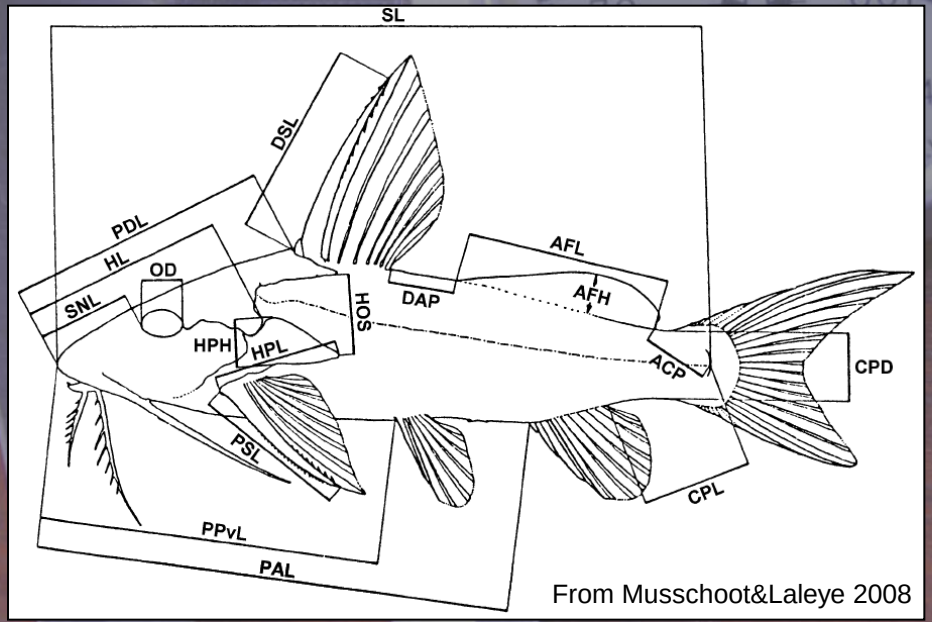
Fish Morphology and Identification in FishBase

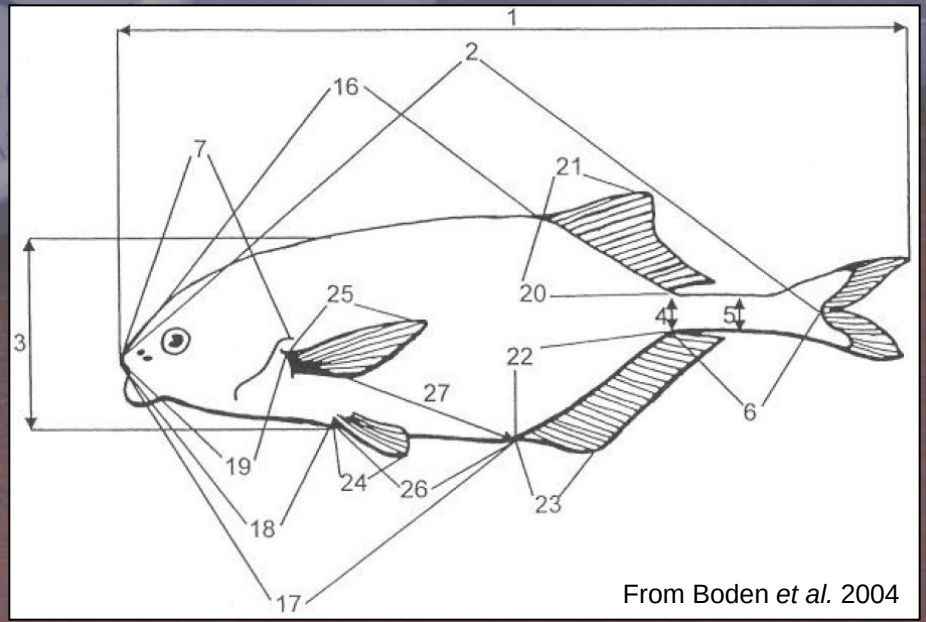
1. Fish Morphology

- Major characters for description and identification of fish:

1. morphometric characters, referring to continuous variables



From Musschoot&Laleye 2008

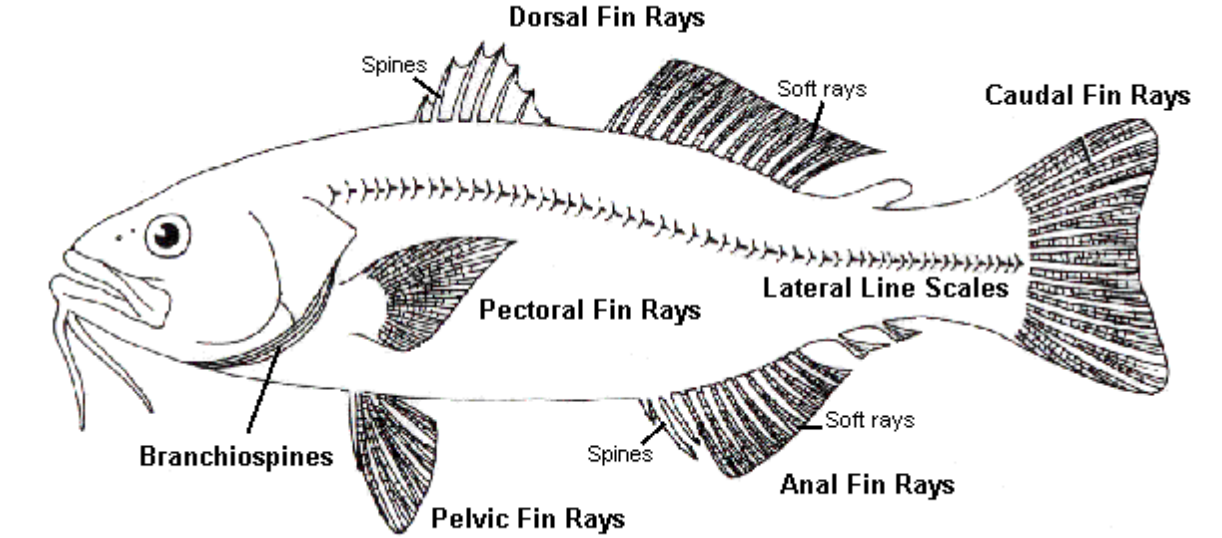


From Boden *et al.* 2004

1. Fish Morphology

- Major characters for description and identification of fish:

2. meristic characters, referring to discontinuous variables

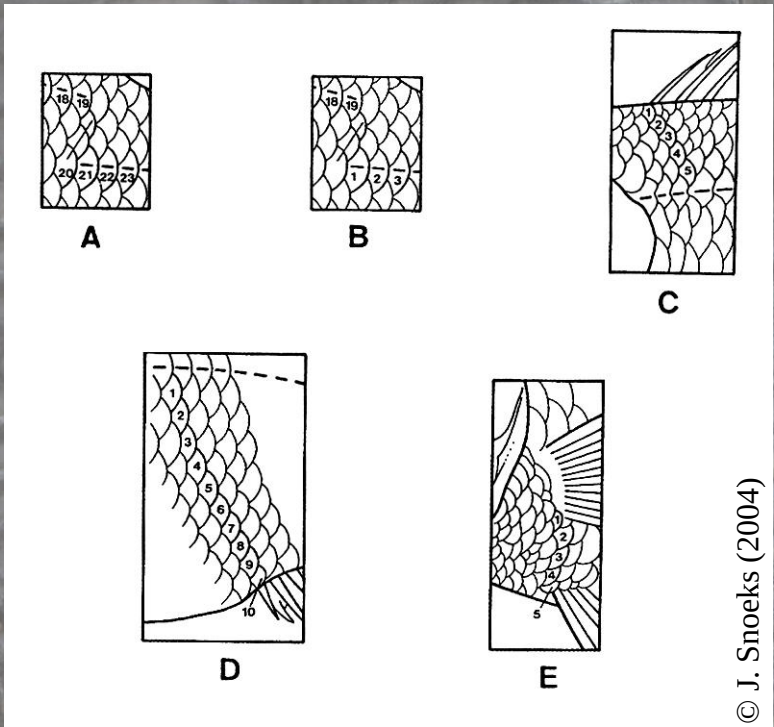


© G. Pavlineris (modified)

© Rajesh Dangi

1. Fish Morphology

Some common meristics: scale counts



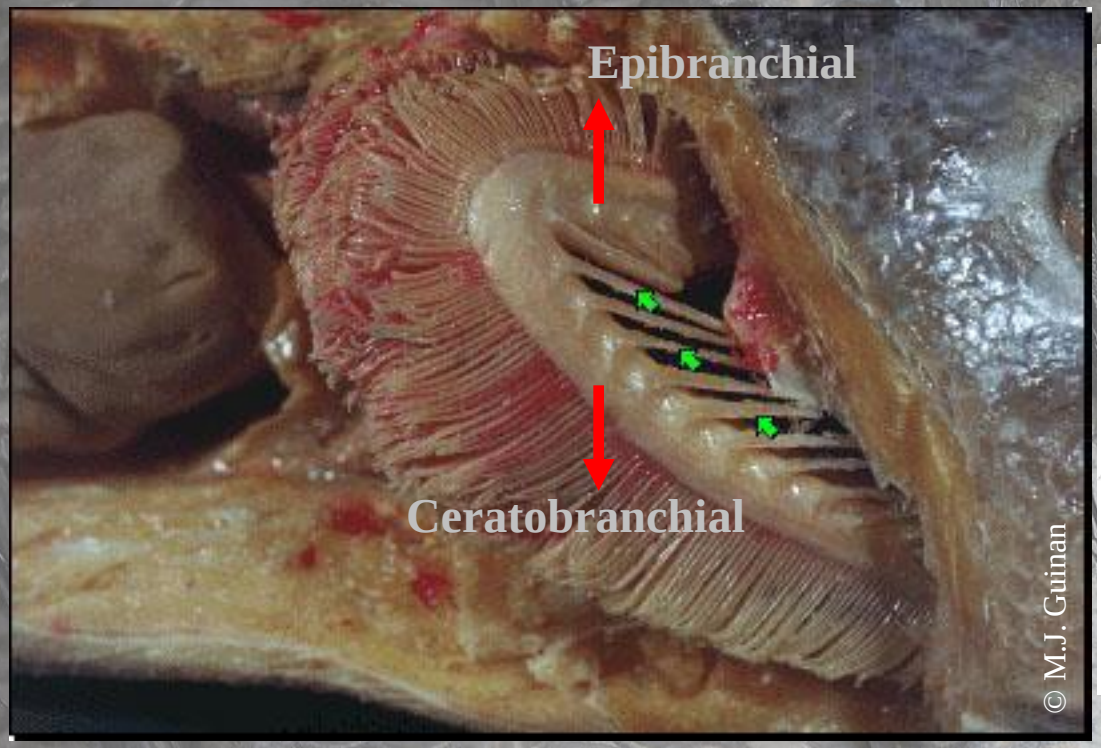
A. Longitudinal scales
B. Lateral scales
C. Upper transversal scales
D. Lower transversal scales
E. Scales between pectoral and pelvic fins

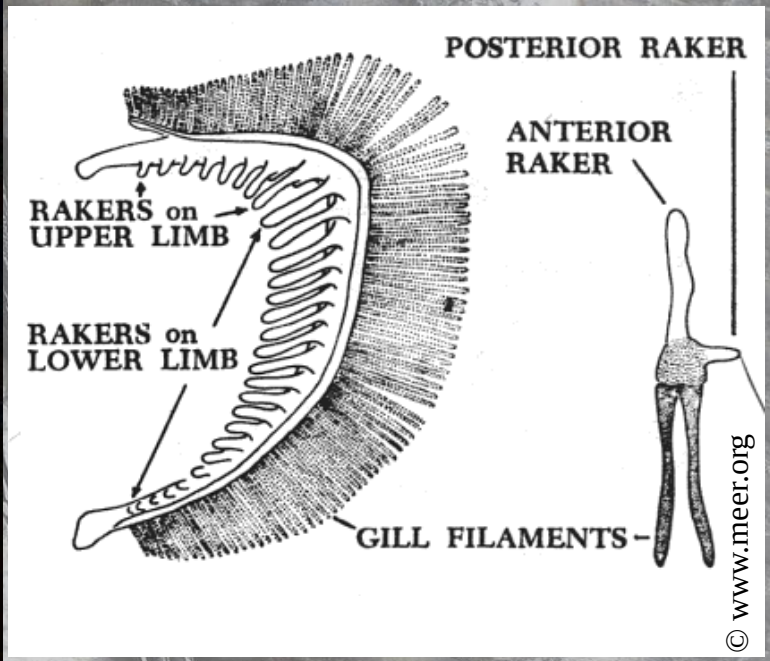
Also predorsal scales, scales around caudal peduncle,…

1. Fish Morphology

Some common meristics: gill rakers

Branchial arch - gill filaments – gill rakers





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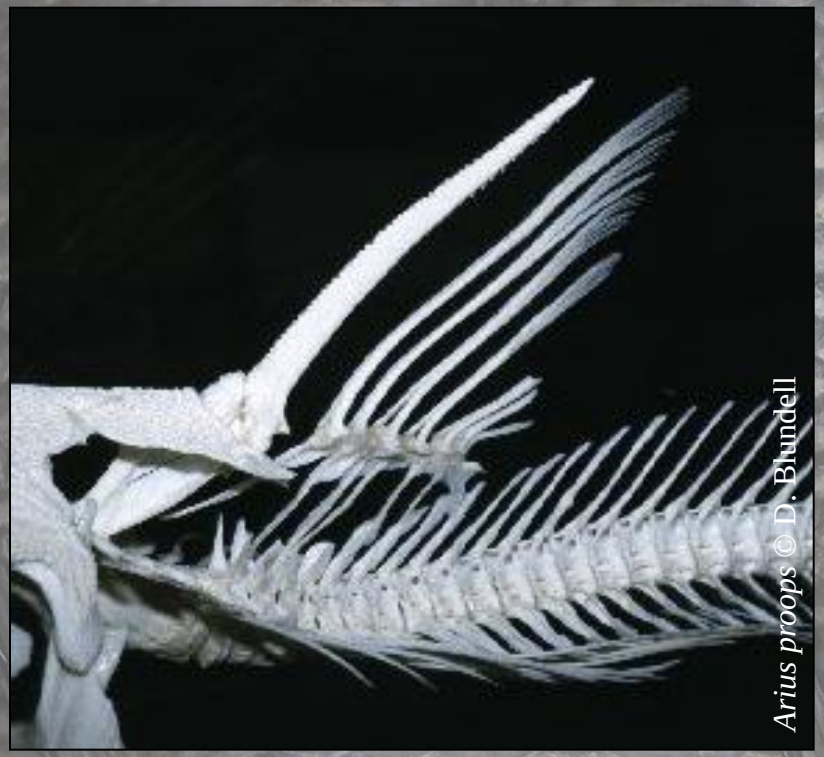
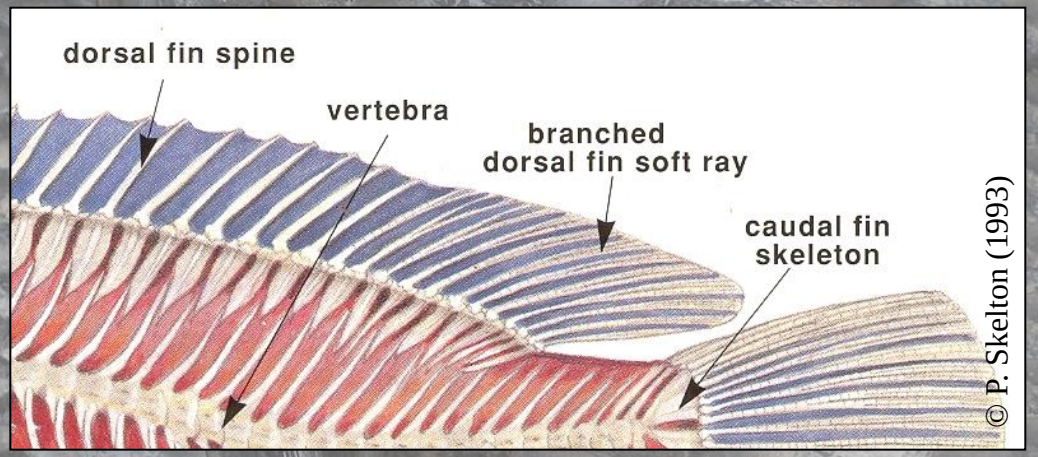
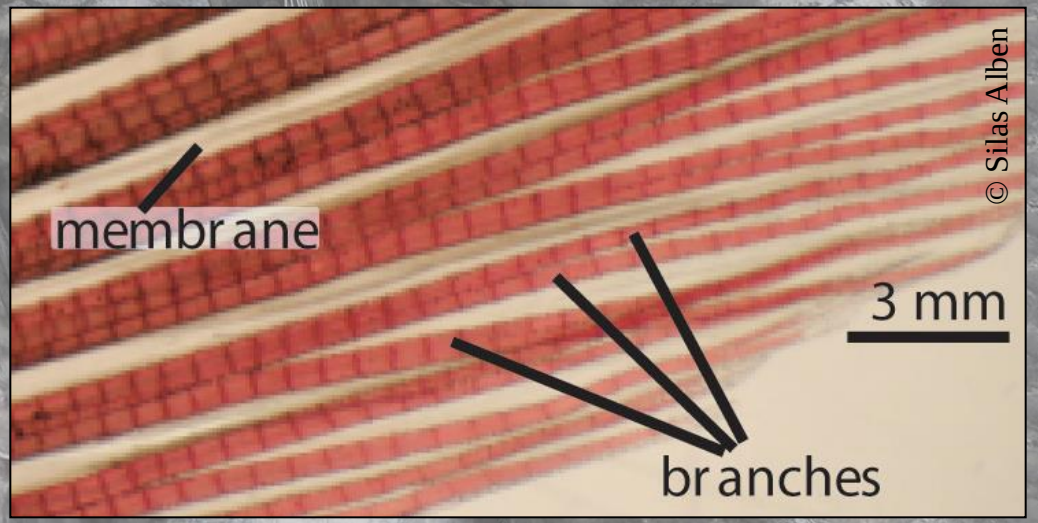
1. Fish Morphology

Some common meristics: fin rays







Spines, “spinelet”, soft rays (branched or not),…

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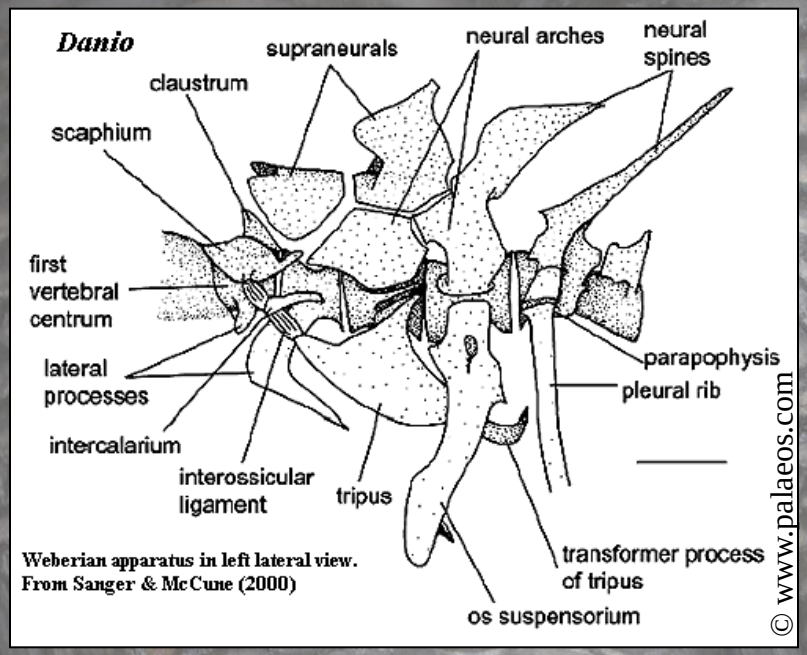
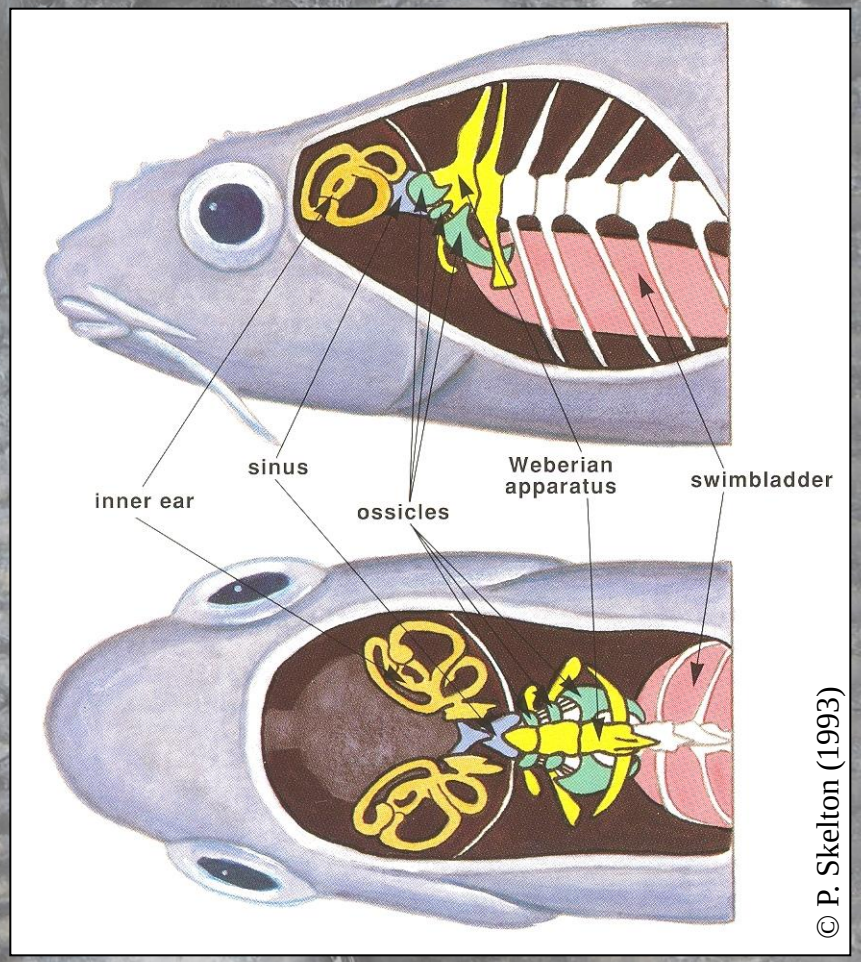
1. Fish Morphology

Some common meristics: vertebrae

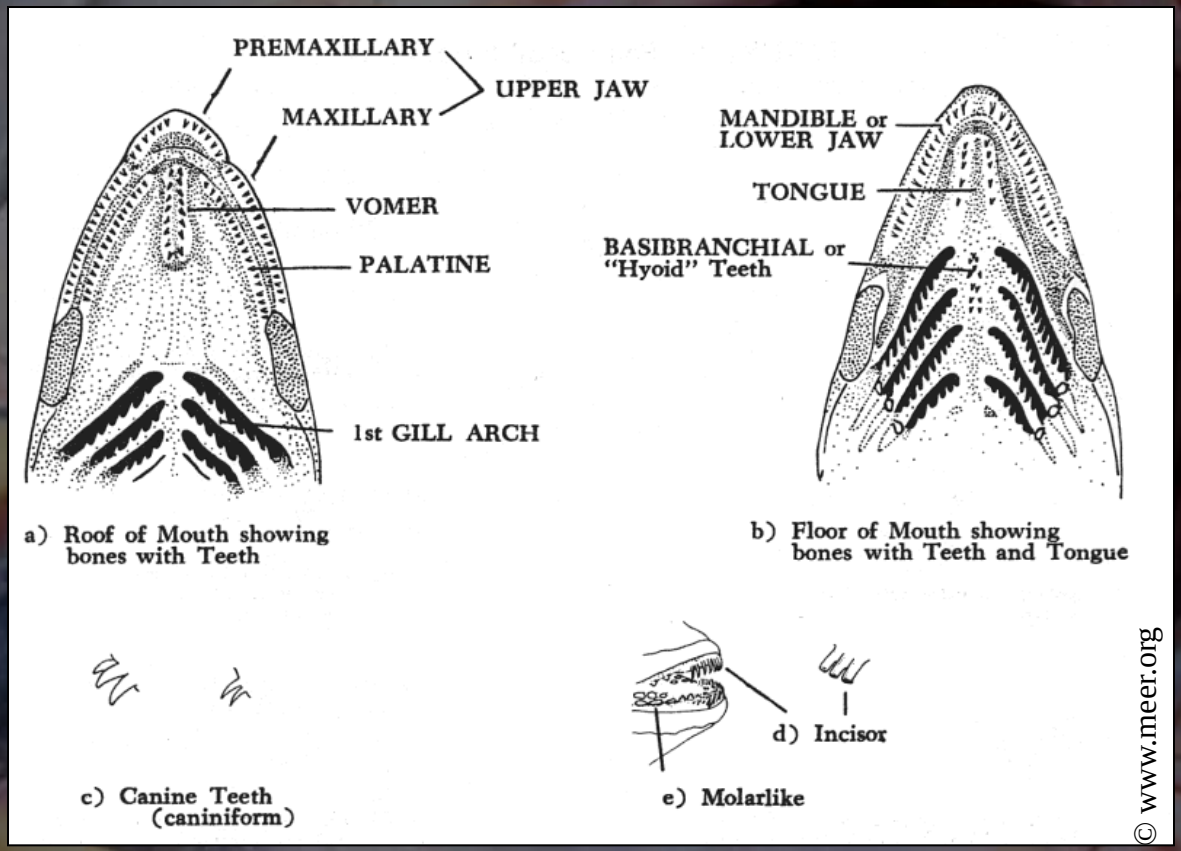




Number of precaudal - preanal - predorsal vertebrae, structure of the weberian apparatus,…

1. Fish Morphology

Some common meristics: teeth



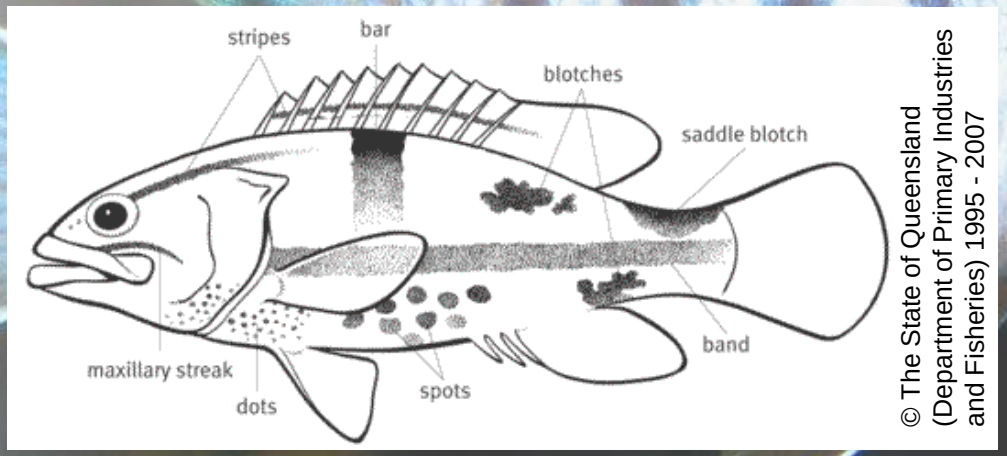
Premaxillary, vomerine and palatine teeth in *Chrysichthys* sp. © MRAC

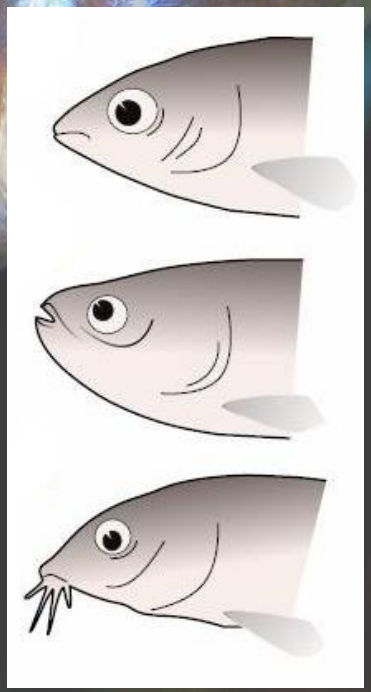
Hydrocynus sp.

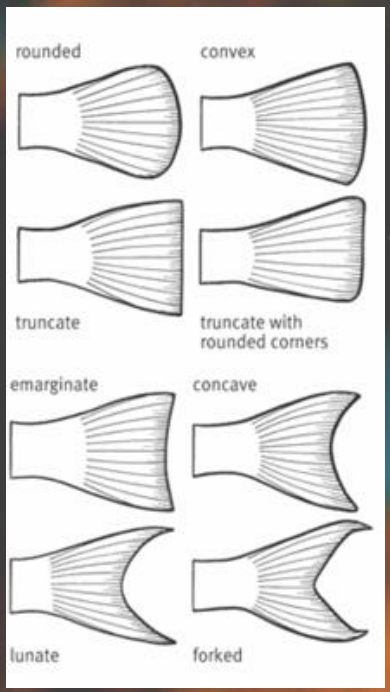
1. Fish Morphology

- Major characters for description and identification of fish:

3. descriptive characters, referring to distinguishable characters







Relative position of fins, length of barbels,…

Cynotilapia afra © Zietto

2. The MORPHOMETRICS Table in FishBase

Data based on measurements of images in FishBase; morphometric data published in journals can be found in the MORPHOLOGY Table, but only if it has diagnostic value.

More information

Countries	Common names	Age/Size	References	Collaborators
FAO areas	Synonyms	Growth	Aquaculture	Pictures
Ecosystems	Metabolism	Length-weight	Aquaculture profile	Stamps, Coins
Occurrences	Predators	Length-length	Strains	Sounds
Introductions	Ecotoxicology	Length-frequencies	Genetics	Ciguatera
Stocks	Reproduction	Morphometrics	Allele frequencies	Speed
Ecology	Maturity	Morphology	Heritability	Swim. type
Diet	Spawning	Larvae	Diseases	Gill area
Food items	Fecundity	Larval dynamics	Processing	Otoliths
Food consumption	Eggs	Recruitment	Mass conversion	Brains
Ration	Egg development	Abundance	Vision	

Species Summary Page

Morphometric Data for *Clarias gariepinus*

n = 2

Picture Name	Length		Lifestage	Aspect ratio
Clgar_u0.gif			unsexed	1.02
Clgar_u3.jpg	78	TL	unsexed	1.38

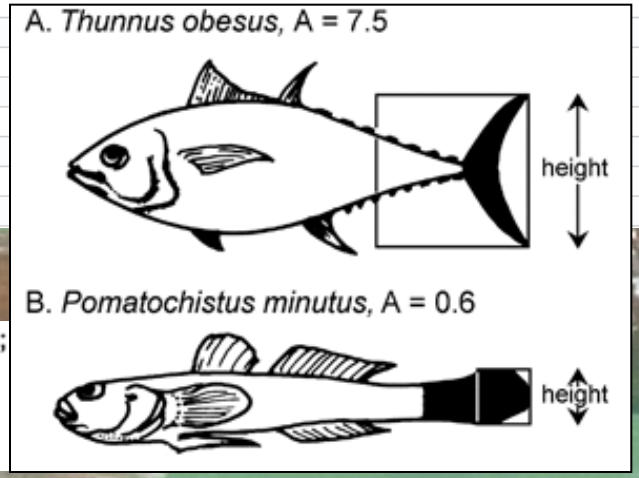
Clarias gariepinus © Uriah Yaniv

2. The MORPHOMETRICS Table in FishBase

Morphometrics of *Clarias gariepinus*

Show Measurement

Picture Used	Clgar_u3.jpg
Size (cm)	78 TL
Sex	unsexed
Locality	
Total length (TL)	553 pixels
Standard length	90.2 % TL
Fork length	100.0 % TL
Pre-anal length	67.8 % TL
Pre-dorsal length	27.1 % TL
Pre-pelvic length	39.2 % TL
Pre-pectoral length	17.2 % TL
Body depth	13.4 % TL
Head length (HL)	16.6 % TL
Eye diameter	15.2 % HL
Pre-orbital length	21.7 % HL
Aspect ratio of caudal fin	1.37911
Remarks	



Aspect ratio ($A = h^2/s$, h = height of the caudal fin; s = surface area of fin) of a pelagic fish (A = 7.5) and a bottom dweller (B = 0.6). Note the correspondence between aspect ratios and modes of life.

3. The MORPHOLOGY Table in FishBase

1. Information on sex differences
2. Descriptive characters (including diagnostic morphometrics)
3. Meristic characters (lateral line, barbels, gill rakers, vertebrae)
4. Fins

Morphology Data of *Clarias gariepinus*

Identification keys

Main Ref.	Teugels, G.G., 1986
Appearance refers to	
Sex attributes	
Specialized organs	no special organs
Different appearance	males alike females
Different colors	males alike females
Remarks	
Descriptive characteristics of juvenile and adult	
Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Body depth is 6-8 times in standard length, the head 3-3,5 times (Ref. 34290). The head is somewhat between rectangular and pointed in dorsal outline; the snout is broadly rounded (Ref. 248). The eyes have a supero-lateral position and are relatively small (Ref. 248). Teeth on the premaxilla and lower jaw are small, fine and arranged in several rows (Ref. 34290). Nasal barbels from 1/5 to 1/2 times as long as the head in fishes longer than 12 cm, and from 1/2 to 4/5 of the head length in smaller individuals; maxillary barbels rarely shorter than the head, usually somewhat longer and reaching to a point midway between the origin of the dorsal fin and the insertion of the pelvic fins; outer mandibular barbel longer than the inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24 to 110, the number increasing with the size of the fish; these gill rakers are long, slender and closely set (Ref. 248, 34290). The distance between the occipital process and the base of the dorsal fin is short; the dorsal fin almost reaches the caudal fin (Ref. 248). The anal fin origin is closer to the caudal fin base than to the snout; it nearly reaches the caudal fin (Ref. 248). The pelvic fin is closer to the snout than to the caudal fin base (Ref. 248). The pectoral fin extends from the operculum to below the first dorsal fin rays; the pectoral spine is robust, serrated only on its outer face, the number of serrations increasing with age (Ref. 248). The lateral line appears as a small, white line from the posterior end of the head to the middle of the caudal fin base; the openings to the secondary sensory canals are clearly marked (Ref. 248). Two colour patterns can be discerned: the uniform and the marbled pattern (Ref. 248). In the uniform pattern, the dorsal surface and the flanks of the body and the dorsal parts of the pectoral and the pelvic fins are generally dark greyish-greenish black, while the belly and the ventral parts of the paired fins are lightly coloured (Ref. 248). In the marbled pattern, the specimens show irregular dark blotches on a light coloured background above and laterally; the belly and the ventral parts of the paired fins are whitish (Ref. 248). Most specimens show pigmentation bands on both sides of the lower surface of the head (Ref. 248). A series of light and dark bands may occur on the caudal fin; the proximal third of the fin is lightly coloured while its other part is dark; occasionally, irregular black spots may occur on the caudal fin (Ref. 248).
Ease of Identification	
Meristic characteristics of Clarias gariepinus	
Lateral Lines	1 Interrupted: No
Scales on lateral line	
Pored lateral line scales	
Scales in lateral series	
Scale rows above lateral line	
Scale rows below lateral line	
Scales around caudal peduncle	
Barbels	
Gill clefts (sharks/rays only)	absent
Gill rakers	
on lower limb	
on upper limb	
total	24 - 110
Vertebrae	
preanal	
total	56 - 63
Fins	
Dorsal fin(s)	
Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0 Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent
Caudal fin	
Attributes	more or less truncate; more or less normal
Anal fin(s)	
Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65
Paired fins	
Pectoral	Attributes more or less normal Spines 1 Soft-rays 9 - 12
Pelvics	Attributes more or less normal Position abdominal behind origin of D1 Spines Soft-rays 6 - 6

1 2 3 4

3. The MORPHOLOGY Table in FishBase

Sex attributes

Specialized organs	no special organs
Different appearance	males alike females
Different colors	males alike females
Remarks	

no special organs
protruding genital papilla (m)
genital papilla with tassels (m)
claspers (m)
gonopodium (m)
prolonged oviduct (f)
different shape of head (f,m)
other

Morphology Data of *Clarias gariepinus*

Identification keys

Main Ref.	Teugels, G.G., 1986
Appearance refers to	
Bones in OsteoBase	

Sex attributes

Specialized organs	no special organs
Different appearance	males alike females
Different colors	males alike females
Remarks	

Descriptive characteristics of juvenile and adult

	elongated
	oval
	more or less straight
	more or less normal
	more or less normal
	sub-terminal/inferior
	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform pattern, dorsal surface and flanks of body and dorsal parts of pectoral and pelvic fins are generally dark grevish-greenish black, while belly and ventral parts of paired fins are lightly coloured; in marbled pattern, specimens show irregular dark blotches on light coloured background above and laterally, belly and ventral parts of the paired fins are whitish (Ref. 248). Most specimens show pigmentation bands on both sides of lower surface of head; a series of light and dark bands may occur on caudal fin; proximal third of caudal fin lightly coloured while other part is dark; occasionally, irregular black spots may occur on caudal fin (Ref. 248).
Ease of Identification	

Meristic characteristics of Clarias gariepinus

Lateral Lines	1	Interrupted: No
Scales on lateral line		
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line		
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)	absent	
Gill rakers		
on lower limb		
on upper limb		
total	24 - 110	
Vertebrae		
preanal		
total	56 - 63	

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0 Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

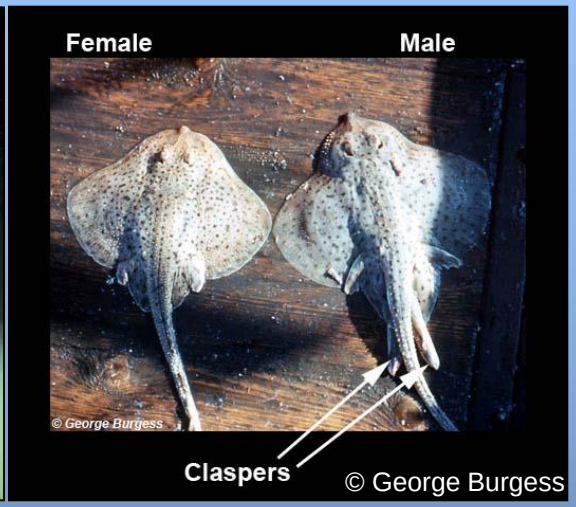
Pectoral	Attributes	more or less normal
	Spines	1
	Soft-rays	9 - 12
Pelvics	Attributes	more or less normal
	Position	abdominal behind origin of D1
	Spines	
	Soft-rays	6 - 6

3. The MORPHOLOGY Table in FishBase

Specialized organs:


Oreochromis squamipinnis © Denis Tweddle


© Seaworld Inc.

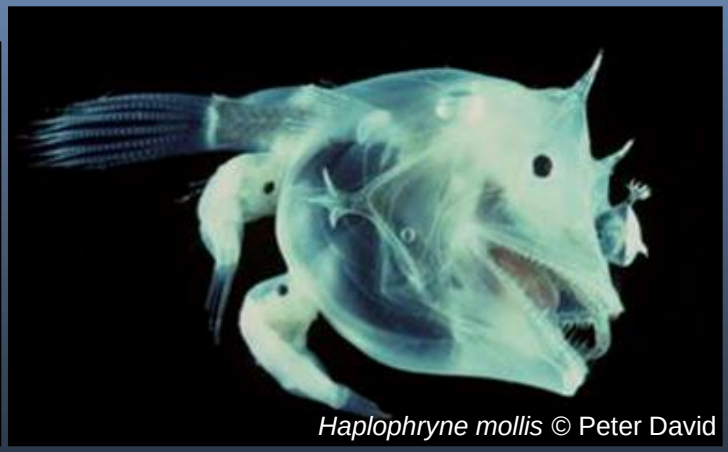


© George Burgess

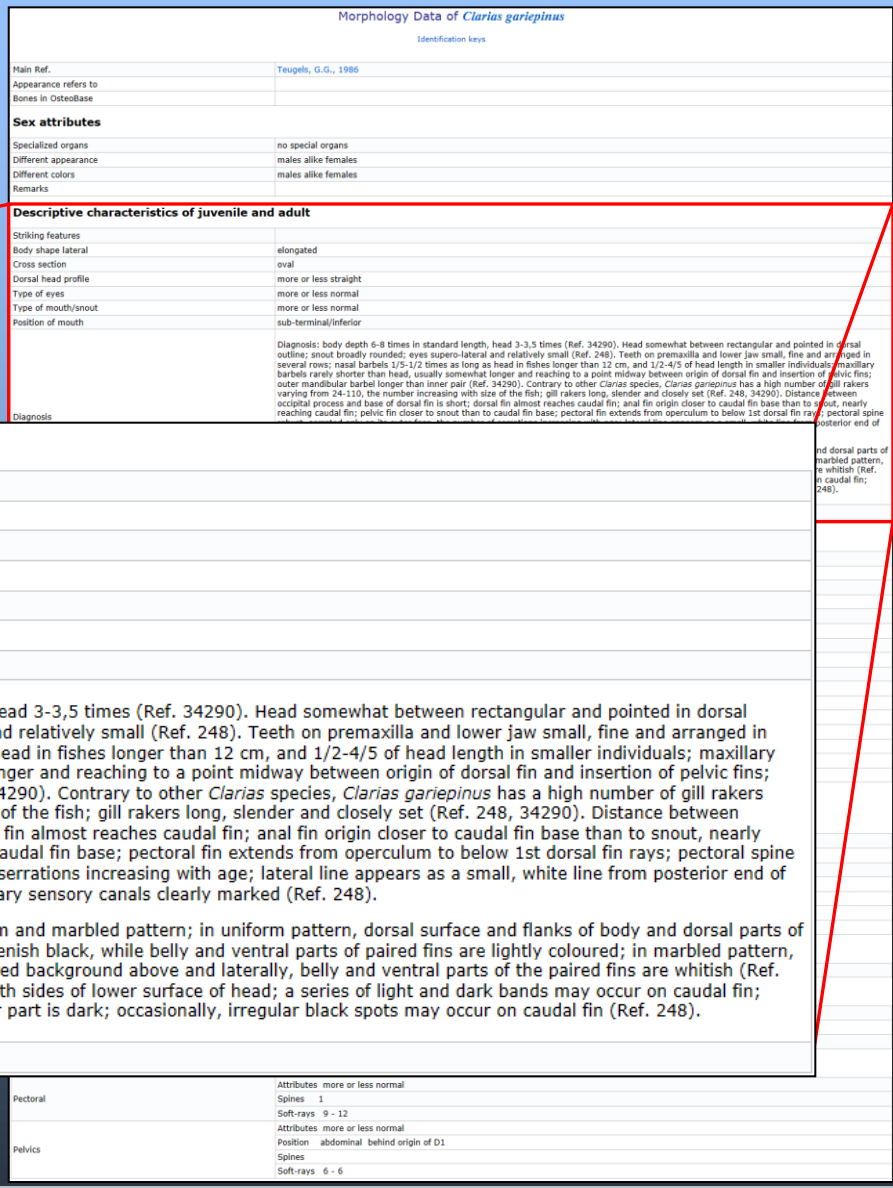
Different appearance/colors:


Pseudotropheus saulosi © Gerard Delany


Oncorhinchus nerka © Peter Essick


Haplophryne mollis © Peter David

3. The MORPHOLOGY Table in FishBase



Morphology Data of *Clarias gariepinus*

Identification keys

Main Ref.	Teugels, G.G., 1986
Appearance refers to	
Bones in OsteoBase	

Sex attributes

Specialized organs	no special organs
Different appearance	males alike females
Different colors	males alike females
Remarks	

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform pattern, dorsal surface and flanks of body and dorsal parts of pectoral and pelvic fins are generally dark greyish-greenish black, while belly and ventral parts of paired fins are lightly coloured; in marbled pattern, specimens show irregular dark blotches on light coloured background above and laterally, belly and ventral parts of the paired fins are whitish (Ref. 248). Most specimens show pigmentation bands on both sides of lower surface of head; a series of light and dark bands may occur on caudal fin; proximal third of caudal fin lightly coloured while other part is dark; occasionally, irregular black spots may occur on caudal fin (Ref. 248).
Ease of Identification	

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvics	Attributes more or less normal
	Position abdominal behind origin of D1
	Spines
	Soft-rays 6 - 6

3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
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Ease of Identification	

Striking features: none

- none
- light organs
- striking shape of body
- striking fins
- striking eyes
- striking type of mouth
- striking barbel(s)
- flaps
- long whip-like tail
- other (see Diagnosis)
- flatfish

Melanostomias barton-beani © www.pbs.org

Dibranchus cracens © California Acad. Sc.

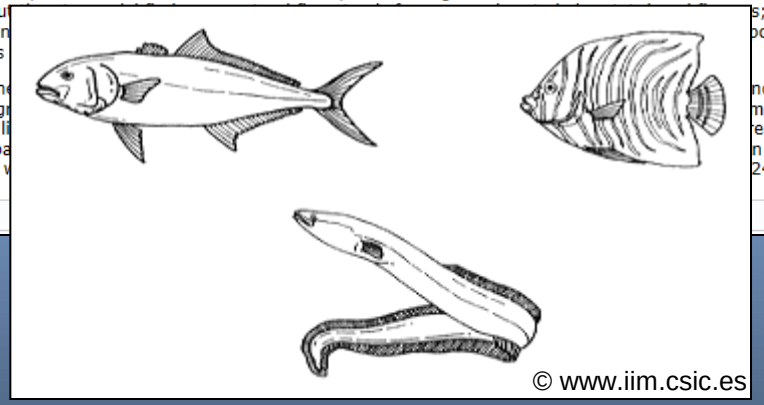
Farlowella sp. © koti.kapsi.fi

Remora © Havhest

3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snou…s; pectoral spine robust, serrated only on its outer face, the n…posterior end of head to middle of caudal fin base; openings … Coloration: 2 colour patterns can be discerne…nd dorsal parts of pectoral and pelvic fins are generally dark gr…marbled pattern, specimens show irregular dark blotches on li…e whitish (Ref. 248). Most specimens show pigmentation ba…n caudal fin; proximal third of caudal fin lightly coloured v…248).
Ease of Identification	



Body shape lateral: short and / or deep

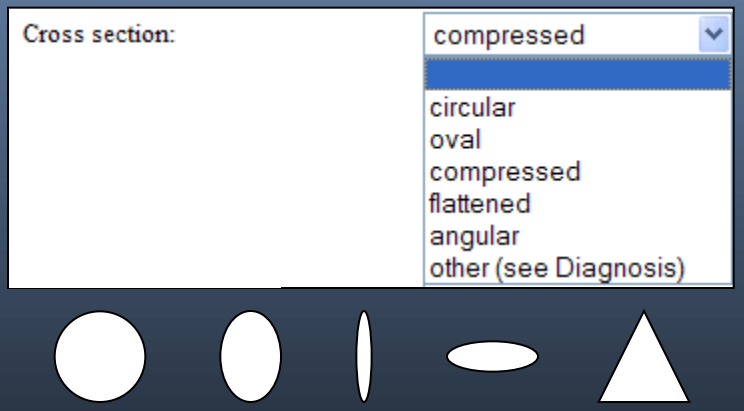
- fusiform / normal
- elongated
- eel-like
- short and / or deep
- other (see Diagnosis)
- modified by breeding

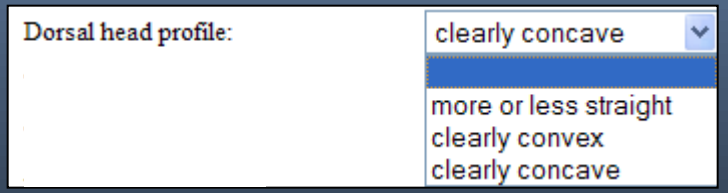

Platy © Wes/www.practicalfishkeeping.co.uk

3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform pattern, dorsal surface and flanks of body and dorsal parts of pectoral and pelvic fins are generally dark greyish-greenish black, while belly and ventral parts of paired fins are lightly coloured; in marbled pattern, specimens show irregular dark blotches on light coloured background above and laterally, belly and ventral parts of the paired fins are whitish (Ref. 248). Most specimens show pigmentation bands on both sides of lower surface of head; a series of light and dark bands may occur on caudal fin; proximal third of caudal fin lightly coloured while other part is dark; occasionally, irregular black spots may occur on caudal fin (Ref. 248).
Ease of Identification	





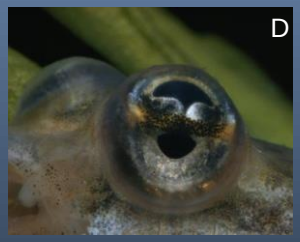
3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform pattern, dorsal surface and flanks of body and dorsal parts of pectoral and pelvic fins are generally dark greyish-greenish black, while belly and ventral parts of paired fins are lightly coloured; in marbled pattern specimens show irregular dark blotches lat… 248). Most specimens show pigmentatio… proximal third of caudal fin lightly colour…
Ease of Identification	

Type of eyes: more or less normal

- more or less normal
- positioned on stalks, very prominent, or tubular
- eyes absent
- eyes with fixed fatty (adipose) tissue/eyelids
- eyes divided into upper and lower part
- asymmetric
- other (see Diagnosis)



A. Mudskipper © Wiljo Jonsson - B. *Astyanax jordani* © National Park Service (NPS) U.S. Department of the Interior - C. Clupeiform adipose eyelid © Michigan Science Art - D. *Anableps anableps* © Paul Zahl/National Geographic/Getty Images - E. Flatfish © K. Telnes.

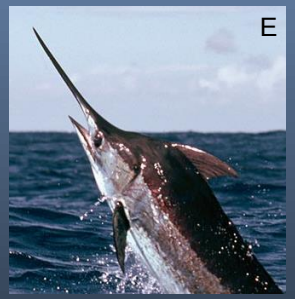
3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discer… n u… fl… pectoral and pelvic fins are generally dark … nd … specimens show irregular dark blotches on … d la… 248). Most specimens show pigmentation … of … proximal third of caudal fin lightly coloured … ly, i…
Ease of Identification	

Type of mouth/snout: more or less normal

- more or less normal
- tube-like
- funnel-like
- sucker-like
- clearly protrusible
- lower jaw greatly elongated
- upper jaw greatly elongated
- other (see Diagnosis)



A. Lamprey © Steve Smith/ECHO - B. Blue spot *Chaetostoma* © Practical Fishkeeping - C. Rubyfish, *Plagiogeneion* sp. © T. Trnski/Australian Museum - D. Halfbeak *Hemiramphus depauperatus* © J.E. Randall - E. Blue marlin, *Makaira* sp. © Tony Arruza/Corbis.

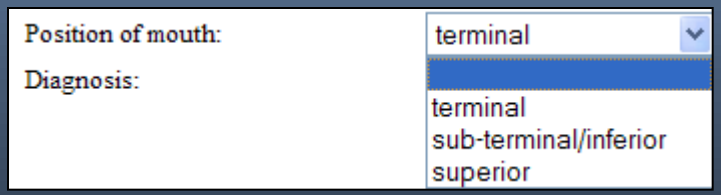
3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, an barbels rarely shorter than head, usually somewhat longer and reaching to a point midway outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* spe varying from 24-110, the number increasing with size of the fish; gill rakers long, slender occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends robust, serrated only on its outer face, the number of serrations increasing with age; later head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform p pectoral and pelvic fins are generally dark greyish-greenish black, while belly and ventral specimens show irregular dark blotches on light coloured background above and laterally, 248). Most specimens show pigmentation bands on both sides of lower surface of head; a proximal third of caudal fin lightly coloured while other part is dark; occasionally, irregular
Ease of Identification	

Male *Oreochromis tanganicae* © Arthur Tagø

Atopochilus savorgnani
© T.R. Vigliotta



Epiplatys fasciolatus fasciolatus © Anton Lamboj

3. The MORPHOLOGY Table in FishBase

Descriptive characteristics of juvenile and adult

Striking features	none
Body shape lateral	short and / or deep
Cross section	
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	terminal
Diagnose	Diagnosis: Adults: narrow preorbital bone (depth max. 21.5% of head length in fishes up to 21.3cm SL); lower pharyngeal jaw with short blade; no enlargement of the jaws in mature fish (lower jaw not exceeding and usually less than 36.8% head length) (Ref. 2). Caudal without regular dark vertical stripes (Ref. 2, 53405, 54467), but with a broad pink to bright red distal margin (Ref. 2). Breeding males assume an intense bright metallic blue on the head, a vermilion edge to the dorsal fin and a more intense pink on the caudal margin (Ref. 2, 54467). Breeding females with the edges of dorsal and caudal fins in a paler more orange color (Ref. 2). Juveniles: upper line of head profile running upward from snout at sharp angle; lower pharyngeal bone nearly triangular, teeth numerous but not densely crowded; dorsal and anal fin striped, with stripes running obliquely on the soft dorsal and longitudinally on the caudal fin; black *Tilapia*-mark on soft dorsal present; body dark; lower lip developed from beneath (Ref. 54566). Description: deep bodied; teeth very small, typical for an algae feeder (Ref. 52307), in 3-5 rows in the jaws, bicuspid in the outermost (Ref. 2, 53405, 54467), tricuspid in the others (Ref. 2, 54467). Lower pharyngeal bone with bicuspid teeth, its toothed part as long as anterior part (Ref. 53405). Scales cycloid (Ref. 367, 2756, 54408), with fringes of the embedded part almost straight (Ref. 54408). Scales on cheek in 2-3 horizontal series; 5-7 scales between base of pectoral and pelvic fin (Ref. 2, 54467). 13.5-14.5 scales below upper lateral line before the pelvic fins (Ref. 367). 2 scales between upper and lower lateral line (Ref. 367, 2756). Upper lateral line with 20-23 scales, lower with 14-18 scales (Ref. 367, 2756). Microbranchiospines present on outer sides of arches 2 to 4 (Ref. 2). Dorsal fin edge thickened and notches between lappets closed in fully ripe males (Ref. 364, 54467). Last dorsal spine the longest (Ref. 367, 2756). Third anal spine a little shorter than last dorsal spine (Ref. 2, 2756, 54467), but stronger (Ref. 2, 54467). Pelvics not greatly produced; caudal often with rounded corners, usually scaly only at the base and between rays on upper and lower parts of the fin; genital papilla of mature male conical or with narrow bifid flange (Ref. 2, 54467). Coloration: Juveniles: grey-brown to slightly golden (Ref. 52307), with vertical bars on sides (Ref. 53405). Specimens <10cm with well developed "Tilapia"-spot on soft dorsal fin (Ref. 2, 52307, 53405, 54467). Sometimes with vague vertical bars on caudal fin (Ref. 2, 3032). Adults: eye with red iris crossed by a black bar (Ref. 2). Ventral region pale silvery-grey (Ref. 2, 367, 3032, 52307). Lips often blackish (Ref. 367). Chin and chest may be blue-black (Ref. 2, 6465). Throat and belly sometimes yellowish but never reddish (Ref. 2756). Silvery and dark spots distributed all over the body (Ref. 52307). Sometimes with several vertical bars on body (Ref. 2, 3032, 31256, 52307), related to emotional state (Ref. 53405, 54467). Opercular spot generally present (Ref. 367, 2756, 54759), but may become totally invisible (Ref. 367). Pectoral fins greyish, pelvic fins blackish (Ref. 367, 2756). Dorsal fin (Ref. 2, 2756, 3032, 52307, 54467) and upper parts of caudal fin (Ref. 2, 367, 2756, 3023, 3032, 6465, 13851, 51850, 52307, 53405) with red margins. Soft dorsal and anal fin, and normally also the caudal fin, with numerous pale spots (Ref. 2, 2756, 3032, 31256, 52307, 54467, 54759). Spots on dorsal and anal fin in oblique rows (Ref. 367). Dorsal fin lappets dark, never red or pale (Ref. 51850). Adult males grey-blue, with head, from upper lips to eye, greenish-brown, becoming darker towards the back; courting males brilliant with metallic blue sparkles on the head (Ref. 52307), or intense metallic blue on the head, sometimes paler blue on the body, with a vermillion edge on the dorsal and a more intense pink caudal margin (Ref. 2, 6465, 54467). Breeding females with paler, more orange edges of dorsal and caudal fin (Ref. 2, 6465). Preserved specimens sometimes with black lateral band (Ref. 53405).
Ease of Identification	likely to be confused with closely related species.

3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Clarias gariepinus

Lateral Lines	1	Interrupted: No
Scales on lateral line		
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line		
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels		
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb		
on upper limb		
total	24 - 110	
Vertebrae		
preanal		
total	56 - 63	

Morphology Data of *Clarias gariepinus*

Identification keys

Main Ref.	Teugels, G.G., 1986
Appearance refers to	
Bones in OsteoBase	

Sex attributes

Specialized organs	no special organs
Different appearance	males alike females
Different colors	males alike females
Remarks	

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body depth 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform pattern, dorsal surface and flanks of body and dorsal parts of pectoral and pelvic fins are generally dark grevish-greenish black, while belly and ventral parts of paired fins are lightly coloured; in marbled pattern, specimens show irregular dark blotches on light coloured background above and laterally, belly and ventral parts of the paired fins are whitish (Ref. 248). Most specimens show pigmentation bands on both sides of lower surface of head; a series of light and dark bands may occur on caudal fin; proximal third of caudal fin lightly coloured while other part is dark; occasionally, irregular black spots may occur on caudal fin (Ref. 248).
Ease of Identification	

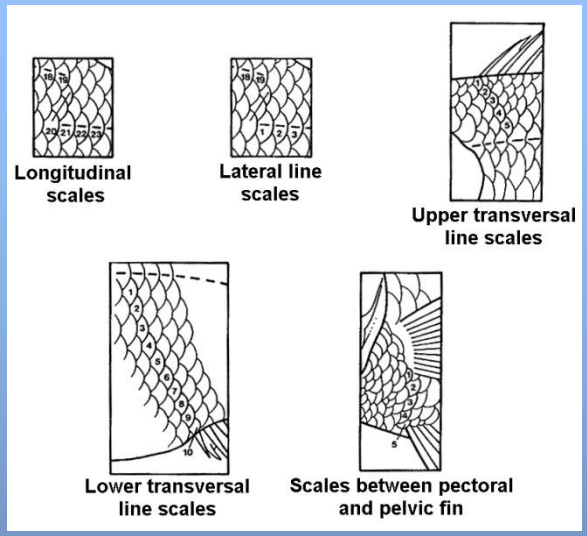
Meristic characteristics of Clarias gariepinus

	1 Interrupted: No
	0
	absent
	24 - 110
	56 - 63
	extending over most of the back length
	1
	Dorsal 0
	Ventral 0
	0 - 0
	61 - 80
	absent
	more or less truncate; more or less normal
	1
	0 - 0
	45 - 65
	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
	Attributes more or less normal
	Position abdominal behind origin of D1
	Spines
	Soft-rays 6 - 6

3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Oreochromis aureus

Lateral Lines	2	Interrupted: No
Scales on lateral line	29 - 33	
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line	4 - 5.5	
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb	18 - 30	
on upper limb	5 - 8	
total		
Vertebrae		
preanal		
total		




Tylochromis sp. © MRAC

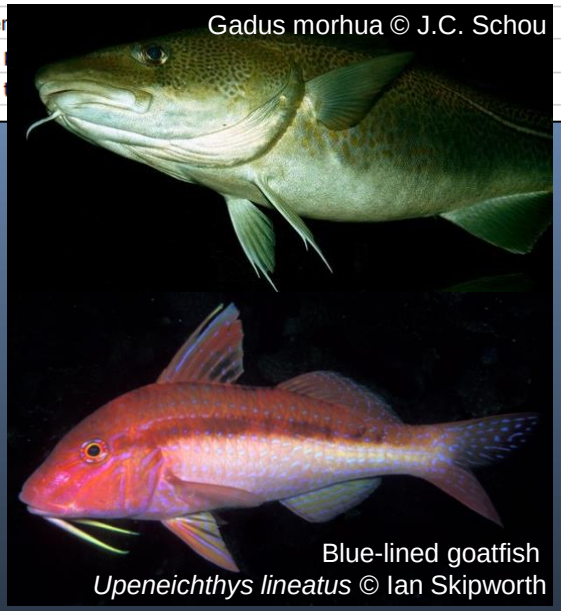
3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Oreochromis aureus

Lateral Lines	2	Interrupted: No
Scales on lateral line	29 - 33	
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line	4 - 5.5	
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb	18 - 30	
on upper limb	5 - 8	
total		
Ver		
	28 - 31	


Synodontis njassae © www.akvariefisk.net


Malapterurus electricus © N. Sloth


Gadus morhua © J.C. Schou

Blue-lined goatfish
Upeneichthys lineatus © Ian Skipworth


Barbus cf. *ablabes* © Anton Lamboj


Corydoras sterbai © G.J. Reclos

3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Oreochromis aureus

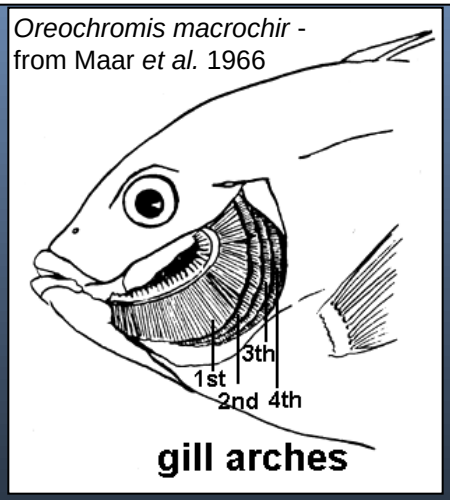
Lateral Lines	2	Interrupted: No
Scales on lateral line	29 - 33	
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line	4 - 5.5	
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb	18 - 30	
on upper limb	5 - 8	
total		
Ver		
	28	

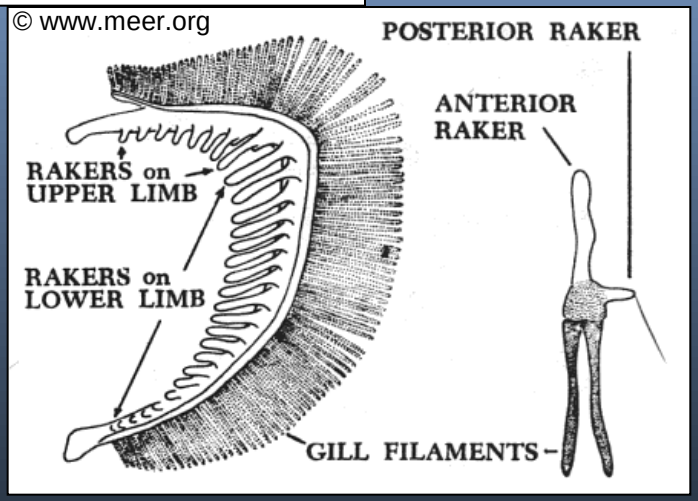
A. Eagle ray © Yongala Dive - B. Grey nurse shark, *Carcharias taurus* © www.wallpaperfishtalk.com - C. Galapagos shark, *Carcharhinus galapagensis* © Doug Perrine - D. Scalloped hammerhead, *Sphyrna lewini* © Duiops - E. Manta ray, *Manta birostris* © www.yunphoto.net

3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Oreochromis aureus

Lateral Lines	2	Interrupted: No
Scales on lateral line	29 - 33	
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line	4 - 5.5	
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb	18 - 30	
on upper limb	5 - 8	
total		
Vertebrae		
preanal		
total	28 - 31	

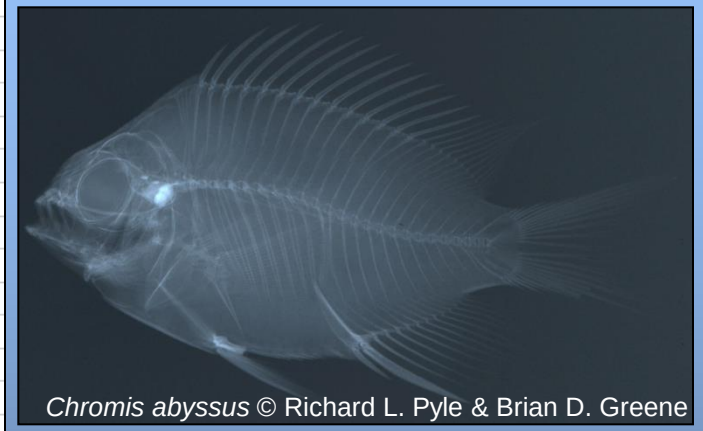




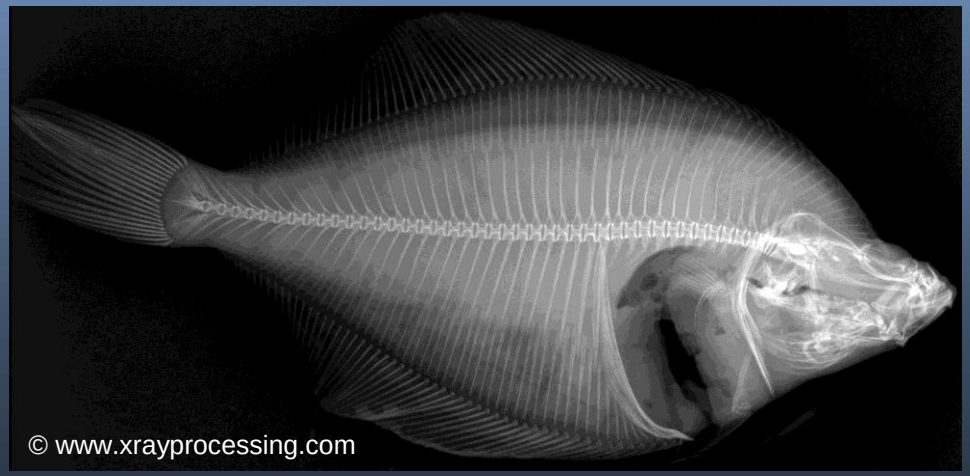
3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Oreochromis aureus

Lateral Lines	2	Interrupted: No
Scales on lateral line	29 - 33	
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line	4 - 5.5	
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb	18 - 30	
on upper limb	5 - 8	
total		
Vertebrae		
preanal		
total	28 - 31	



Chromis abyssus © Richard L. Pyle & Brian D. Greene



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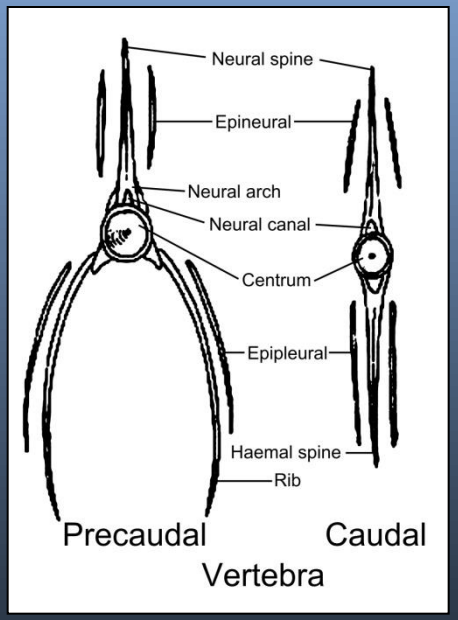
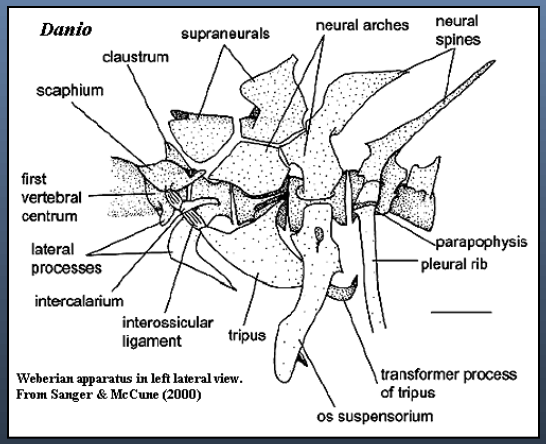


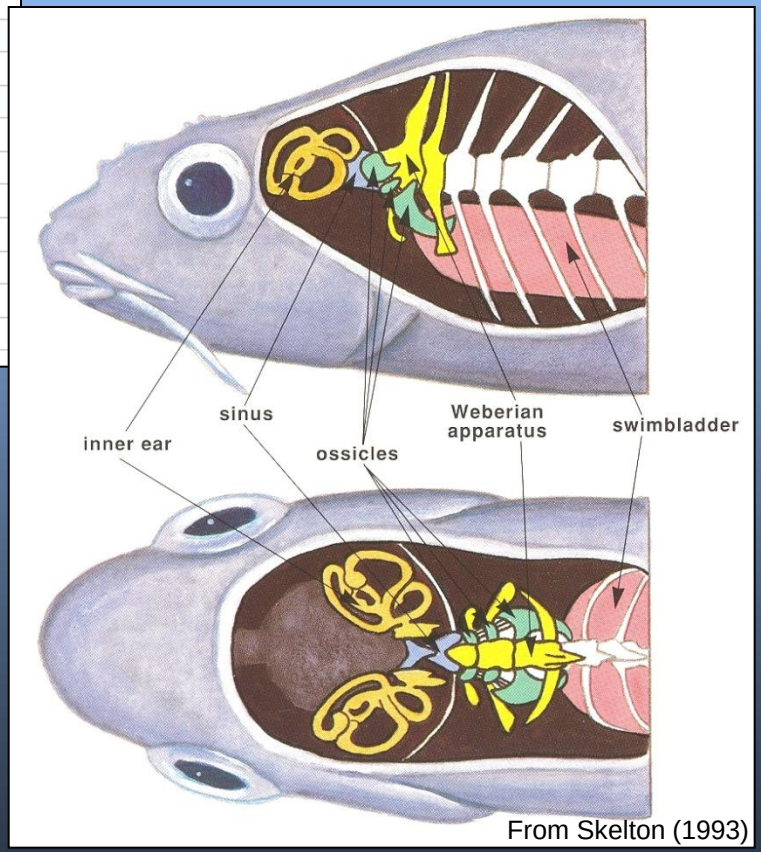
3. The MORPHOLOGY Table in FishBase

Meristic characteristics of Oreochromis aureus

Lateral Lines	2	Interrupted: No
Scales on lateral line	29 - 33	
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line	4 - 5.5	
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)		absent
Gill rakers		
on lower limb	18 - 30	
on upper limb	5 - 8	
total		
Vertebrae		
preanal		
total	28 - 31	



Weberian apparatus in left lateral view. From Sanger & McCune (2000)



From Skelton (1993)

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvics	Attributes more or less normal
	Position abdominal behind origin of D1
	Spines
	Soft-rays 6 - 6

Morphology Data of *Clarias gariepinus*

Identification keys

Main Ref.	Teugels, G.G., 1986
Appearance refers to	
Bones in OsteoBase	

Sex attributes

Specialized organs	no special organs
Different appearance	males alike females
Different colors	males alike females
Remarks	

Descriptive characteristics of juvenile and adult

Striking features	
Body shape lateral	elongated
Cross section	oval
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	sub-terminal/inferior
Diagnosis	Diagnosis: body length 6-8 times in standard length, head 3-3,5 times (Ref. 34290). Head somewhat between rectangular and pointed in dorsal outline; snout broadly rounded; eyes supero-lateral and relatively small (Ref. 248). Teeth on premaxilla and lower jaw small, fine and arranged in several rows; nasal barbels 1/5-1/2 times as long as head in fishes longer than 12 cm, and 1/2-4/5 of head length in smaller individuals; maxillary barbels rarely shorter than head, usually somewhat longer and reaching to a point midway between origin of dorsal fin and insertion of pelvic fins; outer mandibular barbel longer than inner pair (Ref. 34290). Contrary to other *Clarias* species, *Clarias gariepinus* has a high number of gill rakers varying from 24-110, the number increasing with size of the fish; gill rakers long, slender and closely set (Ref. 248, 34290). Distance between occipital process and base of dorsal fin is short; dorsal fin almost reaches caudal fin; anal fin origin closer to caudal fin base than to snout, nearly reaching caudal fin; pelvic fin closer to snout than to caudal fin base; pectoral fin extends from operculum to below 1st dorsal fin rays; pectoral spine robust, serrated only on its outer face, the number of serrations increasing with age; lateral line appears as a small, white line from posterior end of head to middle of caudal fin base; openings to secondary sensory canals clearly marked (Ref. 248). Coloration: 2 colour patterns can be discerned: uniform and marbled pattern; in uniform pattern, dorsal surface and flanks of body and dorsal parts of pectoral and pelvic fins are generally dark greyish-greenish black, while belly and ventral parts of paired fins are lightly coloured; in marbled pattern, specimens show irregular dark blotches on light coloured background above and laterally, belly and ventral parts of the paired fins are whitish (Ref. 248). Most specimens show pigmentation bands on both sides of lower surface of head; a series of light and dark bands may occur on caudal fin; proximal third of caudal fin lightly coloured while other part is dark; occasionally, irregular black spots may occur on caudal fin (Ref. 248).
Ease of Identification	

Meristic characteristics of Clarias gariepinus

Lateral Lines	1	Interrupted: No
Scales on lateral line		
Pored lateral line scales		
Scales in lateral series		
Scale rows above lateral line		
Scale rows below lateral line		
Scales around caudal peduncle		
Barbels	0	
Gill clefts (sharks/rays only)	absent	
Gill rakers		
on lower limb		
on upper limb		
total	24 - 110	
Vertebrae		
preanal		
total	56 - 63	

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvics	Attributes more or less normal
	Position abdominal behind origin of D1
	Spines
	Soft-rays 6 - 6

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

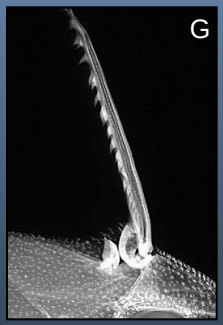
Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
	Attributes more or less normal

Attributes: extending over most of the back length

- no striking attributes
- first fin ray very elongated
- first fin ray transformed to 'line and (luminous) bait'
- first rays forming locking device
- origin on head, nearly above eye
- extending over most of the back length
- continuous with caudal fin
- last fin rays very elongated
- modified to suction disc
- greatly reduced or absent
- other

Caudal fin:



A. *Stonogobiops yashia* © Underground Art Studio - B. *Mastacembelus armatus* © Balaram Mahalder - C. Oarfish, possibly *Trachypterus* © Orkney Marine Life Aquarium - D. *Melanocetus johnsonii* © E.A. Widder - E. *Nematalosa nasus* © J.E. Randall - F. Remora © Iprynne - G. Leatherjacket spine © J. King/Australian Museum

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
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Spines total	0 - 0
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Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

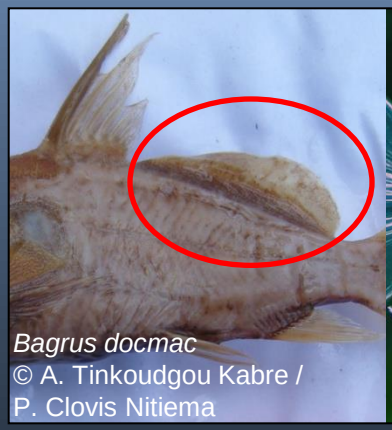
Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
	Attributes more or less normal
	Position
	Spines
	Soft-ra

Merluccius merluccius © www.superfumy.com

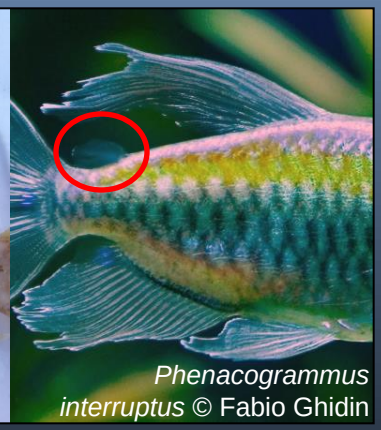
Bluefin tuna © Census of Marine Life

© M.H. Sabaj

Leuciscus cephalus © Tino Strauss



Bagrus docmac
© A. Tinkoudgou Kabre / P. Clovis Nitiema



Phenacogrammus interruptus © Fabio Ghidin

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

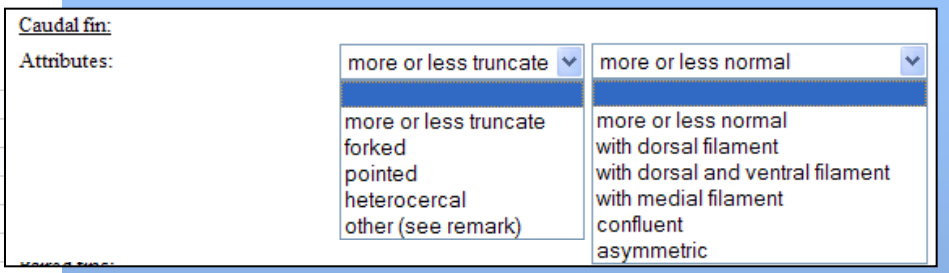
Attributes	more or less truncate; more or less normal

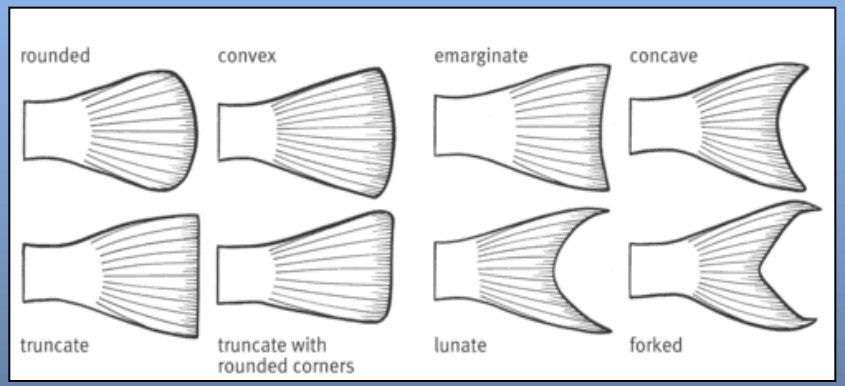
Anal fin(s)

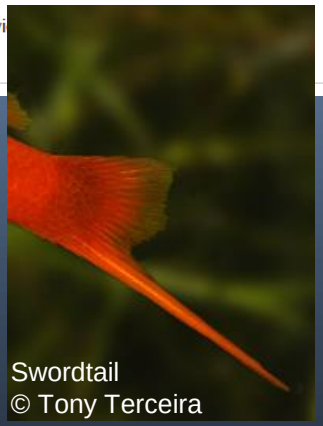
Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvi	Attributes more or less normal






Swordtail
© Tony Terceira


Hemiancistrus pankimpuju © Nathan Lujan


Phenacogrammus interruptus © Fabio Ghidin


Porbeagle shark © Canadian Shark Research Lab

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvi	Attributes more or less normal
	Position abdominal behind origin of D1
	Spine
	Soft-r

Alectis ciliaris © blogs.yahoo.co.jp/tak755/folder/674985.html

Apistogramma cacatuoides © Montana Exotic Tropicals

Juvenile *vs* adult batfish

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of t
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; m

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvics	Attributes more or less normal
	Position abdominal behind origin of D1
	Spines
	Soft-rays 6 - 6

attributes: more or less normal

- more or less normal
- used for locomotion
- very large , lobe-like
- transformed to 'aerofoils'
- transformed to 'arms'
- rays very elongated
- several lower rays isolated
- 1st ray hardened with locking structure
- absent
- other (see Diagnosis)


Periophthalmus modestus © Marli Tanabe


Eagle ray © Yongala Dive


Polynemus multifilis
© www.aquadesignz.com


Flying gurnard © dic.academic.ru


Synodontis kogonensis
© T. Musschoot/MRAC

3. The MORPHOLOGY Table in FishBase

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0
	Ventral 0
Spines total	0 - 0
Soft-rays total	61 - 80
Adipose fin	absent

Caudal fin

Attributes	more or less truncate; more or less normal

Anal fin(s)

Fins number	1
Spines total	0 - 0
Soft-rays total	45 - 65

Paired fins

Pectoral	Attributes more or less normal
	Spines 1
	Soft-rays 9 - 12
Pelvics	Attributes more or less normal
	Position abdominal behind origin of D1
	Spines
	Soft-rays 6 - 6

attributes: more or less normal

- more or less normal
- rays very elongated
- reduced to filaments
- largely reduced to one ray
- joint to one spine only
- joint, cup-like
- part of sucker-disc
- asymmetric in size/position
- suppressed/absent
- aberrant
- other (see Diagnosis)

position: thoracic | beneath origin of D1

- abdominal
- thoracic
- jugular
- absent

- behind origin of D1
- beneath origin of D1
- before origin of D1

Bregmaceros mcclellandi © Gloerfelt-Tarp

Atopochilus savorgnani © T.R. Vigliotta

Gadus morhua © J.C. Schou

4. Fish Identification

- taxonomy = the science of correctly naming species

- often confused with fish identification, which refers to the use of the latest taxonomic information to identify fishes.

- FishBase offers 3 ways to identify fish:
  - -Quick Identification Routine
  - -Identification by morphometrics
  - -Identification Keys

4. Fish Identification

Quick Identification Routine

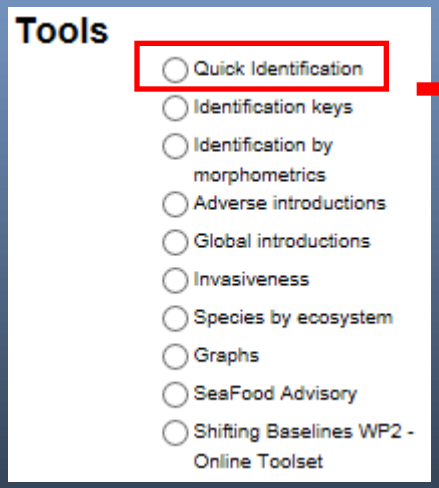
- if no data about the fish is available, pictograms can be used for quick comparison by eye; FishBase also provides an explanation of the groups to choose from
- once at the family level, a list of matching species with picture (if available) is generated
- further identification is done by checking the pictures and full species descriptions

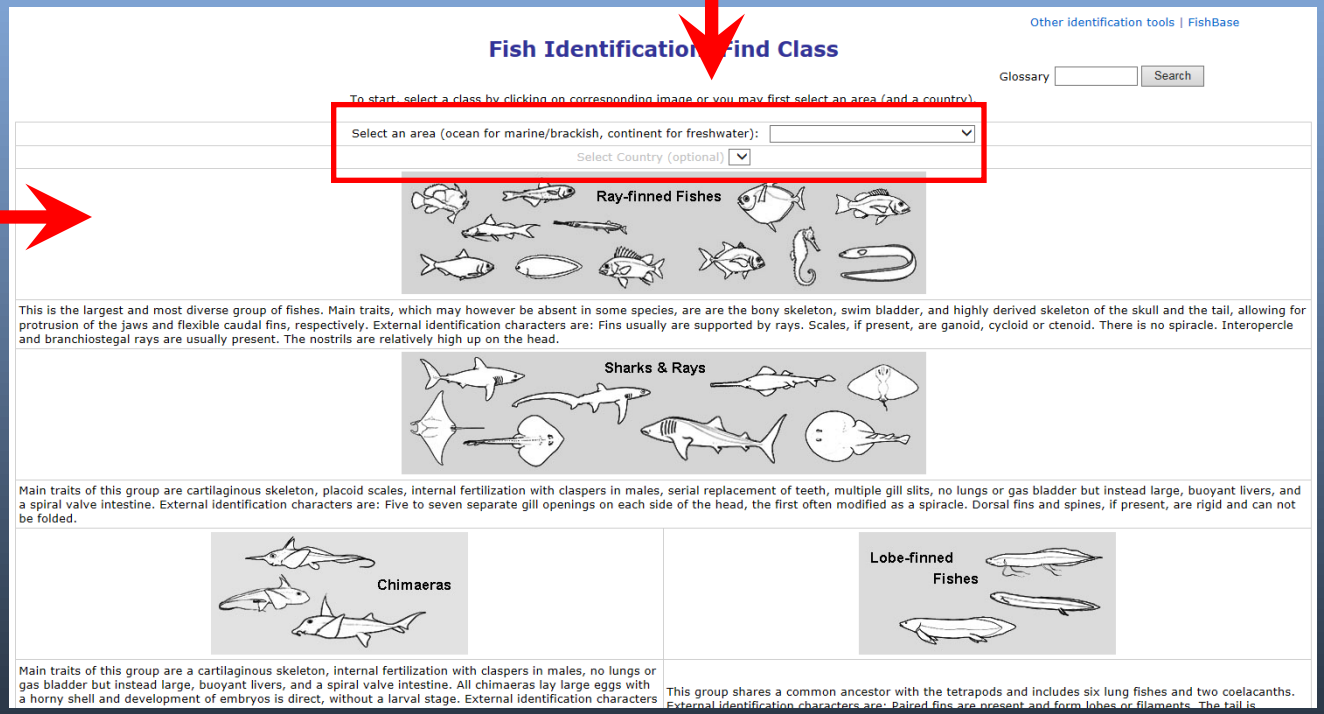
4. Fish Identification

Quick Identification Routine

Search Page

Some information about the specimen to identify can be provided (FAO area, country, number of rays in dorsal and anal fin) to limit the search results





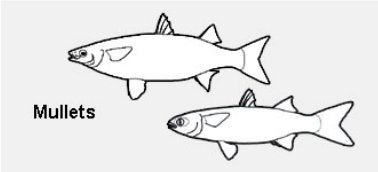
4. Fish Identification

Quick Identification Routine

Fish Identification: Find Order

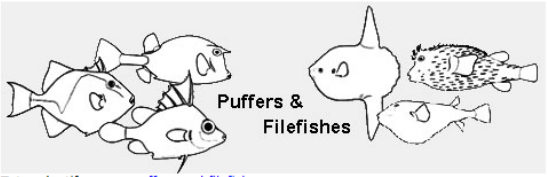
46 orders of ray-finned fishes

Glossary [ ] [?] Enter total number of spines in dorsal [ ] and anal [ ] fins (optional) and select order [Redo] FishBase



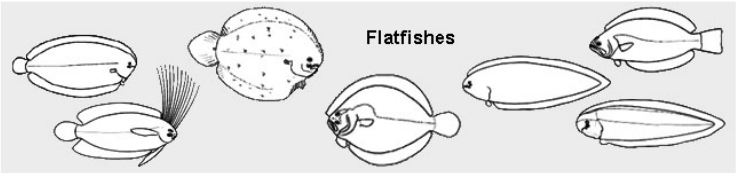
Mugiliformes - mullets

Distribution: All tropical and temperate seas. Chiefly marine (coastal) and brackish water; some in freshwater (*Liza abu* only in fresh and estuaries). Short description: Spinous (4 spines) and soft dorsal fins widely separated. Pelvic fins subabdominal; 1 spine, 5 soft rays. Lateral line hardly visible when present. Mouth of moderate size. Toothless or teeth small. Long gill rakers. Muscular stomach; extremely long intestine. Ve... Max... ...90 cm. Travel in schools and feed on fine algae, diatoms, and detritus of bottom sediments. Important food fishes. Taxonomy: Mugiliformes have been considered as a separate order like here, or as a Per... ...time close to Atherinidae(formes). They are either considered at the base of Acanthopterygii or Percomorpha. The consensus is to consider that they are close to Atherinids, Gasterosteids, Synbranchids, Elassomatids in an unresolved polychotomy. See FoW (Nelson, 2006; Ref. 58010) for more details.



Tetraodontiformes - puffers and filefishes

No parietals, nasals, or infraorbitals, and usually no lower ribs; posttemporal, if present, simple and fused with pterotic of skull; hyomandibular and palatine firmly attached with premaxilla... ...or plates; lateral line present or absent, sometimes multiple; swim bladder present except in molids; 16-30 vertebrae.



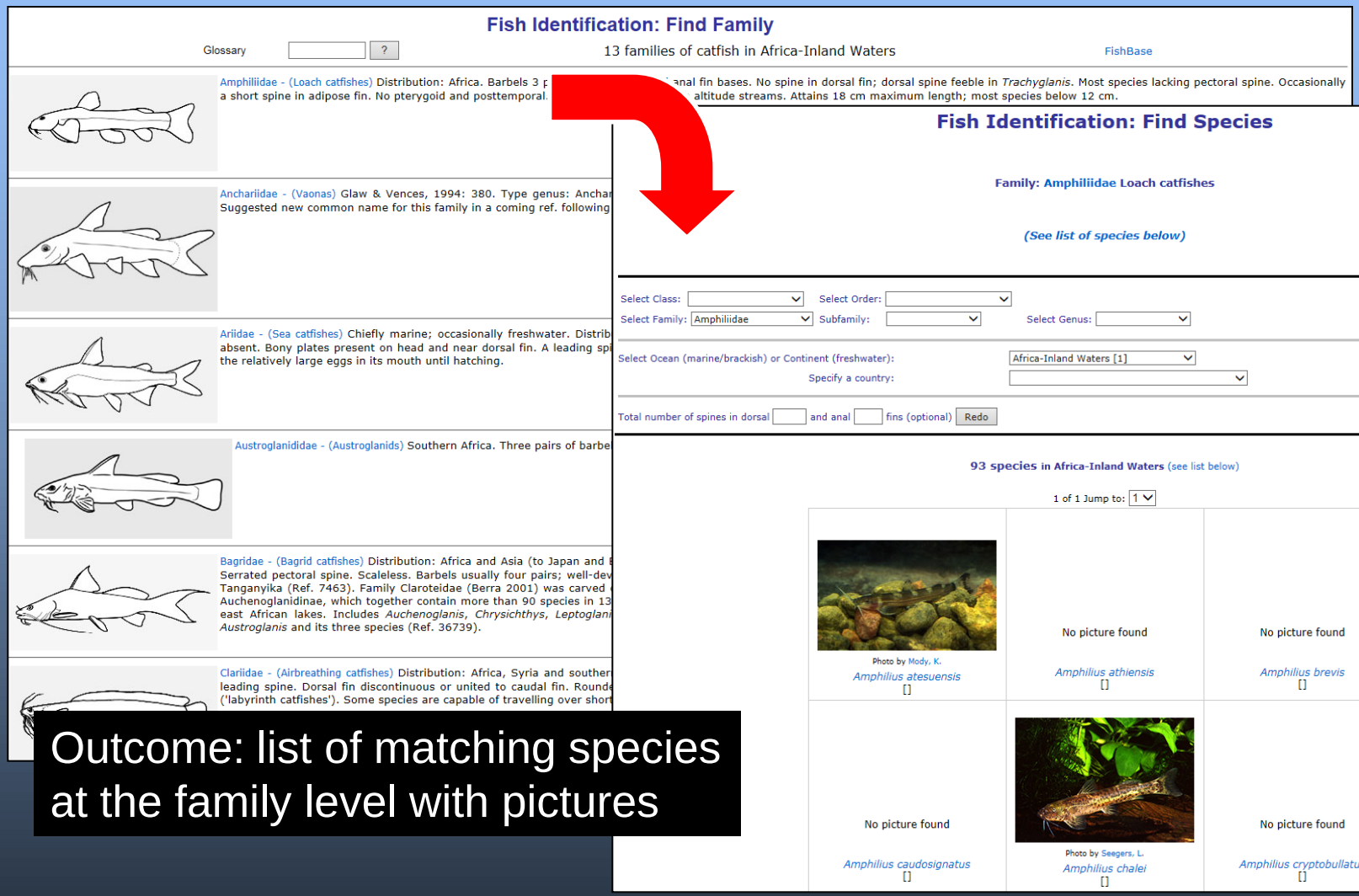
Pleuronectiformes - flatfishes

Adults not bilaterally symmetrical, with one eye migrating to the other side of the cranium; dorsal and anal fins with long bases, dorsal fin base overlapping at least the neurocranium except in *Psettodes*; body highly compressed, somewhat rounded on eyed side and flat on blind side; eyes can protrude above body surface allowing fish to see when buried in the substrate; usually six or seven branchiostegal rays, rarely eight; body cavity small; adults almost always without swim bladder; scales cycloid, ctenoid, or tuberculate. About four species probably occur in freshwater, while another 20 species that are normally marine occasionally enter freshwater.

Use of the fin formulae method (based on Smith and Heemstra, 1986): counts of dorsal and anal fin rays relatively stable and easy to obtain; data derived from MORPHOLOGY Table

4. Fish Identification

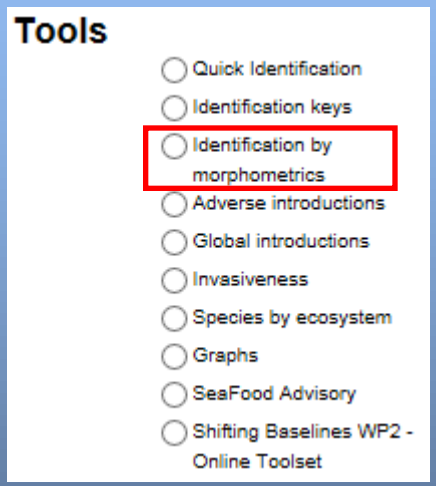
Quick Identification Routine

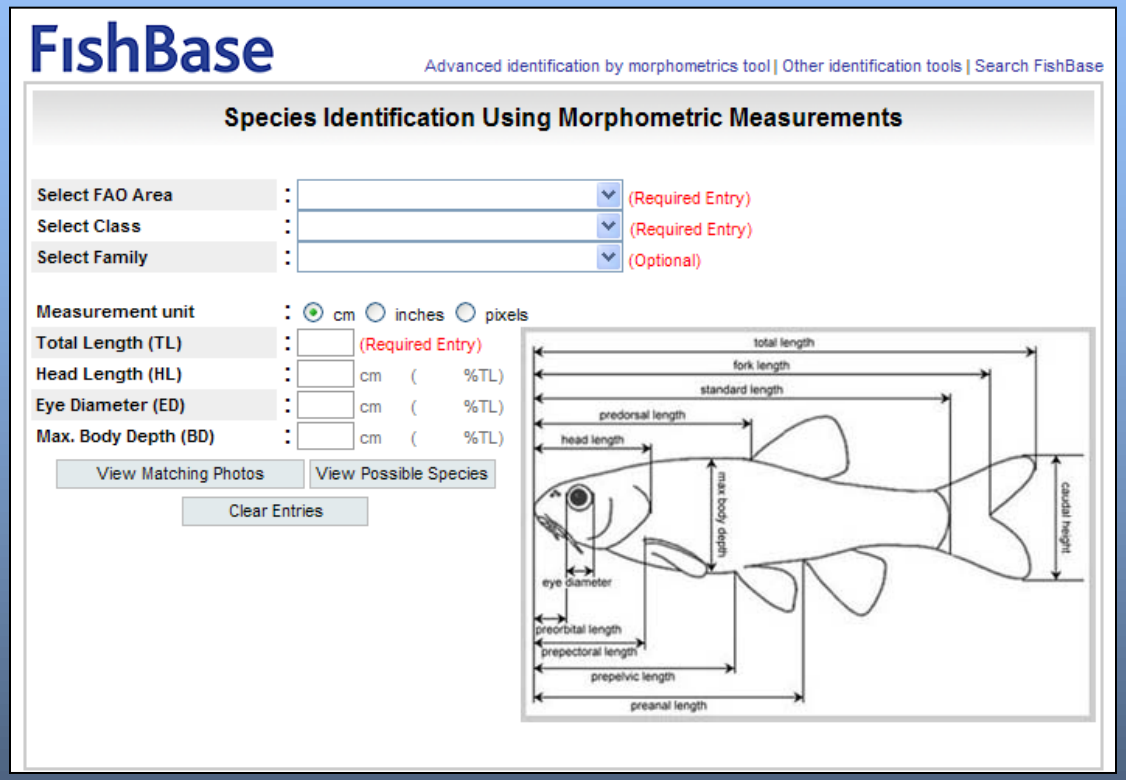


Outcome: list of matching species at the family level with pictures

4. Fish Identification

Identification by morphometrics





- User entries compared to morphometrics derived from measurements on species images

4. Fish Identification

Identification by morphometrics

FishBase

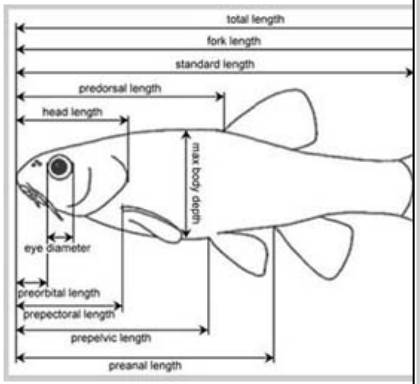
Basic identification by morphometrics tool | Other identification tools | Search FishBase

Advanced Species Identification Using Morphometric Measurements

Select FAO Area	Africa-Inland Waters	(Required Entry)
Select Class	Actinopterygii (Ray-finned fishes)	(Required Entry)
Select Family		(Optional)

Measurement unit : cm inches pixels

Total Length (TL)	14	cm	(Required Entry)
Standard Length (SL)		cm	(0 %TL)
Fork Length (FL)		cm	(0 %TL)
Head Length (HL)	3	cm	(21.43 %TL)
Pre-anal Length (PAL)		cm	(0 %TL)
Pre-dorsal Length (PDL)		cm	(0 %TL)
Pre-pectoral Length (PPEL)		cm	(0 %TL)
Pre-pelvic Length (PPL)		cm	(0 %TL)
Eye Diameter (ED)	1.2	cm	(8.57 %TL)
Pre-orbital Length (POL)		cm	(0 %TL)
Max. Body Depth (BD)	3	cm	(21.43 %TL)
Caudal Height (CH)		cm	(0 %TL)



View Matching Photos | View Possible Species

FishBase

Search FishBase

List of Possible Species

< < < Back

Number of Matching Species 2

Alestidae | *Brycinus brevis* |

Max length : 25 cm TL **Depth range :** - m **Size (cm) :** none

Dorsal spines : - **soft-rays :** - **Anal spines :** 3 - 3 **soft-rays :** 13 - 15

Adults with no fontanel. Long snout, 3x head length, large head. Large adult size. No sexual dimorphism of anal fin. Deep body, < 3x SL for adults. Uniformly brown back, silvery sides and white belly. Affinities: B. macrocephalus

Morphometrics of *Brycinus brevis*
Brbre_u0.jpg / Hippocampus-Bildarchiv

Alestidae | *Brycinus nurse* | Nurse tetra

Max length : 25 cm TL **Depth range :** - m **Size (cm) :** none

Dorsal spines : - **soft-rays :** - **Anal spines :** 3 - 3 **soft-rays :** 10 - 15

Parietal fontanelle absent in adults, ponctiform in juveniles. Jaws equal. Sexual dimorphism on anal form of male adults. Humeral and precaudal spots black. Back greenish, sides silvery and ventral part white. Paired fins bright red, pectorals and ventral not colored or light orange. Part above eye red. Inhabit rivers, lakes, irrigation canals and fringing vegetation. Feed on zooplankton, *Caridina*, insects, snails and vegetation (Ref. 28714). Dwarf populations are described in lake basins: Lake Turkana, *B. n. nana* Pellegrin, 1935 and Lake Chad, *B. n. dageti* Blache and Miton, 1960 (see Ref. 2880).

Morphometrics of *Brycinus nurse*
Brnur_u0.jpg / Hippocampus-Bildarchiv

(Click on species name for more information. Click on the picture to view available pictures for the species)
Note : This list may be incomplete

4. Fish Identification

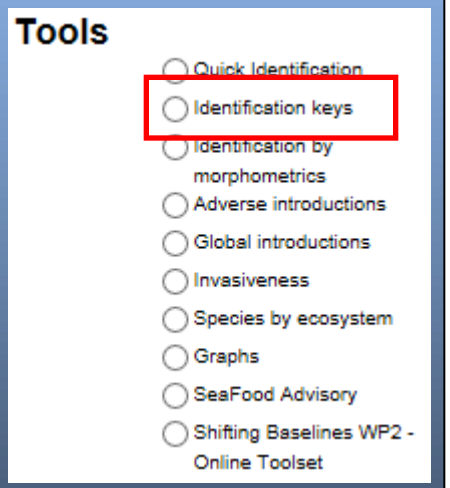
Identification Keys

- Digitized version of published keys
- Available keys listed by FAO area, order, family, country or ecosystem
- A total of 1668 keys is currently available, of which more than 300 for African inland waters

4. Fish Identification

Identification Keys

Search Page



Identification Keys List

n = 1651

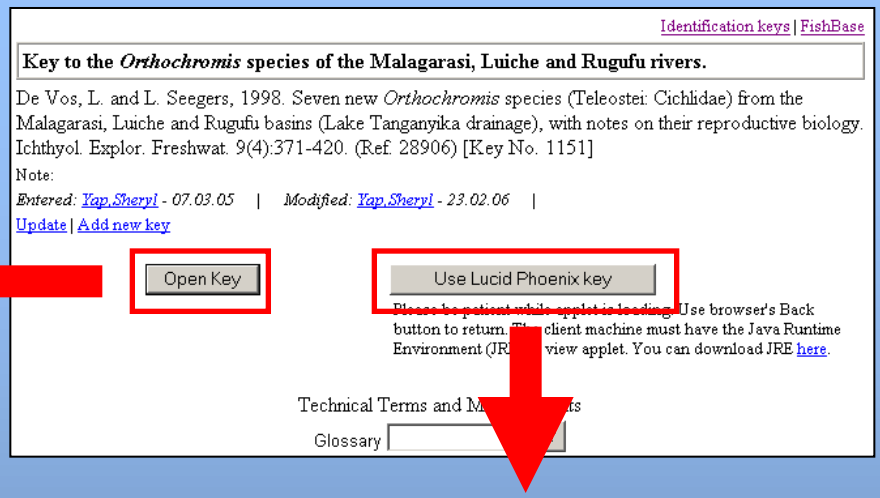
w/ Lucid Interface

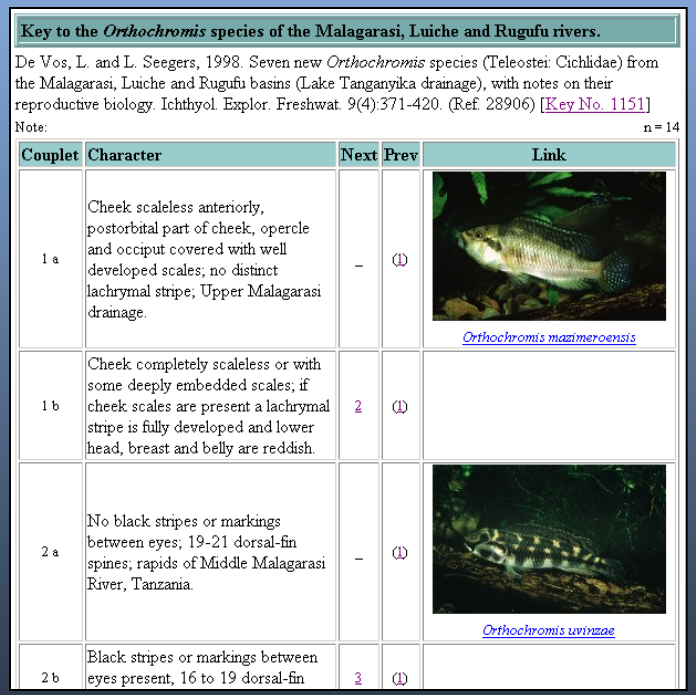
Key Code: Submit

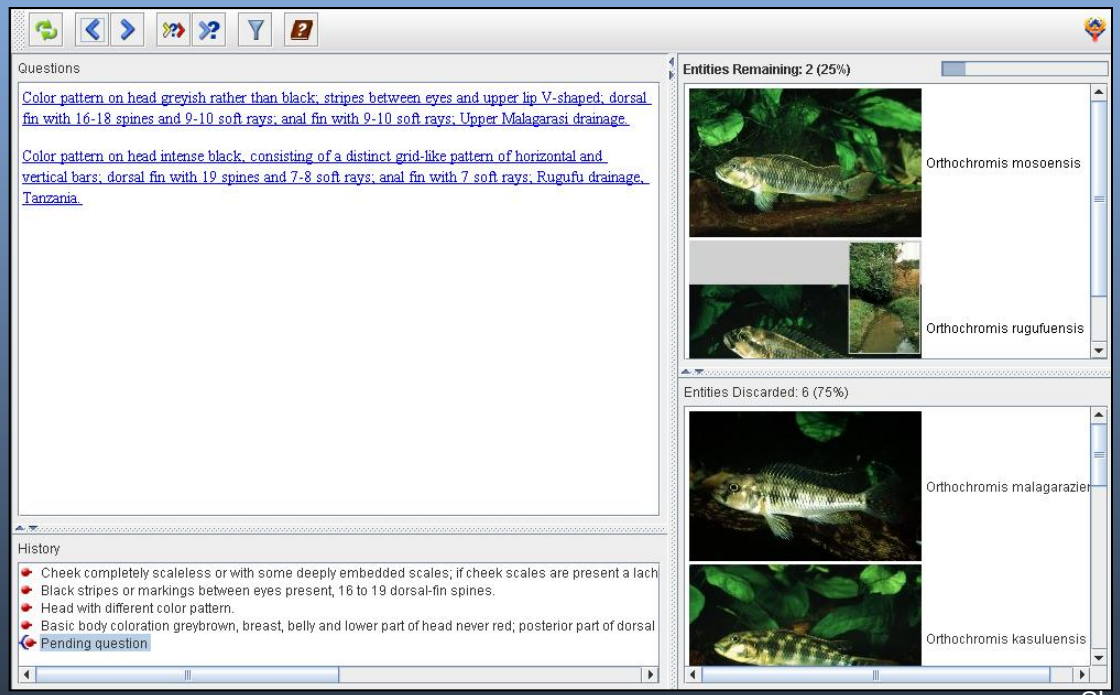
FAO Area	Order	Family	KeyCode	KeyName
Pacific, Western Central			1	Key to the families of sharks in the Western Central Pacific.
	Petromyzontiformes		2	Key to the species of lampreys of the World (adults).
	Petromyzontiformes		3	Key to the species of lampreys of the World (ammocoetes).
Africa-Inland Waters			6	Key to the families of southern African freshwater fishes.
	Perciformes		16	Key to species of pomfrets (Bramidae) from Southwestern Central Atlantic
Africa-Inland Waters	Siluriformes		20	Key to the families of catfishes (Order Siluriformes, suborder Siluroidei) in southern Africa.
Pacific, Northeast			23	Key to elopomorph leptocephali in the Northeast Pacific.
Pacific, Southwest	Pleuronectiformes		37	Key to families of New Zealand bony fishes, section A, flatfishes.
Pacific, Southwest			45	Key to families of New Zealand bony fishes, section E.
Atlantic, Northeast			46	Key to the marine fish families of Europe.
Atlantic, Northeast	Pleuronectiformes		70	Key to the flatfishes (Pleuronectiformes) of Europe.
			71	Key to Orders, some families and genera of fishes.
Atlantic, Northeast			72	Key to the identification of fish larvae in the Northeast Atlantic.
America, North - Inland waters			97	Key to the families of fishes occurring in the fresh waters of Canada.
Pacific, Southwest			154	A key to the families of New Zealand bony fishes.
Pacific, Southwest			155	A key to the families of New Zealand bony fishes.
Pacific, Southwest			156	A key to the families of New Zealand bony fishes.
Pacific, Southwest			157	A key to the families of New Zealand bony fishes.
Pacific, Southwest			158	A key to the families of New Zealand bony fishes.
Pacific, Southwest			159	A key to the families of New Zealand bony fishes.
Pacific, Southwest			160	A key to the families of New Zealand bony fishes.
Pacific, Southwest			162	A key to the families of New Zealand bony fishes.
Pacific, Southwest			163	A key to the families of New Zealand bony fishes.
Pacific, Southwest			164	A key to the families of New Zealand bony fishes.
Pacific, Western Central			180	Key to the families of Batoid fishes occuring in the Western Central Pacific.
Pacific, Western Central	Scorpaeniformes		205	Key to the species of scorpionfishes (also, lionfishes, rockfishes, stingfishes, stonefishes, and waspfishes) (Scorpaenidae) occurring in the Western Central Pacific.
Atlantic, Antarctic	Perciformes		246	Key to the early stages of Antarctic fish.
Europe - Inland waters			269	Keys to the larval and juvenile stages of coarse fishes from fresh waters in the British Isles (Key to developmental stages).

4. Fish Identification

Identification Keys







Show

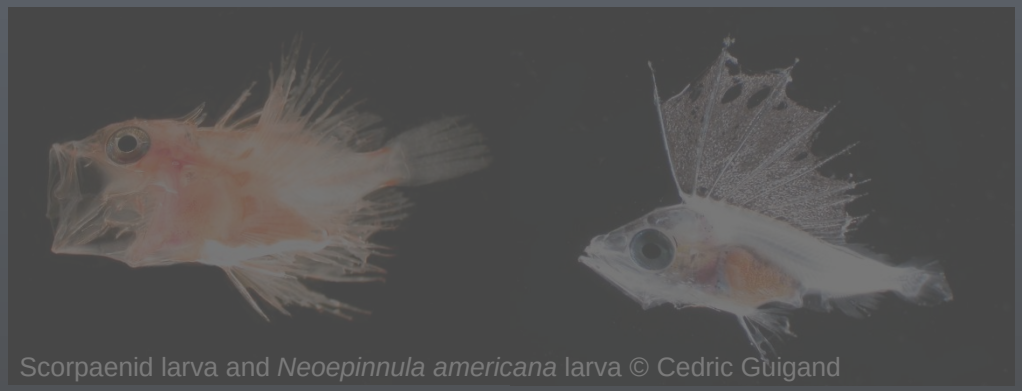
4. Fish Identification

Identification Keys

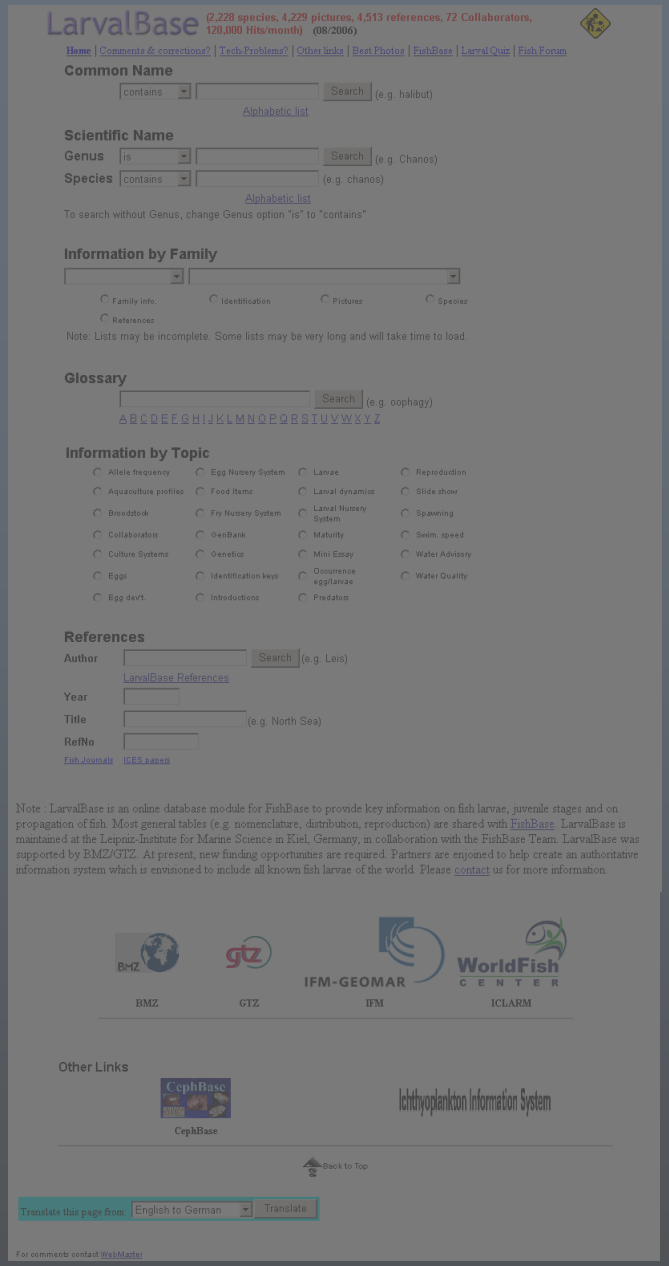
LarvalBase

Identification of fish eggs and larvae:

www.larvalbase.org



Scorpaenid larva and *Neoepinnula americana* larva © Cedric Guigand



4. Fish Identification

Identification Keys

LarvalBase

Information by Topic

Allele frequency	Egg Nursery System	Larvae	Reproduction
Aquaculture profiles	Food Items	Larval dynamics	Slide show
Broodstock	Fry Nursery System	Larval Nursery System	Spawning
Collaborators	GenBank	Maturity	Swim. speed
Culture Systems	Genetics	Mini Essay	Water Advisory
Eggs	Identification keys	Occurrence egg/larvae	Water Quality
Egg dev't.	Introductions	Predators	

Identificaton Keys List

[n=41] Sort by: (•) FAO area ( ) Order ( ) Family ( ) Key No.

FAO area	Order	Family	KeyName
	Perciformes	Sillaginidae	Key to species of *Sillago* of the world. [Key No. 1324]
	Stomiiformes	Phosichthyidae	Key to the larvae of the genus *Vinciguerria*. [Key No. 38]
America, North - Inland waters			Provisional Key to the families of Great Lakes Larval Fishes - (Yolk-sac larvae) (Excluding Anguillidae, Umbridae) [Key No. 332]
America, North - Inland waters			Provisional Key to the families of Great Lakes Larval Fishes - (Larvae) [Key No. 333]
America, North - Inland waters	Clupeiformes	Clupeidae	Provisional Key to Great Lakes Clupeid Larvae - (Yolk-Sac Larvae). [Key No. 336]
America, North - Inland waters	Clupeiformes	Clupeidae	Provisional Key to Great Lakes Clupeid Larvae (Herrings). [Key No. 337]
America, North - Inland waters	Cypriniformes	Catostomidae	Provisional Key to Lake Michigan Catostomid Larvae (suckers). [Key No. 348]
America, North - Inland waters	Cypriniformes	Cyprinidae	Key to species of larval cyprinids syntopic with *Pteronotropis hubbsi* in Chemin a haut Bayou and elsewhere. [Key No. 1177]
America, North - Inland waters	Esociformes	Esocidae	Provisional Key to Great Lakes Esocid Larvae (Pikes). [Key No. 338]
America, North - Inland waters	Perciformes	Centrarchidae	Provisional Key to Genera of Great Lakes Centrarchid Larvae (sunfishes) (1 late yolk-sac larvae and larvae). [Key No. 349]
America, North - Inland waters	Petromyzontiformes	Petromyzontidae	Provisional Key to Great Lakes Petromyzontid Larvae. (Lampreys) [Key No. 334]
America, North - Inland waters	Petromyzontiformes	Petromyzontidae	Provisional Key to Great Lakes Petromyzontid Larvae. (Lampreys) [Key No. 335]
America, North - Inland waters	Salmoniformes	Salmonidae	Provisional Key to Great Lakes Salmonid Larvae, (trouts) (Yolk-sac larvae less than 20 mm TL). [Key No. 340]

Identification keys for larvae are also present in FishBase