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HANDBOOKS FOR THE IDENTIFICATION OF YELLOWFIN AND BIGEYE TUNAS IN (1) FRESH, (2) FROZEN AND (3) FRESH BUT LESS THAN IDEAL CONDITION – *VERSIONS AVAILABLE IN ENGLISH, FRENCH, SPANISH, BAHASA INDONESIA, JAPANESE, KOREAN, AND CHINESE: NEWLY TRANSLATED VERSIONS AVAILABLE IN VIETNAMESE LANGUAGE (1-3) AND BAHASA INDONESIAN (3)*

WCPFC-SC3-FT SWG/IP-5

Paper prepared by

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Handbooks for the identification of yellowfin and bigeye tunas in (1) Fresh, (2) Frozen and (3) Fresh but Less than Ideal Condition – versions available in English, French, Spanish, Bahasa Indonesia, Japanese, Korean, and Chinese: newly translated versions available in Vietnamese language (1-3) and Bahasa Indonesian (3).

Itano, D. G. and S. Fukofuka,. with development and translation assistance from R. Andamari, F-C Chang. Y. Choi, S. Chuvand, M. de Beer, J-R Koh, A.D. Lewis, J.Y. Lu-Chen, T. Matsumoto, G.S. Merta, D-Y Moon, C. Proctor, R. Sarralde, M. Taquet, G. Yamasaki, and the Interpretation and Translation Section of the Secretariat of the Pacific Community

Introduction

The collection, identification and enumeration of catch data from WCPO fisheries is a fundamental role of the Commission. Species-specific identification of target catch is essential for management purposes, particularly for species with differing life history parameters. The problem of species mixing in catch and effort statistics is particularly acute for juvenile yellowfin and bigeye tunas that are similar in appearance. The most significant problem remains with purse seine fisheries as these species, when young are marketed at the same low value which results in little incentive for fishermen or processors to separate by species.

In order to support the accurate reporting of yellowfin and bigeye catches in the region, three identification guides for the identification and differentiation of yellowfin and bigeye tuna at all life stages have been developed. These guides were produced by the Fishing Technology Working Group of the Standing Committee on Tuna and Billfish and continue to be supported through the efforts of the Fishing Technology SWG of the WCPFC Scientific Committee. Three manuals have been produced in MS Powerpoint format to facilitate their use as training guides for observers, port samplers and fishermen.

The first to be produced: **Handbook for the identification of yellowfin and bigeye tunas in fresh condition** provides 27 pages of color photographs of both species ranging in size from 12 - >100 cm in pristine, fresh condition as may be seen by handline, troll and pole-and-line fishermen.

The second manual: **Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition** was produced to show yellowfin and bigeye as they appear after having been frozen in brine onboard a typical tuna purse seine vessel. This guide is particularly useful for training port samplers that must be able to differentiate both species of all sizes after they have been frozen and may have lost their natural color and sustained considerable damage.

The third manual: **Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition** was produced in response to comments that the pictures from the first manual were “too good” and not representative of fish often seen on the deck of a purse seiner or at fresh fish unloading ports throughout the region. This version purposefully depicts both species in a range of sizes and condition that make them difficult to identify, e.g. discolored, smashed, missing fins, bent, etc. This handbook has proved very useful for the observer training purposes.

Translations

Various fishery agencies in the Pacific, Indian and Atlantic Oceans have expressed interest in using these materials to assist their national observer and port sampling programs. To date, the original English versions have been translated into French, Spanish, Bahasa Indonesia, Japanese, Korean, Chinese (traditional) and Vietnamese versions.

Due to the size of these files, the Pelagic Fisheries Research Program has made all language versions available in Adobe PDF format on a publicly accessible ftp site. To access this site, mouse click on this link or paste it into a web browser.

ftp://ftp.soest.hawaii.edu/PFRP/itano

Files can be uploaded and downloaded to this site. The file names appear as:

1_BE-YF ID Fresh_ENGLISH_v2.pdf
2_BE-YF ID Frozen_ENGLISH_v5.pdf
3_BE-YF ID Less Ideal_ENGLISH_v6.pdf
4_BE-YF ID Fresh_BAHASA_v1.pdf
5_BE-YF ID Frozen_BAHASA_v4.pdf
6_BE-YF ID Fresh _JAPANESE_v1.pdf
7_BE-YF ID FROZEN_JAPANESE_v1.pdf
8_BE-YF ID Less Ideal_JAPANESE_v2.pdf
9_BE-YF ID Fresh _FRENCH_v1.pdf
10_BE-YF ID Frozen_FRENCH_v1.pdf
11_BE-YF ID Less Ideal_FRENCH_v1.pdf
12_BE-YF ID Fresh _SPANISH_v3.pdf
13_BE-YF ID Frozen_SPANISH_v3.pdf
14_BE-YF ID Less ideal_SPANISH_v4.pdf
15_BE-YF ID Fresh_KOREAN_v1.pdf
16_BE-YF ID Frozen_KOREAN_v1.pdf
17_BE-YF ID Less Ideal_KOREAN_v1.pdf
18_BE-YF ID Fresh Less Ideal_CHINESE_traditional_v1.pdf
19_ BE-YF ID Fresh_VIETNAMESE_v1.pdf
20_ BE-YF ID Frozen_VIETNAMESE_v1.pdf
21_ BE-YF ID Less Ideal_VIETNAMESE_v1.pdf
22_ BE-YF ID Less Ideal_BAHASA_v1.pdf

To access the much larger Powerpoint versions for training purposes, contact David Itano dgi@hawaii.edu for further instructions. AN EXAMPLE OF ONE OF THE GUIDES TRANSLATED INTO THE VIETNAMESE LANGUAGE IS APPENDED.

A complete listing of each version follows this page. The authors are seeking fishery agencies willing to support this effort by translating the guides into their native tongue for regional distribution.

Acknowledgements

The author would like to gratefully acknowledge all the persons listed above and below who contributed their time and efforts in the production of these training materials. Special thanks to Mr Martin de Beer of Sanford Ltd for his cooperation in allowing the photographs to be taken of frozen tuna on the FV San Nikunau and to Mr Gordon Yamasaki, NMFS/PIRO for facilitating the same.

Versions of yellowfin – bigeye identification guides currently available.

1) Itano, D.G.**. Handbook for the identification of yellowfin and bigeye tunas in fresh condition. English version 2.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA.

2) Itano, D.G.**. Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. English version 5.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA.

3) Fukofuka, S. & D. Itano. **Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. English version 6.** Pelagic Fisheries Research Programme, Honolulu, Hawaii, USA; Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

4) Itano, D.G.**.** with translation by G.S. Merta and C.H. Proctor. **Bahasa Indonesia version of: Handbook for the identification of yellowfin and bigeye tunas in fresh condition. Indonesian version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; Research Institute of Marine Fisheries, Jakarta Indonesia,; CSIRO Division of Marine and Atmospheric Research, Hobart, Australia.

5) Itano, D.G.**.** with translation by G.S. Merta and C.H. Proctor. **Bahasa Indonesia version of: Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. Indonesian version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; Research Institute of Marine Fisheries, Jakarta Indonesia; CSIRO Division of Marine and Atmospheric Research, Hobart, Australia.

6) Itano, D.G.**.** with translation by T. Matsumoto. **Japanese language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh condition. Japanese version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA.; National Research Institute of Far Seas Fisheries, Shimizu, Japan.

7) Itano, D.G.**.** with translation by T. Matsumoto. **Japanese language version of: Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. Japanese version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; National Research Institute of Far Seas Fisheries, Shimizu, Japan.

8) Fukofuka, S. & D. Itano with translation by T. Matsumoto. **Japanese language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. Japanese version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; National Research Institute of Far Seas Fisheries, Shimizu, Japan.

9) Itano, D.G.**.** with translation by M. Taquet. **French language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh condition. French v1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; IFREMER, La Réunion – France.

10) Itano, D.G.**.** with translation by SPC. **French language version of: Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. French version 1.**

Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; Interpretation and Translation Section, Secretariat of the Pacific Community, Noumea, New Caledonia.

11) Fukofuka, S. & D. Itano with translation by SPC. **French language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. French version 1.** Pelagic Fisheries Research Programme, Honolulu, Hawaii, USA; Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia., Interpretation and Translation Section, SPC, Noumea, New Caledonia.

12) Itano, D.G.**.** with translation by R. Sarralde. **Spanish language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh condition. Spanish version 3.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; Instituto Espaňol de Oceanografĩa, Tenerife, Spain.

13) Itano, D.G.**.** with translation by R. Sarralde. **Spanish language version of: Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. Spanish version 3.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; Instituto Espaňol de Oceanografĩa, Tenerife, Spain.

14) Fukofuka, S. & D. Itano with translation by R. Sarralde. **Spanish language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. Spanish version 4.** Pelagic Fisheries Research Programme, Honolulu, Hawaii, USA; Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia; Instituto Espaňol de Oceanografĩa, Tenerife, Spain.

15) Itano, D.G.**.** with translation by D-Y Moon, J-R Koh and Y. Choi. **Korean language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh condition. Korean version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; National Fisheries Research & Development Institute, Busan, Korea; Coastal Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

16) Itano, D.G.**.** with translation by D-Y Moon, J-R Koh, and Y. Choi. **Korean language version of: Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. Korean version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; National Fisheries Research & Development Institute, Busan, Korea; Coastal Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

17) Itano, D.G.**.** with translation by D-Y Moon, J-R Koh, and Y. Choi. **Korean language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. Korean version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; National Fisheries Research & Development Institute, Busan, Korea; Coastal Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

18) Fukofuka, S. & D. Itano with translation by JY Lu-Chen. **Chinese language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. Chinese version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; University of Hawaii, Center for Interpretation and Translation Studies, Honolulu, Hawaii, USA.

19) Itano, D.G.. with translation by S. Chuvand. **Vietnamese language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh condition. (v1)**. Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA. Secretariat of the Pacific Community, Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

20) Itano, D.G.. with translation by S. Chuvand. **Vietnamese language version of: Handbook for the identification of yellowfin and bigeye tunas in brine frozen condition. (v1)**. Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA. Secretariat of the Pacific Community, Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

21) Fukofuka, S. & D. Itano with translation by S. Chuvand. **Vietnamese language version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. (v1)**. Pelagic Fisheries Research Programme, Honolulu, Hawaii, USA; Secretariat of the Pacific Community, Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

22) Itano, D.G.**.** with translation by G.S. Merta and C.H. Proctor. **Bahasa Indonesia version of: Handbook for the identification of yellowfin and bigeye tunas in fresh, but less than ideal condition. Indonesian version 1.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii, USA; Research Institute of Marine Fisheries, Jakarta Indonesia; CSIRO Division of Marine and Atmospheric Research, Hobart, Australia.

A Handbook for the Identification of Yellowfin and Bigeye Tunas in *Fresh Condition* (v2)

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Western and Central Pacific Fisheries Commission

Handbook for the Identification of Yellowfin and Bigeye Tunas in *Fresh Condition* (v2)

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Fishing Technology Working Group
INF-FTWG-5
August 2004

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Note: All images are by the author unless specifically credited otherwise. No images represented here may be reproduced separately from this handbook without express written consent of the author.

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

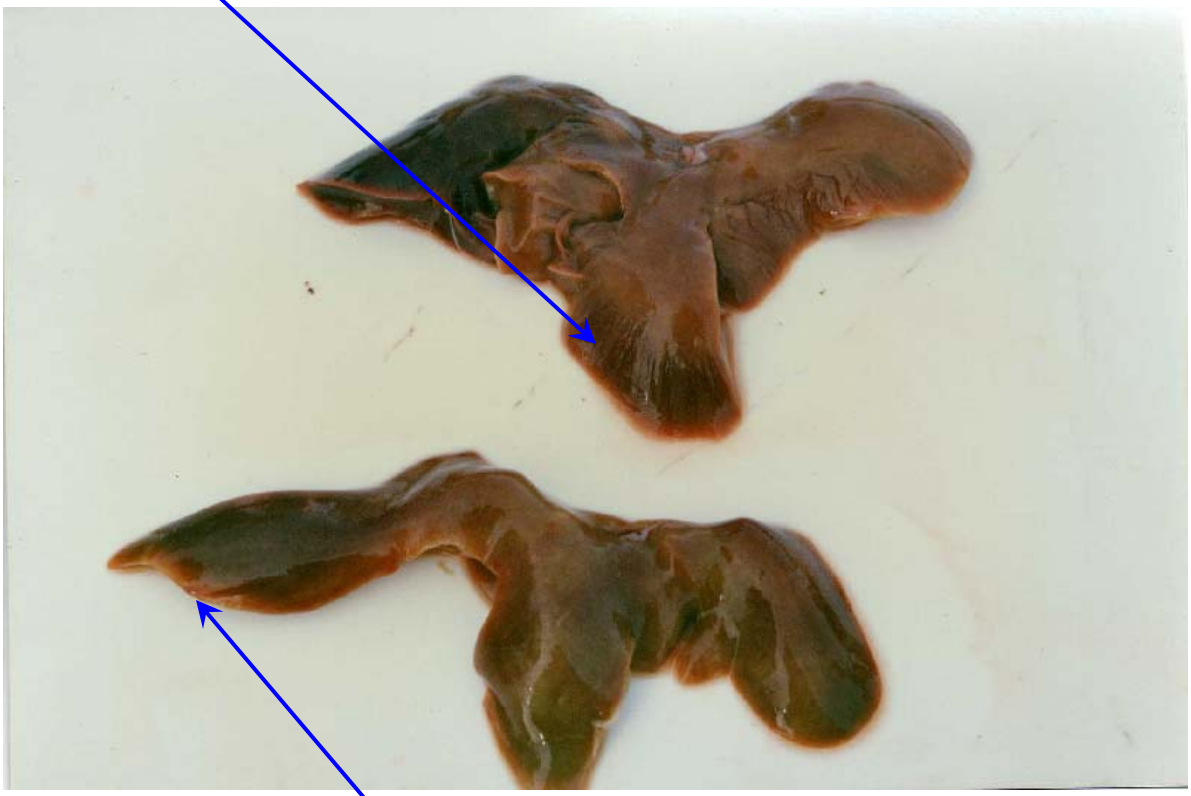
➢ External characteristics

- 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

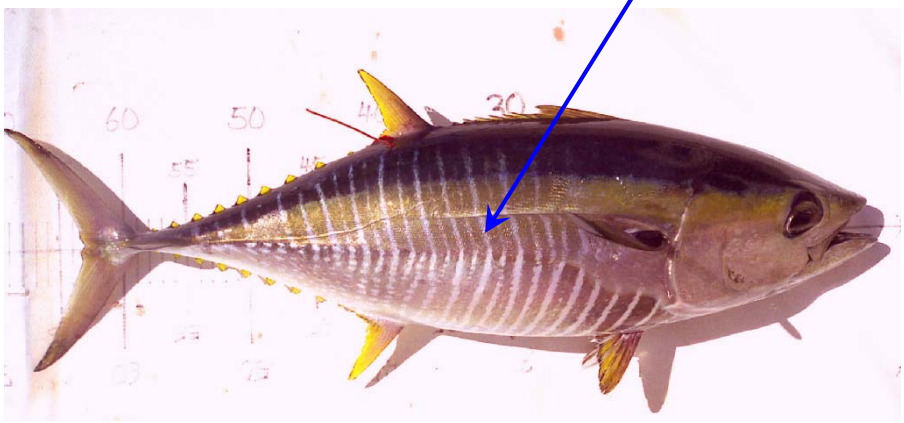
- only in anterior half of body cavity
- inconspicuous, usually deflated or slightly inflated

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.

<u>Therefore body colors are not a reliable key to species identification.</u>

➢ 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

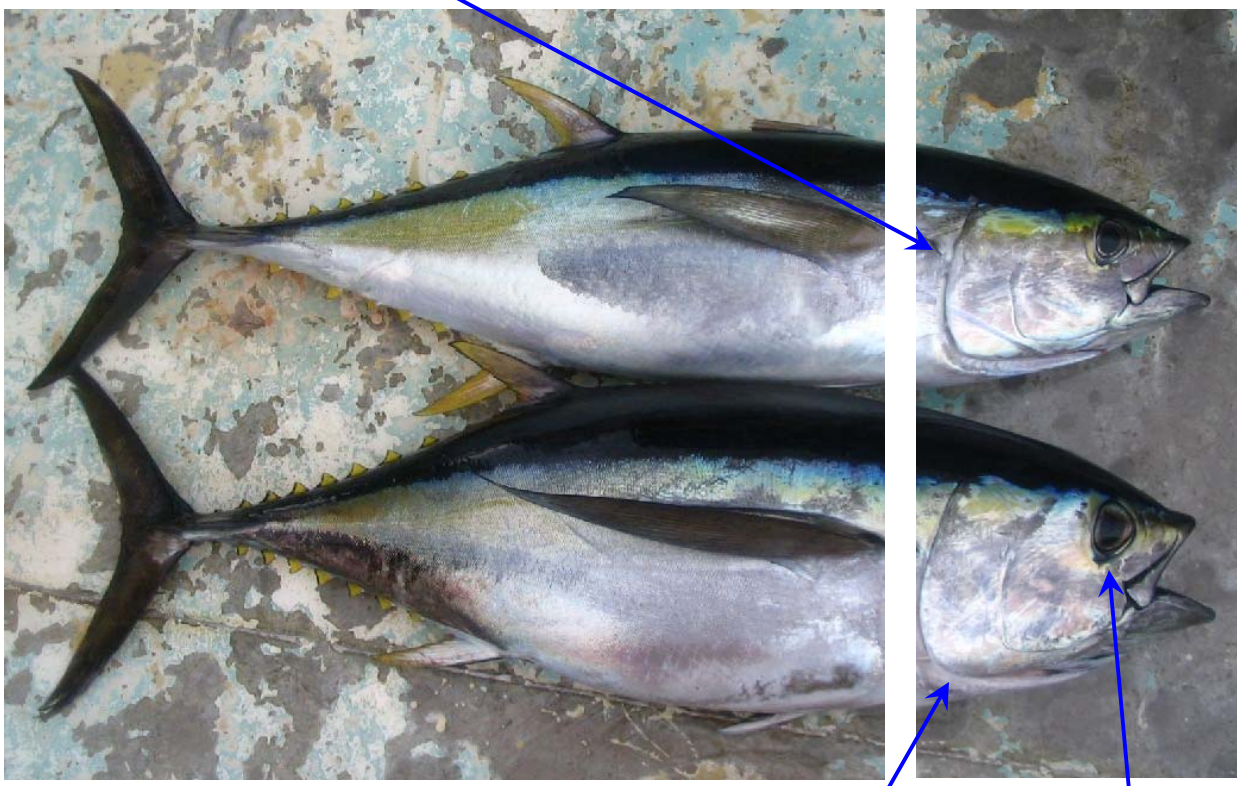
- body deep, rounded
- body outline rounded, forming a smooth dorsal and ventral arc between snout and caudal peduncle

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

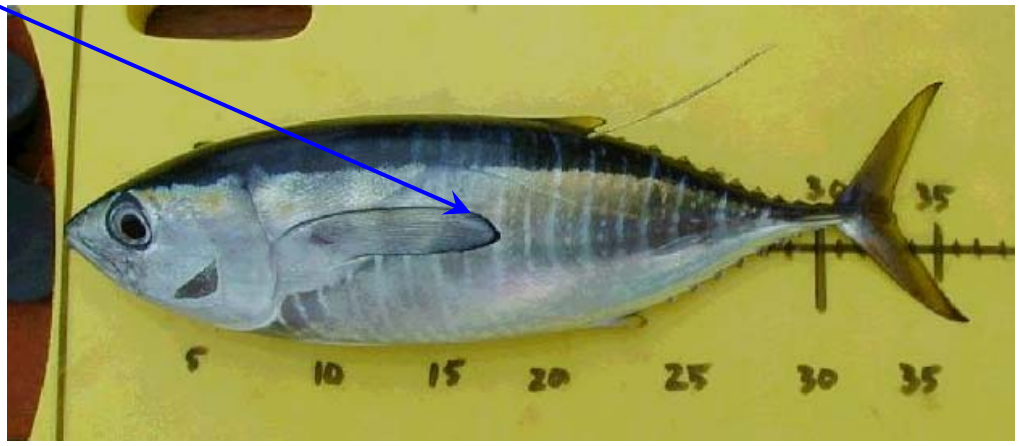
External Characteristics

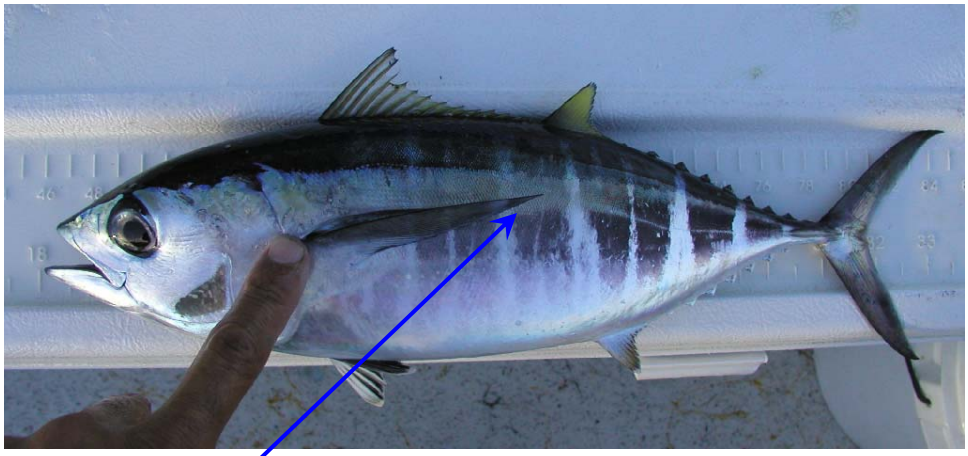
- **Pectoral fin length and characteristics**

  (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

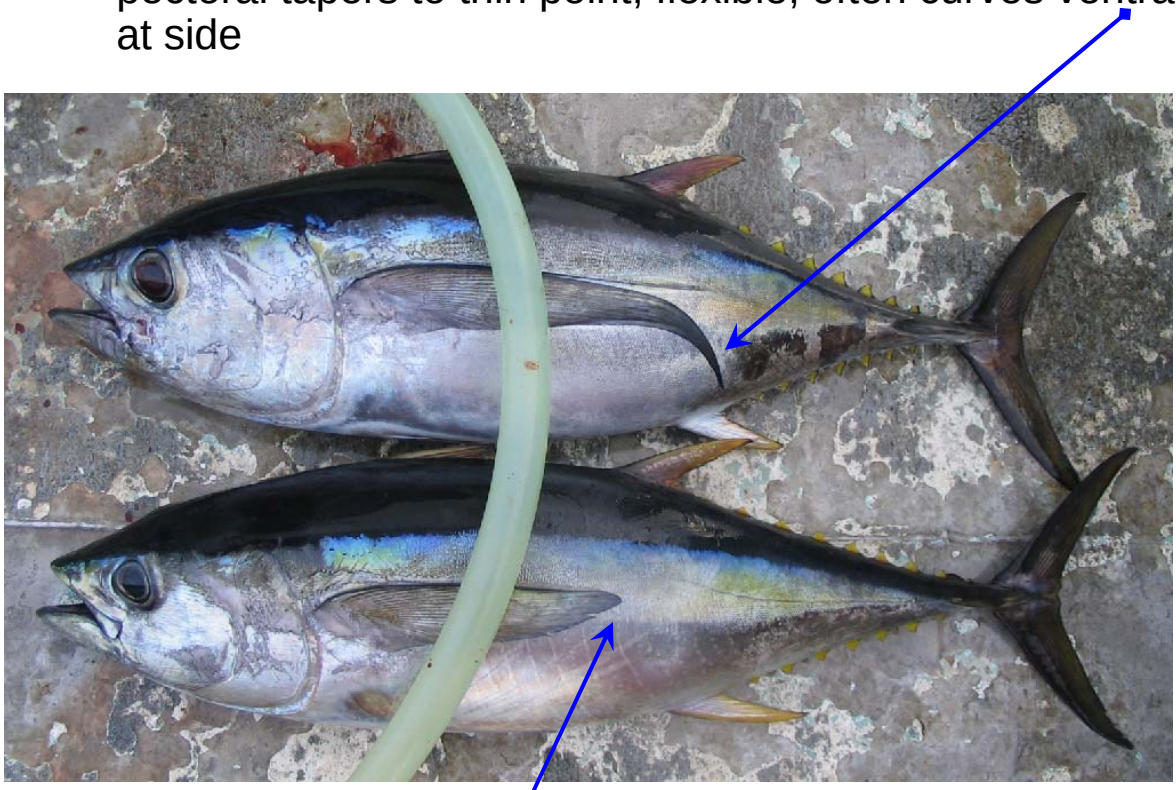
External Characteristics

▪ 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

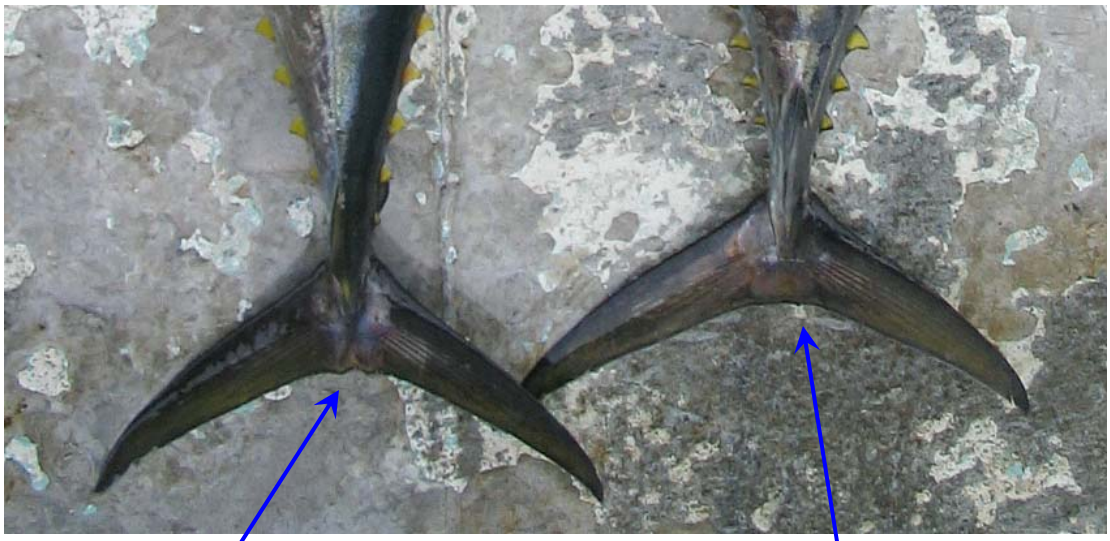
Bigeye 96 cm

Yellowfin 104 cm

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

External Characteristics

▪ Caudal fin

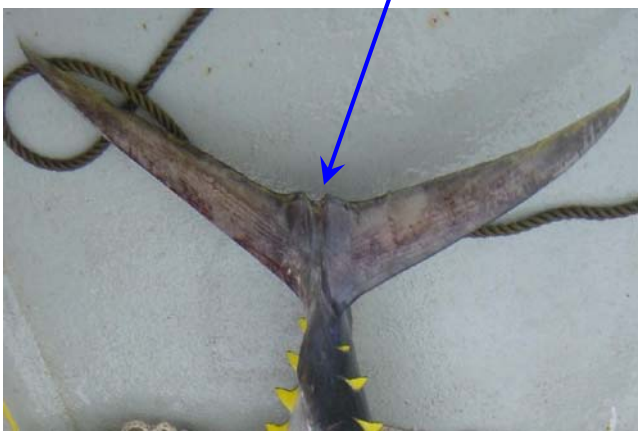


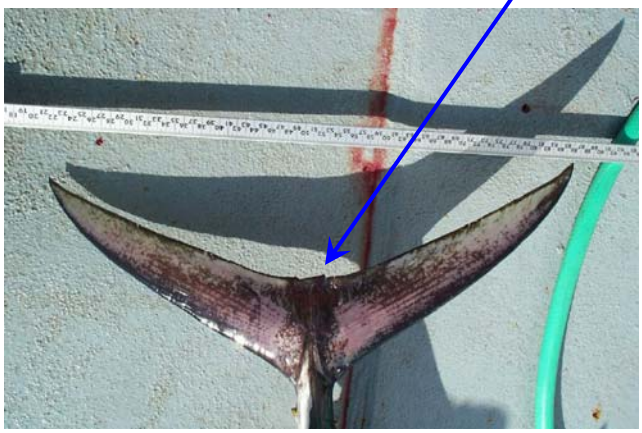
➢ **Yellowfin**

- 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

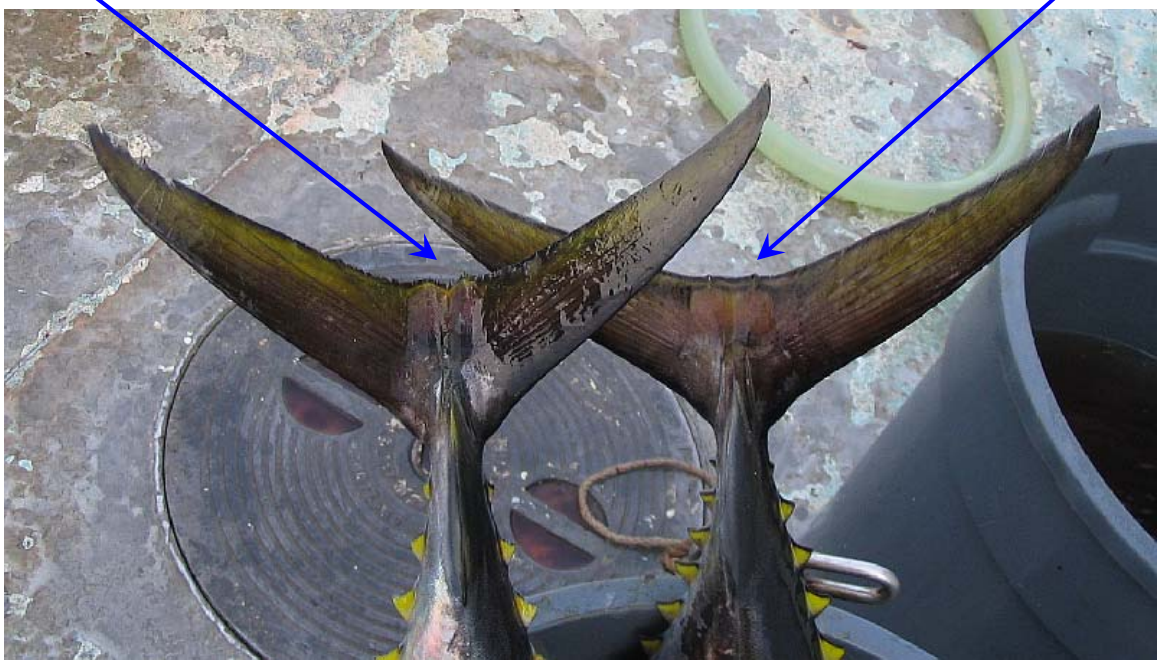
Forms "V or M" shaped notch

Bigeye

Forms flat or slightly rounded cup

Yellowfin

Bigeye



External Characteristics

- **Finlet coloration**

➢ **Yellowfin**

- bright yellow with no or slight 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

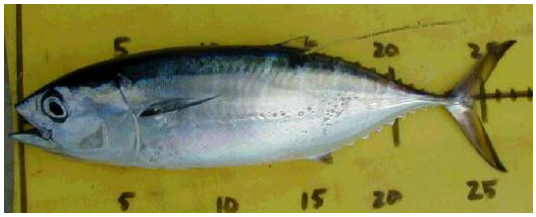
- **Bigeye (~ 34 cm)**
  - Longer, pointed pectoral fin
  - Irregular, white lines across body
  - Large head, deep body, large eye
  - Dusky colored tail

External Characteristics

Examples of small yellowfin and bigeye

Yellowfin 17 cm

Bigeye 32.5 cm



Yellowfin 25 cm

Bigeye 34 cm

Yellowfin 32 cm

Bigeye 36 cm

Yellowfin 37 cm

Yellowfin 41 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 2nd 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 2nd dorsal, small head and eye
  - Evenly spaced lines and rows of uniform dots
  - Noticeable “V” notch in caudal fin with two raised areas
  - 2nd dorsal and anal fins beginning to elongate

- **Note:**
  - the bigeye has lost all body markings and yellow coloration

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