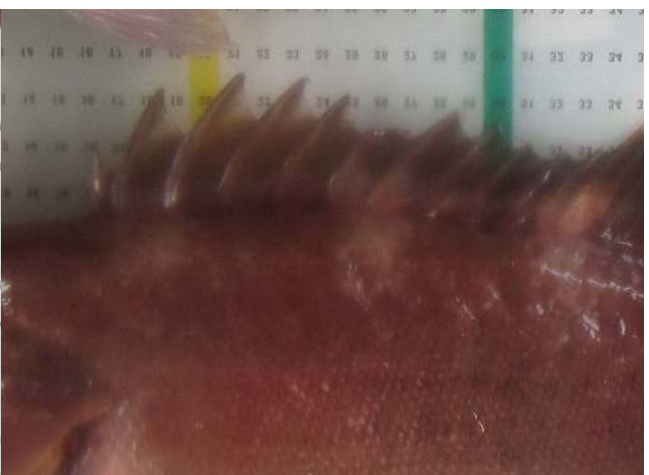
A



B



C



D

A : 2 faint dark brown stripes from eye to end of operculum and another darker strip from lower edge of eye to sub opercle

B : Pectoral fin hyaline greyish yellow

C : Lower part of caudal fin sometimes darker than rest of fin

D : Margin of interspinous dorsal-fin membranes yellow



54. *Epinephelus stictus*

Blackdotted Grouper

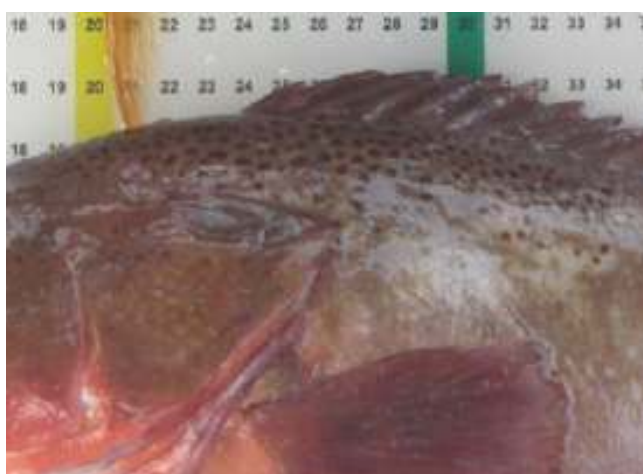
Kerapu Lumpur, Kerapu Bendera



A



B



C



D

A : Chest and ventral part of body head pale reddish orange

B : 5 faint oblique dark bars (may be lost in preservative)

C : Numerous of dark brown to black dots on dorsalateral parts of head and body

D : Soft dorsal and anal fins with narrow dark margin



Comparisons between *Epinephelus stictus*, *Epinephelus amblycephalus*, and *Epinephelus kupangensis*



Epinephelus amblycephalus
Yellow streak on maxillary groove
Small dots on the edge of brown bars



Epinephelus stictus
No yellow on maxillary groove
Small dots more cattered on the upper portion of the body



Epinephelus kupangensis
No yellow on maxillary groove
Large dots on edge of brown bars

55. *Epinephelus epistictus*

Dotted Grouper, Black-dotted Grouper
Kerapu, Kerapu Pulut, Kerong-kerong



A



B

A : Small, black spots on dorsolateral part of body
B : Pectoral fin rays brownish, the membranes clear

Intraspecies variations

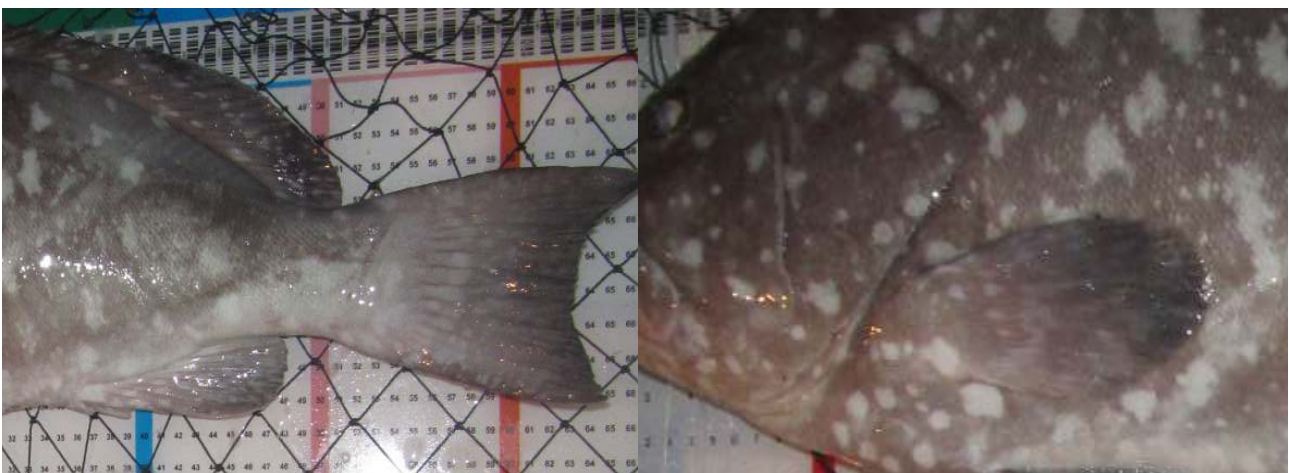


56. *Epinephelus multinotatus*

White-blotched Grouper, Rankin Cod
Kerapu, Kerapu Karet



A



B

C

A : Scattered irregular whitish spot and blotches

B : Colour of median fins greyish black

C : Pelvic fins greyish black



Comparisons between *Epinephelus multinotatus* and *Epinephelus cyanopodus*



Epinephelus multinotatus

Covered with whitish spots and blotches



Epinephelus cyanopodus

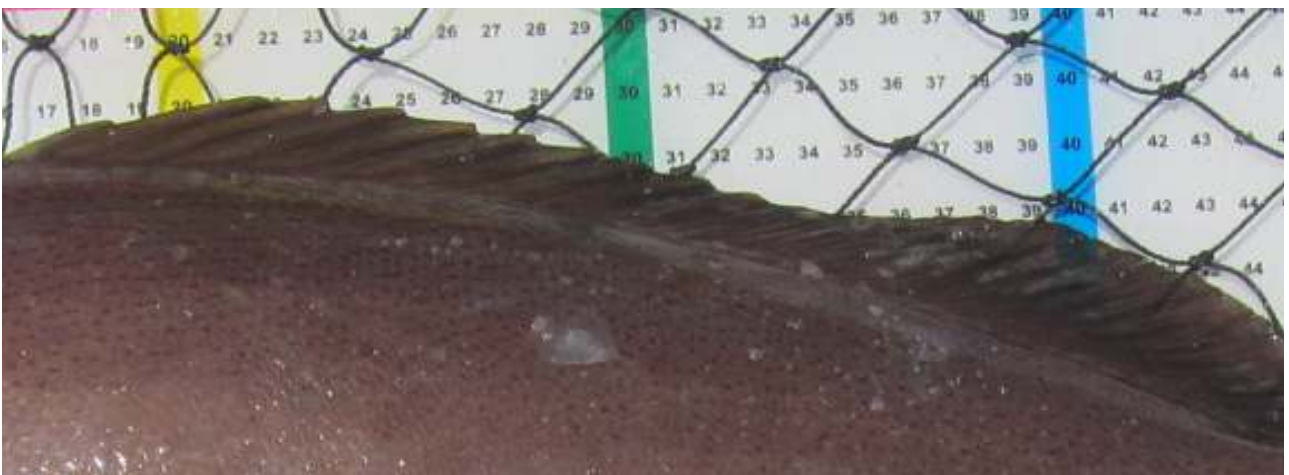
Covered with blackish spots and blotches

57. *Epinephelus undulosus*

Wavy-lined Grouper, Brown-lined Reef Cod
Kerapu Totol



A



B

A : Brown to golden-brown dots on head and wavy-longitudinal lines on dorsal part of body
B : Margin of spinous dorsal fin narrowly blackish



58. *Epinephellus amblycephalus*

Banded Grouper

Kerapu Lumpur, Kerapu Bendera



A



B

C

- A : 7 dark brown bars from head to caudal fin
- B : Small black spots along the edges of body bars
- C : Yellow groove on maxilla

Intraspecies variations



A



B

The juvenile of *Epinephelus amblycephalus* (A) has more clear bars on body than the adult (B).

Comparisons between *Epinephelus amblycephalus*, *Epinephelus stictus*, and *Epinephelus kupangensis*



Epinephelus amblycephalus
Yellow streak on maxillary groove
Small dots on the edge of brown bars



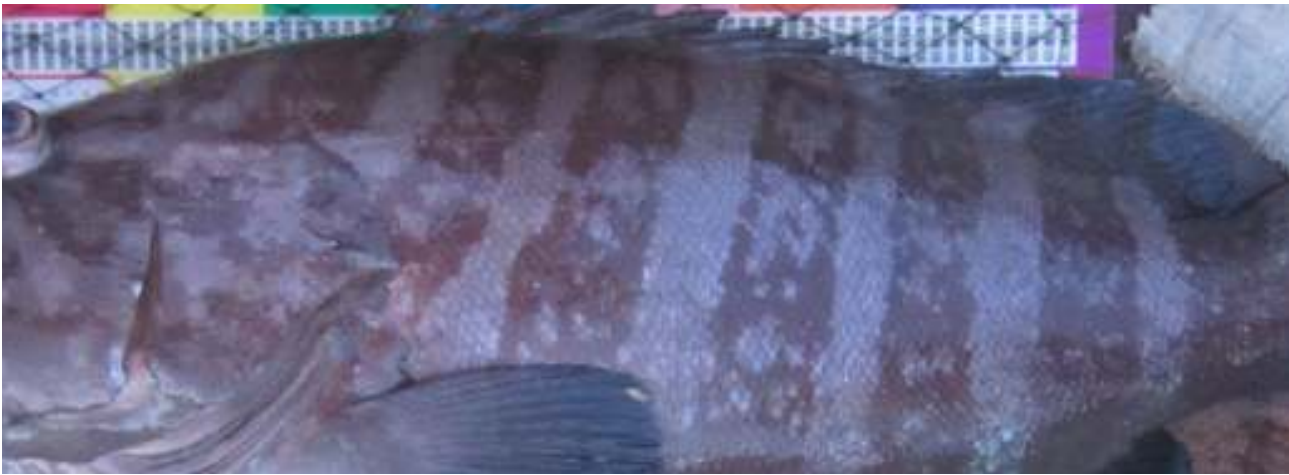
Epinephelus stictus
No yellow on maxillary groove
Small dots more cattered on the upper portion of the body



Epinephelus kupangensis
No yellow on maxillary groove
Large dots on edge of brown bars

59. *Hyporthodus octofasciatus*

Eightbar Grouper, Eight-banded Rockcod
Kerapu, Otang



A



B



C

A : Body buff with 8 broad dark brown bars

B : White margin at corners of caudal fin

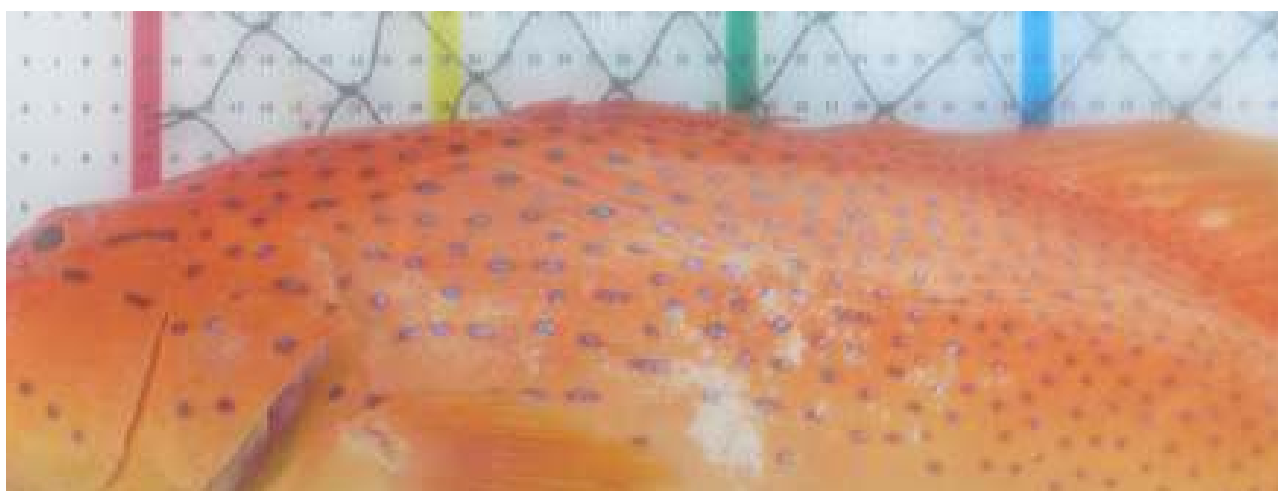
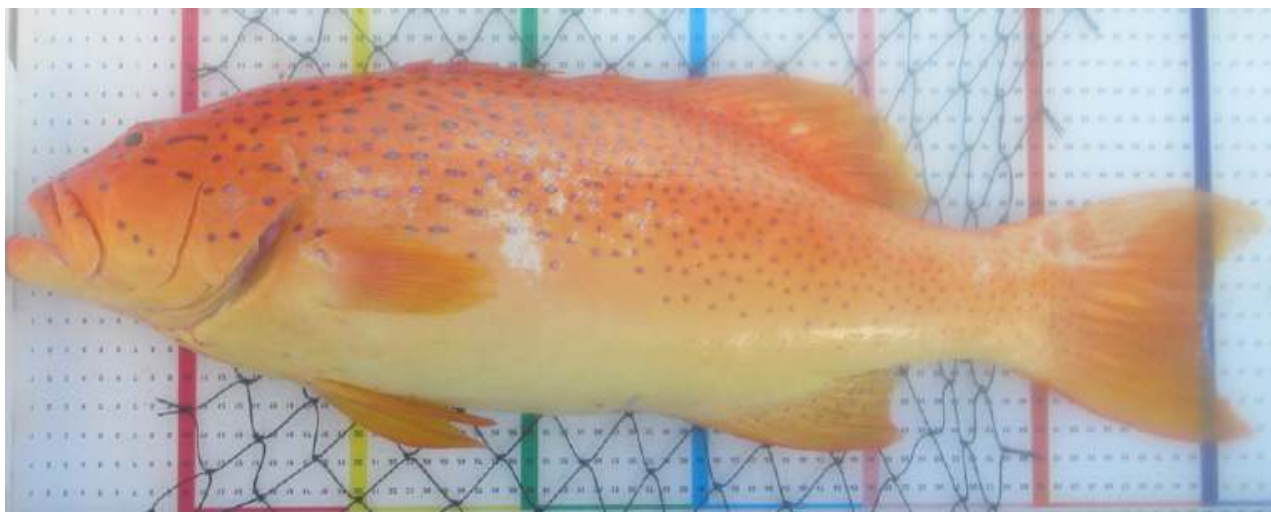
C : Pelvic fins and distal half of soft dorsal and anal fins are blackish brown



60. *Plectropomus maculatus*

Bar-cheeked Coral Trout

Sunu Kasar, Kerapu Lodi, Tai Sing



A



B



C

A : Covered with dark edge blue spots, on head and half part of body are oval or horizontal elongated and becoming much smaller, more uniformly round and more numerous on rear part of body and on fins, 3-7 on the cheek (below and behind the eye)

B : Usually a single blue spot on the pectoral-fin base

C : No blue spot on the pelvic fins

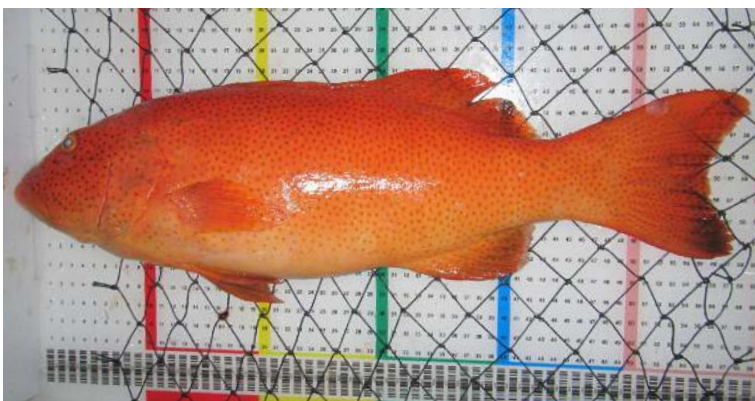


Comparisons between *Plectropomus maculatus* and *Plectropomus leopardus*



Plectropomus maculatus

Has long spots on head and shrinks toward the caudal fin. The spots is covered dark edge.



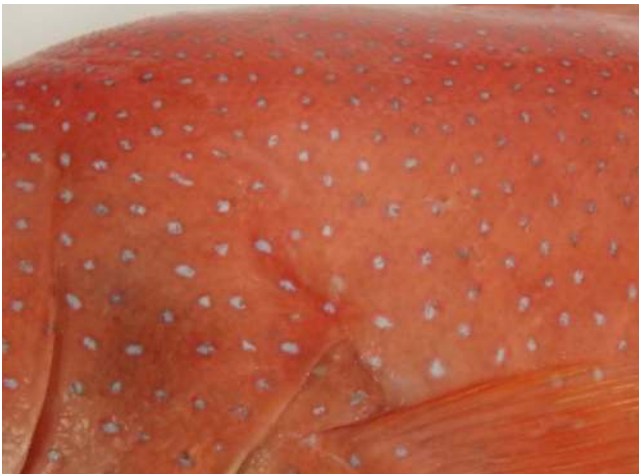
Plectropomus leopardus

- The spots are smaller than *Plectropomus maculatus*.
- Same size of spots on body

61. *Plectropomus leopardus*

Leopard Coral Trout

Sunu Merah, Sunu Halus Tung Sing



A



B

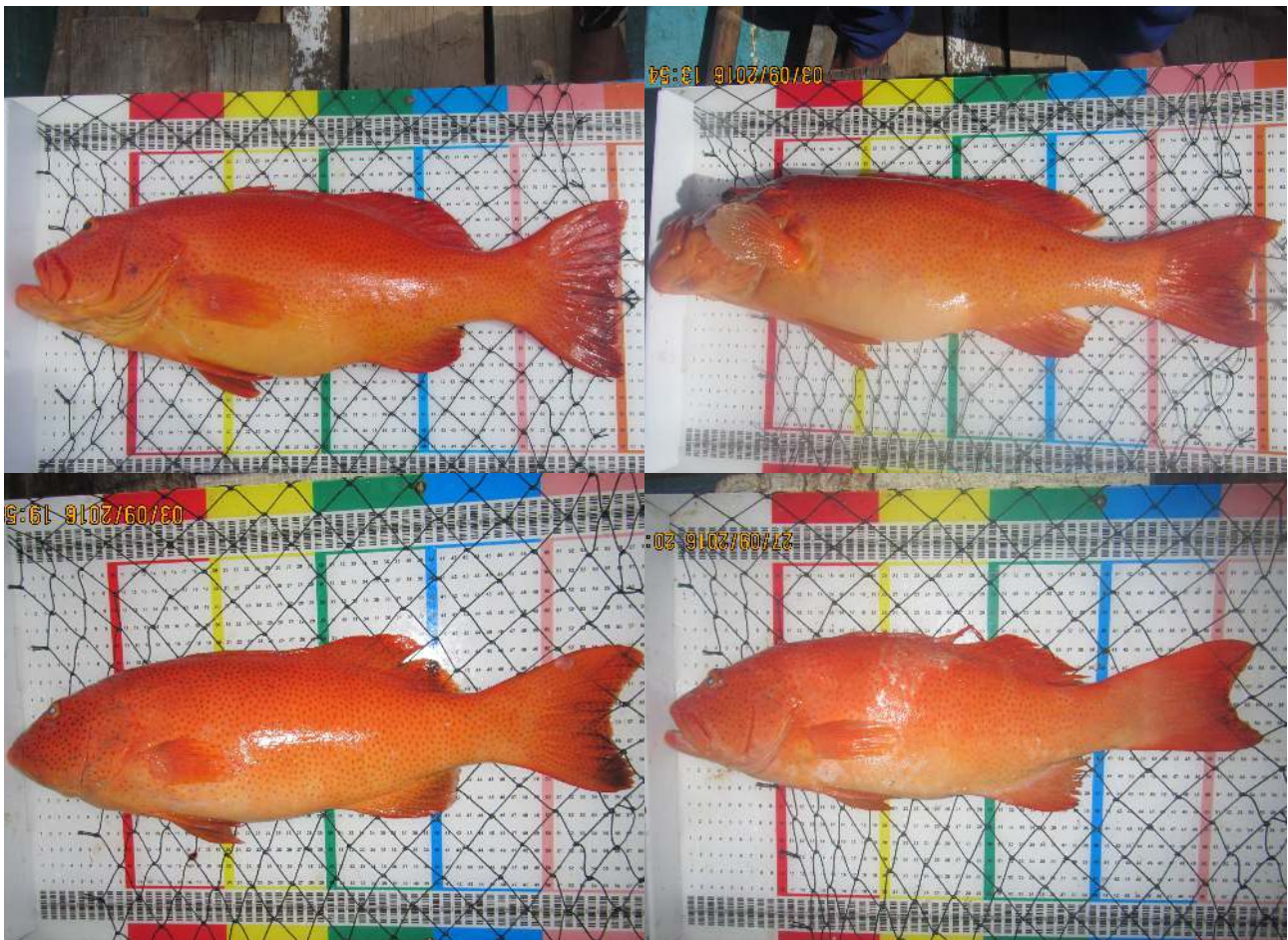


C

A : Covered with numerous small blue spots

B : Blue ring on edge of eye orbit (sometimes broken into segments)

C : White line usually visible along middle of caudal fin

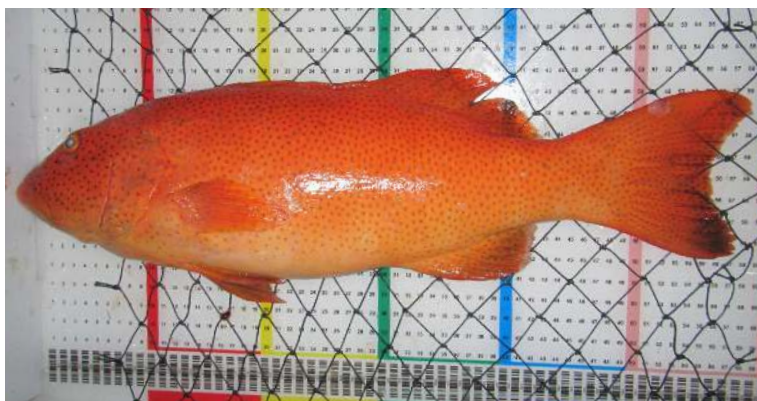


Comparisons between *Plectropomus leopardus* and *Plectropomus maculatus*



Plectropomus maculatus

Has long spots on head and shrinks toward the caudal fin. The spots is covered dark edge.



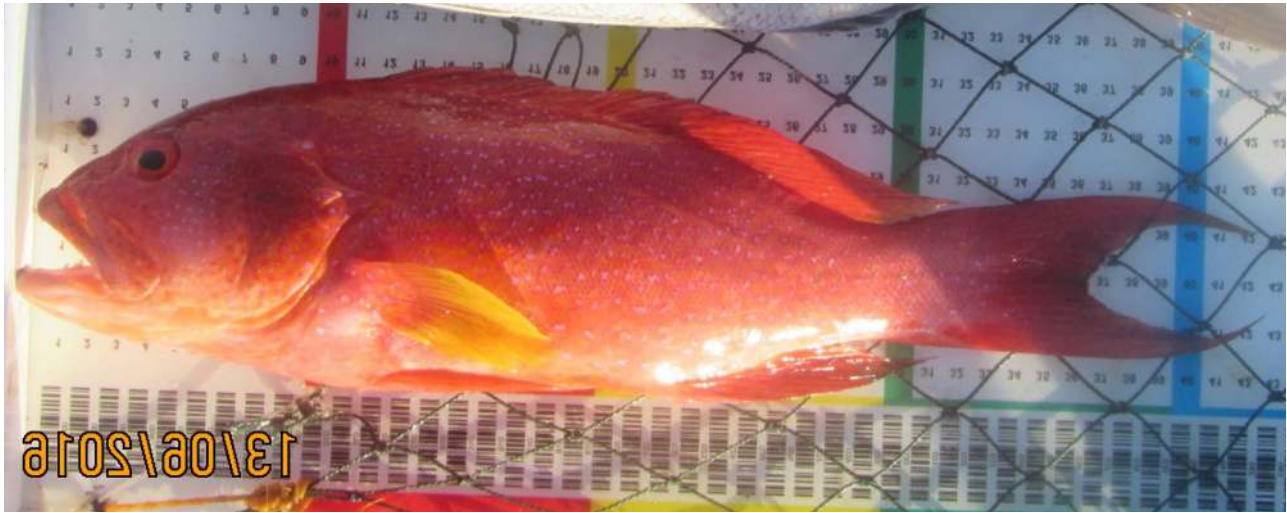
Plectropomus leopardus

- The spots are smaller than *Plectropomus maculatus*.
- Same size of spots on body

62. *Variola albimarginata*

Lyretail Grouper

Ekor Gunting, Ekor Bulan



A



B



C



D

A : Irregular red bands alternating with yellow lines

B : Densely red spots on head

C : Pectoral fins yellow

D : Contains a distinctive lunar caudal fin with a narrow white margin

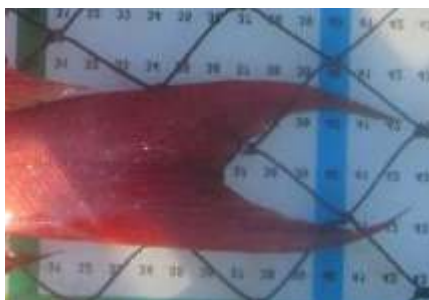


Comparisons between *Variola albimarginata* and *Variola louti*

Variola albimarginata



Variola louti



White margin at caudal fin



Yellow margin at caudal fin

LETHRINIDAE

63. *Lethrinus atkinsoni*

Pacific Yellowtail Emperor
Ketambak, Jangki, Lencam



A



B



C



D

- A: Upper maxilla or lips reddish
- B: Dorsal fin pale, yellowish, reddish
- C: The base of pectoral fin reddish
- D: Edges of pelvic, dorsal, anal and caudal fins often reddish



64. *Lethrinus lentjan*

Pinkear Emperor, Redspot Emperor
Lencam, Tambak Pasir, Jangki



A



B



C



D

- A: Posterior margin of opercle red
- B: Sometimes base of pectoral fin red
- C: Pectoral fin white, yellow or pinkish
- D: Pale spots on scales; centers of scales on upper sides often white



65. *Lethrinus laticaudis*

Grass Emperor, Blue-lined Emperor
Ketambak, Lencam



A



B



C



D

- A: Brown head with blue dots on cheeks
- B: Short blue stripes radiating in front and behind eye
- C: Irregular dark blotches scattered around the brown-light tan body
- D: The vertical fins (dorsal and anal fins) mottled



66. *Lethrinus nebulosus*

Spangled Emperor, Spangled Sweetlip
Ketambak Pasir, Ketambak, Lencam



A

B



C

D

- A: Three blue lines and/or rows of blue spots radiating forward from eye on snout in life
- B: Centers of many scales with a white or light blue spot
- C: The pelvic fins dusky/blackish
- D: The edge of dorsal and caudal fins reddish (red margin)



67. *Lethrinus olivaceus*

Longnosed Emperor, Longfaced Emperor
Tambak Moncong, Lencam, Ketambak



A



B

C

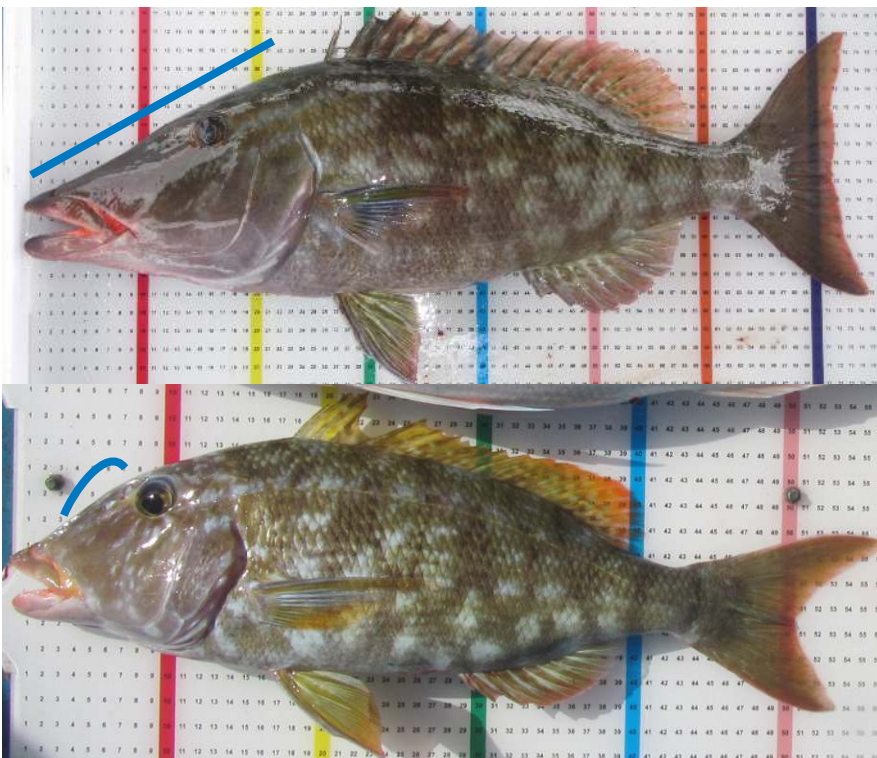
A: Head long and tapered

B: Upper jaw, especially near corner of mouth sometimes edged behind with red

C: Body grey with scattered irregular dark blotches



Comparisons between *Lethrinus olivaceus* and *Lethrinus amboinensis*



Lethrinus olivaceus:

- has a more elongated snout and mouth.
- there is NO distinct hump between the eyes.

Lethrinus amboinensis:

- has a shorter snout and shorter mouth.
- there is a hump in front of the eyes.

68. *Lethrinus amboinensis*

Ambon Emperor

Ketambak, Lencam, Jangki



A



B



C

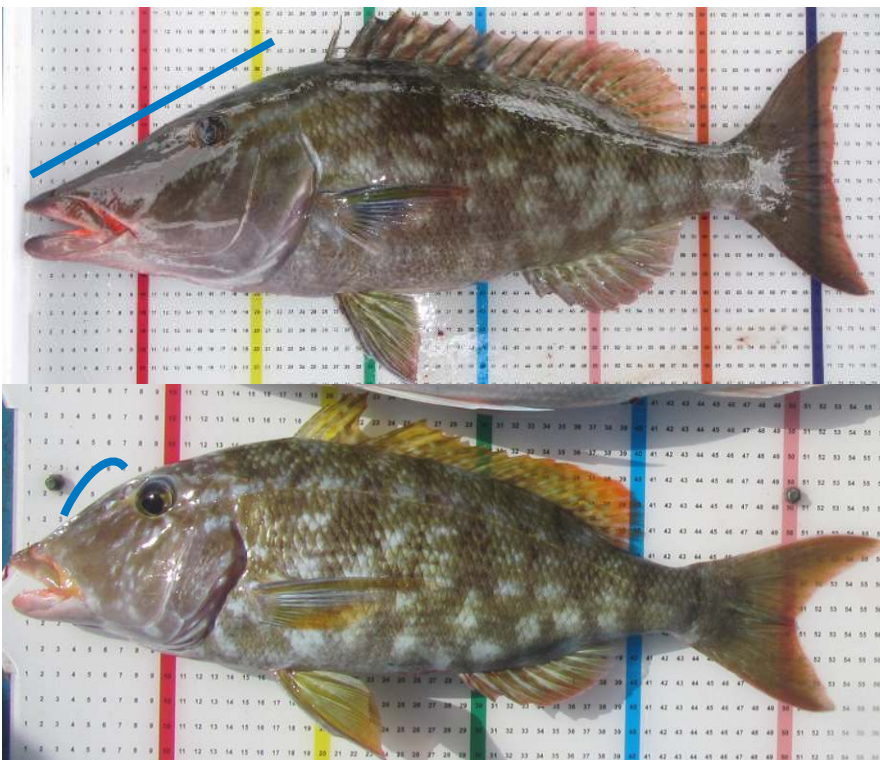


D

- A: Snout moderately long, with a distinct hump in large individuals in front of eyes
- B: Posterior nostril an oblong longitudinal opening
- C: Body yellowish with scattered indistinct dark blotches;
- D: The basal portion of the center rays of pectoral fin white, the outer edges yellow



Comparisons between *Lethrinus amboinensis* and *Lethrinus olivaceus*



Lethrinus olivaceus:

- has a more elongated snout and mouth.
- there is NO distinct hump between the eyes.

Lethrinus amboinensis:

- has a shorter snout and shorter mouth.
- there is a hump in front of the eyes.

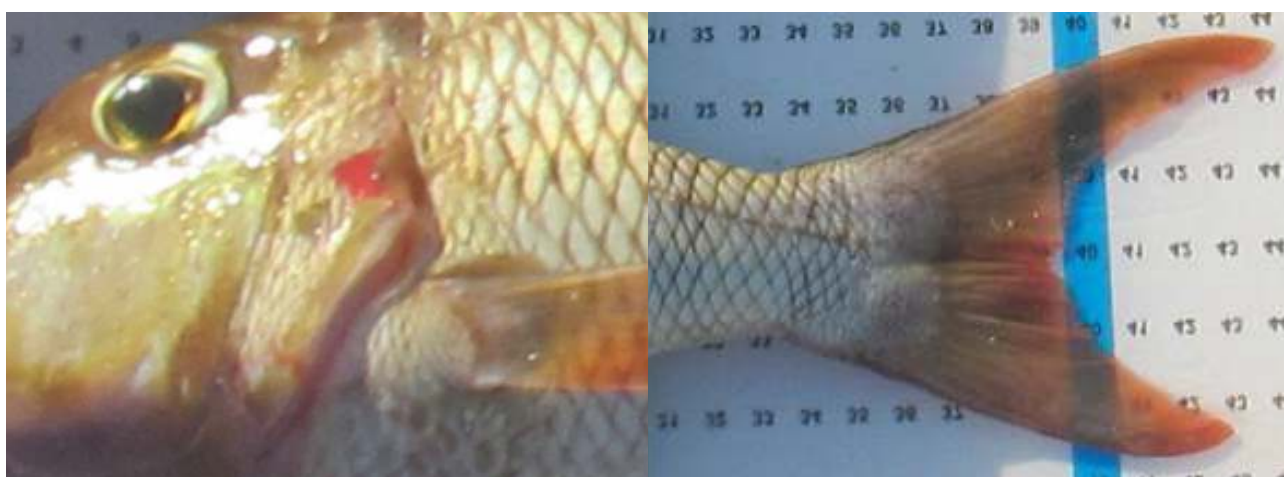
69. *Lethrinus rubrioperculatus*

Spotcheek Emperor, Spot Cheek Bream
Lencam, Ketambak, Bulan-bulan



A

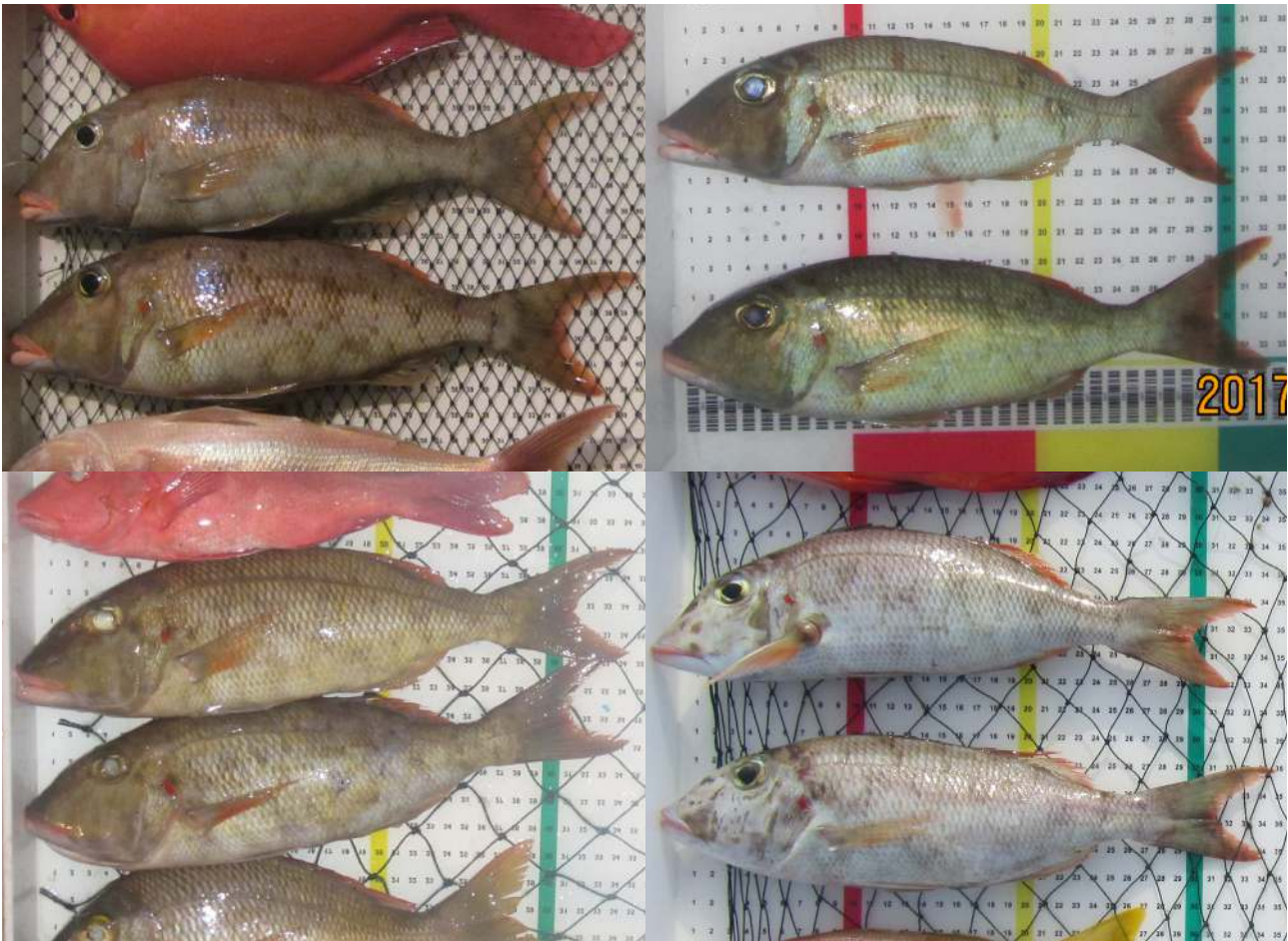
B



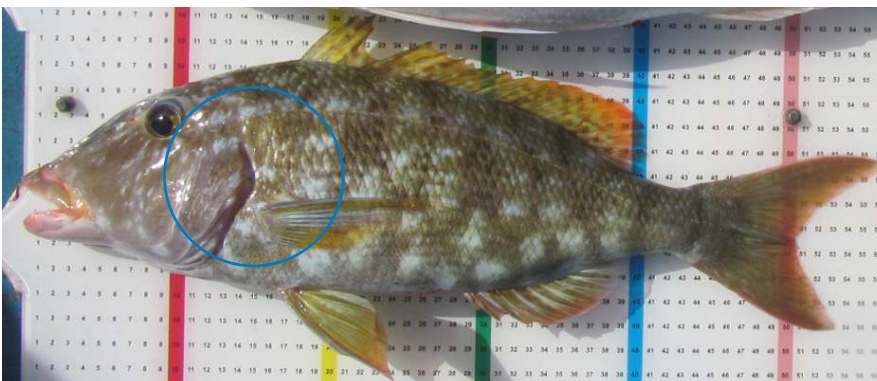
C

D

- A: Lips and a spot on upper edge of operculum usually red
- B: Body olive-grey or brown, with scattered irregular small black blotches
- C: Posterior angle of operculum with a wide scaleless area
- D: Fins pale or pinkish



Comparisons between *Lethrinus amboinensis* and *Lethrinus rubrioperculatus*



Lethrinus amboinensis:

- NO red spot on upper edge of operculum



Lethrinus rubrioperculatus:

- A red spot on upper edge of operculum

70. *Wattsia mossambica*

Mozambique Large-eye Bream
Padi-padi Hitam, Padi-padi Duri



A



B



C



D

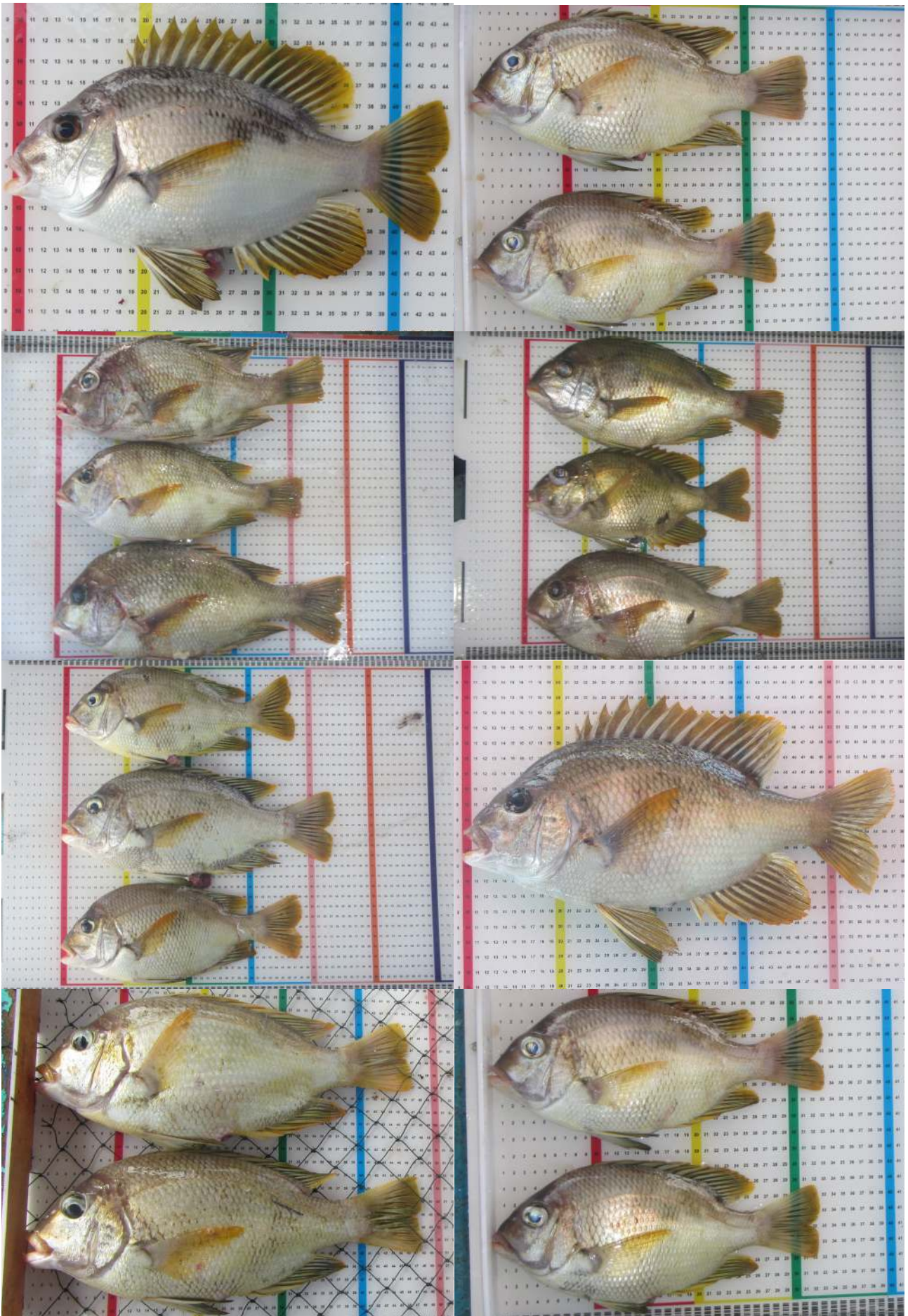
The overall colour of the fish is silvery-grey with yellowish suffusion

A: Both dorsal and anal fins have strong spines

B: Caudal fin slightly forked with broadly rounded lobes

C: Indistinct dark blotches or bars sometimes apparent on body

D: Fins yellow, faint brown spotting may be present on soft dorsal, anal, and caudal fins

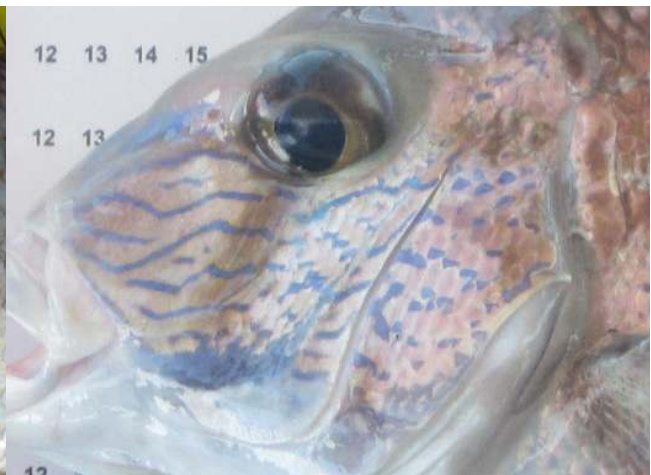


71. *Gymnocranius grandoculis*

Blue-lined Large-eye Bream, Blue-lined Emperor
Padi-padi Putih, Tambak Pasir



A



B



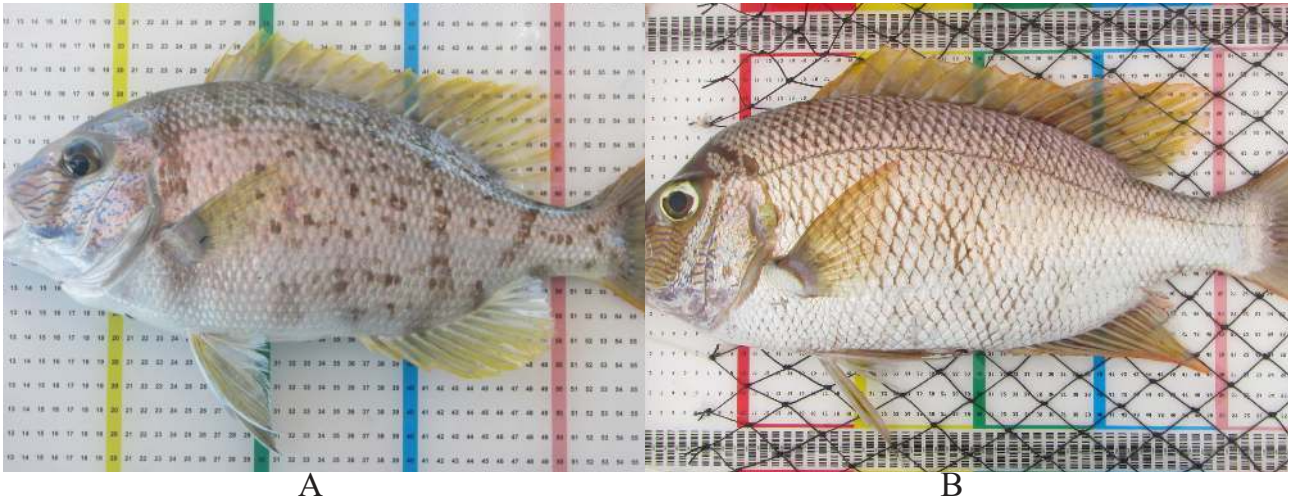
C



D

- A: Anterior half of head often brown
- B: A series of narrow undulating, longitudinal blue lines on cheek and side of snout
- C: Fins clear to yellow or orange
- D: A narrow brown bar across base of pectoral fins

Intraspecies variations



Juveniles (A) often with 5 or 6 irregular dark bars on side but in adults (B) is faded

Comparisons between *Gymnocranius grandoculis* and *Gymnocranius griseus*



Gymnocranius griseus



Gymnocranius grandoculis

Gymnocranius griseus lacks the wavy blue lines under eyes.

Gymnocranius grandoculis HAS blue lines under eyes even after prolonged exposure on ice.

Gymnocranius grandoculis



Gymnocranius griseus

Variations are common within the same species for both *Gymnocranius griseus* and *Gymnocranius grandoculis*. Yellow hue on the fins varies between specimens of the same species.

Larger specimens of *Gymnocranius griseus* display less distinct bands or patterns, than that of smaller specimens. Similar size *Gymnocranius griseus* and *Gymnocranius grandoculis* may have similar pattern and coloration.



Gymnocranius griseus and *Gymnocranius grandoculis* have identical body and tail shape.



However, wavy lines under eyes is a reliable identifier to differentiate the two.

72. *Gymnocranius griseus*

Grey Large-eye Bream

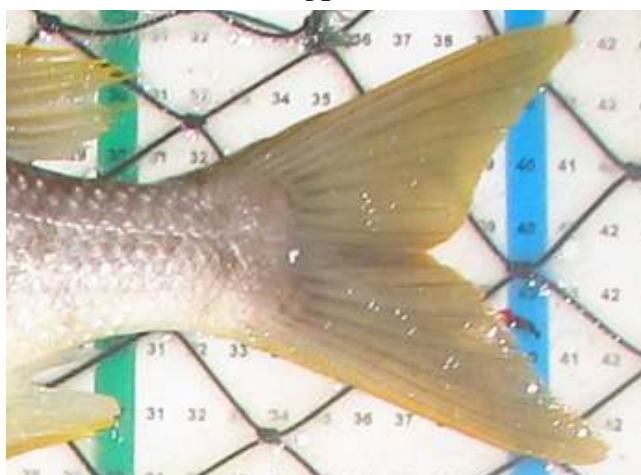
Padi-padi Putih, Tambak Pasir



A



B



C



D

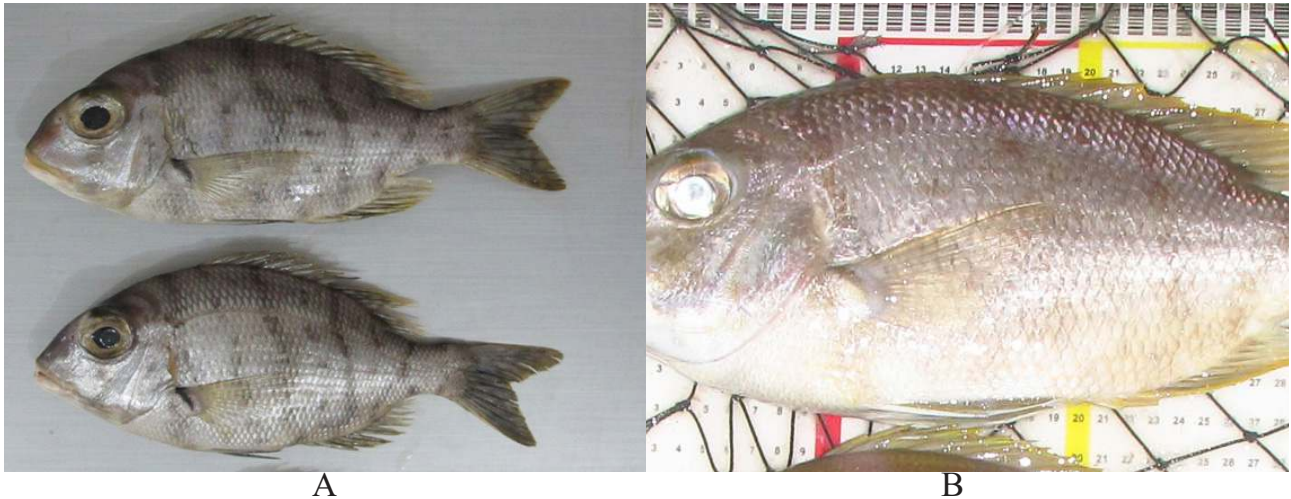
A: One narrow dark bar through eye and across cheek

B: Frequently appear a diffuse to vivid pattern of 5 to 8 narrow dark bars on side

C: Caudal fin moderately forked with pointed tips

D: Fins mainly clear to yellowish

Intraspecies variations



In juvenile (A) size usually the black pattern on the body is more clear than adult (B)

Comparisons between *Gymnocranius griseus* and *Gymnocranius grandoculis*



Gymnocranius griseus

Gymnocranius grandoculis

Gymnocranius griseus lacks the wavy blue lines under eyes.

Gymnocranius grandoculis HAS blue lines under eyes even after prolonged exposure on ice.

Gymnocranius grandoculis



Gymnocranius griseus

Variations are common within the same species for both *Gymnocranius griseus* and *Gymnocranius grandoculis*. Yellow hue on the fins varies between specimens of the same species.

Larger specimens of *Gymnocranius griseus* display less distinct bands or patterns, than that of smaller specimens. Similar size *Gymnocranius griseus* and *Gymnocranius grandoculis* may have similar pattern and coloration.



Gymnocranius griseus and *Gymnocranius grandoculis* have identical body and tail shape.

However, wavy lines under eyes is a reliable identifier to differentiate the two.

CARANGIDAE

73. *Carangoides coeruleopinnatus*

Coastal Trevally, Onion Trevally

Kwe



A



B



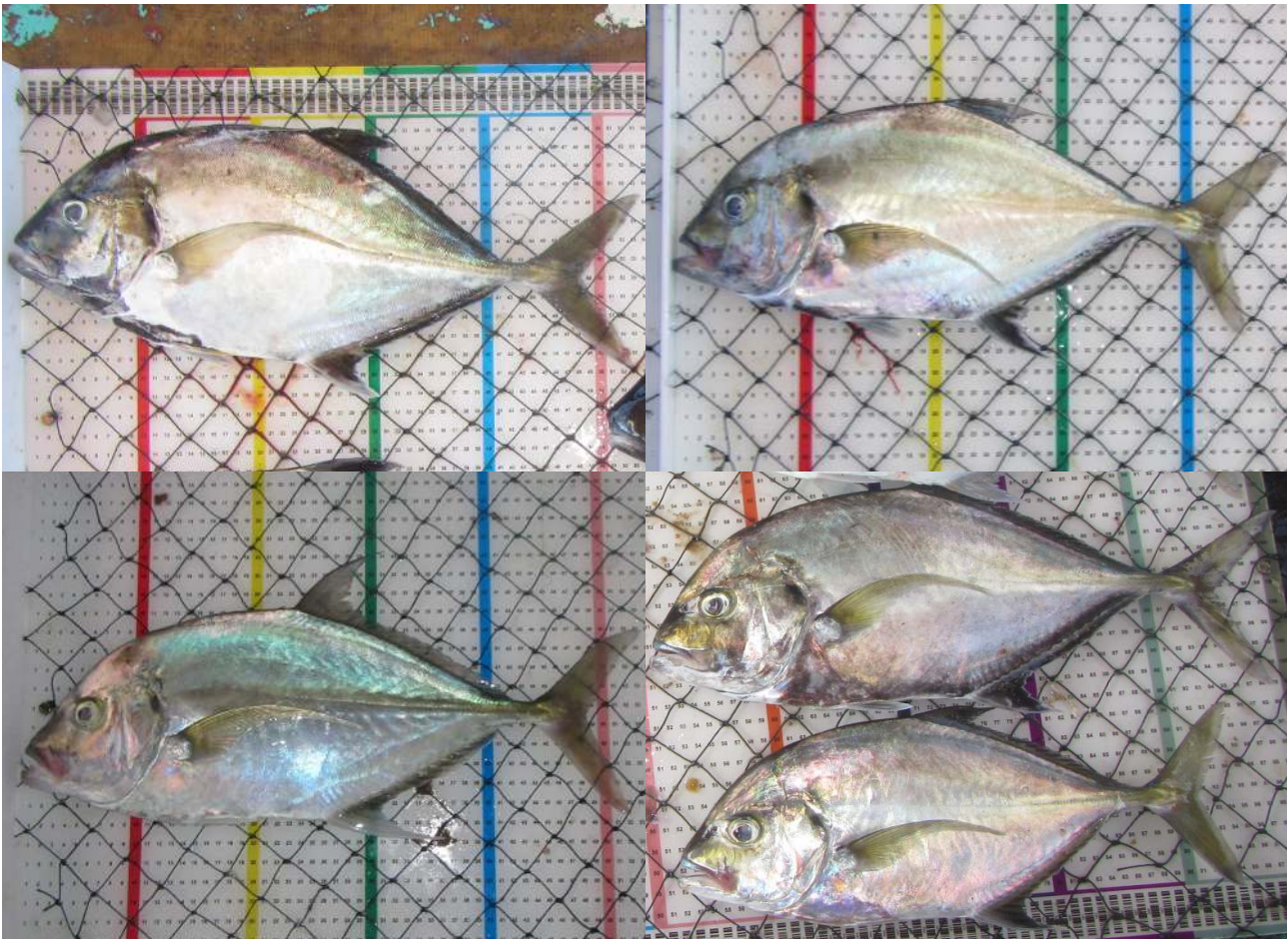
C

D

A: Breast naked ventrally to distinctly behind origin of pelvic fins; laterally, naked area of breast typically extends diagonally to naked base of pectoral fin

B: Small black blotch on upper margin of opercle

C: Sides with numerous small yellow spots



Comparisons between *Carangoides coeruleopinnatus* and *Carangoides malabaricus*



Carangoides coeruleopinnatus:

- The naked area of breast typically extends diagonally to naked base of pectoral fin
- Lower jaw a bit CONCAVE (see circle)



Carangoides malabaricus:

- The naked area of breast typically extends diagonally to naked base of pectoral fin, INCLUDING small area anteriorly just above pectoral fin base
- Lower jaw a bit CONVEX (see circle)

74. *Carangoides fulvoguttatus*

Yellowspotted Trevally, Goldspotted Trevally
Kwe Macan



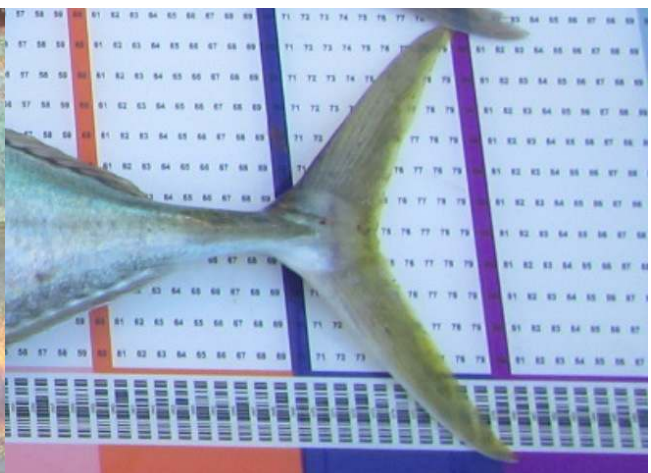
A



B



C



D

Body is relatively elongate in shape

A: Numerous small gold or brassy spots mainly on dorsal half

B: Breast partially naked ventrally to well posterior to pelvic fin origin

C: Eye is located high above the mouth

D: The outer edge of caudal fin has a yellow margin



75. *Carangoides malabaricus*

Malabar Trevally

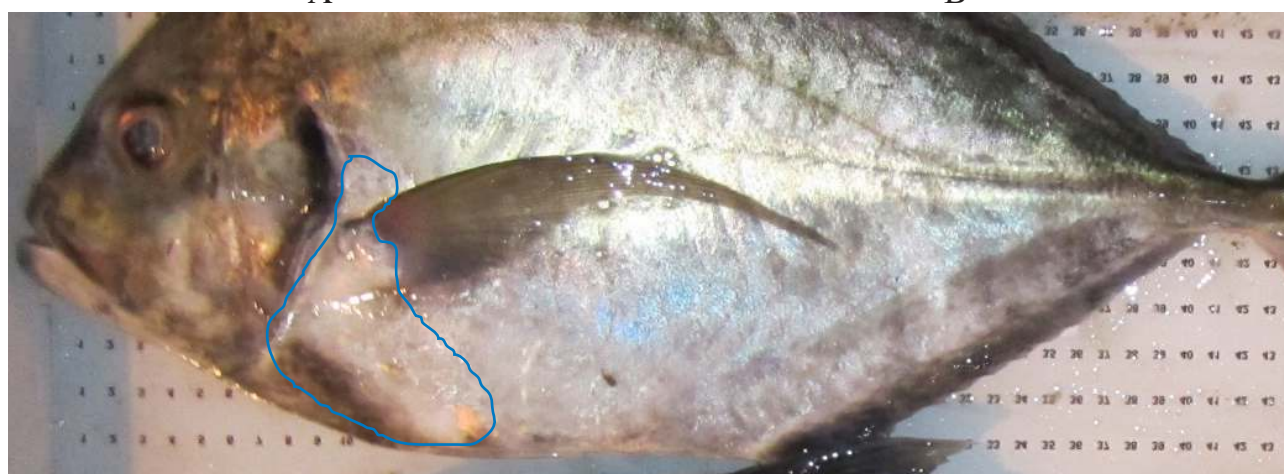
Kwe



A



B



C

D

A: Dorsal profile of head strongly elevated to nape, almost straight

B: Body strongly compressed, almost oval

C: Breast naked ventrally to distinctly behind pelvic fins; laterally, naked area of breast extends diagonally to naked base of pectoral fin, including small area anteriorly just above pectoral fin base



Comparisons between *Carangoides malabaricus* and *Carangoides coeruleopinnatus*



Carangoides coeruleopinnatus:

- The naked area of breast typically extends diagonally to naked base of pectoral fin
- Lower jaw a bit CONCAVE (see circle)



Carangoides malabaricus:

- The naked area of breast typically extends diagonally to naked base of pectoral fin, INCLUDING small area anteriorly just above pectoral fin base
- Lower jaw a bit CONVEX (see circle)

76. *Carangoides chrysophrys*

Longnose Trevally, Tea Leave Trevally
Kwe



A



B

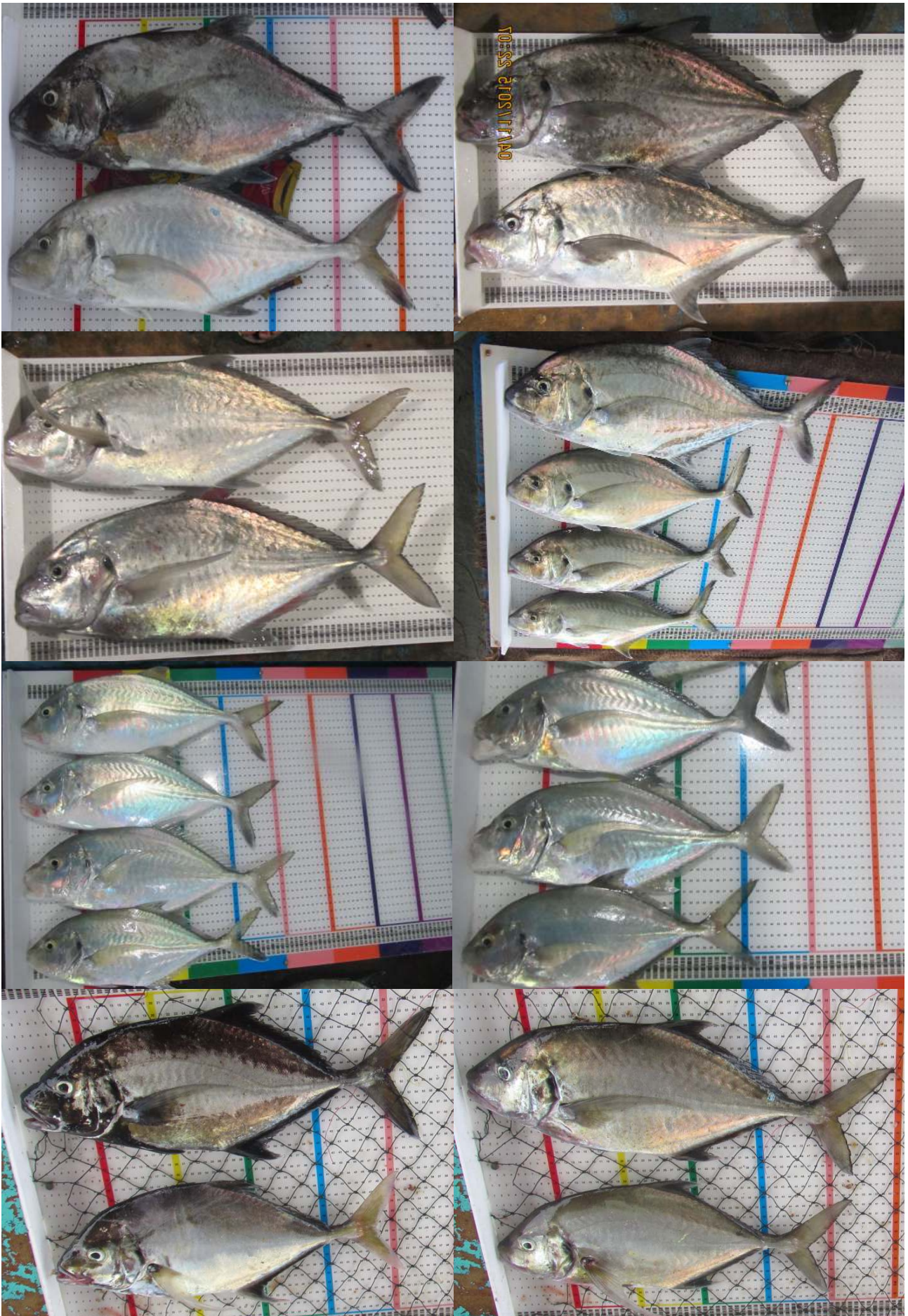


C

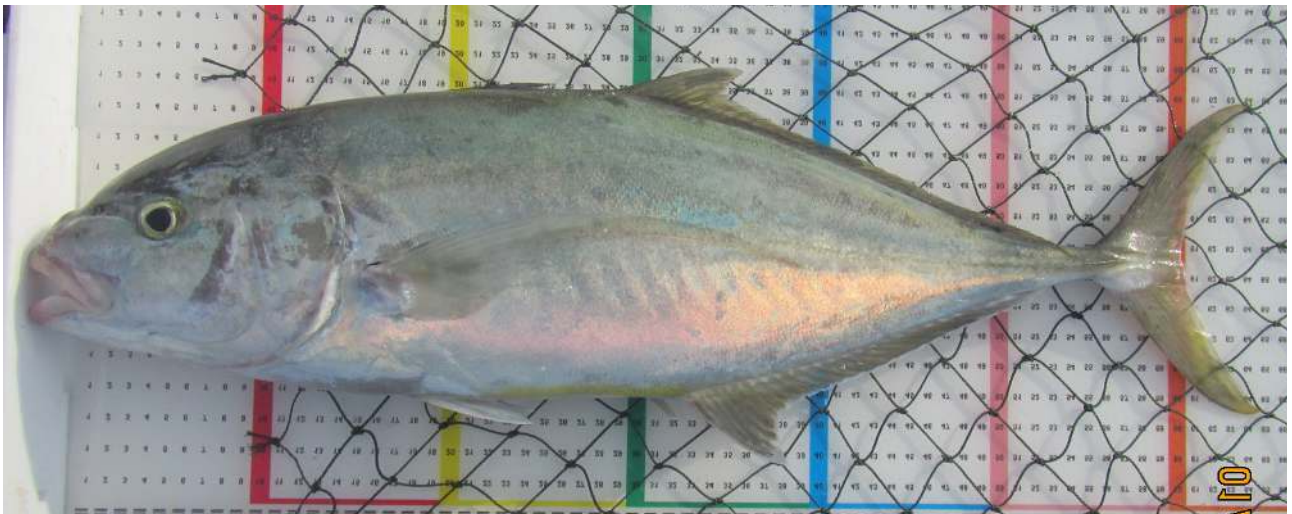
A: A gently sloping head profile except between the snout and the mouth where there is vertical slope

B: A black spot on the upper operculum

C: Silvery body, but several blackish



77. *Carangoides gymnostethus*
Bludger Trevally
Tangkolak, Kwe Lilin



A



B



C



D

- A: Body ovate and compressed, becoming more elongate with growth
- B: Head and nape profile gently convex, becoming less steep with age
- C: Breast scaleless ventrally to behind origin of pelvic fins
- D: Few brown or golden spots on side, sometimes present midlaterally



78. *Caranx bucculentus*

Blue Spotted Trevally, Wide Mouth Trevally
Cakal, Bubara, Kwe, Bengkolo, Cepak



A



B



C



D

- A: Straight part of lateral line longer than the chord of underside curved part of lateral line
- B: Species with the longest sequence of scutes in the family
- C: Dark spot at upper pectoral fin base
- D: Small blue spots on upper half of body (adults)



Comparisons between *Caranx bucculentus* and *Caranx ignobilis*

Caranx ignobilis



Caranx bucculentus



Dorsal profile of head of both *Caranx ignobilis* and *Caranx bucculentus* are steeply slope, so it is not a reliable distinguisher.

The length of scutes of *Caranx ignobilis* is NO MORE than the second of dorsal fin but in *Caranx bucculentus* is MORE than the second of dorsal fin or reach the first of dorsal fin.

79. *Caranx ignobilis*

Giant Trevally

Cakal, Bubara, Kwe, Bengkolo



A

B



C

D

The largest of the trevallies

A: Steep forehead profile and silvery to dusky colouration

B: Scattered small dark spots on the dorsal side of body

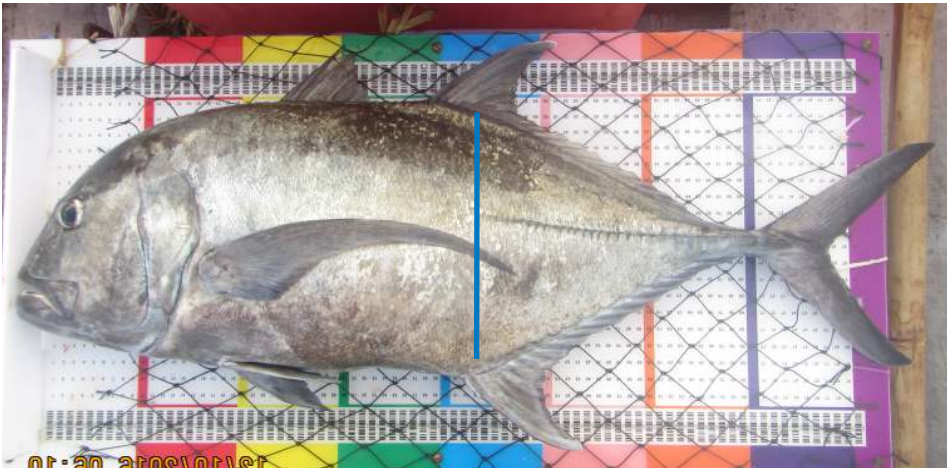
C: Fins usually pigmented grey to black (caudal fin)

D: The length of scutes is no more than the second dorsal fin



Comparisons between *Caranx bucculentus* and *Caranx ignobilis*

Caranx ignobilis



Caranx bucculentus



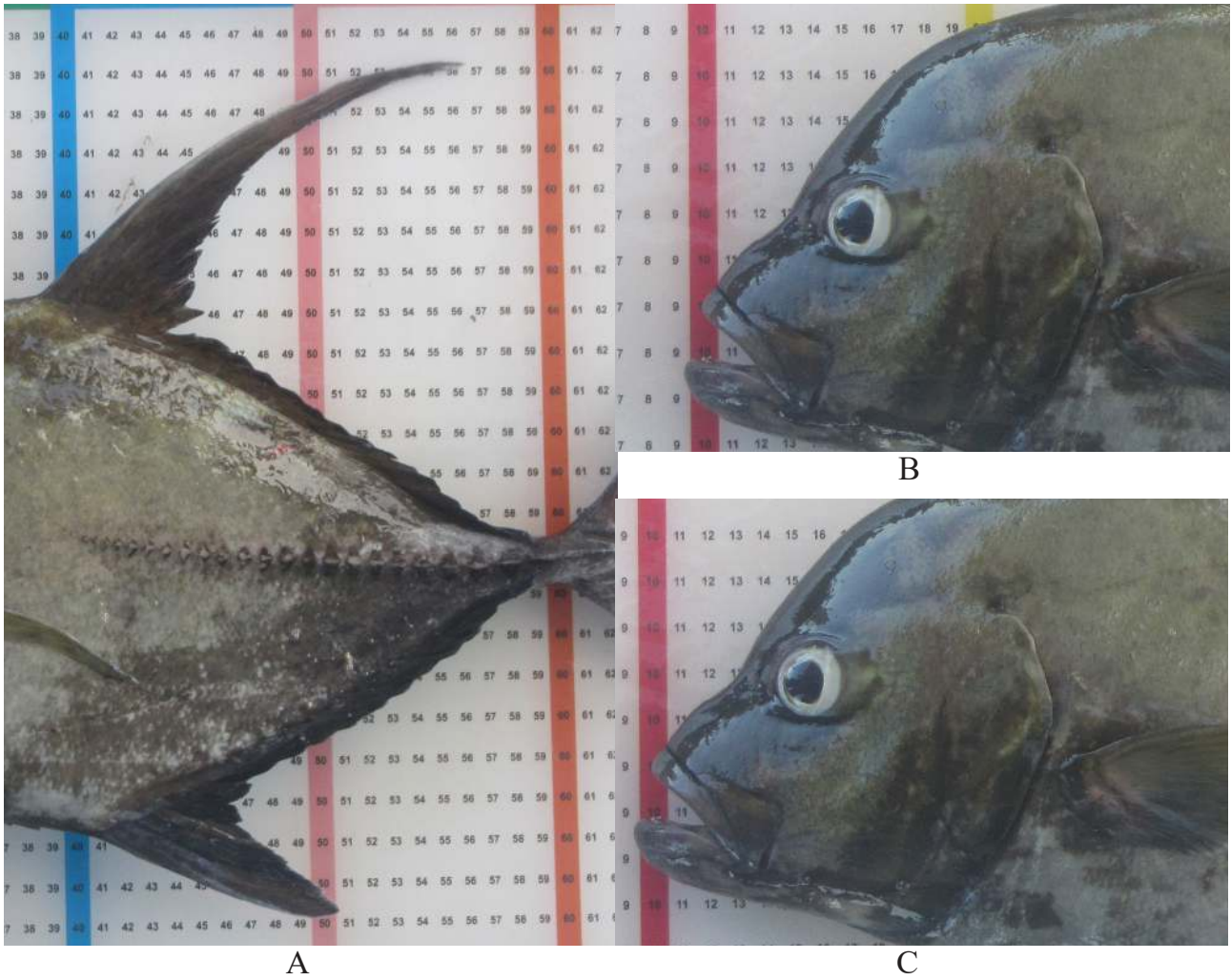
Dorsal profile of head of both *Caranx ignobilis* and *Caranx bucculentus* are steeply slope, so it is not a reliable distinguisher.

The length of scutes of *Caranx ignobilis* is NO MORE than the second of dorsal fin but in *Caranx bucculentus* is MORE than the second of dorsal fin or reach the first of dorsal fin.

80. *Caranx lugubris*

Black Trevally, Black Jack

Cakal, Tengkolok, Bengkolo Hitam, Kwe



Head, body & fins dark olive grey to brown or black dorsally, shading to bluish gray ventrally

A: Median fins (dorsal and anal fins) and lateral line scutes usually dark brown or black

B: Upper profile of head steep, the anterior part slightly concave

C: Mouth relatively large, the maxilla nearly reaching center of eye



81. *Caranx sexfasciatus*

Bigeye Trevally

Cakal, Bengkolo, Kwe Gorong, Bubara



A



B



C



D

A: Relatively large eye with well developed gelatinous membrane

B: Upper jaw extends beyond posterior margin of eye

C: Second dorsal fin with white tip on anterior lobe

D: Small black spot on uppermost rear edge of opercle



Comparisons between *Caranx sexfasciatus* and *Caranx tille*

Caranx tille



- Black spot on the top part of the operculum (see blue circle)
- Body elongated with steep forehead
- NO white spot on dorsal fin
- Second dorsal fin olive grey to blackish
- Anal fin yellow-olive to black.

Caranx sexfasciatus



- Black spot on the top part of the operculum. Spot is smaller than spot on *Caranx tille*
- Body elongated with sloping forehead
- White spot on the dorsal fin
- Second dorsal fin olive grey to blackish
- Anal fin yellow-olive to black

82. *Caranx tille*

Tille Trevally, Tille Kingfish
Bubara, Kwe Lilin, Bengkolo Putih



A



B



C



D

- A: Blackish spot on upper rear edge of opercle, adjacent to a small white spot
- B: Second dorsal fin without white tip on anterior lobe
- C: Black spot on the base of pectoral fin
- D: Rounded, strongly convex anterior profile of the head



Comparisons between *Caranx tille* and *Caranx sexfasciatus*

Caranx tille



- Black spot on the top part of the operculum (see blue circle)
- Body elongated with steep forehead
- NO white spot on dorsal fin
- Second dorsal fin olive grey to blackish
- Anal fin yellow-olive to black.

Caranx sexfasciatus



- Black spot on the top part of the operculum. Spot is smaller than spot on *Caranx tille*
- Body elongated with sloping forehead
- White spot on the dorsal fin
- Second dorsal fin olive grey to blackish
- Anal fin yellow-olive to black

83. *Elagatis bipinnulata*

Rainbow Runner, Hawaiian Salmon
Selayang, Cumok, Salem, Sunglir



A

B



C

A: Head and snout pointed

B: Terminal 2-rayed finlet without inter-radial membranes, present in dorsal and anal fins

C: Colour dark olive-blue or green above and white below. Two narrow light blue or bluish-white stripes along sides, with a broader or yellowish stripe between them



84. *Seriola dumerili*

Amberjack

Cakal Kanang, Kwe Batu Besar



A



B



C

A: Length of dorsal-fin lobe about equal to, or slightly longer than pectoral fin

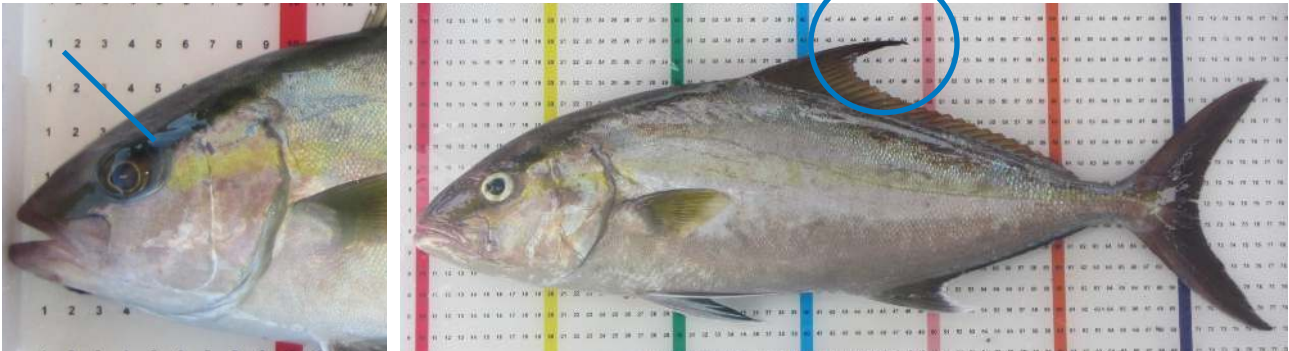
B: Caudal peduncle groove present

C: An amber stripe from eye along middle of body. Colour dark olive-blue or green above and white below. Two narrow light blue or bluish-white stripes along sides, with a broader or yellowish stripe between them



Comparisons between *Seriola dumerili* and *Seriola rivoliana*

Seriola rivoliana



- Base of dorsal fin is LONGER than *Seriola dumerili* (see blue circle)
- Juveniles with a dark nuchal bar extending from the eye to the dorsal-fin origin (see blue line)

Seriola dumerili

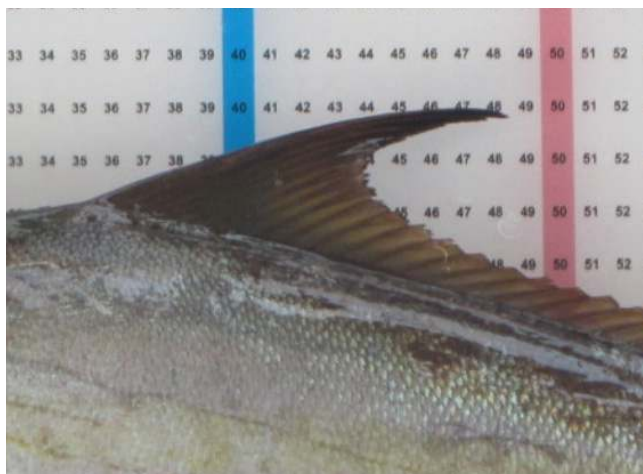


- Base of dorsal fin is SHORTER than *Seriola rivoliana* (see blue circles)
- Sometimes have yellow nuchal bar extending from the eye to the dorsal-fin origin (see blue lines)

85. *Seriola rivoliana*

Almaco Jack

Cakal Kanang, Kwe Batu



A



B



C

A: Length of dorsal fin lobe about 1.3 to 1.6 times longer than pectoral fin

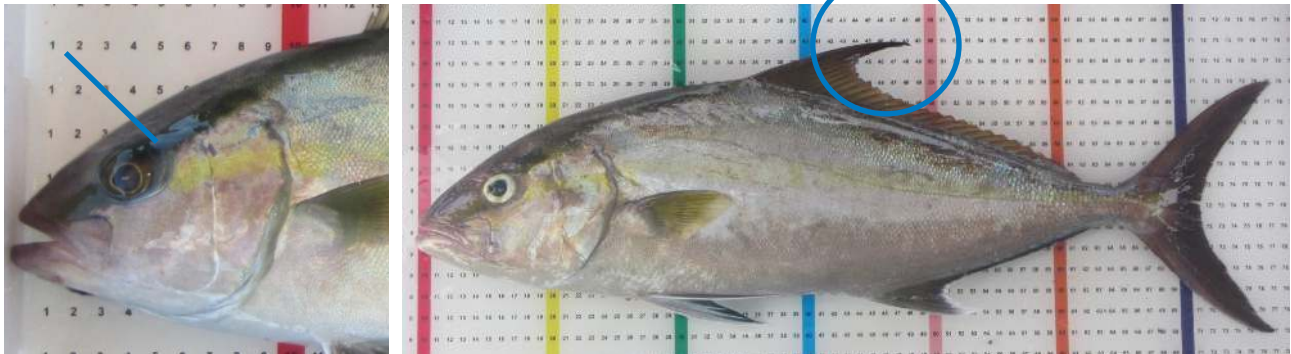
B: Caudal peduncle groove present

C: Juveniles (from 2 to 18 cm fork length) with a dark nuchal bar extending from the eye to the dorsal fin origin, but often persistent in adults.



Comparisons between *Seriola rivoliana* and *Seriola dumerili*

Seriola rivoliana



- Base of dorsal fin is LONGER than *Seriola dumerili* (see blue circle)
- Juveniles with a dark nuchal bar extending from the eye to the dorsal-fin origin (see blue line)

Seriola dumerili



- Base of dorsal fin is SHORTER than *Seriola rivoliana* (see blue circles)
- Sometimes have yellow nuchal bar extending from the eye to the dorsal-fin origin (see blue lines)

EMMELICHTHYIDAE

86. *Erythrocles schlegelii*

Japanese Rubyfish

Terompet, Kurisi Jepang



A



B



C



D

A: Reddish brown dorsally, silvery pink on sides and ventrally

B: Lips red

C: Caudal fin red

D: Fins with red rays and translucent membranes



SPARIDAE

87. *Argyrops spinifer*

Taiwan Soldier Bream, King Soldier Bream
Bawal, Ciacang, Ikan Piring-piring



A



B



C



D

- A: Upper profile of head steep and almost straight from upper jaw to eye
- B: The first 2 dorsal-fin spines very short, 3rd - 5th spines and sometimes to 7th spine flattened and much elongated
- C: Dark red on margin of upper part of opercle
- D: Caudal fin deeply emarginate to forked, with pinnate lobes

Intraspecies variations



Young fish (A) with several vertical red bars on body and will be faded in adult (B)

Comparisons between *Argyrops spinifer* and *Dentex carpenteri*

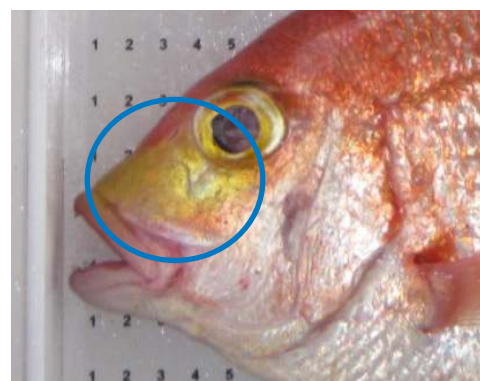
Argyrops spinifer



- *Argyrops spinifer* has more steeply slope head than *Dentex carpenteri*
- Long spines on dorsal fin

- Dark red margin on the opercle

Dentex carpenteri



- Head profile from eye to mouth at an angle
- No extended or filamentous dorsal
- Three golden saddle like blotches on the back but are usually faded

- Yellow coloration on cheeks

88. *Dentex carpenleri*

Yellowback Bream, Deep Sea Snapper
Ciacang, Ikan Piring-piring



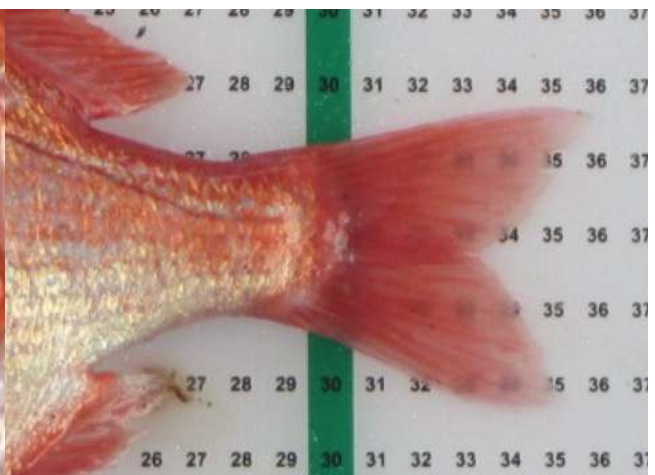
A



B



C



D

- A: Posterior margin of upper jaw not reaching to or reaching slightly beyond vertical at anterior margin of eye
B: Upper profile of head not too steep and almost straight from upper jaw to eye
C: Often wide yellow region on greater part from snout to second infraorbital
D: Fins with red rays and translucent membranes



Comparisons between *Dentex carpenteri* and *Argyrops spinifer*

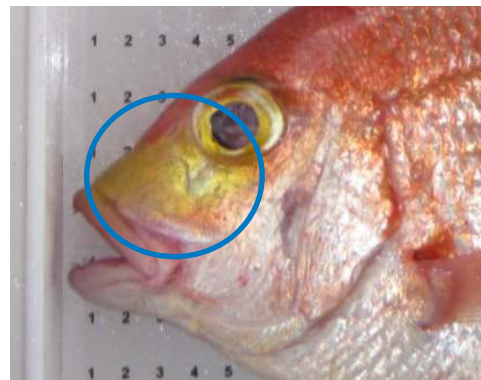
Argyrops spinifer



- *Argyrops spinifer* has more steeply slope head than *Dentex carpenteri*
- Long spines on dorsal fin

- Dark red margin on the opercle

Dentex carpenteri



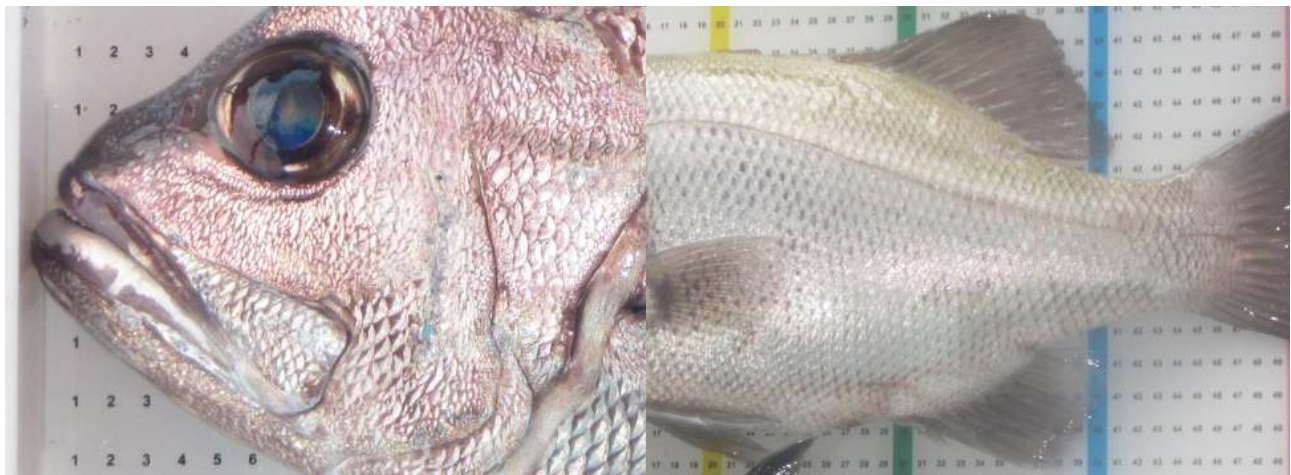
- Head profile from eye to mouth at an angle
- No extended or filamentous dorsal
- Three golden saddle like blotches on the back but are usually faded

- Yellow coloration on cheeks

GLAUCOSOMATIDAE

89. *Glaucosoma buergeri*

Grey bigmouth bream, Northern Pearl Perch, Deepsea Jewfish
Ikan Cinculu



A

B



C

D

- A: Mouth large, oblique, reaching to about the posterior margin of the eye
- B: At the tip of both soft dorsal fin and anal fin almost forming a straight line
- C: Body silvery grey with about 10 longitudinal thin bands (become indistinct with age)
- D: Roof of mouth, tongue, and gill rakers black



HAEMULIDAE

90. *Diagramma labiosum*

Slate Sweetlip, Slate Bream

Gajih, Raja Bau



A

B



C

A: Grey bronze to blue-grey with numerous small dark brown spots on caudal and soft dorsal fins

B: No yellow spots on head at any size

C: Scattered darker blotches may be present on body and head



Comparisons between *Diagramma labiosum* and *Diagramma pictum*

Diagramma labiosum



- Body bronze-grey with mauve tints
- Scattered dark blotches or brown spots on caudal and soft dorsal fin. Spots fade with age
- NO yellow spots on cheek at any stage

Diagramma pictum



- Body blue-grey with yellow / orange spots on cheek, which become larger and coalesces on the head to form irregular stripes (juveniles)
- Black spots on caudal and dorsal fin
- Spots on body not present in adults specimen

91. *Diagramma pictum*

Painted Sweetlip, Trout Sweetlip
Gajih, Raja Bau



A



B



C



D

- A: Blue-grey with bright yellow to golden-orange spots sometimes forming lines on head
- B: Spots on the caudal fin clear
- C: Dorsal fins bordered with black
- D: Anal and pelvic fins tipped with black



Comparisons between *Diagramma labiosum* and *Diagramma pictum*

Diagramma labiosum



- Body bronze-grey with mauve tints
- Scattered dark blotches or brown spots on caudal and soft dorsal fin. Spots fade with age
- NO yellow spots on cheek at any stage

Diagramma pictum



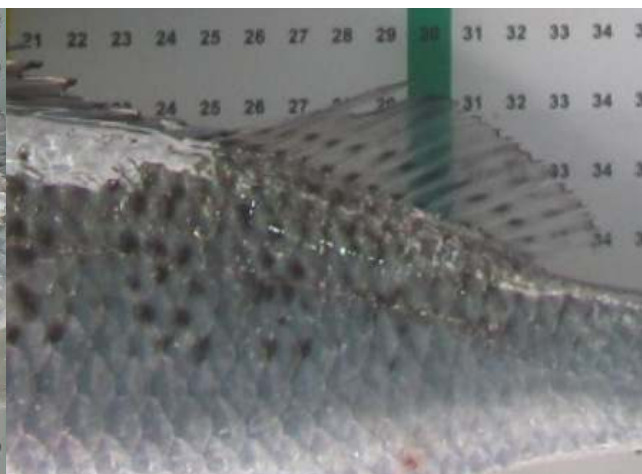
- Body blue-grey with yellow / orange spots on cheek, which become larger and coalesces on the head to form irregular stripes (juveniles)
- Black spots on caudal and dorsal fin
- Spots on body not present in adults specimen

92. *Pomadasys kaakan*

Barred Javelin, Javelin Grunter
Kerong-kerong, Ikan Ronga



A



B

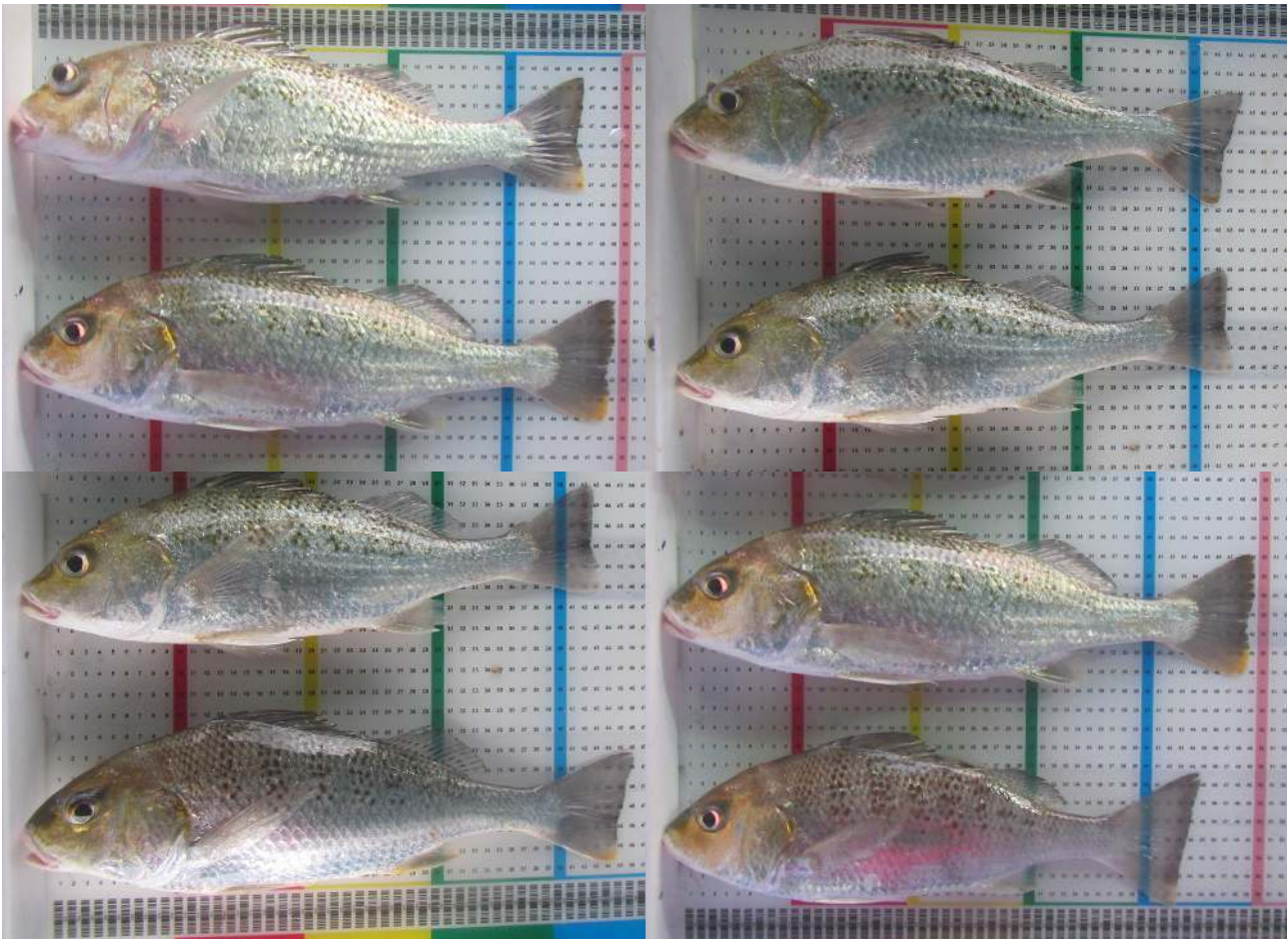


C



D

- A: Body with pairs of spots or dull blotches arranged into vertically interrupted bars
- B: Old specimens may be uniformly coloured with dark blotches or spots on dorsal fins
- C: Yellow blotches on cheek
- D: Yellow tip on the ventral side of caudal fin



Comparisons between *Pomadasys kaakan* and *Protonibea diacanthus*



Pomadasys kaakan:

- Pairs of spots or dull blotches arranged into vertically interrupted bars
- Yellow blotches on cheek
- Yellow tip on the ventral side of caudal fin
- Caudal fin straight



Protonibea diacanthus:

- Brown blackish spots on dorsal part of body, NOT forming bars
- NO yellow blotches on cheek
- NO yellow tip on the ventral side of caudal fin
- Caudal fin biconcave without pointed tip

PRIACANTHIDAE

93. *Cookeolus japonicus*

Long-fin Bulleye, Deepwater Bulleye
Mangla, Ikan Bulan, Ikan Mata Besar



A



B



C



D

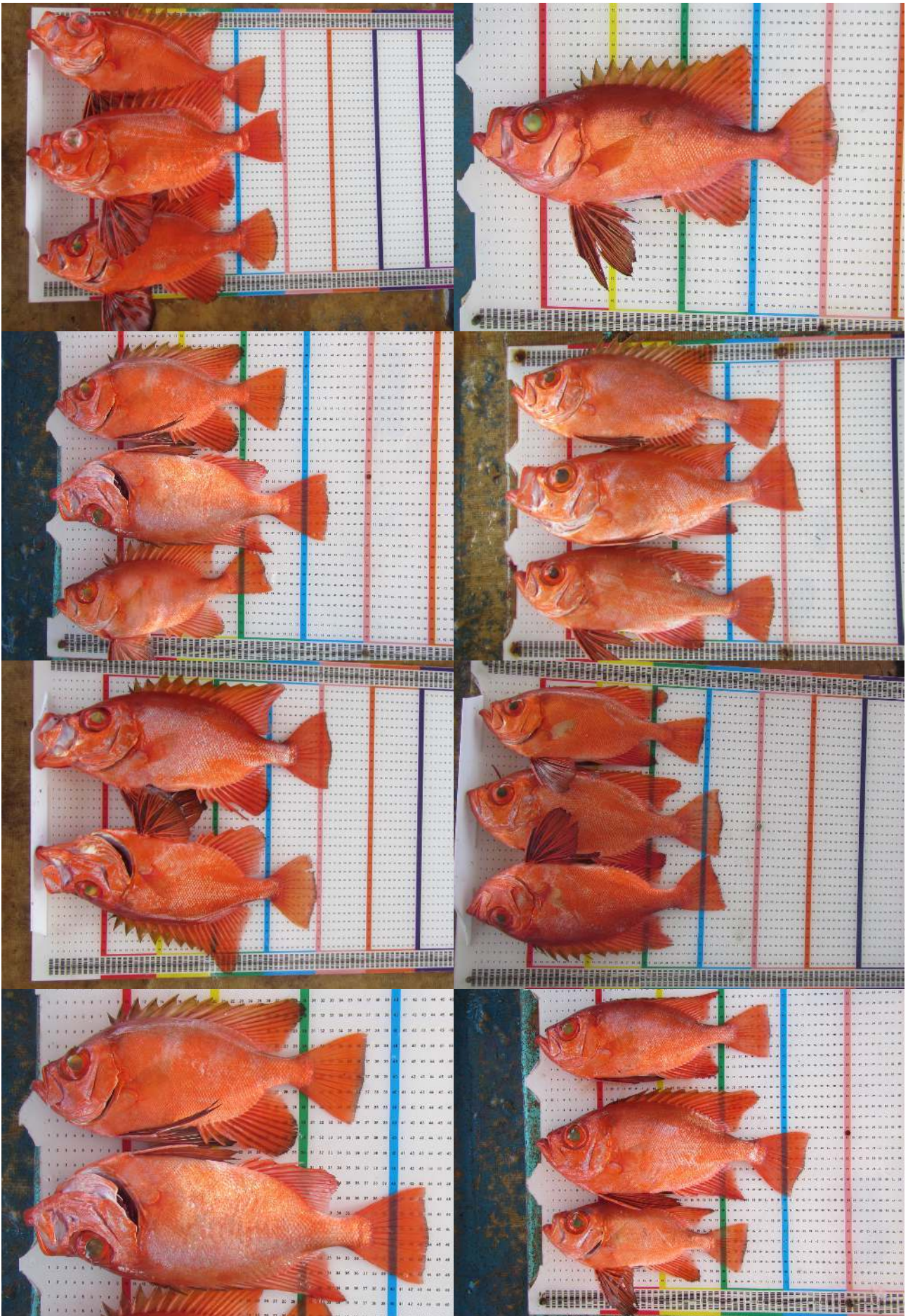
Head, iris of eyes and body reddish

A: Extremely large eyes (about 1/2 head length) and upturned mouth

B: Pectoral fins relatively short.

C: Pelvic fins positioned in advance of pectoral fins and attached to belly by membrane

D: Soft dorsal and anal fins long and broadly pointed



SPHYRAENIDAE

94. *Sphyraena barracuda*

Greater Barracuda

Pengaluan, Lengko, Langsar, Alu-alu



A

B



C

Deep green to steel grey colour above, sides mostly silvery, becoming abruptly white on ventral surface

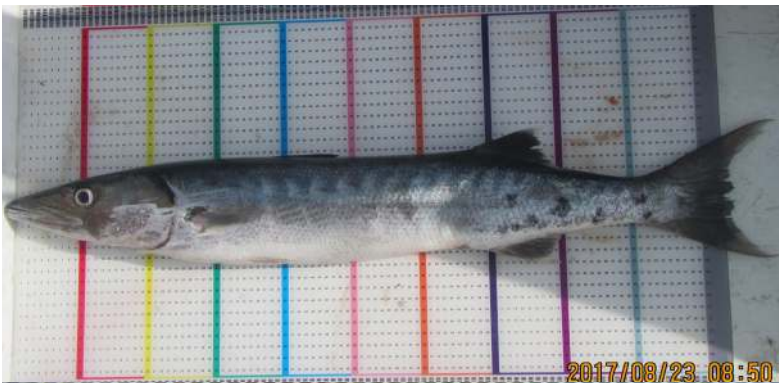
A: 18 to 22 oblique dark bars on back above lateral line

B. Second dorsal, anal and caudal fins violet to blackish with whitish tips

C: Several scattered inky blotches on hind part of body below lateral line (adults)



**Comparisons between
Sphyraena barracuda, *Sphyraena forsteri* and *Sphyraena putnamae***



Sphyraena barracuda:

- Dark bars on back above lateral line
- Caudal fin blackish with whitish tips
- Several scattered inky blotches on hind part of body below lateral line



Sphyraena forsteri:

- NO dark bars on back
- Caudal fin blackish WITHOUT whitish tips
- NO scattered inky blotches on hind part of body below lateral line



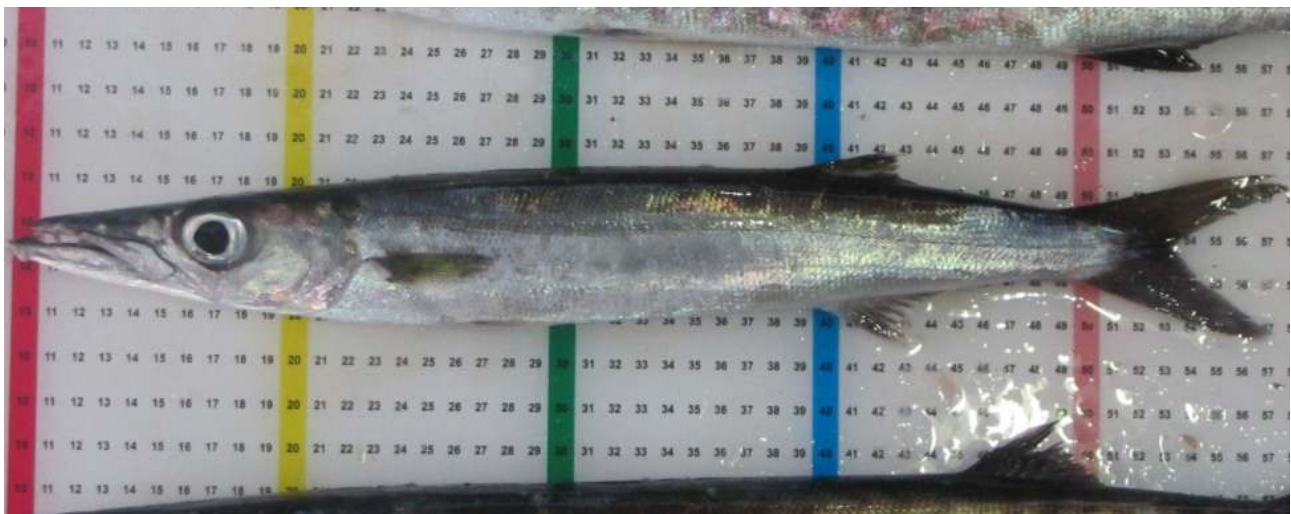
Sphyraena putnamae:

- Dark chevron markings on body
- Caudal fin dark black without whitish tips
- NO scattered inky blotches on hind part of body below lateral line

95. *Sphyaena forsteri*

Bigeye Barracuda

Pengaluan, Lengko, Langsar, Alu-alu



A



B

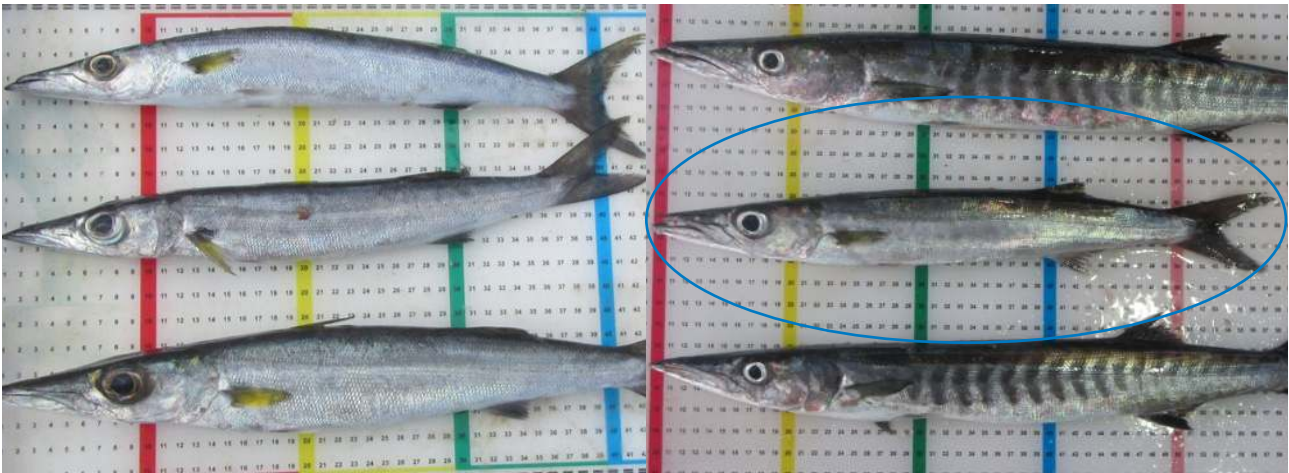


C

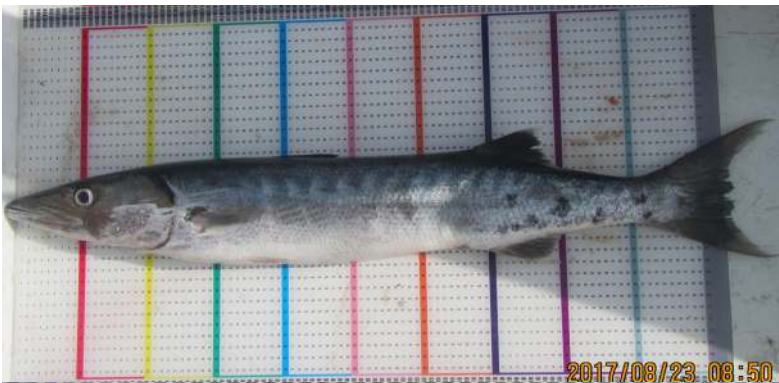
A: Head large, with a long, pointed snout; Eye very large, mouth large

B: A dark blotch in axil of pectoral fin

C: Colour blue/black above, sides silvery, without dark bars or chevrons



**Comparisons between
Sphyraena barracuda, *Sphyraena forsteri* and *Sphyraena putnamae***



Sphyraena barracuda:

- Dark bars on back above lateral line
- Caudal fin blackish with whitish tips
- Several scattered inky blotches on hind part of body below lateral line



Sphyraena forsteri:

- NO dark bars on back
- Caudal fin blackish WITHOUT whitish tips
- NO scattered inky blotches on hind part of body below lateral line



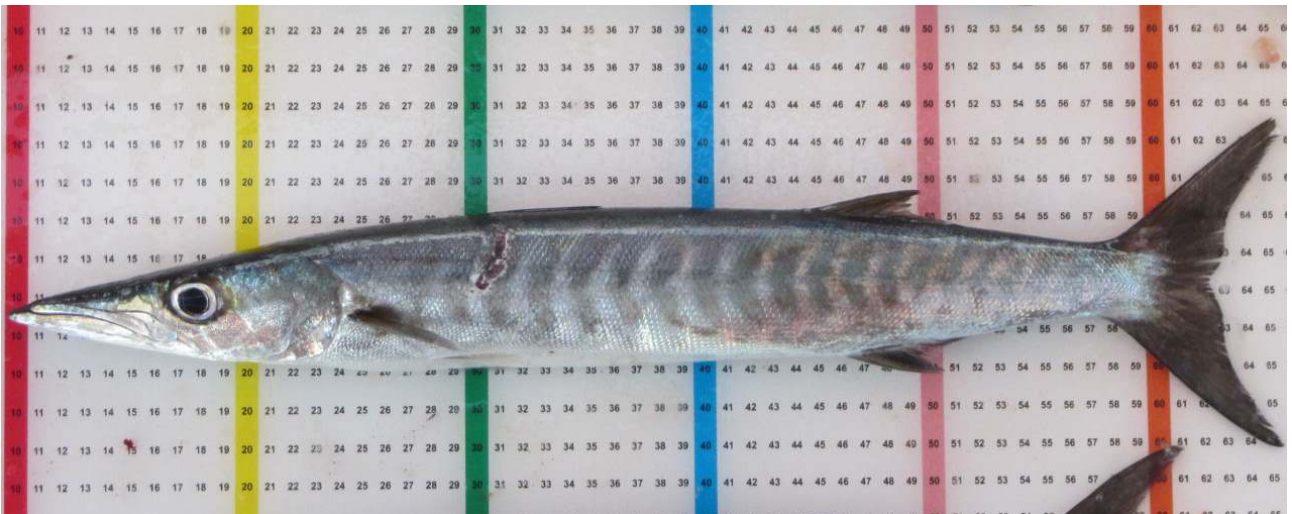
Sphyraena putnamae:

- Dark chevron markings on body
- Caudal fin dark black without whitish tips
- NO scattered inky blotches on hind part of body below lateral line

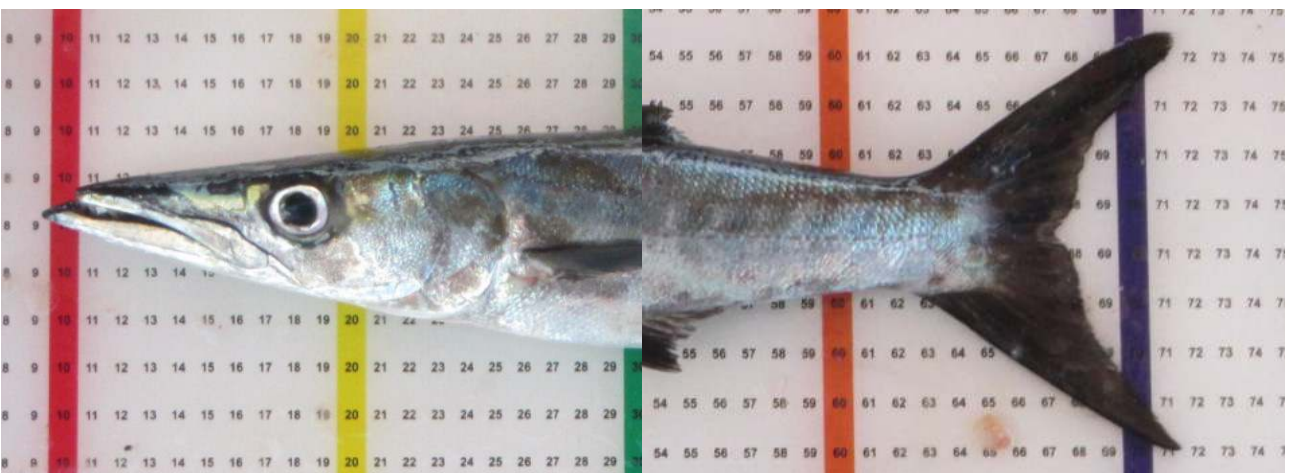
96. *Sphyraena putnamae*

Sawtooth Barracuda, Military

Pengaluan, Lengko, Langsar, Alu-alu



A



B

C

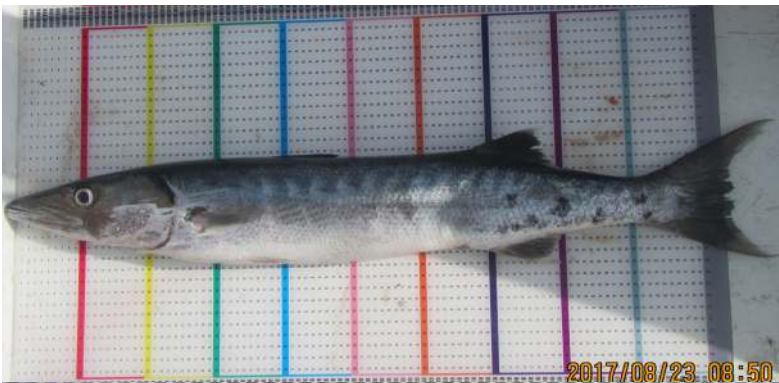
A: Many typical dark chevron markings on body

B: Maxilla reaching below anterior edge of eye

C: Caudal fin blackish without white tips



**Comparisons between
Sphyraena barracuda, *Sphyraena forsteri* and *Sphyraena putnamae***



Sphyraena barracuda:

- Dark bars on back above lateral line
- Caudal fin blackish with whitish tips
- Several scattered inky blotches on hind part of body below lateral line



Sphyraena forsteri:

- NO dark bars on back
- Caudal fin blackish WITHOUT whitish tips
- NO scattered inky blotches on hind part of body below lateral line



Sphyraena putnamae:

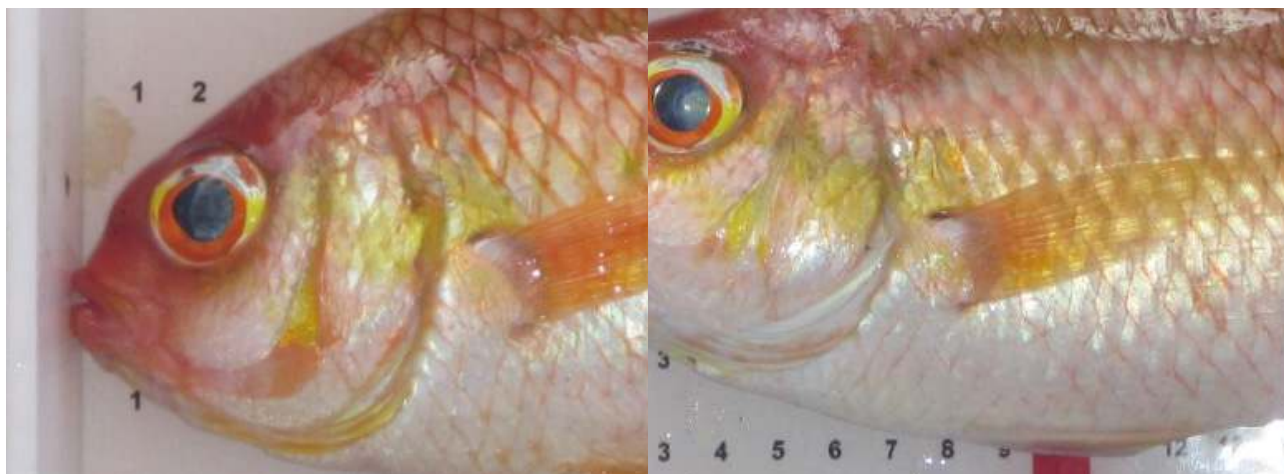
- Dark chevron markings on body
- Caudal fin dark black without whitish tips
- NO scattered inky blotches on hind part of body below lateral line

NEMIPTERIDAE

97. *Parascolopsis eriomma*

Rosy Dwarf Monocle Bream

Kumeje Batu, Kerisi



A

B



C

Overall body colour orange pinkish

A: A very short snout and large eye

B: Upper axis of pectoral fin black

C: A broad yellowish longitudinal band along middle of body from above pectoral fin to base of caudal fin



HOLOCENTRIDAE

98. *Ostichthys japonicus*

Japanese Soldierfish, Giant Squirrelfish
Sisik Batu



A



B



C



D

- A: Color when fresh overall reddish, edges of scales red, the centers silvery pink
- B: Tail size (start from caudal peduncle to caudal fin) unproportional with body shape
- C: Dorsal profile of head is convex
- D: The last spine of dorsal fin is longer than penultimate spine



RACHYCENTRIDAE

99. *Rachycentron canadum*

Cobia, Black Kingfish

Badee, Gabus Laut



A

B



C

D

A: Head broad and depressed

B: Caudal fin lunate in adults, upper lobe longer than lower

C: Pectoral fin pointed

D: First dorsal fin consisting of 7-9 short but strong isolated spines, not connected by membrane



SCIAENIDAE

100. *Protonibea diacanthus*

Black Jewfish, Northern Mulloway
Dileh, Samgeh Belang



A



B

A: Brown blackish spots on dorsal part of body
B. Caudal fin biconcave without pointed tip



Comparisons between *Pomadasys kaakan* and *Protonibea diacanthus*



Pomadasys kaakan:

- Pairs of spots or dull blotches arranged into vertically interrupted bars
- Yellow blotches on cheek
- Yellow tip on the ventral side of caudal fin
- Caudal fin straight



Protonibea diacanthus:

- Brown blackish spots on dorsal part of body, NOT forming bars
- NO yellow blotches on cheek
- NO yellow tip on the ventral side of caudal fin
- Caudal fin biconcave without pointed tip

REFERENCES