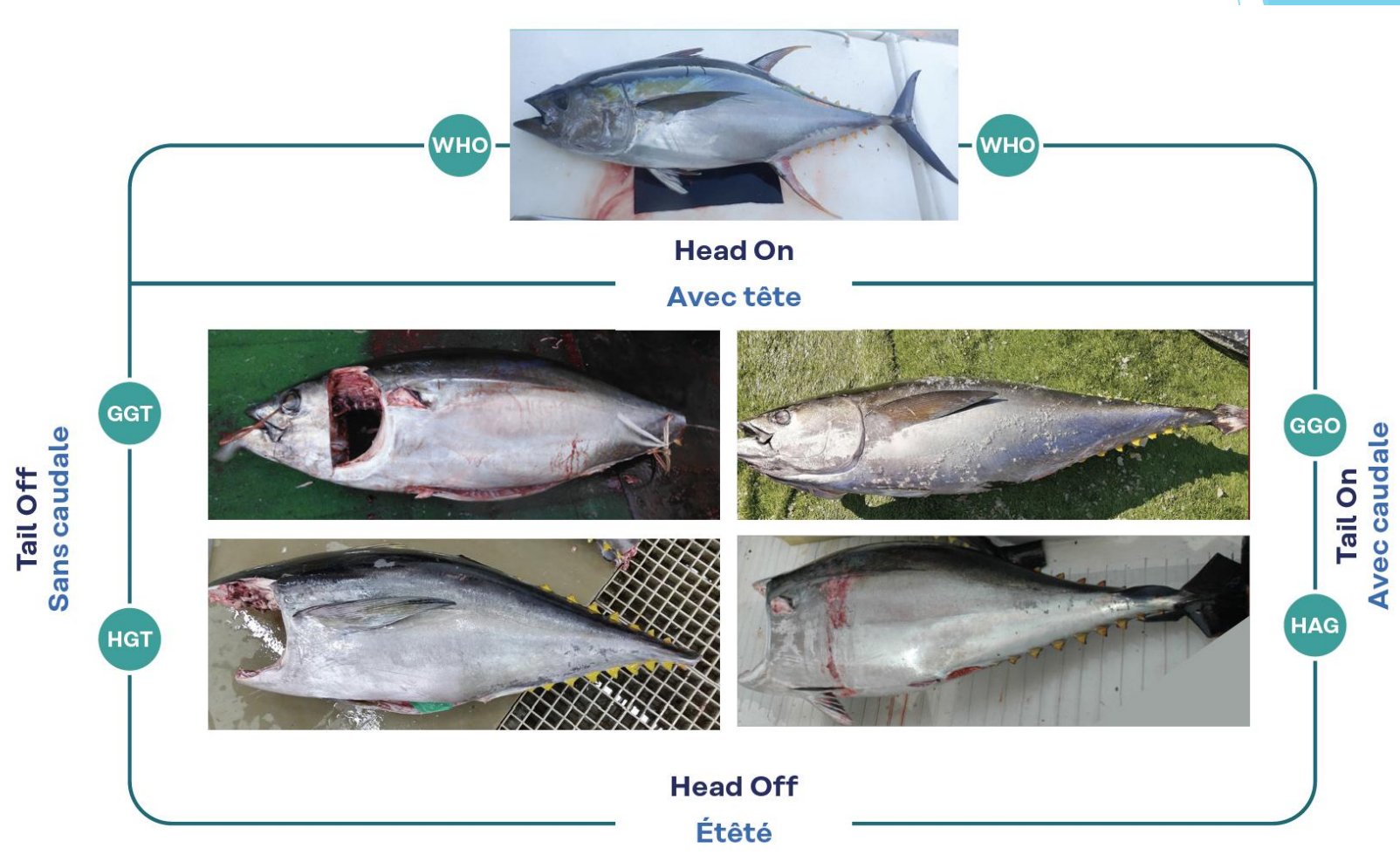


IDENTIFICATION OF PROCESSED TUNAS AND BILLFISHES

YFT LL GGT DF



Matrix of onboard fish processing used in IOTC fisheries



Tunas

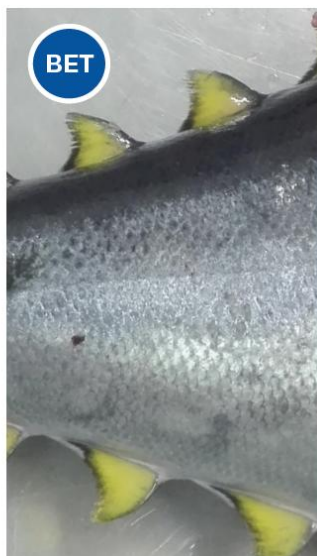


© OTHONGEL/OD

Remember the different parts you must check

- ▶ Pectoral fins
- ▶ Caudal fins
- ▶ Finlets
- ▶ Body shape
- ▶ Eyes
- ▶ Position of dorsal fins
- ▶ Colors or marks

Finlets

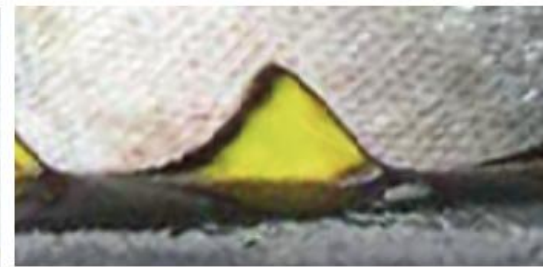


THON ALBACORE	THON OBÈSE	THON GERMON	THON LISTAO	THON ROUGE DU SUD
				

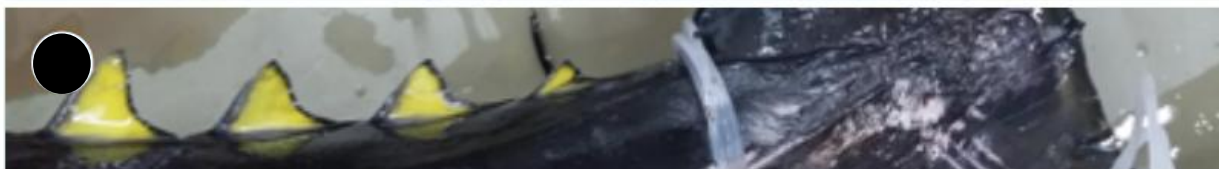
Shape
of body



Shape
of the
tail



Finlets





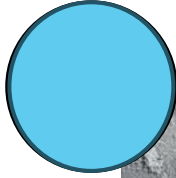
The main caudal keel is dull yellow for southern bluefin tuna (SBF).
La carène caudale principale est jaune pâle pour le thon rouge du sud (SBF).













When there is nothing visible,
what can we verify?



DIFFERENTIATION BETWEEN BET, YFT & SBF

THUNNUS OBESUS

Base of the stomach cavity smooth.

Base de la cavité stomacale lisse.



THUNNUS ALBACARES

Distinct protrusion.

Protrusion distincte.

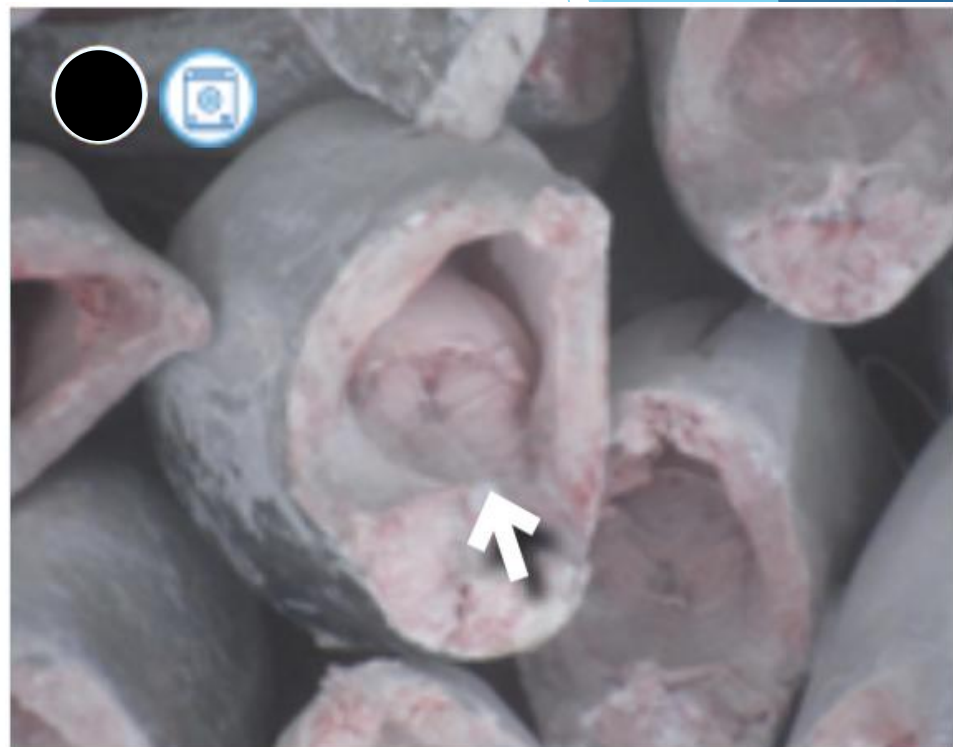


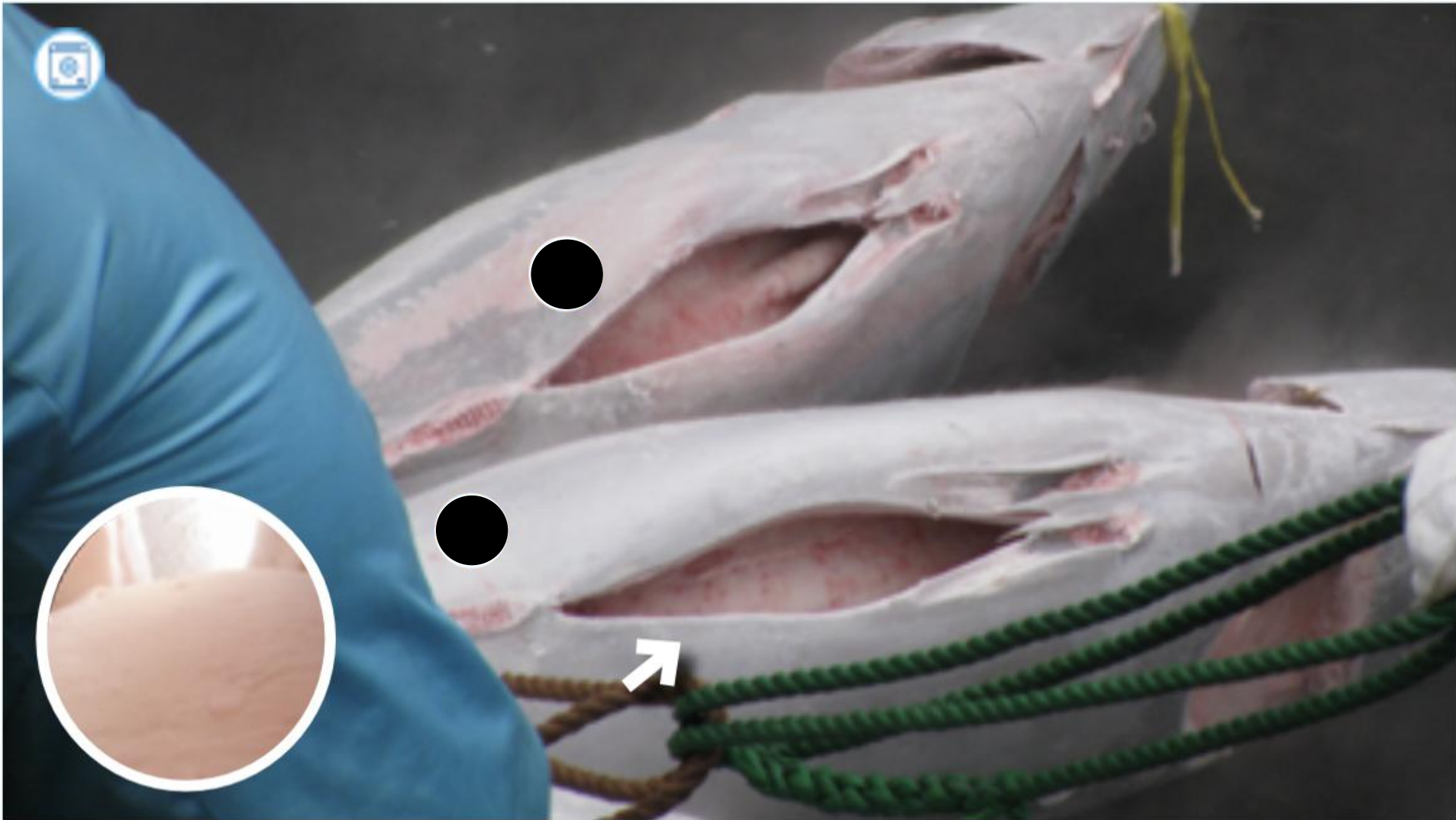
THUNNUS MACCOYII

Stomach cavity smooth with distinct bulge in front.

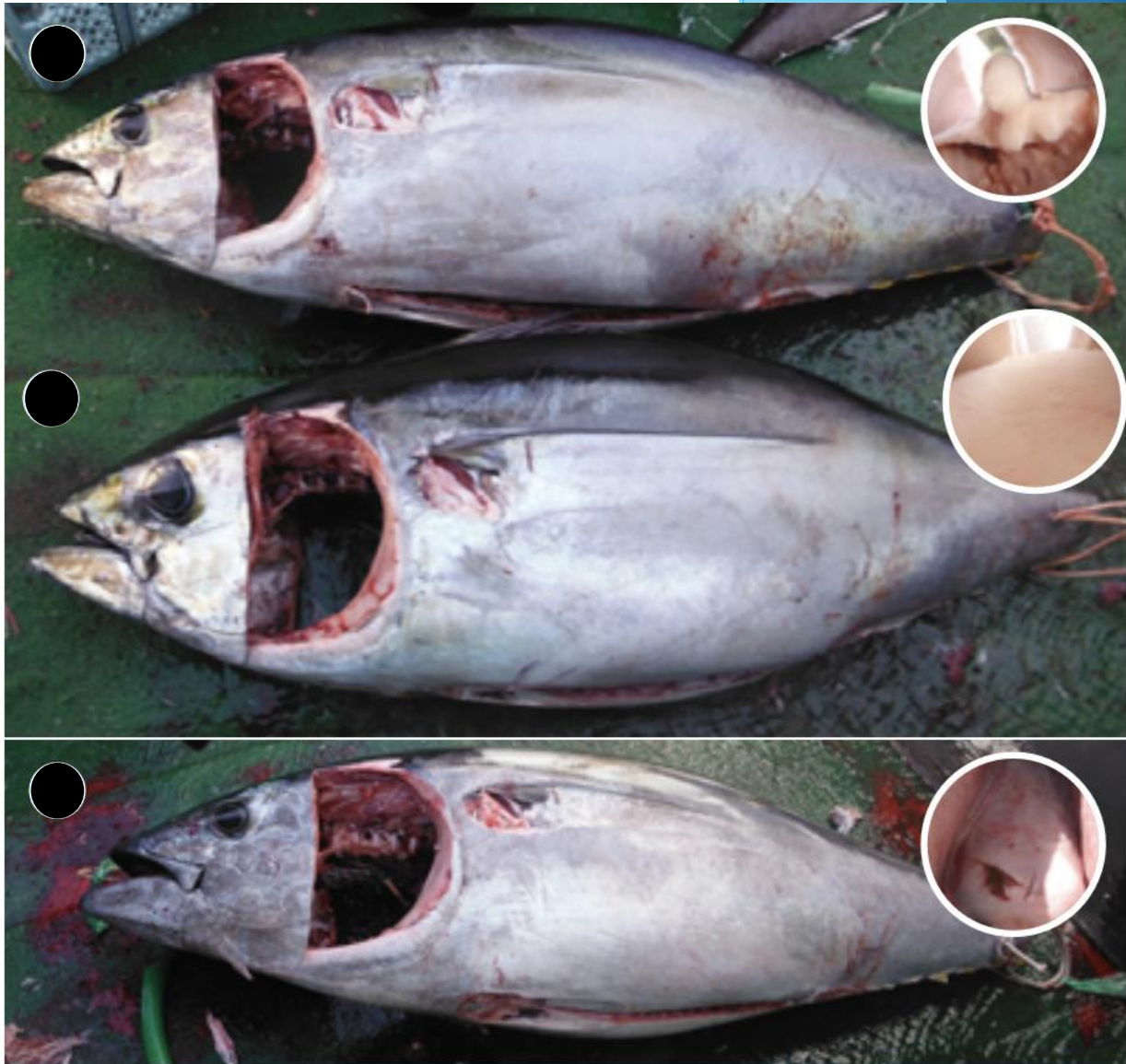
Cavité stomacale lisse avec renflement distinct à l'avant.







DIFFERENTIATION
BETWEEN BET,
YFT & SBF





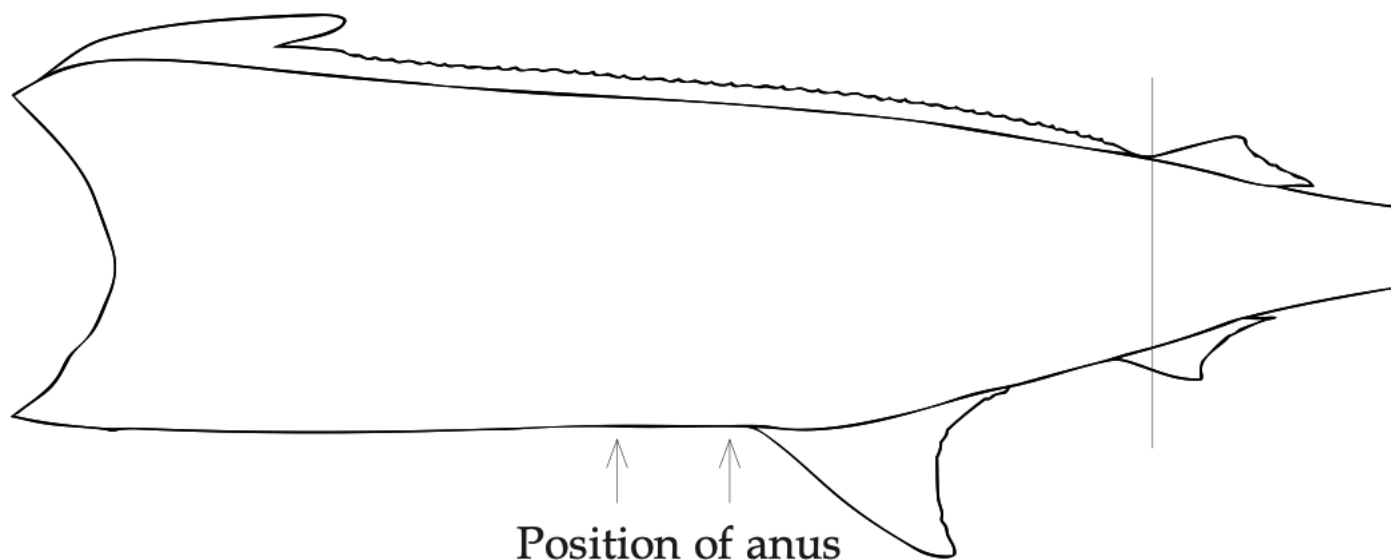


The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the image, creating a dynamic, modern feel. The left side is mostly a plain, light cream color.

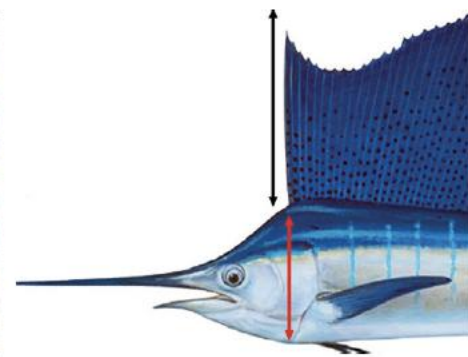
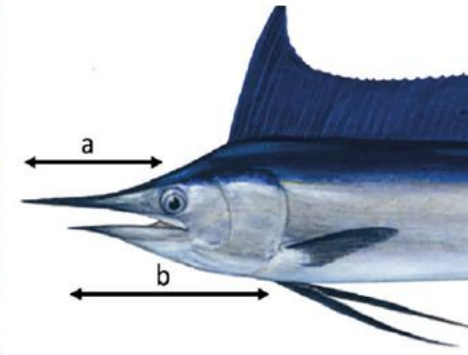
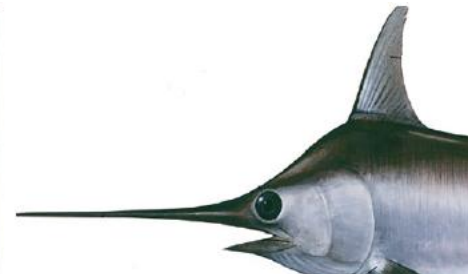
Billfish

What is left on processed billfish

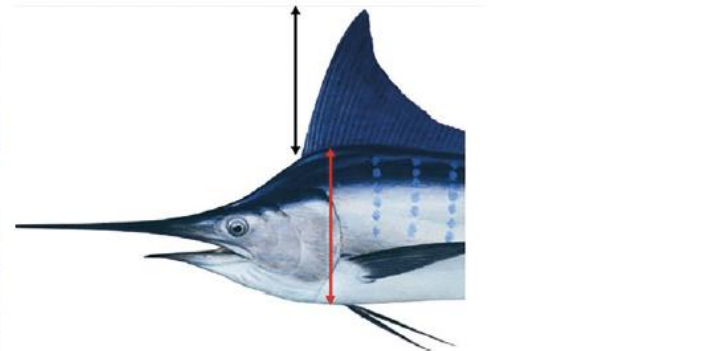
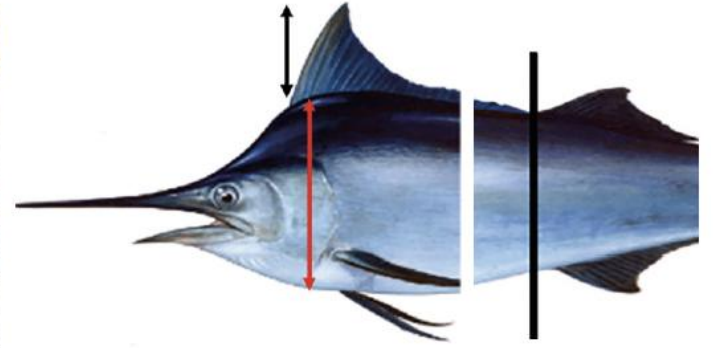
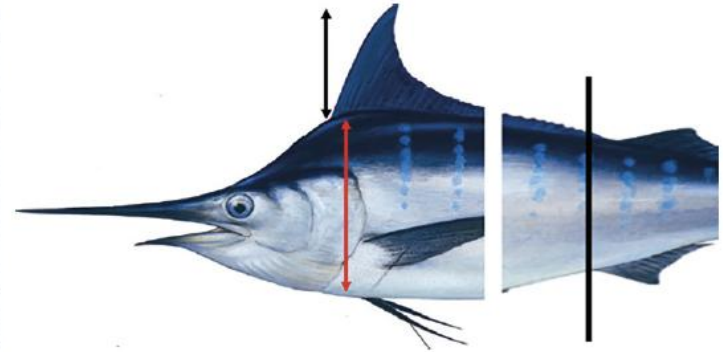
- ▶ They can be big specimens, so to store the fish they removed:
 - ▶ Head
 - ▶ Tail
 - ▶ Fins
 - ▶ Gutted



SWO/SSP/SFA comparison



Marlins comparisons



Processed Swordfish and sailfish

SWO



SFA



SWORDFISH // ESPADON

Skin colour changes from grey dorsal colour to fading to a pale pink on the ventral side. Broad flattened caudal peduncle clearly visible. Relatively broad oval shape in cross-section. More rounded than other marlin species.

La couleur de la peau passe du gris côté dorsal à la décoloration en rose pâle du côté ventral. Large pédoncule caudal aplati bien visible. Forme ovale relativement large en coupe transversale. Plus arrondi que les autres espèces de marlins.

SAILFISH // VOILIER

Long 'scar' from fin removal that extends to just past the anal fin. Second short scar just posterior to the dorsal fin where the second dorsal fin is removed. Significantly laterally compressed to all other billfish.

Longue «cicatrice» du retrait de la nageoire qui s'étend juste au-delà de la nageoire anale. Deuxième cicatrice courte juste en arrière de la nageoire dorsale où la deuxième nageoire dorsale est retirée. Significativement comprimé latéralement à tous les autres istiophoridés

Processed Marlines

BUM



BLM



SSP



BLUE MARLIN // MARLIN BLEU

More pronounced hump where first dorsal fin has been removed. Skin on ventral side rough to touch. Flesh grey in colour. Can be very large in comparison to other marlins. Thicker in cross section to Black marlin and Striped marlin.

Bosse plus prononcée là où la première nageoire dorsale a été retirée. Peau de la face ventrale rugueuse au toucher. Couleur gris chair. Peut être très grand par rapport aux autres marlins. Coupe transversale plus épaisse que le marlin noir et le marlin rayé.

BLACK MARLIN // MARLIN NOIR

Less pronounced hump where dorsal fin is cut away. Skin on ventral surface smooth to touch. More compressed in cross section to Blue marlin.

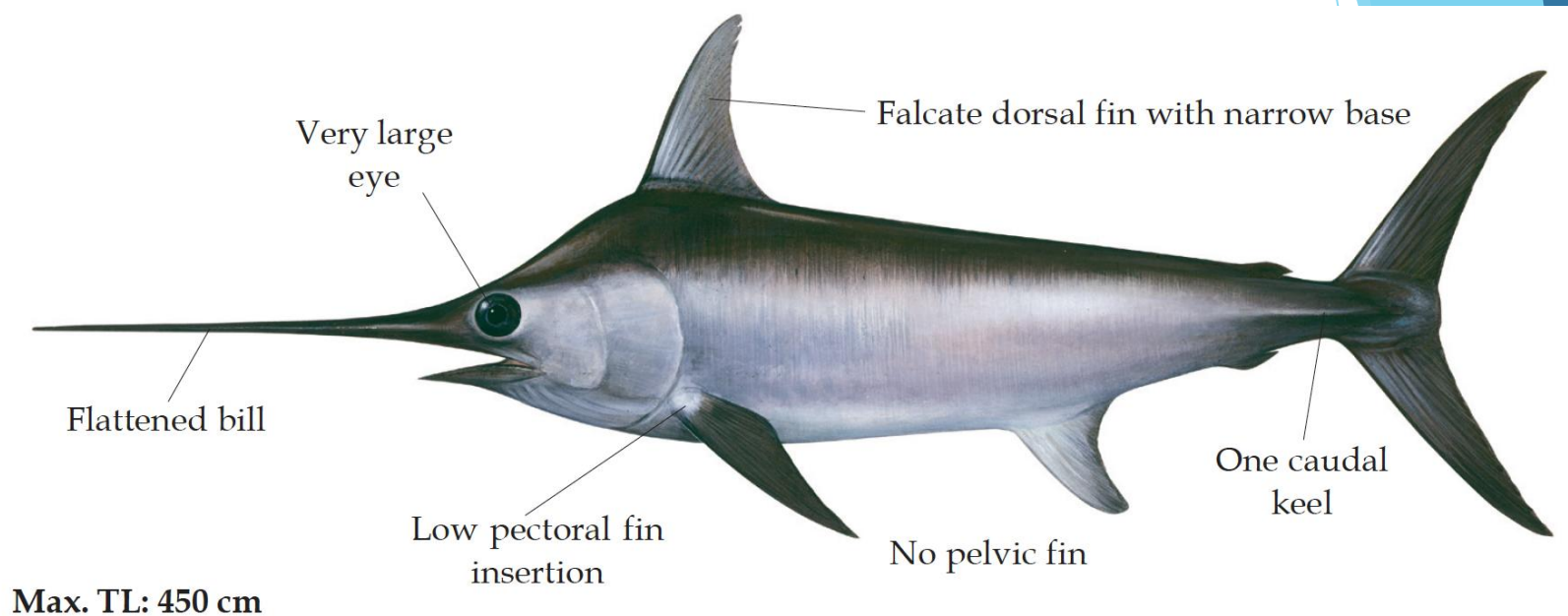
Bosse moins prononcée où la nageoire dorsale est coupée. La peau sur la surface ventrale est lisse au toucher. Plus comprimé en coupe transversale au marlin bleu.

STRIPED MARLIN // MARLIN RAYÉ

Notable low slope of head from eye to first dorsal fin. Normally (GGT). Skin smooth to touch. Flesh light pink in colour. More laterally compressed in cross section to Black and Blue marlins.

Notable faible pente de la tête de l'œil à la première nageoire dorsale. Normalement (GGT). Peau lisse au toucher. Chair rose clair. Plus latéralement comprimé en coupe transversale aux marlins noirs et bleus.

SWORDFISH (SWO) - *Xiphias gladius*



BILL: Long flattened bill. **BODY:** Head almost flat from bill to base of dorsal. Large eyes. Dark blue/black on the dorsal surface fading gradually to a steel grey / white ventrally. **DORSAL:** First & second dorsal widely separated (except if <100 cm). **PEDUNCLE & KEEL:** One large single caudal keel on either side. **CAUDAL:** Large broad caudal relative to other billfish. Similar colour to dorsal surface. **ANAL:** First anal long, almost half length of dorsal & pectoral. Leading edge slightly curved. Second anal short and indistinct & slightly anterior to second dorsal. **PELVIC:** No pelvic fins. **PECTORAL:** Placed low on body.

SWORDFISH (SWO)



Swordfish is mainly caught in longline fishery and processed in number of ways: i) whole, gilled and gutted; ii) headed & finned with tail on; iii) headed & finned with tail off; and iv) filleted. Underside of processed swordfish pale pink colour. **Very distinct broad caudal peduncle visible in all processed states.** Commonly preserved onboard frozen or fresh on ice.

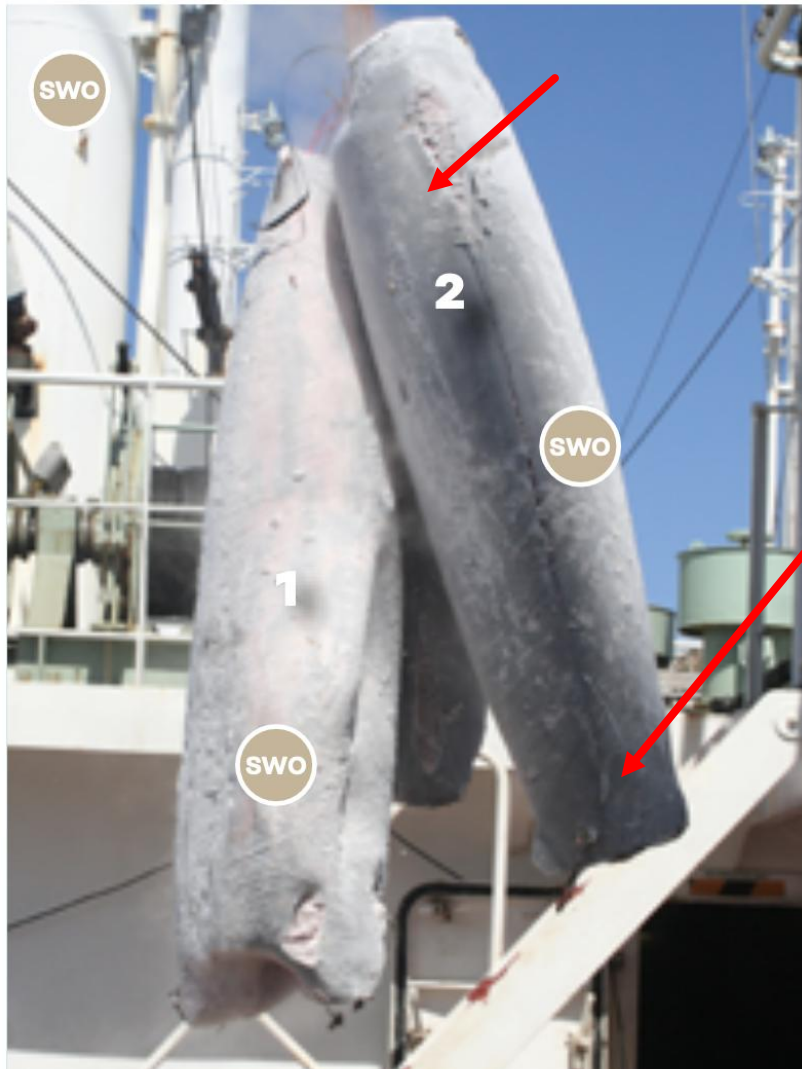
SWORDFISH (SWO)



- ▶ Dorsal fin scar visible

SWORDFISH (SWO)

SWO LL HGT FR



1. Relatively uniform colour from grey on dorsal to pinkish on ventral side.

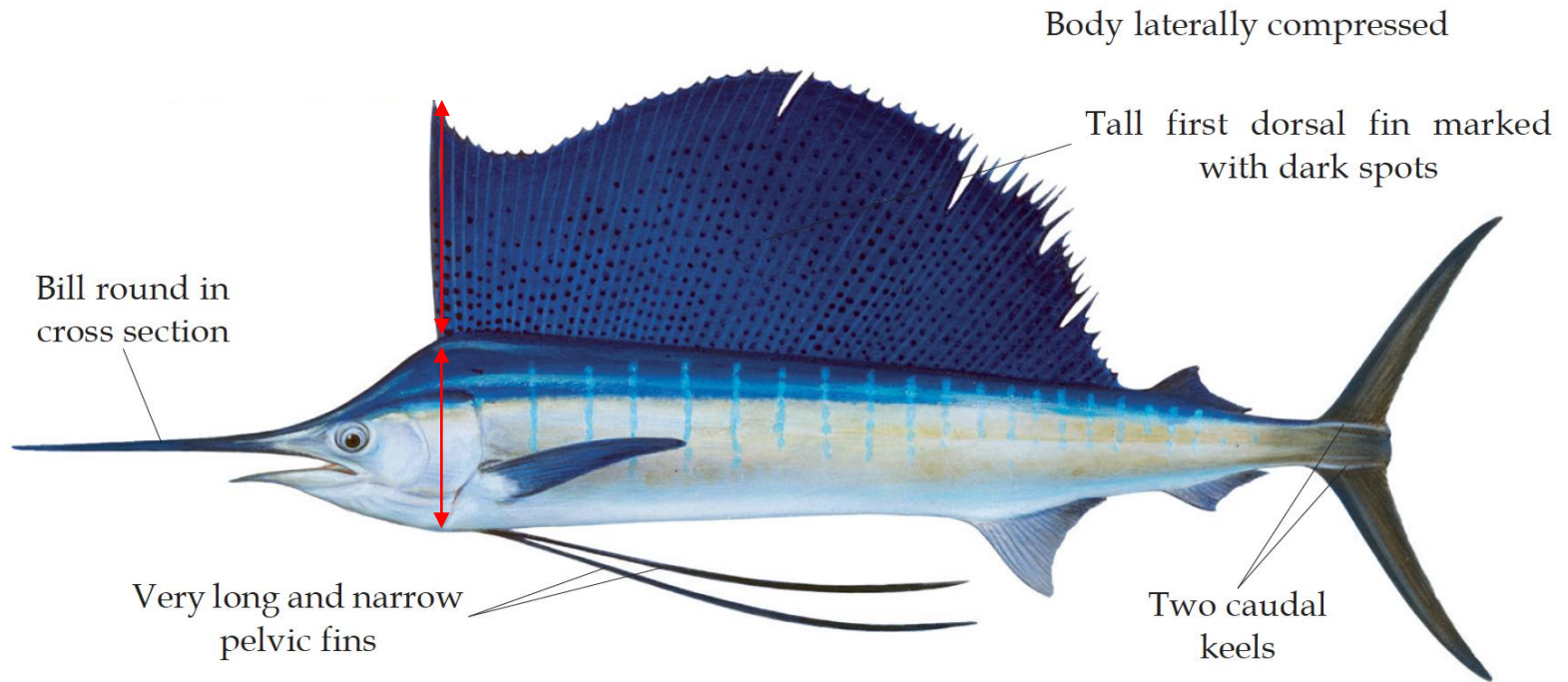
2. The scar of the dorsal fin cut near the head.

1. Couleur relativement uniforme du gris sur la dorsale au rosâtre sur la face ventrale.

2. La cicatrice de la nageoire dorsale coupée près de la tête.

INDO-PACIFIC SAILFISH (SFA)

Istiophorus platypterus



Max. TL: 320 cm

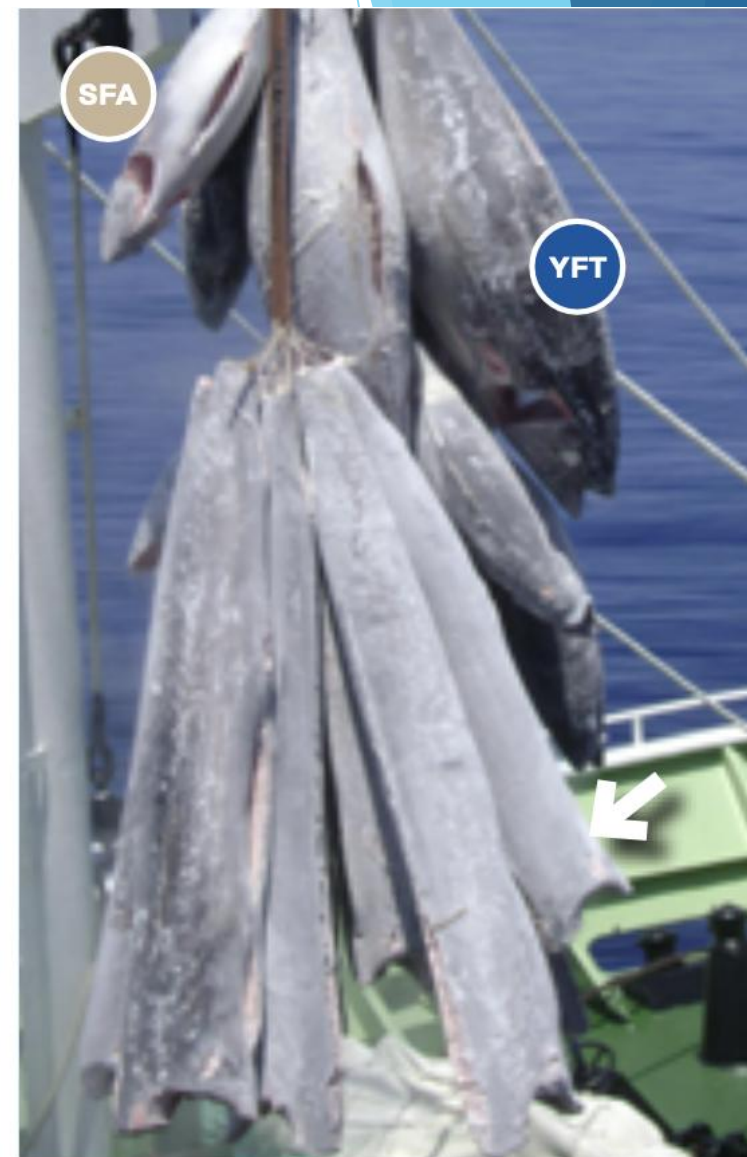
BILL: Round in cross section. **BODY:** back dark with about 20 bluish vertical bars; belly pale silver. **DORSAL:** Two dorsal fins, the first very large (42 to 49 rays) the second small (six to seven rays). Slender elongate and compressed with a high, sail-like first dorsal fin. Membrane of first dorsal fin blue-black with numerous dark spots. **PEDUNCLE & KEEL:** Caudal peduncle with double keels on each side. **CAUDAL:** Forked. **ANAL:** Bases of first & second anal tinged with silvery white. **PELVIC:** Two soft rays fused together, very long and narrow, depressible into a groove. **PECTORAL:** Long, stiff, falcate in shape, with 18 to 20 rays.

INDO-PACIFIC SAILFISH (SFA)



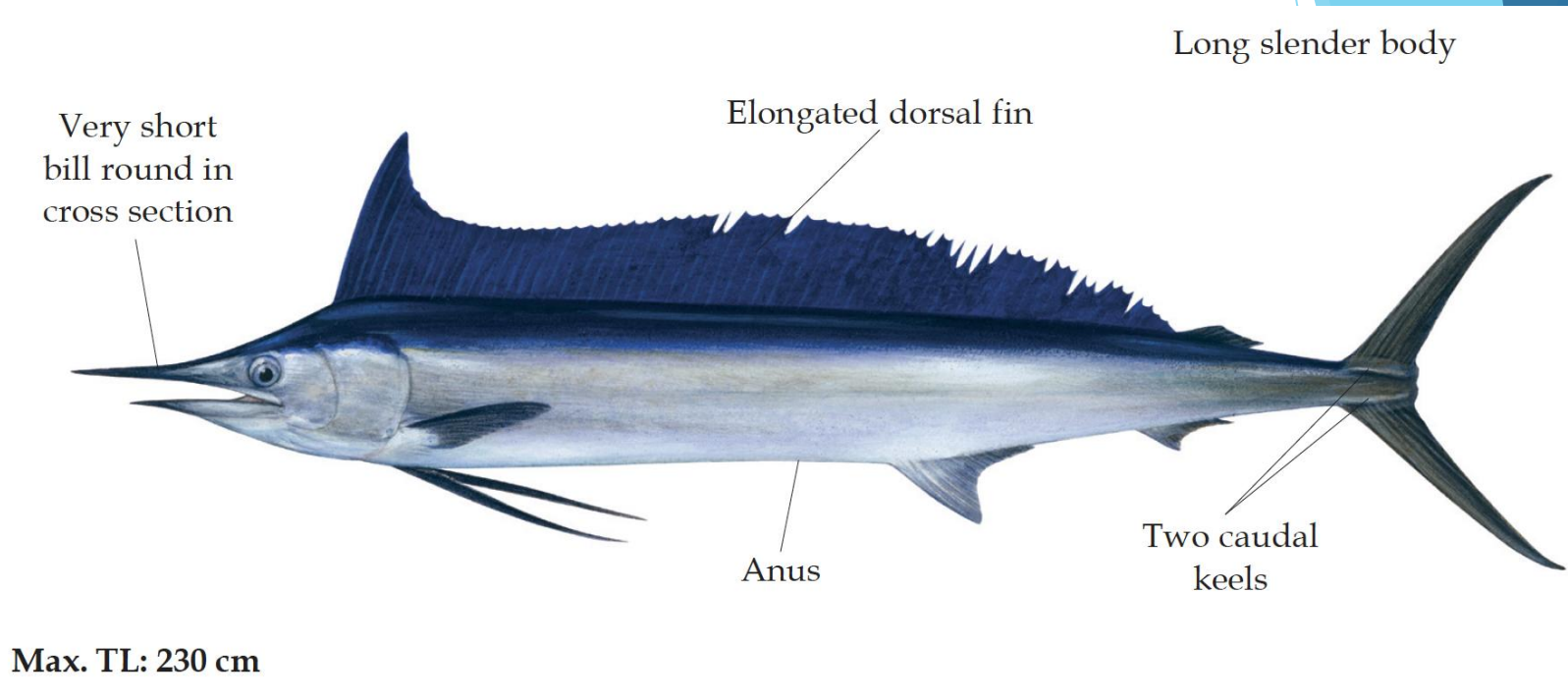
Long cut on dorsal ridge where fin is removed that extend well past the anal fin, second cut near tail where short second dorsal fin is removed.

INDO-PACIFIC SAILFISH (SFA)



SHORTBILL SPEARFISH (SSP)

Tetrapturus angustirostris



BILL: Bill very short, equal to or shorter than head length. **BODY:** Dark blue with brown along the sides and silvery-white below. **DORSAL:** Long, first dorsal dark blue. **PEDUNCLE & KEEL:** Two caudal keels. **CAUDAL:** Inner surfaces black and the outer surface is white. **ANAL:** White colour. **PELVIC:** Longer than pectoral. **PECTORAL:** Inner surfaces black and the outer surface is white.

SHORTBILL SPEARFISH (SSP)



Bill very short (a), equal to or shorter than head length (b).

Rostre très court (a), de longueur égale ou inférieure à celle de la tête (b).

SHORTBILL SPEARFISH (SSP)

SSP LL WHO IC



SHORTBILL SPEARFISH (SSP)

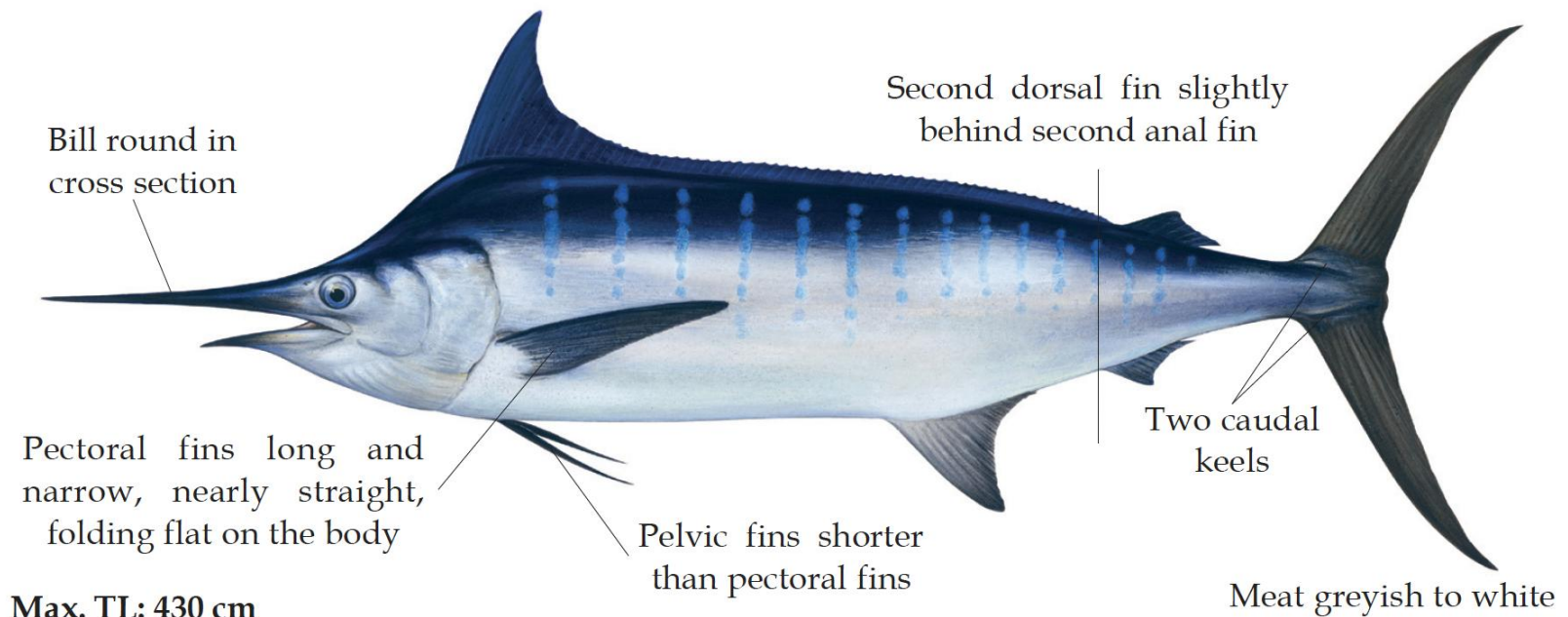
SSP LL GGT IC



1. Processed head off and bill off.

2. Scar where topfin is cut extends well past the anal fin and merges with the scar where second dorsal fin is removed. Commonly confused with the indo-pacific sailfish.

BLUE MARLIN (BUM) - *Makaira nigricans*



BILL: Round in cross section. **BODY:** Blue-black on dorsal surface and white silver below with approximately 15 vertical stripes. Body thick in cross section with greyish-white meat. Lateral line has a network of interconnecting canals. **DORSAL:** Second dorsal slightly behind to second anal. First dorsal height is $\frac{1}{2}$ to $\frac{3}{4}$ of greatest body depth. **PEDUNCLE & KEEL:** Two caudal keels. **CAUDAL:** Forked, symmetrical (*homocercus*) & rigid. **ANAL:** Brown, bases with a tinge of silvery white. **PELVIC:** Shorter than pectoral. **PECTORAL:** Pectoral rotate and fold flat to body and are almost straight, not sickle shaped.

BLUE MARLIN (BUM)



Blue marlins are processed either whole (brined) or head, fins and tail cut off (on ice/frozen). Processed products have more pronounced hump near head, body thick in cross section with greyish-white meat and belly feels smooth if rubbed toward head. Sometimes processed in fillets. Commonly preserved onboard frozen or fresh on ice (bill often removed).

BLUE MARLIN (BUM)

Blue marlins have more pronounced hump near head, body thick in cross section.



BLUE MARLIN (BUM)



Blue marlins have more pronounced hump near head, body thick in cross section.

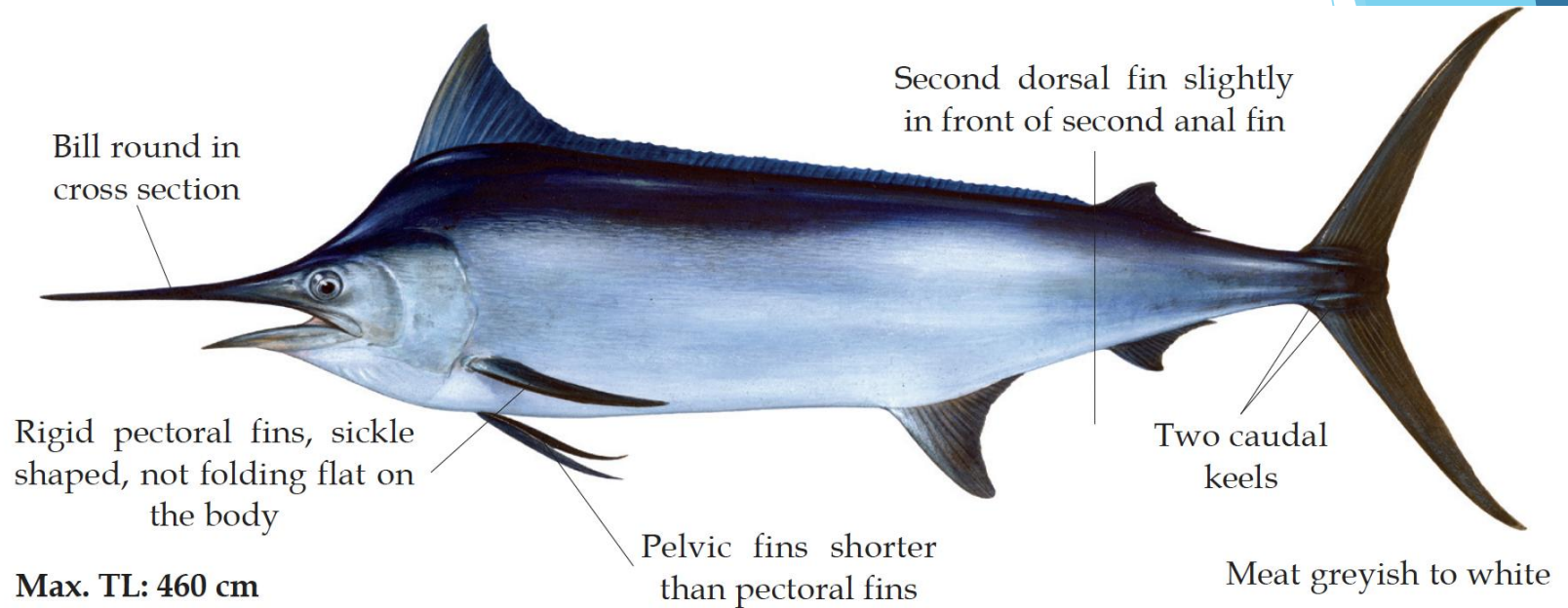
BLUE MARLIN (BUM)



BLUE MARLIN (BUM)

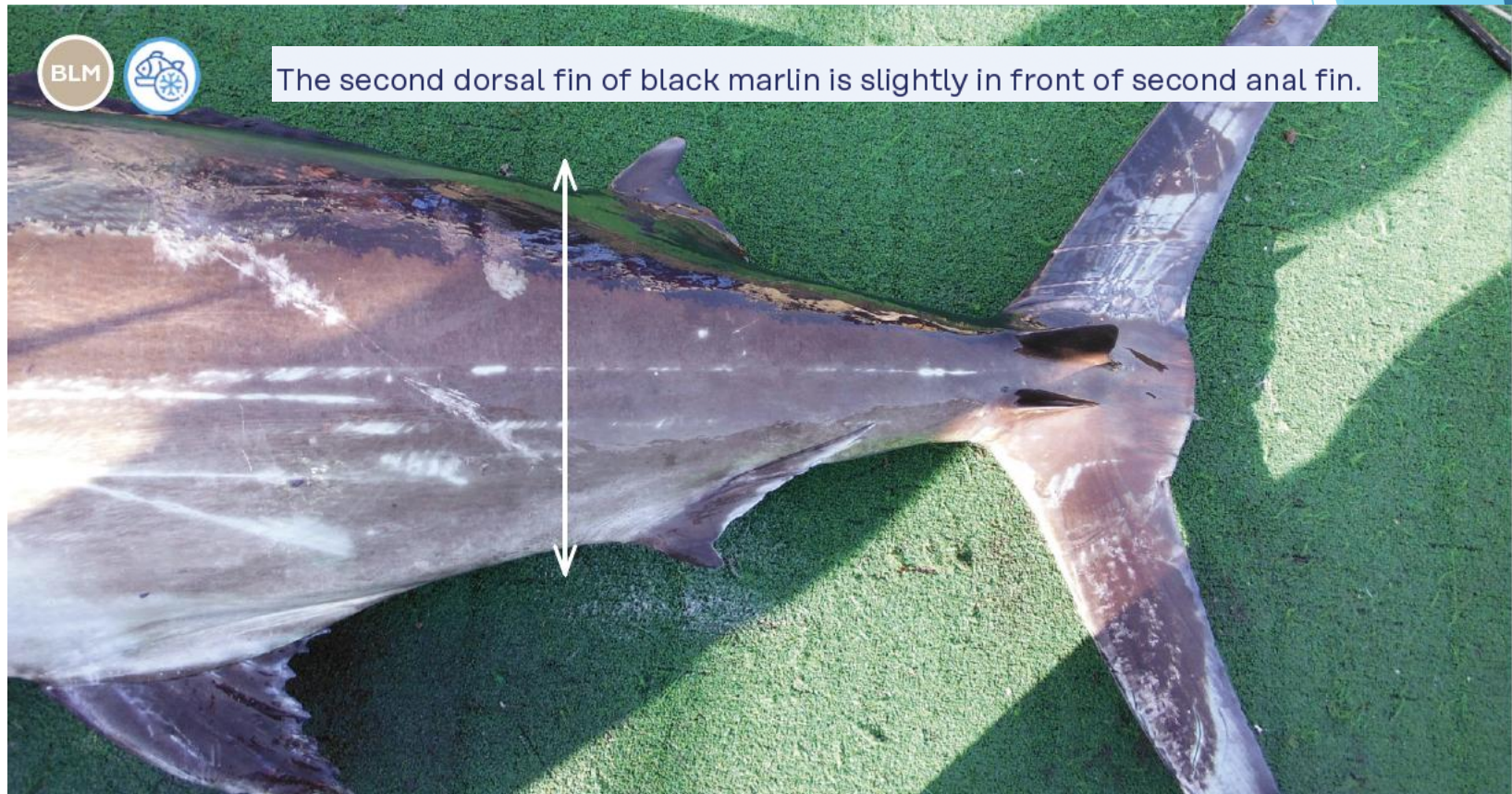


BLACK MARLIN (BLM) *Istiompax indica*

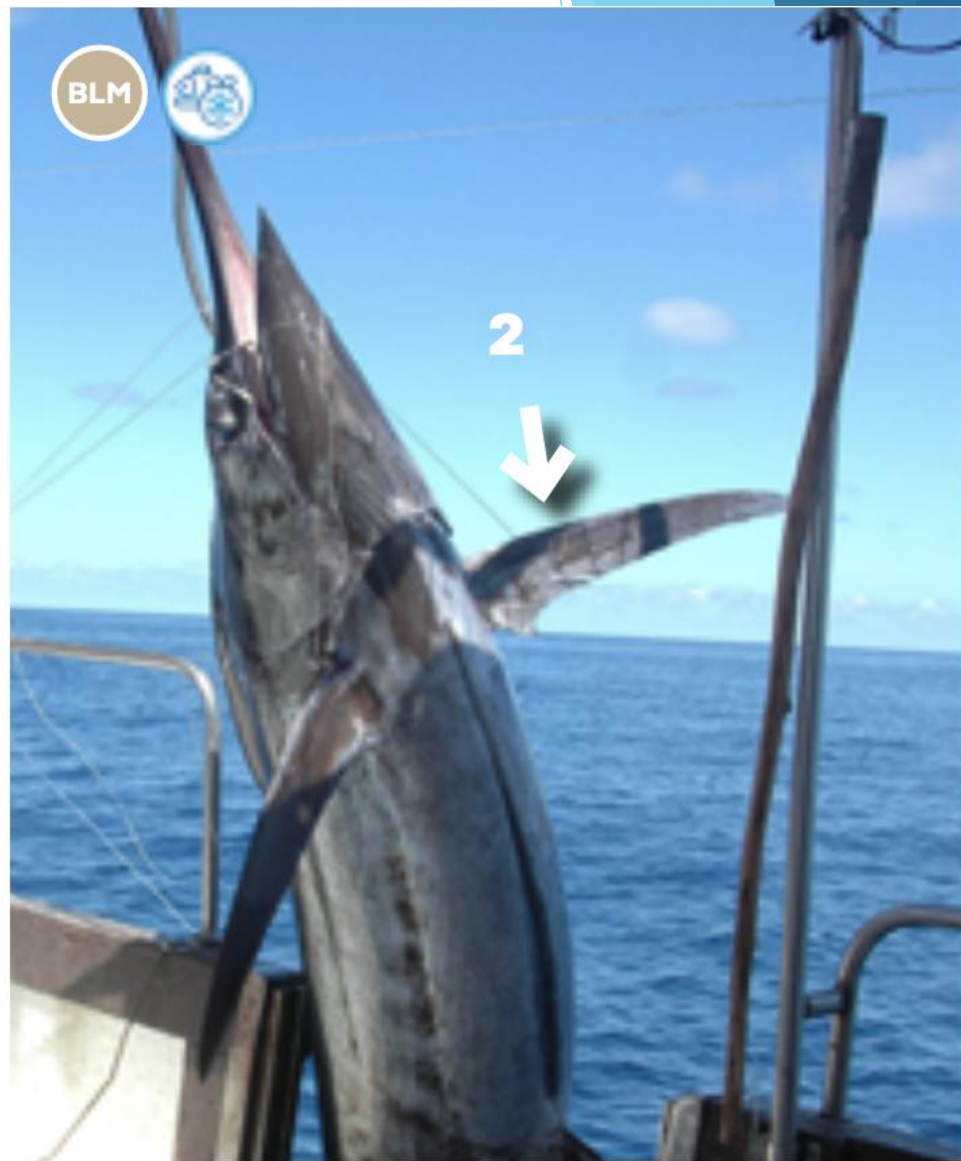


BILL: Short, stout bill, round in cross section. **BODY:** Body elongate & not very compressed. Black to dark blue on the back, silver white to white on belly. Highly angled nape (area between bill & first dorsal). Flanks without spots. Sometimes with light blue vertical stripes. **DORSAL:** Membrane of first dorsal blue black. Low dorsal rounded tip. First dorsal height is $\frac{1}{2}$ or less of body depth; second dorsal slightly front of second anal. **PEDUNCLE & KEEL:** Two caudal keels. **CAUDAL:** Forked, symmetrical (homocercus) & rigid. **ANAL:** Brown with tinges of dark blue in some specimens. **PELVIC:** Short, shortest of all marlins. **PECTORAL:** sickle shaped & rigid; cannot be folded flat to body.

BLACK MARLIN (BLM)



BLACK MARLIN (BLM)

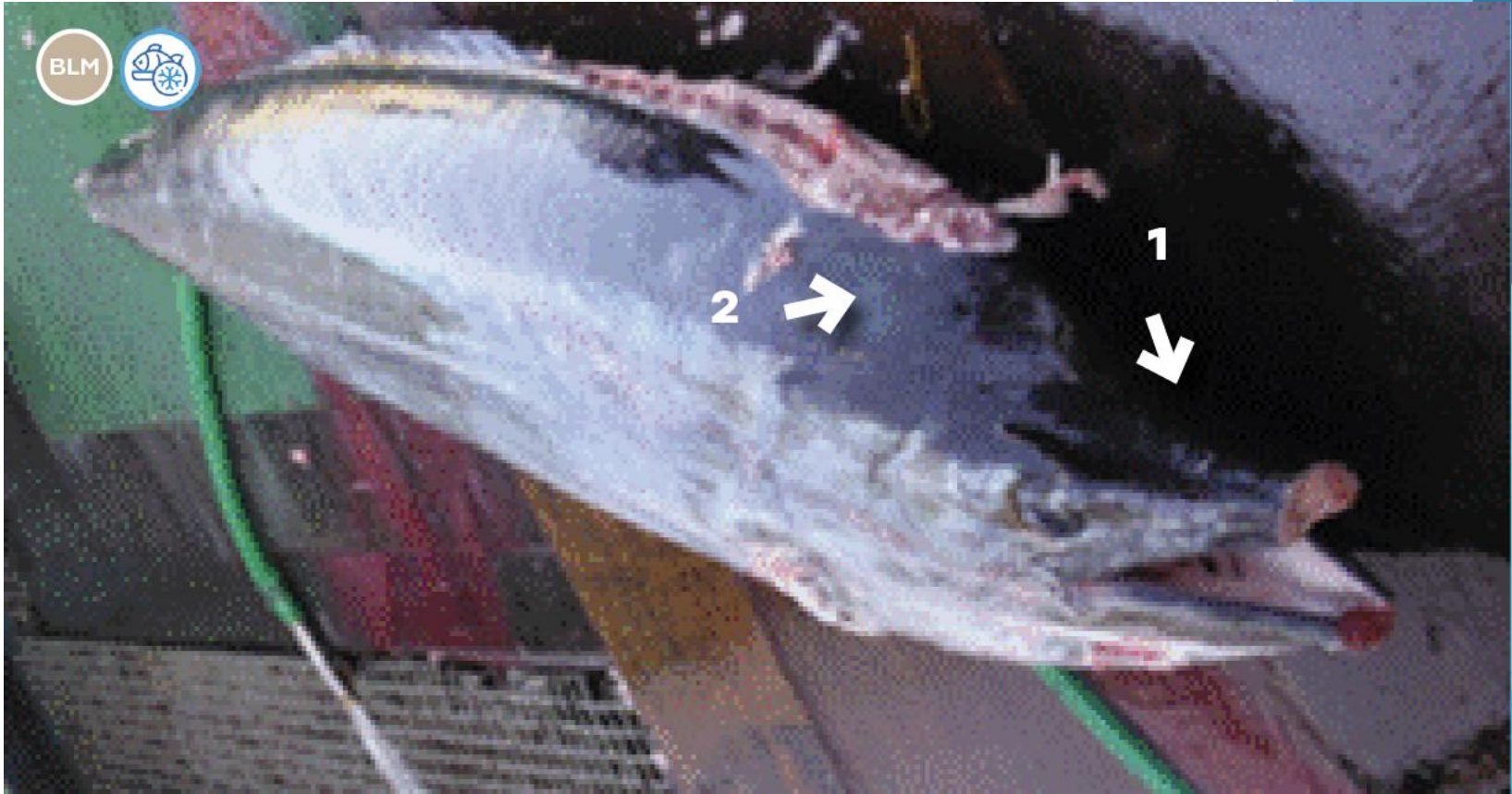


BLACK MARLIN (BLM)



Ridged pectoral fin cut to fold it flat. Distinguishing features visible for a black marlin are steep forehead and short dorsal fin that is less than half the width of the head.

BLACK MARLIN (BLM)

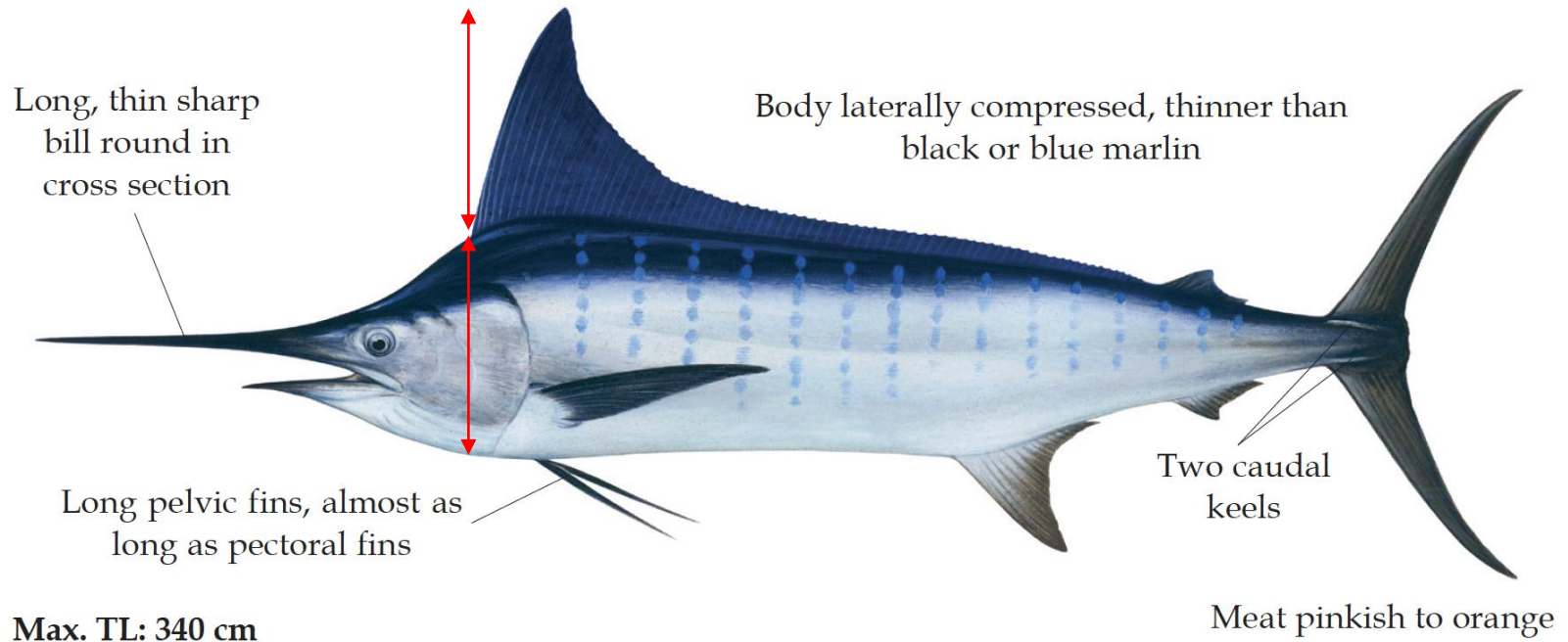


The steeper slope of head anterior to first dorsal fin.

Flesh feels smooth after processing with less pronounced hump near head.



STRIPED MARLIN (MLS) – *Kajikia audax*



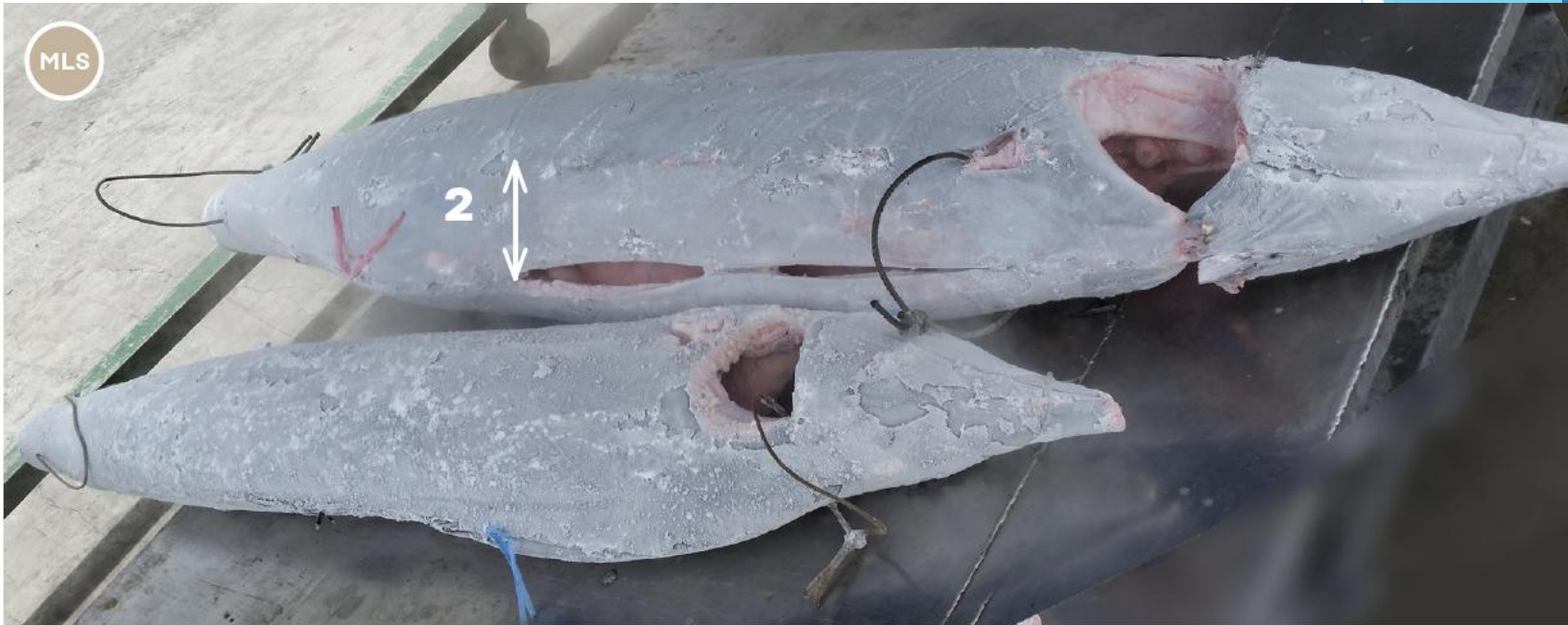
BILL: Long, thin, sharp. **BODY:** Back dark blue; belly silvery; membrane of first dorsal blue black without dark spots; flanks with about 20 bluish stripes. Laterally compressed, not rounded, much thinner than blue or black marlins. **DORSAL:** First dorsal height equal to or greater than body depth, thin membrane easily torn. **PEDUNCLE & KEEL:** Two caudal keels. **CAUDAL:** Forked, symmetrical and rigid. **ANAL:** Base with a tinge of silvery white. **PELVIC:** Long thin, longest of all marlins. **PECTORAL:** Falcate & flexible.

STRIPED MARLIN (MLS)



Meat of striped marlin pinkish to orange in colour and belly will feel smooth if rubbed towards head. Shape and height of dorsal fin equal or greater than body depth. Normally gutted and gilled. Commonly preserved on board fresh on ice or frozen (LL).

STRIPED MARLIN (MLS)



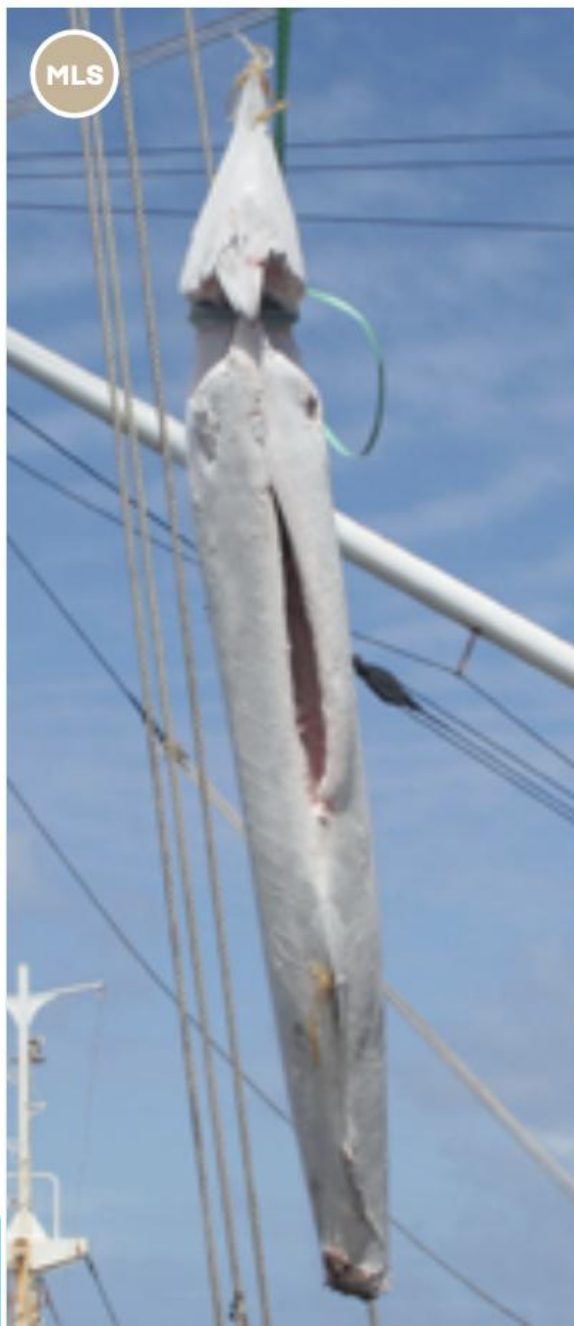
1. Processed head on and bill off. **2.** Body laterally compressed, thinner than black or blue marlin.

1. Transformé avec la tête et le rostre coupé. **2.** Corps compressé latéralement, plus fin que celui du marlin noir ou bleu.

STRIPED MARLIN (MLS)

MLS GGT FR





Comparison between blue and black marlins

BLUE MARLIN / MARLIN BLEU

First dorsal fin height is $\frac{1}{2}$ to $\frac{3}{4}$ greatest body depth.

La hauteur de la première nageoire dorsale est de $\frac{1}{2}$ à $\frac{3}{4}$ la plus grande hauteur du corps.

Pectoral fins nearly straight, not sickle shaped.

Nageoires pectorales presque droites, pas en forme de faucille.

Second dorsal fin slightly posterior to second anal fin.

Deuxième nageoire dorsale légèrement postérieure à la deuxième nageoire anale

Blue-black colour on back and upper sides, white/silver below.

Couleur bleu-noir sur le dos et les côtés supérieurs. Ventre blanc / argent.

Body thick in cross section with greyish-white meat.

Corps épais en coupe transversale avec chair blanc grisâtre.

BLACK MARLIN / MARLIN NOIR

First dorsal fin height is equal or less than half of body depth.

La hauteur de la première nageoire dorsale est égale ou inférieure à la moitié de la profondeur du corps

Pectoral fins sickle shaped and rigid, cannot be folded flat to body.

Nageoires pectorales en forme de faucille et rigides, ne peuvent pas être pliées à plat sur le corps

Second dorsal fin slightly in front of second anal fin.

Deuxième nageoire dorsale légèrement en avant de la deuxième nageoire anale.

Black to dark blue colour on dorsal surface. Belly silvery-white to white.

Couleur noire à bleu foncé sur la face dorsale. Ventre blanc argenté à blanc.

Angled nape (area between bill and first dorsal fin). Short, stout bill, round in cross section.

Nuque inclinée (zone entre le bec et la première nageoire dorsale). Bec court et robuste, section transversale ronde.







Fillet comparison

SWORDFISH (SWO)

SWO LL FLT FR



Swordfish is mainly caught in longline fishery and processed in number of ways: i) whole, gilled and gutted; ii) headed & finned with tail on; iii) headed & finned with tail off; and iv) filleted. Underside of processed swordfish pale pink colour. Very distinct broad caudal peduncle visible in all processed states. Commonly preserved onboard frozen or fresh on ice.

Comparison between blue marlin and sailfish



THANKS

QUESTIONS?



REFERENCES

IOTC (2013). IDENTIFICATION OF TUNA AND TUNA-LIKE SPECIES IN INDIAN OCEAN FISHERIES. IOTC-2013-SC16-INF10.

IOTC (2022). PORT STATE MEASURES – SPECIES IDENTIFICATION GUIDE FOR FISHERIES INSPECTORS, VICTORIA. FAO. [HTTPS://DOI.ORG/10.4060/CC3060B](https://doi.org/10.4060/cc3060b)