

KEY TO FISH FAMILIES IN THE INDOCHINESE MEKONG

Coverage. This key covers all 93 fish families, hitherto recorded from fresh- and brackish-water areas of the Mekong Basin, as well as an additional 3 marine-fish families that are expected to enter the brackish estuaries in this region (*viz.*, Myliobatidae, Gymnuridae, and Apogonidae). Note that this key is made based primarily on the fish species of the Indochinese Mekong; namely this key may not apply to the non-Mekong species of respective families (*viz.*, fishes from the other geographic regions).

- 1a. Five pairs of gill openings 2
1b. Single pair of gill opening(s) 6



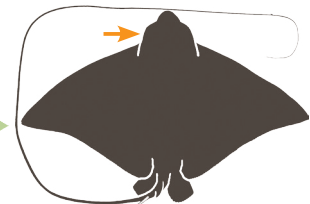
- 2a. Gill openings located on lateral side of body **Carcharhinidae** (p. 34) ▶
2b. Gill openings located on ventral surface of body 3



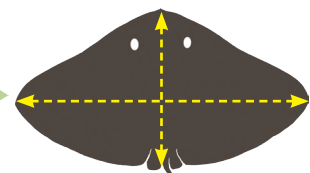
- 3a. Snout greatly elongate, with a row of distinct thorns on each side, forming saw-like appearance **Pristidae** (p. 39) ▶
3b. Snout not as in 3a 4



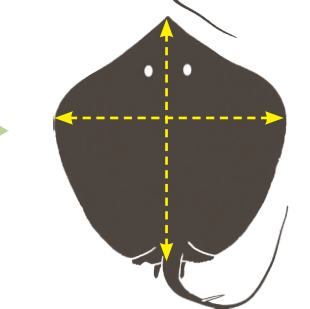
- 4a. Eyes located on lateral sides of protruding head **Myliobatidae** (p. 39) ▶
4b. Eyes on dorsal surface of disc 5



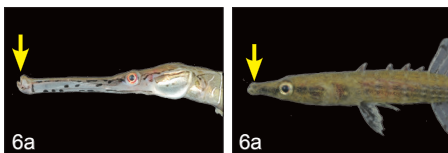
- 5a. Disc much wider than its length; tail relatively short **Gymnuridae** (p. 39) ▶



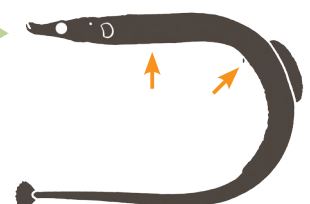
- 5b. Disc width subequal to its length; tail long **Dasyatidae** (p. 35) ▶



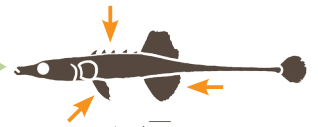
- 6a. Body elongate, encased in bony plates; mouth small, opening at tip of bony tube-like snout 7
6b. Combination of characters not as in 6a. 8



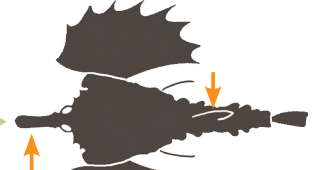
- 7a. Pelvic fin absent; no dorsal-fin spines; anal fin absent or, if present, very small and rudimentary **Syngnathidae** (p. 337) ▶



7b. Pelvic fin present; usually 5 small isolated spines preceding soft dorsal fin; anal fin as large as dorsal fin **Indostomidae** (p. 336) ▶



8a. Body broad, depressed, and encased in bony plates; snout elongate, flat stick-like; short-based dorsal and anal fins, each with 5 unbranched rays **Pegasidae** (not shown in this book) ▶



8b. Combination of characters not as in 8a. 9

9a. Body greatly elongate, eel-like or tapering ribbon-like; pelvic fins absent 10

9b. Shape of body variable (eel-like in some); pelvic fins usually present (absent in some, but at least the eel-like species have pelvic fins) 18

10a. Head well compressed and nearly triangular; lower jaw projecting; body well compressed and ribbon-like, tapering posteriorly **Trichiuridae** (p. 400) ▶



10b. Combination of characters not as in 10a 11



11a. A series of many small spines along dorsal midline before soft dorsal fin; 2–3 anal-fin spines **Mastacembelidae** (p. 348) ▶



11b. No spines before soft dorsal fin; no anal-fin spines 12

12a. Caudal fin may be separated from dorsal/anal fins; pectoral fin present; 34–48 dorsal-fin rays; 37–48 anal-fin rays; small size (up to 4.5 cm SL) **Chaudhuriidae** (p. 347) ▶



12b. Combination of characters not as in 12a. 13

13a. Pectoral fins absent 14

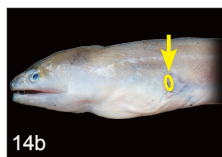
13b. Pectoral fins present 15



14a. Gill membranes continuous across ventral surface of body **Synbranchidae** (p. 344) ▶



14b. A pair of small pore-like gill openings on side of body **Muraenidae** (p. 47) ▶

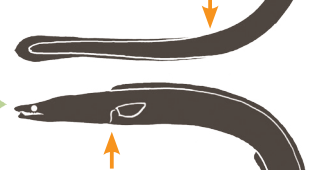


15a. Anus at posterior part of body **Moringuidae** (p. 48) ▶

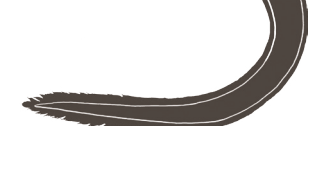


15b. Anus at or before midlength of body 16

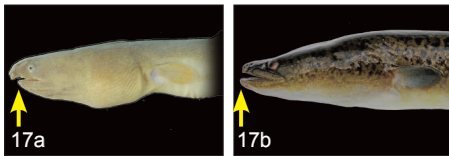
16a. Enlarged teeth at tip of lower jaw; gill openings confined to lower part of body **Muraenesocidae** (p. 51) ▶



16b. No enlarged teeth at tip of lower jaw; gill openings at midside of body 17



17a. Lower jaw not projecting beyond upper jaw; no scales on body **Ophichthidae** (p. 48) ▶

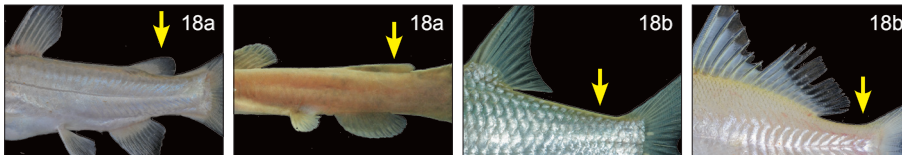


17b. Lower jaw slightly projecting beyond upper jaw; minute embedded scales on body **Anguillidae** (p. 46) ▶



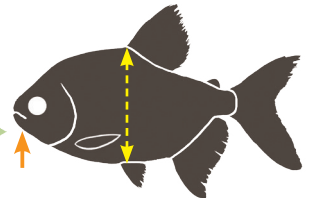
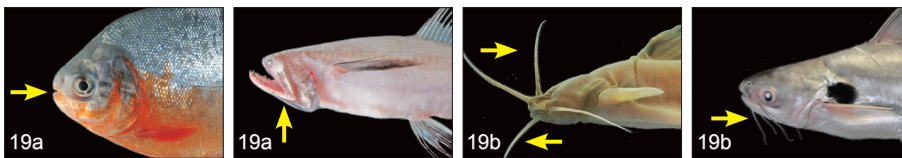
18a. Adipose fin present 19

18b. Adipose fin absent 28



19a. Barbels absent 20

19b. Barbels present (except for adults of a large pangasiid catfish, *Pangasianodon gigas*, lacking barbels) 21



20a. Body deep and compressed; mouth small **Characidae** (p. 241) ▶

20b. Body slender; mouth small to large 21

21a. Mouth small or moderate in size, not reaching posteriorly a vertical line through posterior margin of eye; lateral-line scales absent on body **Salangidae** (p. 307) ▶

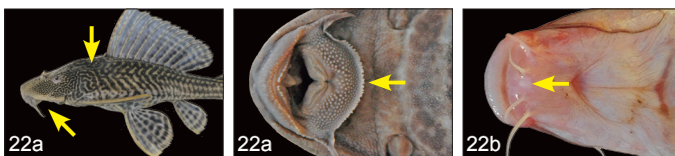


21b. Mouth large, extending posteriorly well beyond a vertical line through posterior margin of eye; lateral-line scales present on body **Synodontidae** (p. 308) ▶



22a. Body encased in bony plates; mouth ventral; lower lip broad and papillose, forming a semi-circular flap **Loricariidae** (p. 304) ▶

22b. Body not encased in bony plates; position of mouth variable; lips not forming a semi-circular flap 22

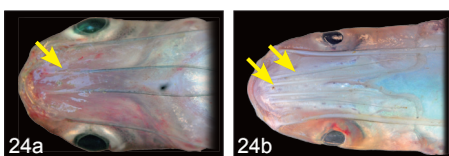
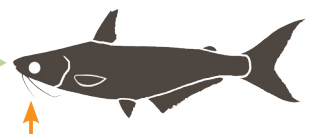


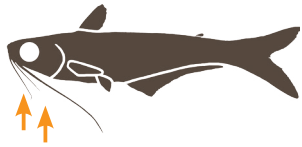
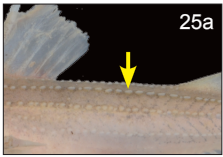
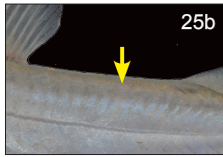
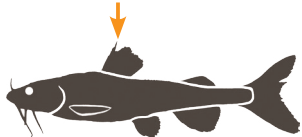
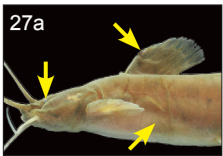
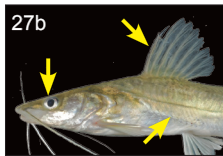
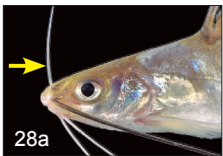
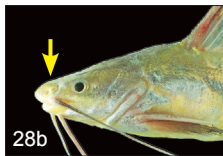
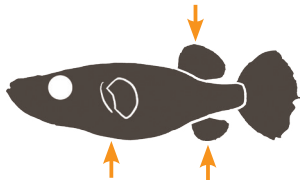
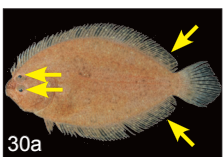
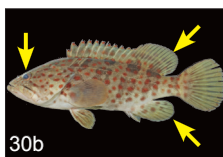
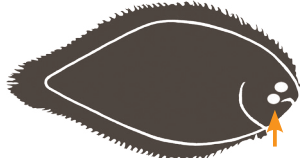
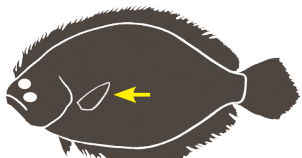
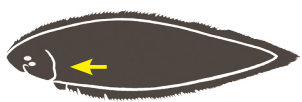
23a. A long-based anal fin, with 24 or more rays 23

23b. Anal-fin base short 24

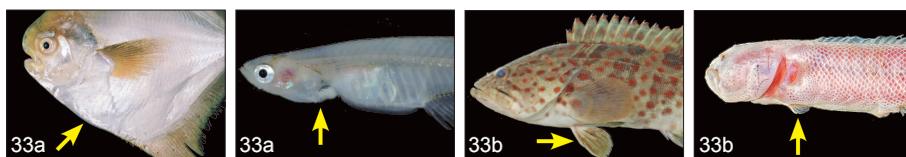


24a. Single pair of barbels on ventral surface of lower jaw (except for adults of *Pangasianodon gigas*, lacking barbels) **Pangasiidae** (p. 260) ▶

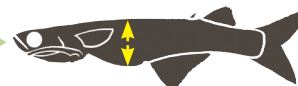


- 24b. Two pairs of barbels on ventral surface of lower jaw **Schilbidae** (p. 274) ► 
- 25a. Body covered with numerous small tubercles 26
- 25b. Body smooth, without small tubercles 27
- 

- 26a. Dorsal fin with a strong, pungent spine **Akysidae** (p. 296) ► 
- 26b. Dorsal fin with or without spinous ray, but the spine, if present, not strong and pungent **Sisoridae** (p. 300) ► 
- 27a. Dorsal fin covered by thick skin; eye minute, sometimes embedded under skin; head and body reddish brown in many species **Amblycipitidae** (p. 295) ► 
- 27b. Combination of characters not as in 27a. 28
- 

- 28a. Nasal barbel present **Bagridae** (p. 282) ► 
- 

- 28b. Nasal barbel absent **Ariidae** (p. 276) ► 
- 29a. Body soft and globular; dorsal and anal fins located at posterior half of body, with no spines; pelvic fins absent **Tetraodontidae** (p. 498) ► 
- 29b. Combination of characters not as in 29a 30
- 30a. Both eyes on one side of body; dorsal and anal fins with long bases 31
- 30b. Eyes bilateral; shape of dorsal and anal fins variable 33
- 

- 31a. Eyes on right side of body **Soleidae** (p. 487) ► 
- 31b. Eyes on left side of body 32
- 32a. Pectoral fins present **Paralichthyidae** (p. 486) ► 
- 32b. Pectoral fins absent **Cynoglossidae** (p. 492) ► 

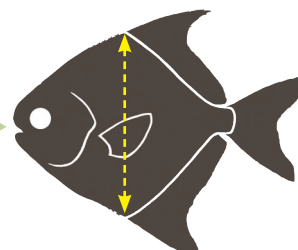
- 33a. Pelvic fins absent or vestigial at least in adult 34
 33b. Pelvic fins present (may be minute) 35



- 34a. Body slender; small fishes (up to 3.7 cm SL) **Phallostethidae** (p. 318) ▶

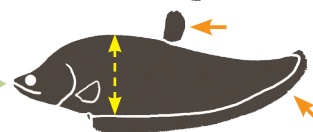


- 34b. Body deep and compressed; moderately large-sized fishes, not as in 33a
 **Stromateidae** (p. 393) ▶



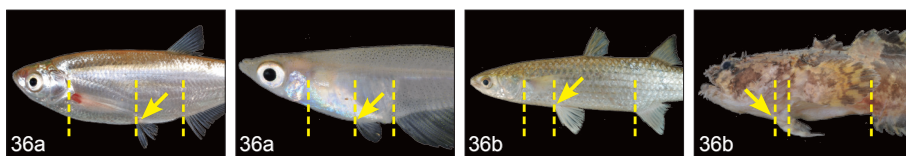
- 35a. Body deep and compressed, broad knife-like; a single feather-like dorsal fin; long-based anal fin, continuous with caudal fin **Notopteridae** (p. 42) ▶

- 35b. Combination of characters not as in 35a. 36



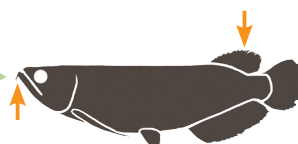
- 36a. Pelvic fins usually located around, or behind, midpoint of distance between head and origin of anal fin (may be slightly anterior to the midpoint in an engraulidid genus, *Coilia*); no pelvic-fin spines 37

- 36b. Combination of characters not as in 36a 57



- 37a. A pair of short fleshy barbels on chin; scales on body large, 23–26 lateral-line scales; dorsal fin located on posterior part of body, with its base much shorter than anal-fin base
 **Osteoglossidae** (p. 41) ▶

- 37b. Combination of characters not as in 37a 38

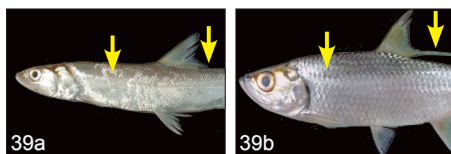


- 38a. Large gular plate on underside of head 39

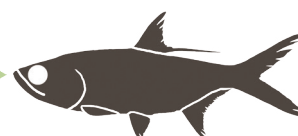
- 38b. Gular plate absent 40



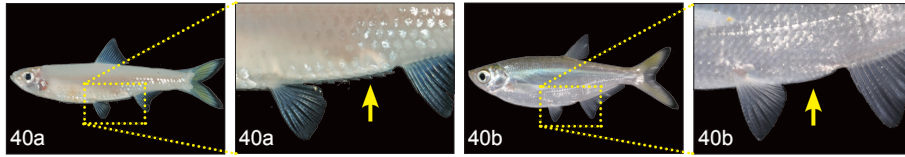
- 39a. Body slender; last dorsal-fin ray not elongate; scales small **Elopidae** (p. 52) ▶



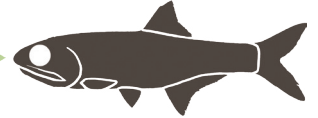
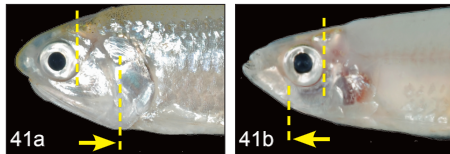
- 39b. Body deeper; last dorsal-fin ray elongate and filamentous; scales large
 **Megalopidae** (p. 53) ▶



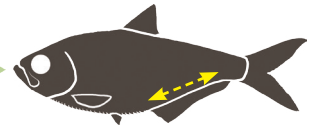
- 40a. Belly with a series of scutes41
 40b. No scutes on belly 43



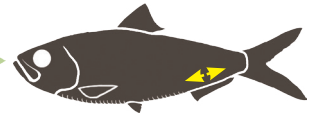
- 41a. Jaws very long, extending posteriorly well beyond a vertical through hind margin of eye **Engraulidae** (p. 54) ▶
 41b. Jaws moderate in size, not reaching posteriorly to a vertical through hind margin of eye 42



- 42a. Long-based anal fin, with 30 or more rays **Pristigasteridae** (p. 62) ▶

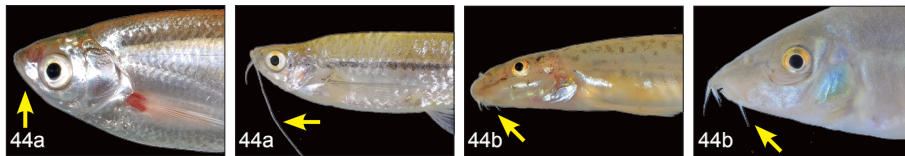


- 42b. Short-based anal fin, with less than 30 rays **Clupeidae** (p. 62) ▶

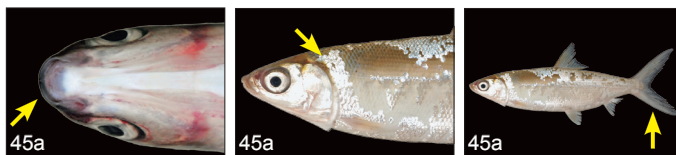


- 43a. No teeth on jaws 44
 43b. Teeth on jaws (may be minute) 49

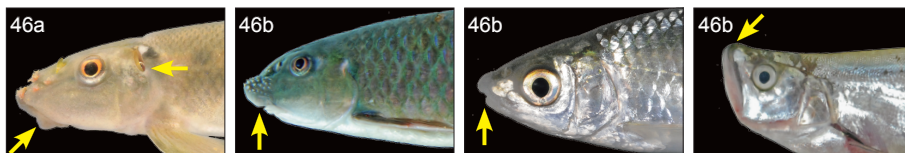
- 44a. Barbels absent or, if present, 1–2 pairs only 45
 44b. Three or more pairs of short barbels (modified into minute papilla-like processes in many depressed species of Balitoridae) 47



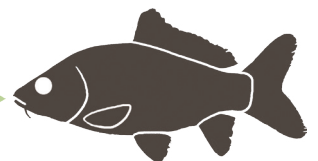
- 45a. Mouth small; scales minute, 75–91 lateral-line scales; lateral line nearly straight; caudal fin long and deeply forked **Chanidae** (only a single species, *Chanos chanos*, p. 70) ▶
 45b. Combination of characters not as in 45a 46



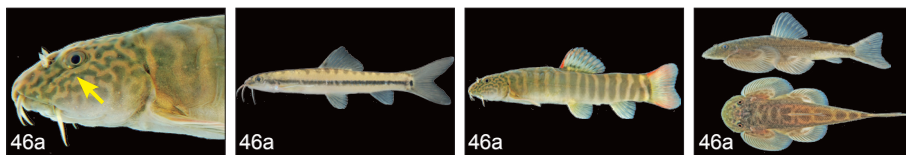
- 46a. Mouth ventral, modified into a sucking organ; a small vertically-elongate opening above gill cover **Gyrinocheilidae** (p. 184) ▶



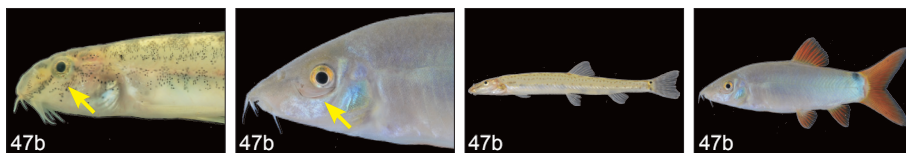
- 46b. Position and shape of mouth variable; no additional opening above gill cover **Cyprinidae** (p. 73) ▶



- 47a. No erectile spine below eye; body elongate and typical loach-like, or depressed and stone-fly-like **Balitoridae** (p. 202) ▶



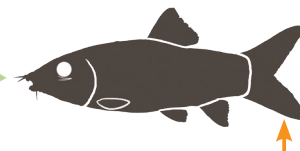
- 47b. A small, posteriorly-directed erectile spine below eye (absent in a few species); body elongate and typical loach-like, or relatively deep and compressed 48



- 48a. Caudal fin truncate or rounded, often weakly emarginate; body slender and elongate **Cobitidae (subfamily Cobitinae)** (p. 186) ▶

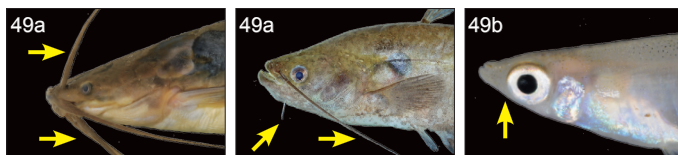


- 48b. Caudal fin deeply forked; body deeper **Cobitidae (subfamily Botiidae)** (p. 194) ▶



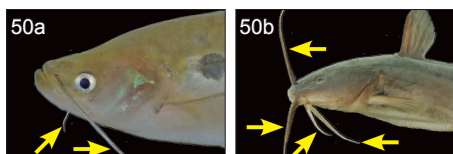
- 49a. Barbels present (may be very short or rudimental in a silurid genus *Phalacronotus*) 50

- 49b. Barbels absent 53



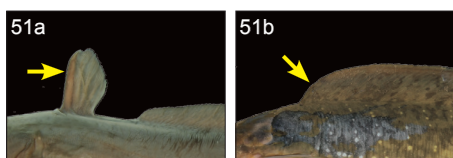
- 50a. Two pairs of barbels (may be very short or rudimental) **Siluridae** (p. 248) ▶

- 50b. Four pairs of barbels 51



- 51a. A single strong dorsal-fin spine **Plotosidae** (p. 243) ▶

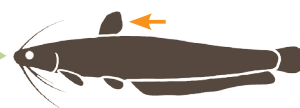
- 51b. No dorsal-fin spines 52



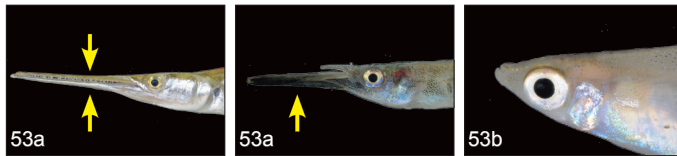
- 52a. Dorsal-fin base very long **Clariidae** (p. 244) ▶



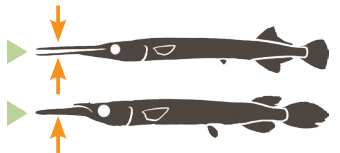
- 52b. Dorsal-fin base short **Heteropneustidae** [not shown in this book (see p. 243)] ▶



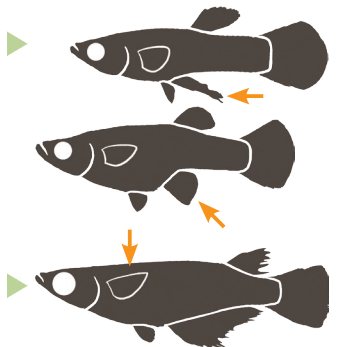
- 53a. Upper and/or lower jaws greatly elongate, javelin-line 54
 53b. Both jaws not elongate and javelin-like 55



- 54a. Both jaws elongate, javelin-like **Belonidae** (p. 334) ▶
 54b. Lower jaw elongate, javelin-like and much longer than short triangular upper jaw
 **Hemiramphidae** (p. 329) ▶



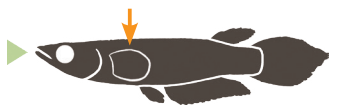
- 55a. Base of anal fin as much as, or shorter than, dorsal-fin base; anal fin of males modified into a rod-like intromittent organ **Poeciliidae** (p. 323) ▶
 55b. Base of anal fin much longer than dorsal-fin base; anal fin of males not rod-like 56



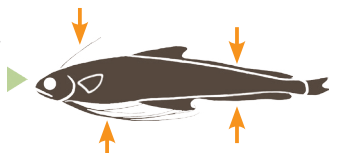
- 56a. Body semitranslucent when alive; no distinct black spots on dorsal fin; pectoral fin nearly falcate (rather than rounded) **Adrianichthyidae** (p. 326) ▶



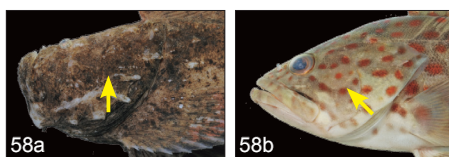
- 56b. Body not semitranslucent; a large black spot on dorsal fin; pectoral fin rounded
 **Aplocheilidae** (p. 322) ▶



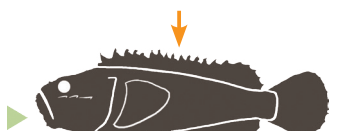
- 57a. First dorsal fin comprising a single elongate ray; long-based second dorsal and anal fins; 3 of 5 pelvic-fin rays greatly elongate and filamentous **Bregmacerotidae** (p. 309) ▶
 57b. Combination of characters not as in 57a. 58



- 58a. A longitudinal bony ridge (usually with some or more small spines) across middle of cheek 58
 58b. No distinct bony ridge across middle of cheek 59



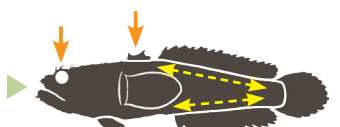
- 59a. Head moderately deep, not much depressed; a single continuous dorsal fin
 **Scorpaenidae** (p. 352) ▶



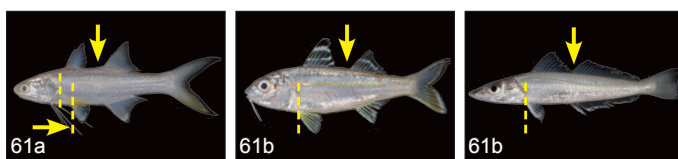
- 59b. Head well depressed; 2 dorsal fins **Platycephalidae** (p. 353) ▶



- 60a. First dorsal fin with 3 strong spines; head broad, with numerous fleshy flaps; long-based second dorsal and anal fins; no scales on body **Batrachoididae** (p. 310) ▶
 60b. Combination of characters not as in 60a 61



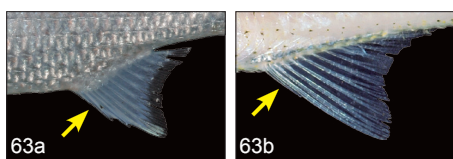
- 61a. Two widely-separated dorsal fins; origin of pelvic fin placed well behind a vertical line through pectoral-fin base 62
- 61b. Combination of characters no as in 61a 64



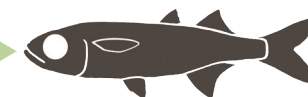
- 62a. Lower rays of pectoral fin prolonged and thread-like, separated from main part of the fin; snout rounded and projecting anteriorly beyond jaws **Polynemidae** (p. 380)
- 62b. No thread-like, free pectoral-fin rays; snout not projecting anteriorly beyond jaws 63



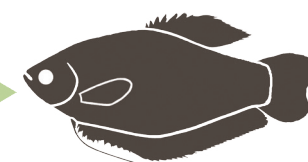
- 63a. Two or 3 anal-fin spines **Mugilidae** (p. 312)



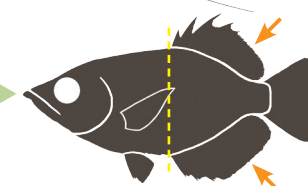
- 63b. Single anal-fin spine **Atherinidae** (p. 318)



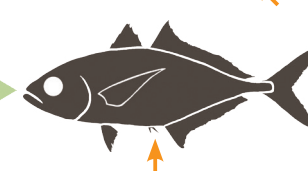
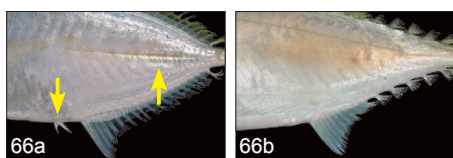
- 64a. Single dorsal fin, with its base much shorter than anal-fin base; first soft pelvic-fin ray greatly elongate and thread-like in many species **Osphronemidae** (p. 404)
- 64b. Base of dorsal fin(s) as long as, or longer than, anal-fin base; tip of first soft pelvic-fin ray slightly elongate in some, but not greatly prolonged and thread-like 65



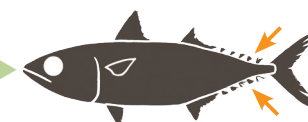
- 65a. Single dorsal fin, confined to posterior half of body **Toxotidae** (p. 385)
- 65b. Shape of dorsal fin(s) variable, but not as in 65a. 66



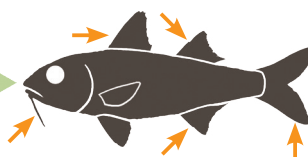
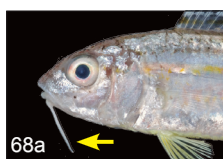
- 66a. First 2 anal-fin spines separated from main part of the fin; some lateral-line scales (at least those on posterior part of body) modified into spiny scutes in many species **Carangidae** (p. 390)
- 66b. No separated anal-fin spines from main part of the fin; no spiny scutes on side of body 67



- 67a. Five or more finlets behind second dorsal and anal fins **Scombridae** (p. 398)
- 67b. No finlets behind second dorsal and anal fins 68

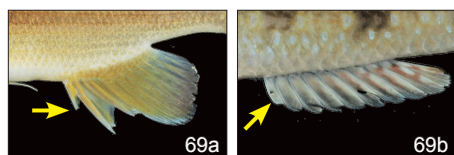


- 68a. A pair of long fleshy barbels on chin; dorsal fin well separated; caudal fin forked; single anal-fin spine **Mullidae** (p. 371)

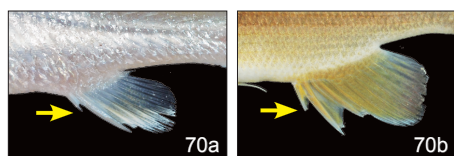


- 68b. Combination of characters not as in 68a 69

- 69a. Two or more anal-fin spines 70
 69b. Single or no anal-fin spine 92



- 70a. Two anal-fin spines 71
 70b. Three or more anal-fin spines 73

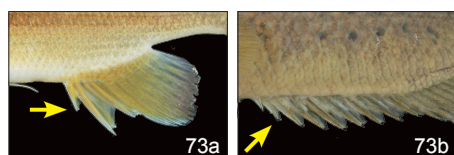


- 71a. Two separated dorsal fins, the anterior (first) one with 6–8 spines and the posterior (second) one with 1 spine and 8–14 soft rays; relatively short-based anal fin, with 2 spine and 8–18 soft rays **Apogonidae** (not shown in this book) 72
 71b. Combination of characters not as in 71a. 72

- 72a. Body slender; snout narrowly pointed; mouth small, not reaching to a vertical through anterior margin of eye; long-based anal fin, with 2 slender spines and 18–23 soft rays **Sillaginidae** (p. 371) 72

- 72b. Body moderately deep; shape of snout variable, but not narrowly pointed; short-based anal fin, with 2 spines and 6–8 soft rays **Sciaenidae** (p. 372) 72

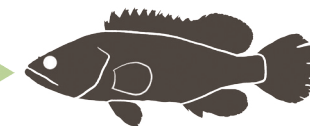
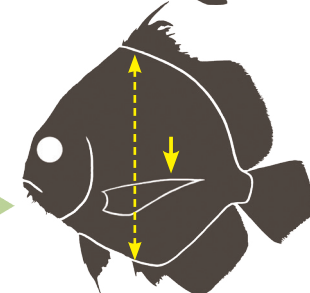
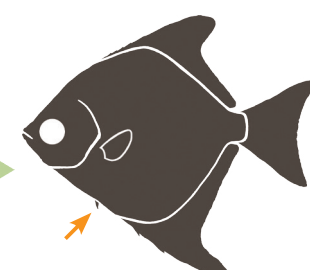
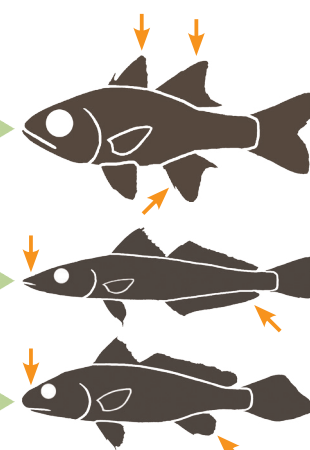
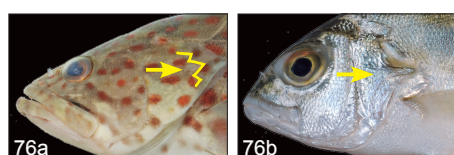
- 73a. Three anal-fin spines 74
 73b. Four or more anal-fin spines 90



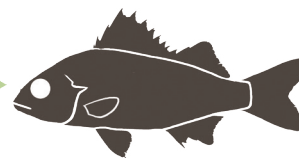
- 74a. Pelvic fin rudimentary **Monodactylidae** (p. 393) 75
 74b. Pelvic fin moderately developed, not rudimentary 75

- 75a. Pectoral fin falcate, longer than head; body extremely deep; mouth greatly protrusible **Drepaneidae** (p. 392) 76
 75b. Combination of characters not as in 75a 76

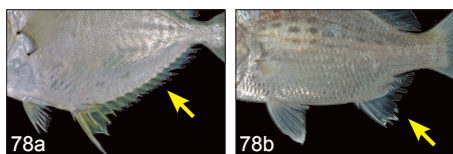
- 76a. Three flat posteriorly-directed spines at posterior part of operculum **Serranidae** (p. 362) 77
 76b. Posterior part of operculum with 2 or less spines 77



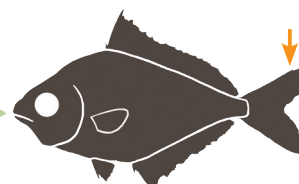
- 77a. Two spines at posterior part of operculume, the lower one much larger and stronger than upper one; body and caudal fin with distinct dusky stripes **Terapontidae** (p. 384) ▶
- 77b. Combination of characters not as in 77a 78



- 78a. Anal-fin base long; 13 or more soft anal-fin rays 79
- 78b. Anal-fin base relatively short; less than 12 soft anal-fin rays 80



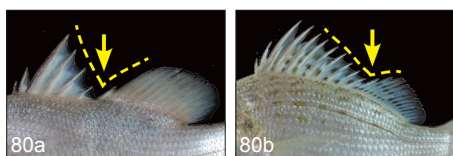
- 79a. Upper jaw greatly protrusible; caudal fin forked **Leiognathidae** (p. 388) ▶



- 79b. Upper jaw not protrusible; caudal fin truncate **Ephippidae** (not shown in this book) ▶



- 80a. Dorsal fin with a deep notch, and the anterior and posterior parts not or barely connected by very low membrane 81
- 80b. Dorsal fin with no deep notch, and the anterior and posterior parts broadly connected by membrane 82



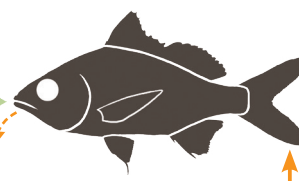
- 81a. Caudal fin forked **Ambassidae** (p. 356) ▶



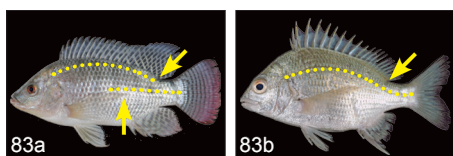
- 81b. Caudal fin rounded **Latidae** (p. 361) ▶

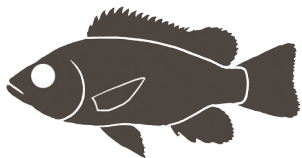
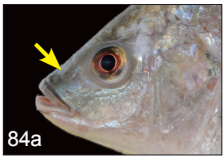
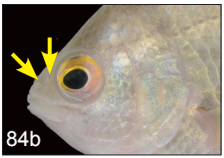
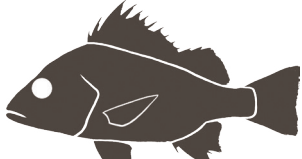
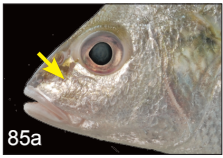
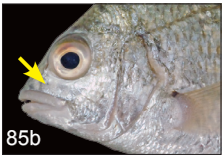
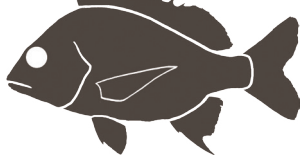
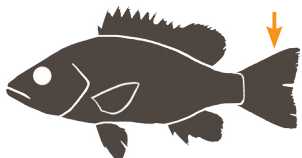
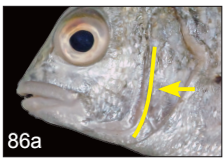
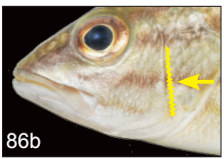
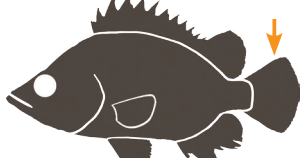
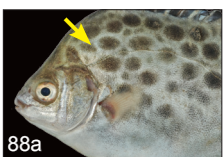
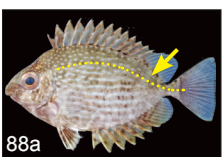
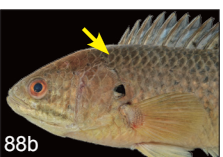
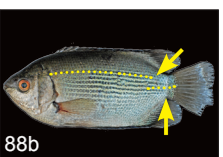
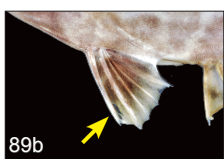
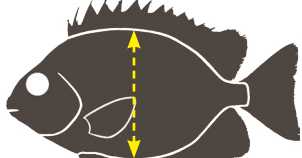


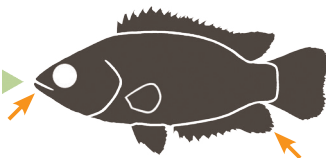
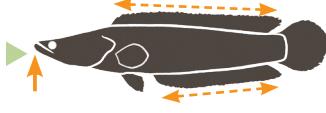
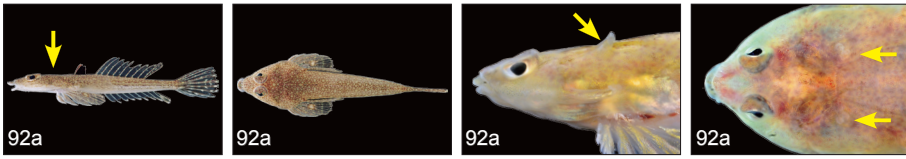
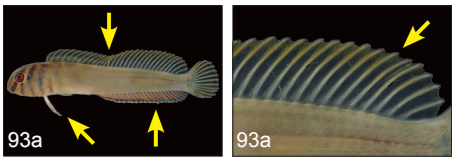
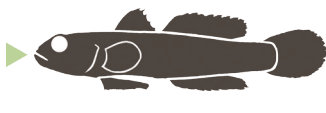
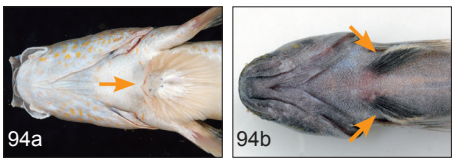
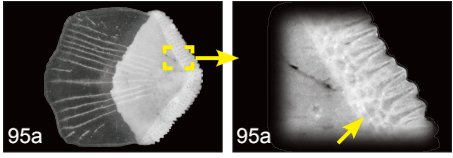
- 82a. Mouth greatly protrusible; caudal fin deeply forked **Gerreidae** (p. 386) ▶
- 82b. Combination of characters not as in 82a 83



- 83a. Lateral line interrupted at posterior part of body 84
- 83b. Lateral line continuous 86



- 84a. A single pairs or nares **Cichlidae** (p. 368) ▶ 
-  
- 84b. Two pairs of nares **Nandidae** (p. 366) ▶ 
-  *Nandus*
 *Pristolepis*
- 85a. Interspace between eye and upper jaw largely scaled **Haemulidae** (p. 370) ▶ 
- 85b. Interspace between eye and upper jaw with no scales 86 
-  
- 86a. Posterior margin of peropercle smooth **Sparidae** (p. 370) ▶ 
- 86b. Posterior margin of preopercle serrated 87 
-  
- 87a. Caudal fin truncate or slightly emarginated **Lutjanidae** (p. 363) ▶ 
- 87b. Caudal fin rounded **Lobotidae** (p. 364) ▶ 
- 88a. Scales minute, difficult to be counted without magnification; lateral line continuous 89
- 88b. Scales moderately large; lateral line interrupted at posterior part of body 90
-    
- 89a. Body extremely deep; pelvic fin with 1 spine and 5 soft rays; 4 anal-fin spines **Scatophagidae** (p. 395) ▶ 
-  
- 89b. Body moderately deep; pelvic fin with 2 spines and 3 soft rays; 7 anal-fin spines **Siganidae** (p. 396) ▶ 

- 90a. Mouth located anteroventral to eye; anal fin with 9–11 spines and 8–12 soft rays **Anabantidae** (p. 402) 
- 90b. Mouth located in front of eye; anal fin with 13–15 spines and 17–19 soft rays **Helostomatidae** (p. 403) 
- 91a. Single long-based dorsal fin; long-based anal fin; separated pelvic fins; lower jaw projecting beyond upper jaw; lateral line present on body **Channidae** (p. 412) 
- 91b. Combination of characters not as in 91a 92
- 92a. Head greatly depressed; usually 2 separated dorsal fins (1st dorsal fin absent in *Tonlesapia*); no scales on body; a small pore-like gill opening **Callionymidae** (p. 418) 
- 
- 92b. Combination of characters not as in 92a 93
- 93a. Single long-based dorsal fin; long-based anal fins; all soft rays of dorsal and anal fins simple (unbranched); no scales on body; pelvic fin with 1 spine and 2–3 soft rays **Blenniidae** (p. 417) 
- 
- 93b. Combination of characters not as in 93a 94
- 94a. Pelvic fins usually united medially, forming a disc (if not, the length of base of second dorsal fin longer than distance from posterior end of second dorsal fin to base of caudal fin) **Gobiidae** (p. 430) 
- 
- 94b. Pelvic fins separated 95
- 95a. Multiple rows of minute cuboid cteni present around base of peripheral normal (spine-like) cteni **Odontobutidae** (p. 420) 
- 
- 95b. Scale cteni, if present, uniserial and spine-like, with no additional cuboid cteni around base (all scales cycloid in some species) **Eleotrididae** (p. 421) 
- 