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**A HANDBOOK FOR THE IDENTIFICATION OF  
YELLOWFIN AND BIGEYE TUNAS  
IN FRESH CONDITION**

**David G. Itano**



Pelagic Fisheries Research Program  
JIMAR, University of Hawaii  
USA

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**David G Itano**  
Pelagic Fisheries Research Program  
University of Hawaii, JIMAR  
Honolulu, Hawaii  
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# **Handbook for the Identification of Yellowfin and Bigeye Tunas in Fresh Condition**

**David G Itano  
Pelagic Fisheries Research Program  
University of Hawaii, JIMAR  
Honolulu, Hawaii  
USA**

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**The MS Powerpoint version of this ID guide can be made available to fisheries observer programs and agencies for training purposes by contacting the author directly.**

# Identification of Yellowfin and Bigeye Tuna by Visual Criteria



Identifying fresh tuna is a relatively easy matter compared to distinguishing frozen or iced fish. Even at small sizes, each species has distinct coloration, body markings and body morphologies that allow rapid visual keys to positive identification.



Photo: S. Fukofuka



Photo: S. Fukofuka

Frozen tuna are far more difficult to distinguish due to fin damage, discoloration, skin abrasion and distortion or crushing during the storage process.

Nevertheless, these fish are still easily distinguishable as a yellowfin (left) and a bigeye tuna (right).

# Identification of Yellowfin and Bigeye Tuna by Visual Criteria

Even though tuna are easiest to distinguish in fresh condition, misidentifications and lumping of both species commonly occurs in surface fisheries. The pictures in this handbook should serve as a “best case” scenario for identifying yellowfin from bigeye tuna at all sizes. These examples can then be used to help differentiate samples that are in a less optimal condition, such as those pictured below.

Juvenile yellowfin and bigeye tuna in fresh condition can be reliably identified using a combination of the following features:



Photo: R. Gillett

## ➤ Internal characteristics

- liver appearance and morphology
- swim bladder morphology

## ➤ External characteristics

- body markings
- body morphology
- head and eye morphology
- pectoral fin characteristics
- caudal fin characteristics
- finlet coloration

# Internal Characteristics

## Liver morphology and appearance

- **Large, conspicuous organ along anterior, ventral portion of gut cavity**
  - **Bigeye**
    - Three rounded lobes of about equal size
    - Ventral surface striated



- **Yellowfin**
  - Right lobe longer and thinner than rounded medial and left lobes
  - Lobes smooth, clear. No striations.

# Internal Characteristics

## Swim bladder

### ➤ Bigeye

- occupies almost entire body cavity
- large, conspicuous, often inflated



### ➤ Yellowfin

- only in anterior half of body cavity
- inconspicuous, usually deflated or slightly inflated

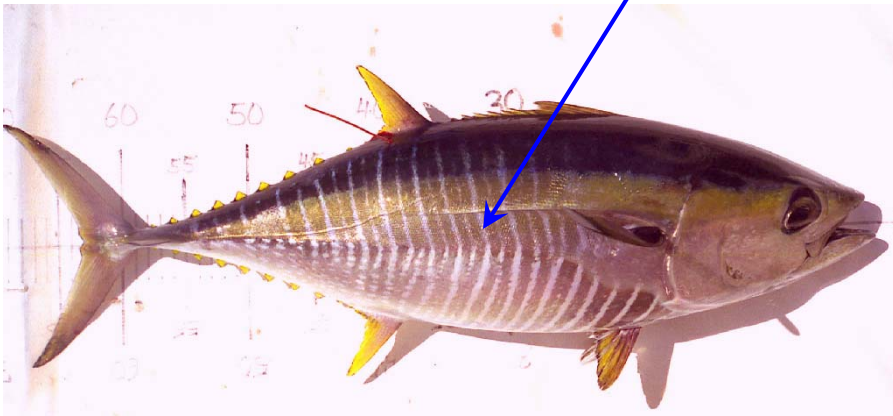


# External Characteristics

## Body markings

### ➤ Yellowfin

- Conspicuous chevron pattern of closely spaced silvery lines
- Solid lines alternate with rows of dots
- Line pattern extends from tail, forward to beneath pectoral fin and to above mid-lateral line



### ➤ Bigeye

- Irregular vertical, widely spaced white lines or marks
- Some rows of dots but few and irregular
- Line pattern irregular, broken, confined mostly to below mid-lateral line

## External Characteristics

### Body markings – anterior under pectoral

#### ➤ Yellowfin

- conspicuous alternating bands forward to below pectoral fin
- clear demarcation between marked and unmarked region



#### ➤ Bigeye

- markings more common on posterior half of body, few spots
- demarcation between marked and unmarked region not as clear

# External Characteristics

## Coloration

### ➤ Yellowfin

- Fresh yellowfin show a bright yellow mid-lateral band
- Dark black back may be separated from the gold by a thin blue band
- Fins yellow to yellowish, anal fin sometimes tinged with silver
- Flanks and belly silvery white



### ➤ Bigeye

- Golden to brassy mid-lateral band, less distinct
- Dark black back edged with bright metallic blue line
- Fins dusky yellowish with anal fin tinged with silver
- Caudal fin often dusky black
- Flanks and belly pearly white

# External Characteristics

## Coloration:

However, colors fade very quickly after death making both species appear similar in color.

**Therefore body colors are not a reliable key to species identification.**

### ➤ Example 1

- The yellow band on the yellowfin (lower) has faded
- The yellowfin also shows the bright blue band below the black back, similar to the bigeye
- Caudal fin colorations are similar in both fish



### ➤ Example 2



- The yellow band on the yellowfin (above) has faded, making the bright blue line more distinct like the bigeye (below)
- Sides and belly have faded to a pearly white color in both species
- Fin coloration is similar

# External Characteristics

## Body morphology

### ➤ Yellowfin

- body elongate, long tail
- body outline flat between second dorsal and caudal fin and between anal and caudal fin



### ➤ Bigeye

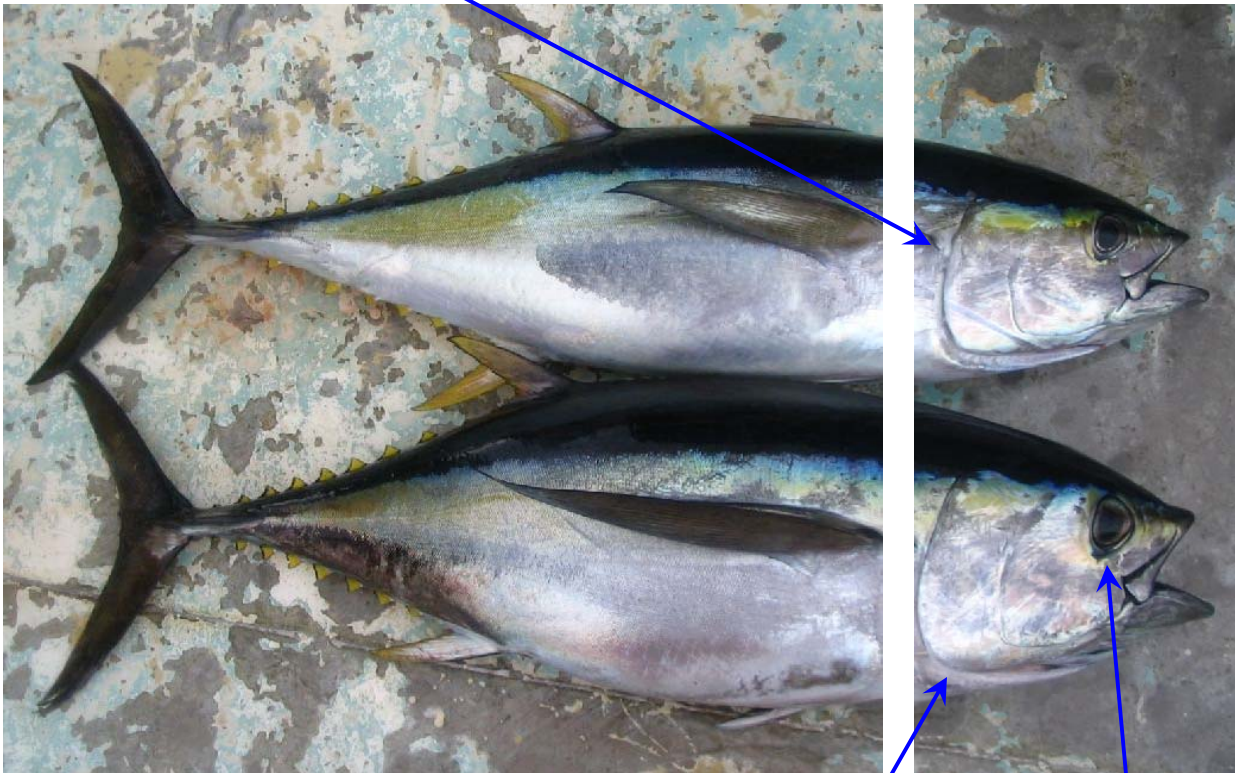
- body deep, rounded
- body outline rounded, forming a smooth dorsal and ventral arc between snout and caudal peduncle

# External Characteristics

## Head and eye morphology

### ➤ Yellowfin

- shorter head length and depth vs Fork Length than bigeye
- smaller eye diameter compared to bigeye of same Fork Length



### ➤ Bigeye

- greater head length and depth vs Fork Length than yellowfin
- greater eye diameter compared to yellowfin of same Fork Length

## External Characteristics

**Remember – there are always exceptions**

### ➤ **Yellowfin**

- Lines and banding can become washed out, rubbed out or faded, especially with larger yellowfin
- the eye may appear quite large, like that of a bigeye tuna



### ➤ **Bigeye**

- body markings can be quite distinct, with rows of lines and dots, especially with smaller bigeye
- however, rows are never as closely spaced or regular as with yellowfin

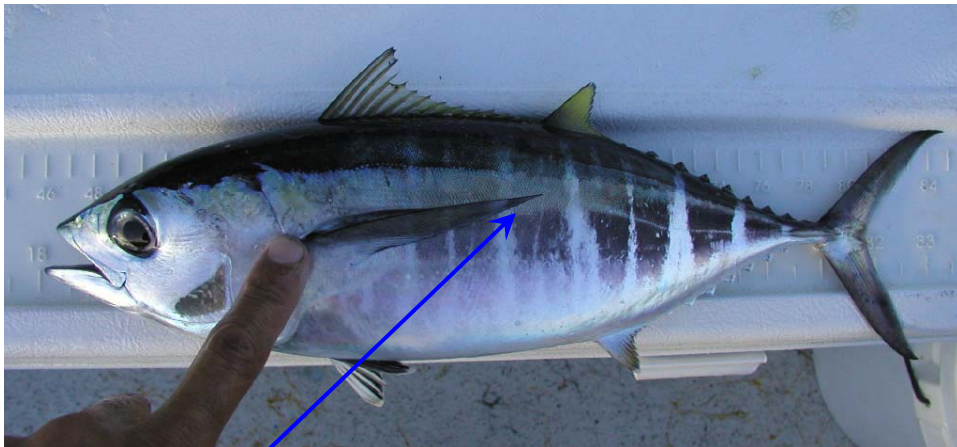
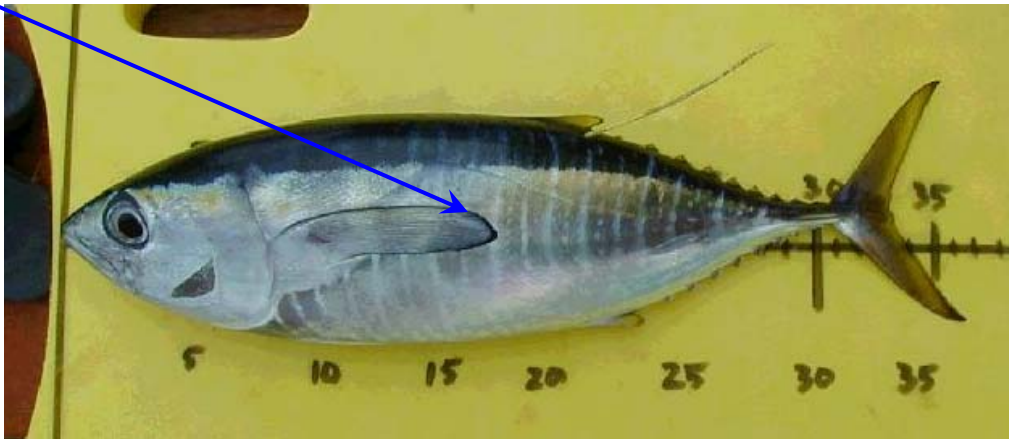
## External Characteristics

### Pectoral fin length and characteristics

(for small fish less than ~ 40 cm Fork Length)

#### ➤ Yellowfin

- pectoral fin short, just reaching insertion of second dorsal fin
- pectoral fin thicker, stiffer and rounded at tip



#### ➤ Bigeye

- pectoral fin slightly longer reaching second dorsal fin
- pectoral fin thin, flexible and pointed at the tip

**However, pectoral fin lengths are not that different for such small fish. Other features are more distinct such as body markings and morphology**

## External Characteristics

### Pectoral fin length and characteristics

(for medium sized fish ~ 45 – 110 cm Fork Length)

#### ➤ Bigeye

- pectoral fin long, extending beyond the second dorsal fin base
- pectoral tapers to thin point, flexible, often curves ventrally at side



#### ➤ Yellowfin

- pectoral fin short, extending to base of second dorsal fin
- pectoral fin thicker, stiff, blade-like

**For large bigeye and yellowfin above 150 cm, the pectoral fins become similar in size and shape.**

# External Characteristics

## Pectoral fin characteristics

### ➤ Yellowfin

- pectoral fin shorter, thicker, “blade-like” compared to bigeye



Yellowfin 104 cm

Bigeye 99 cm

### ➤ Bigeye

- Pectoral fin longer, thinner, pointed at tip



Bigeye 96 cm

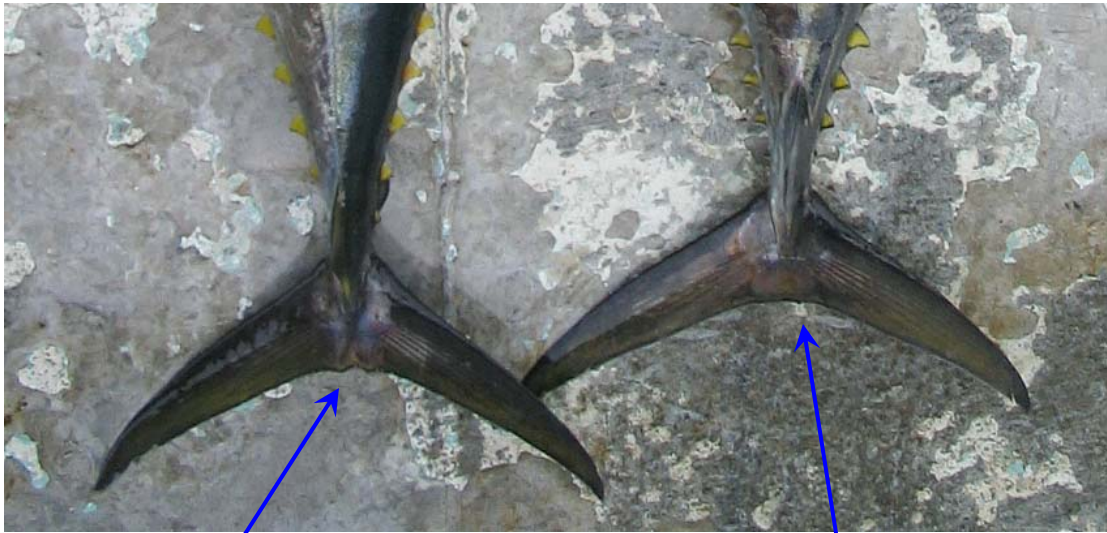


Yellowfin 104 cm

Bigeye pectoral fin forms smooth arc with “floppy” tips.  
Yellowfin pectoral fins are straight and stiff.

# External Characteristics

## Caudal fin

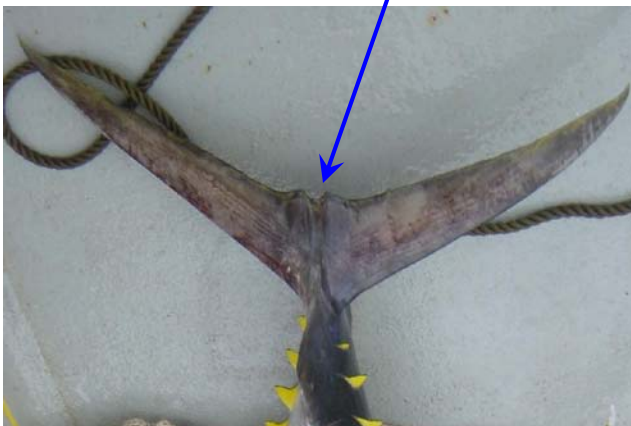


### ➤ Yellowfin

- Central portion of trailing edge forms distinct notch
- Two distinctly raised ridges present that form the “V” notch

### ➤ Bigeye

- Central portion of trailing edge forms a flat or slightly crescent shaped area
- Central area of caudal fin flat with two inconspicuous low mounds present.



## External Characteristics

**Caudal fin – center of trailing edge**

**Yellowfin**

Forms “V or M” shaped notch



**Bigeye**

Forms flat or slightly rounded cup



# External Characteristics

## Finlet coloration

### ➤ Yellowfin

- bright yellow with no black edging



### ➤ Bigeye

- yellowish color edged with black

# External Characteristics

## Comparisons by size and features

### ➤ Yellowfin (~ 33 cm)

- Short, blunt pectoral fin
- Closely spaced markings of lines and rows of dots in chevron pattern extending to insertion of pectoral fin
- Shorter, smaller head, small, round eye
- Yellowish tail



### ➤ Bigeye (~ 34 cm)

- Longer, pointed pectoral fin
- Irregular, white lines across body
- Large head, deep body, large eye
- Dusky colored tail

# External Characteristics

## Examples of small yellowfin and bigeye



**Yellowfin 17 cm**



**Yellowfin 25 cm**



**Yellowfin 32 cm**



**Yellowfin 37 cm**



**Yellowfin 41 cm**



**Bigeye 32.5 cm**



**Bigeye 34 cm**



**Bigeye 36 cm**



**Bigeye 44 cm**

## Examples of extremely small yellowfin tuna

These yellowfin tuna are of a size that you are unlikely to see in capture fisheries but are commonly found inside the stomachs of other tuna and predatory fish. They were collected on an anchored FAD in Hawaiian waters on 15 August 1997 and measured 12.6, 14.3, 14.5 and 15.9 cm FL. Despite their tiny size, the pattern of lines separated by a row of spots is apparent even in fish of this size.



## External Characteristics

### Comparisons by size and features

#### ➤ Bigeye (~ 56cm)

- Large, deep head, large eye, deeply rounded body
- Long pectoral fin with thin, pointed tip
- Vertical, widely spaced irregular white lines



#### ➤ Yellowfin (~ 56 cm)

- Long, narrow body, small head, small eye
- Closely spaced, chevron pattern of alternating lines and rows of spots clearly visible to below pectoral fin

**Note: pink coloration is caused by a reflection and is not representative of natural color.**

# External Characteristics

## Comparisons by size and features

### ➤ Yellowfin (96 cm)

- Long, narrow body, straight outline behind 2<sup>nd</sup> dorsal fin
- Thick, relatively short, “blade-like” pectoral fin
- Small head and eye
- Notch in center of tail



### ➤ Bigeye (93 cm)

- Rounded, deep body outline, large, deep head, large eye
- Long pectoral fin, thin tip pointing ventrally
- Flat trailing edge of tail

### ➤ Note:

- the body markings and some coloration have already faded

# External Characteristics

## Comparisons by size and features

### ➤ Bigeye (99 cm)

- Deep, rounded body outline, large, deep head, large eye
- Long pectoral fin, thin, pointed, wavy tip
- Trailing edge of caudal fin flat



### ➤ Yellowfin (104 cm)

- Long, narrow body, straight behind 2<sup>nd</sup> dorsal, small head and eye
- Evenly spaced lines and rows of uniform dots
- Noticeable “V” notch in caudal fin with two raised areas
- 2<sup>nd</sup> dorsal and anal fins beginning to elongate

### ➤ Note:

- the bigeye has lost all body markings and yellow coloration

## External Characteristics

### Mixed fish on deck

The sampler must be alert to changes in size and species compositions during the unloading process, and record these changes as they occur. In order to do so, the ability to quickly determine tuna species under a variety of conditions is necessary.



There are three yellowfin and six bigeye pictured above. Positive identifications are possible for all of them but one tuna needs closer examination due to camera angle and lighting

Using the criteria outlined in this handbook, positive identifications should be possible using only external characteristics. If in doubt, cut the fish and check the liver.

**Note:**

**The yellowfin and bigeye samples illustrated in this guide are in excellent condition making identifications easy and straight forward. With practice, port samplers and observers should be able to make positive identifications from fish in a wide range of condition using external characteristics alone.**

**Remember:**

**Identifications should be based on a combination of features appropriate to the particular sample being examined – and not just a single feature. If doubt remains, the fish should be set aside and examined for internal characteristics.**

**END**