

PLEURONECTIFORMES – flatfishes

Pleuronectiformes (*sensu* Nelson, 2006) comprises highly specialized flattened fishes, commonly known as "flatfishes." Their most characteristic feature is to have bilaterally-asymmetric appearance, *e.g.*, both eyes situated on a single (right or left) side of head in adult. In their early life stages (larvae and small juveniles), they have a single eye on each side, and after that one eye migrates to the other side. The body is laterally (not dorsoventrally) flattened, with long-based dorsal and anal fins; and, in many cases, the eyed-side surface of the body is a much darker than the eyeless-side surface.

According to Nelson (2006), about 678 species are recognized in 14 flatfish families. Many of flatfishes are found in the marine waters, but a few species are known to enter to, or be confined to, the fresh- and/or brackish-water areas.

During our field surveys in the Mekong in 2007–2013, at least 17 species belonging to 3 flatfish families (Paralichthyidae, Soleidae, and Cynoglossidae) were collected; many of these were collected from the Mekong Delta in Vietnam, whereas the other few were from Cambodia, Thailand, and Laos. These 17 species are shown in this book, although several additional species are expected to be found in the Vietnamese Mekong in particular in the brackish estuaries.

Actually, Vidthayanon (2008) recorded 2 additional soles, *i.e.*, *Brachirus orientalis* and *Dagetichthys marginata* (as *Synaptura marginata*) from the Mekong Delta. Furthermore, Rainboth *et al.* (2012) recorded at least 10 other species from the Mekong: *Psettodes erumei* (Psettodidae, see right photograph); *Engyproson mogkii* (Bothidae); *Solea ovata*, *Typhlachirus caecus*, and *Zebrias quagga* (Soleidae); *Cynoglossus abbreviatus*, *C. gracilis*, *C. lida*, and two unidentified species of *Cynoglossus* (Cynoglossidae). Identification of these records, however, will



Non-Mekong fish of *Psettodes erumei* (Psettodidae), sold at a fish market in Phuket Island, Thailand (photo: KS). See also text.

require re-confirmation based on the voucher specimens. For example, at least 2 species of these appears to be not accurately identified: *E. mogkii* is a marine species with a narrow interorbital space (see also, *e.g.*, Amaoka & Ho, 2018), whereas the photographed specimen shown by Rainboth *et al.* (2012) has a wide interorbital space; *T. caecus* is an Indonesian (Sumatran) species, and the photographed specimen of the species in Rainboth *et al.* (2012), collected from Tiền Giang of Vietnam, is most likely identified as the Mekong species *Typhlachirus elongatus* (see "Notes" of *T. elongatus*, p 488). And, although the identifications of some species of *Cynoglossus* shown by Rainboth *et al.* (2012) is also doubtfulness (see "Notes" of, *e.g.*, *C. microlepis*, p. 429), it is difficult to re-confirm the identification based only on the small photographs they provided. Further extensive, careful research is needed for clarification of the flatfish fauna in the Mekong.

Pseudorhombus arsius (Hamilton, 1822)

Family: Paralichthyidae (FC: 500)

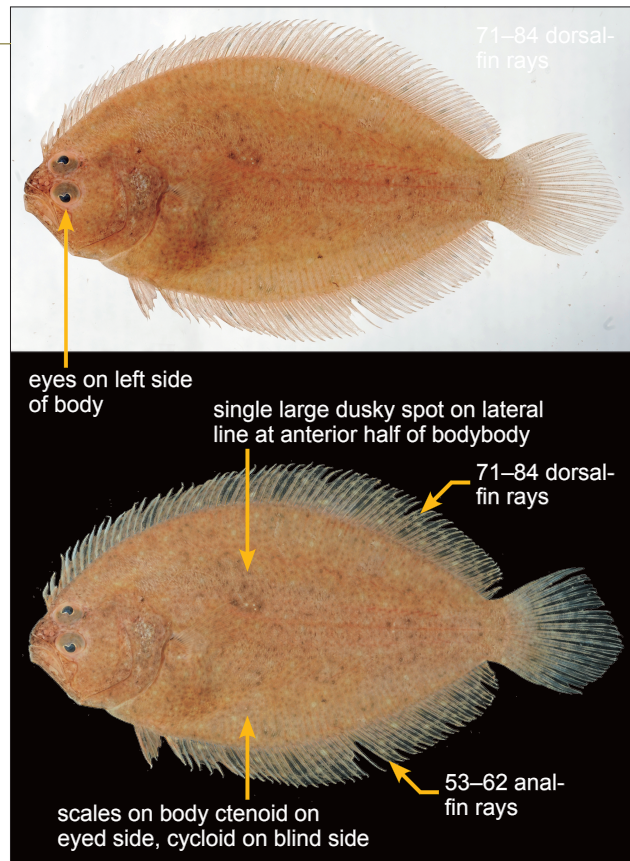
Size: 45 cm SL (Amaoka, 2016: 20).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A relatively large-sized species of flatfishes (or sand flounders), found in shallow coastal marine waters; it is also known to enter brackish estuaries with sandy or sandy-mud bottoms. This species is fairly common in local markets of the Mekong Delta in Vietnam, and is sold as fresh and sometimes dried.

Flounders of the family Paralichthyidae can be distinguished from the other flatfishes by having the following combination of characters (Amaoka & Hensley, 2001; Amaoka, 2016): eyes on the left side of the head; no spinous rays on fins; short-based pelvic fins, nearly symmetrical in position/shape to each other; caudal fin separated from (not joined to) dorsal and anal fins. The paralichthyid flounders look similar to the flatfishes of the other 3 families with eyes on the left side of the head, *i.e.*, Psettodidae (fish with the eyes on the right side of the head are also seen; see photograph, above), Citharidae, and Bothidae, all of which are expected to be in the Mekong and adjacent waters; the Psettodidae and Citharidae have a pelvic-fin spine (the former also has spinous rays on dorsal and anal fins), and the Bothidae has pelvic fins, which are asymmetrical in shape/position to each other.

Pseudorhombus arsius is the only paralichthyid species with reliable records from the Mekong, although several congeners are also expected to be in the estuarine areas.

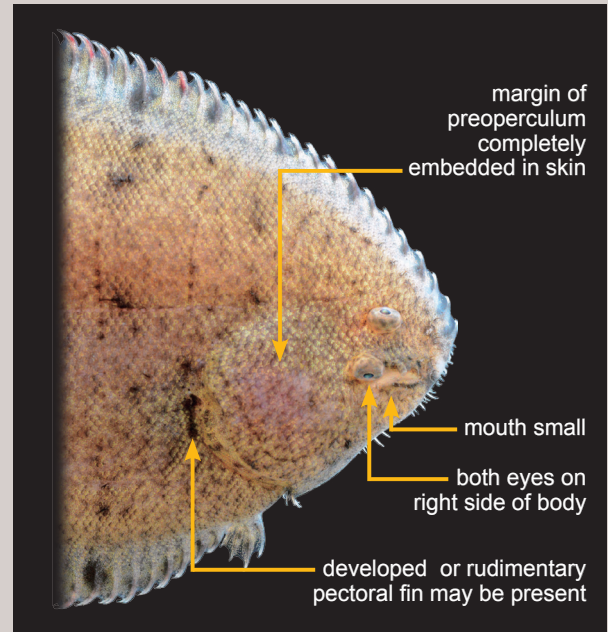


CTUP 1488 (photo: LXT)

Soles

Fishes of the family Soleidae, commonly known as "soles," somewhat resemble the cynoglossid fishes (pp. 492–497) in general appearance, *e.g.*, small mouth, margin of preoperculum completely embedded in skin, and, in several genera, united dorsal and anal fins with the caudal fin, but have both eyes on the right side of the head (*vs.* left side in the cynoglossids). Although all soleid fishes shown in this book have dorsal and anal fins united with the caudal fin, more than a few soleid genera (*e.g.*, *Solea*, also expected to be in the Mekong) have dorsal and anal fins separated from the caudal fin. Some genera have developed and/or rudimentary pectoral fins (*e.g.*, *Brachirus* and *Dagetichthys*), whereas the others lack the pectoral fins (*e.g.*, *Achiroides*).

In the Indochinese Mekong, the soleid fishes are commonly found in both fresh- and brackish-waters, and are frequently sold fresh at the local markets (particularly the large-sized species, *e.g.*, *Brachirus siamensis*).



Achiroides melanorhynchus (Bleeker, 1850)

Family: Soleidae (FC: 501)

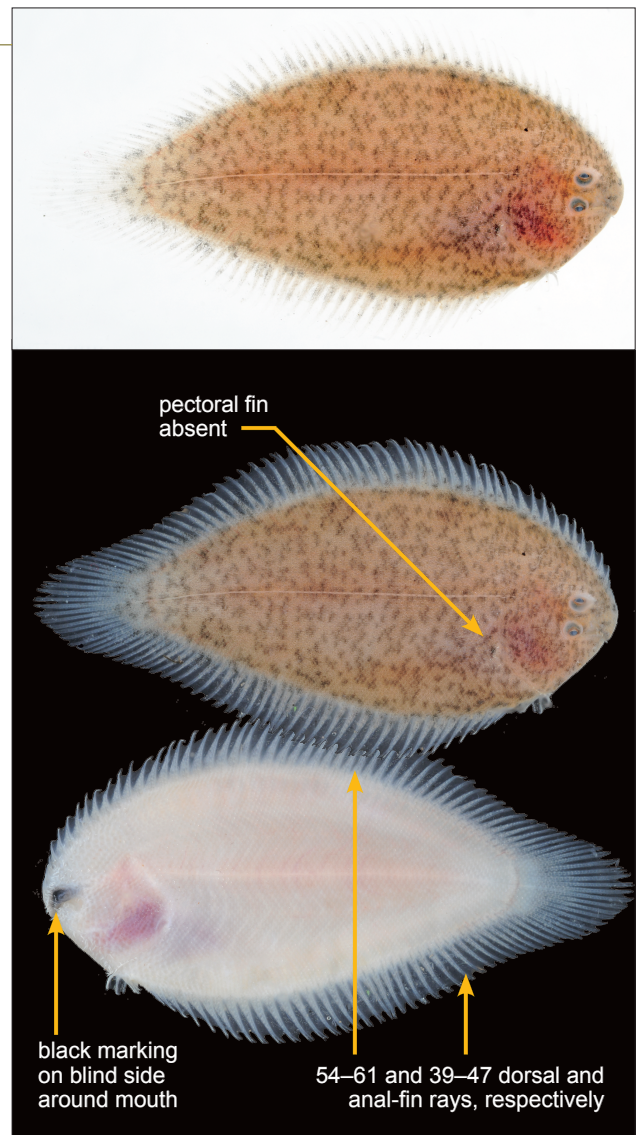
Size: 11.2 cm SL (Kottelat *et al.*, 1993: 170).

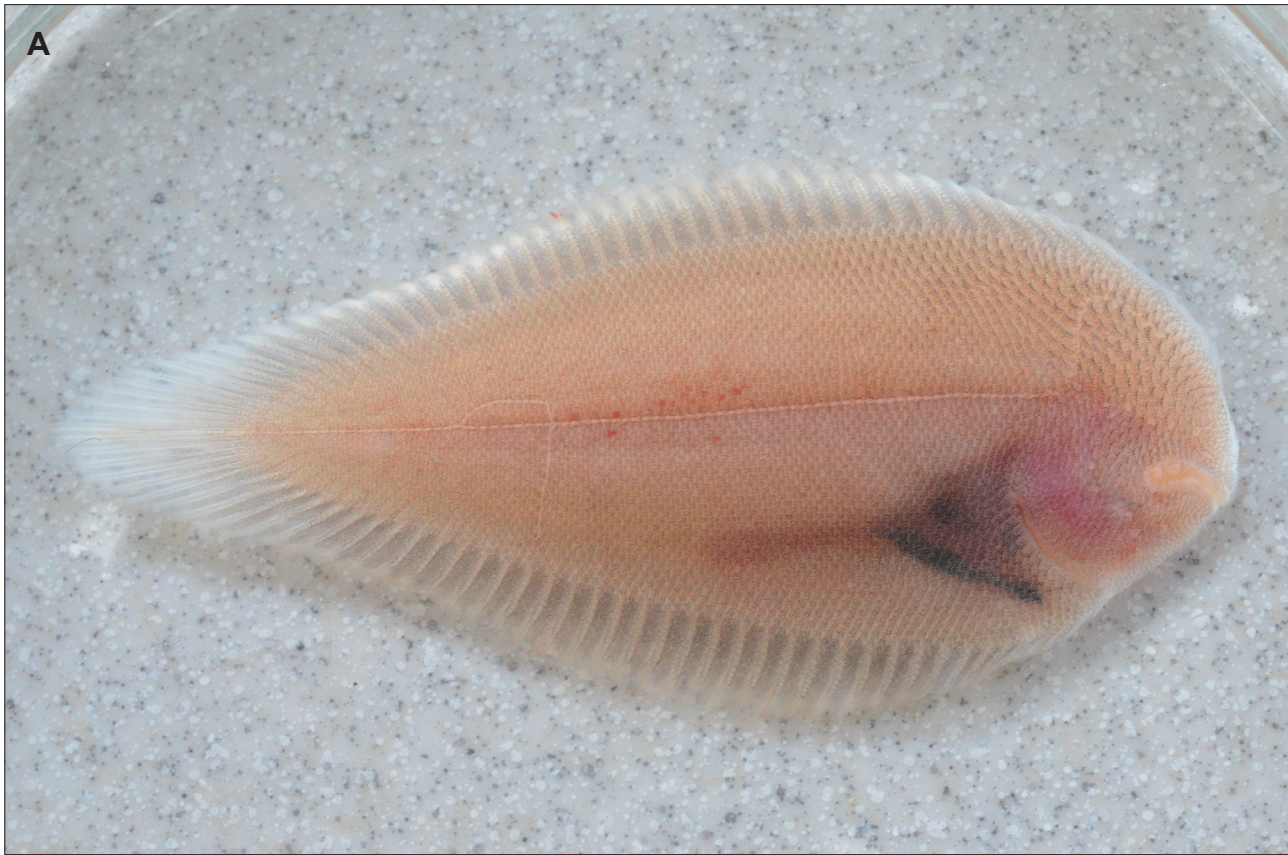
Distribution: Mekong Basin in Cambodia and Vietnam; Western Pacific.

Notes: A small-sized species of flatfishes (or soles), found in the lower reaches or estuaries of large rivers with muddy bottoms; it is a fairly common species (but much less than a similar-looking *Brachirus harmandi*, p. 489), which is frequently collected from the lower reaches of the Mekong in Cambodia and Vietnam.

Achiroides looks similar to *Brachirus*, but lacks pectoral fins. Two species, *Achiroides leucorhynchus* and *A. melanorhynchus*, are known in the genus from Southeast Asia (*e.g.*, Munroe, 2001; Kottelat, 2013c). Kottelat (1984a) recorded *A. melanorhynchus* from the Mekong, with no indication of the voucher specimens. Rainboth (1996b) listed both of these species in his book of the fishes of the Cambodian Mekong, but, judging from the general appearance, the fish of *A. leucorhynchus* in his photograph (Rainboth, 1996b, pl. 27, fig. 211) is here re-identified as *Brachirus harmandi*; no photograph of the Mekong specimen of *A. melanorhynchus* was available from him. Later, Rainboth *et al.* (2012) listed both *A. leucorhynchus* and *A. melanorhynchus* in their book of their "Greater Mekong Ecosystem"; they merely cited the records from previous literatures, that were based on the specimens from peninsular Thailand (Smith, 1945) and a non-specific locality of Vietnam (Orsi, 1974). As already pointed out by Kottelat (2001a), the photographed fish of *A. leucorhynchus* and *A. cf. melanorhynchus* shown by Baird *et al.* (1999) appear to be misidentification of *B. harmandi*. The figured fish of both *A. leucorhynchus* and *A. melanorhynchus* in the book of fishes of the Mekong Delta by Vidthayanon (2008, figs 345 and 346) can be re-identified as *Brachirus siamensis* (p. 488).

During the course of our field surveys in the Mekong in 2007–2013, we could only collect a single species *A. melanorhynchus*. The distribution of *A. leucorhynchus* in the Mekong needs to be verified based on the voucher specimens.





Typhlachirus elongatus Pellegrin & Chevey, 1940

Family: Soleidae (FC: 501)

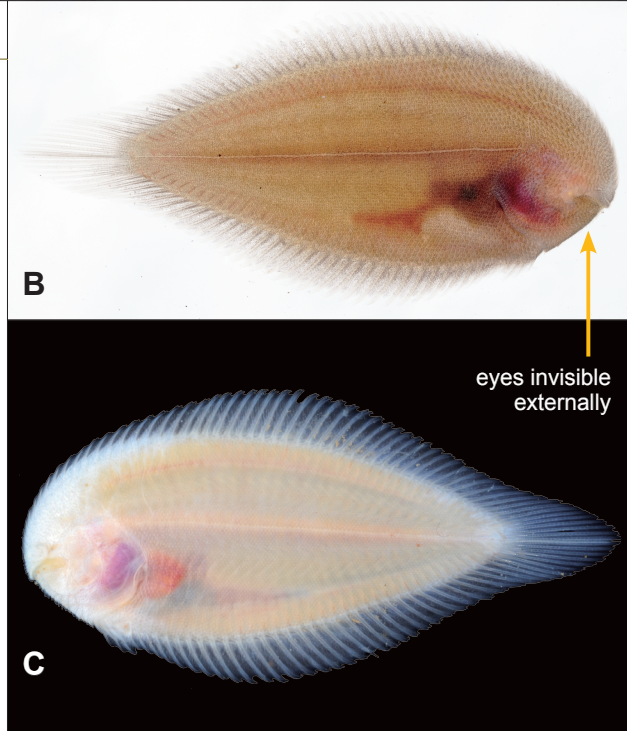
Size: 12.3 cm SL (CTU-P 5263).

Distribution: Mekong Basin in Vietnam.

Notes: A small-sized species of flatfishes (or soles), found in brackish estuaries and adjacent tidal areas of large rivers with mud bottoms; it is fairly common, and usually found in the trawled fishes in the Vietnamese Mekong.

Typhlachirus elongatus, also known as *Brachirus elongatus* in some previous literatures (e.g., Kottelat, 2013c; Tran *et al.*, 2013), is readily distinguished from the other Mekong flatfishes by having rudimentary eyes; the eyes are minute and embedded in the skin (see Evseenko & Bolshakov, 2018, fig. 5), and, from the external view, the fish has an eye-less appearance. *Typhlachirus* currently recognized is merely distinguishable from *Brachirus* by this character (Lapierre, 2007; Evseenko & Bolshakov, 2018). Generic assignment to *Typhlachirus* (rather than *Brachirus*) by Evseenko & Bolshakov (2018) is tentatively followed here, although the intergeneric relationships undoubtedly need to be clarified in order to verify the limits of these *Brachirus*-like genera (see also Desoutter *et al.*, 2001).

Evseenko & Bolshakov (2018) recognized 3 distinct species in *Typhlachirus*, i.e., *T. caecus*, *T. elongatus*, and *T. lipophthalmus*, but their examined specimens were limited [*i.e.*, 2 syntypes and 3 additional, recently-collected specimens of *T. elongatus* only (data of the congeners appears to be referred from the original descriptions)]. According to Evseenko & Bolshakov (2018) and Tan & Grinang (2020), *T. elongatus* differs from the congeners by having 34–38 anal-fin rays (vs. 39–42 in *T. caecus* and 39–41 in *T. lipophthalmus*) and 33–34 vertebrae (vs. 35–36 in *T. caecus*), and *T. caecus* differs from *T. lipophthalmus* by having 52–53 dorsal-fin rays (vs. 54–56 in *T. lipophthalmus*). Since these differences are minor and based on a few specimens, further extensive research is crucial towards our better understanding of the species diversity



A) One of CTU-P specimen (Cần Thơ, Vietnam, photo: KS); B and C) CTU-P 1301 (photo: KS)

of these blind soles. Materials of *T. elongatus*, commonly seen in the Mekong Delta of Vietnam (particularly Cần Thơ), may be helpful for this task.

Distribution pattern of these 3 species is poorly understood, and these species are hitherto known only from respective type localities (and around); namely, *T. caecus*, *T. elongatus*, and *T. lipophthalmus* are known from Sumatra (Bagansiapiapi), the Mekong Delta, and Borneo (Sarawak), respectively. Rainboth *et al.* (2012, pl. 116, fig. 2430) identified a fish from Tiền Giang in the Mekong Delta of Vietnam as *T. caecus*, but their identification requires re-confirmation based on the voucher specimen.



Brachirus harmandi (Sauvage, 1878)

Family: Soleidae (FC: 501)

Size: 8.3 cm SL (Kottelat, 2001a: 164).

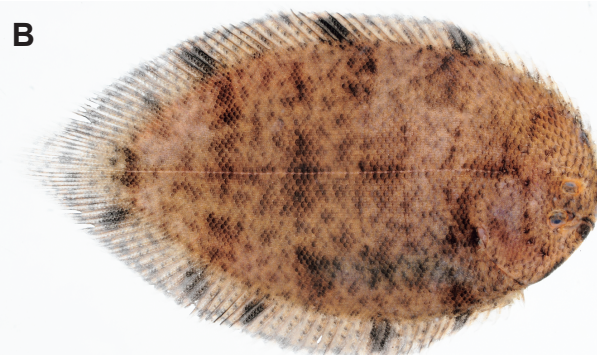
Distribution: Mekong Basin in Laos, Thailand, Cambodia, and Vietnam; Chao Phraya Basin and Malay Peninsula.

Notes: A relatively small-sized species of flatfishes (or soles), found in freshwater rivers with muddy or sandy-mud bottoms; fairly common in large rivers of the Mekong Basin in Laos, Thailand, and Cambodia, but sometimes collected from tidal areas in Vietnam (e.g., Cần Thơ); it is less common than the larger congener *Brachirus siamensis* (next page) at the local markets.

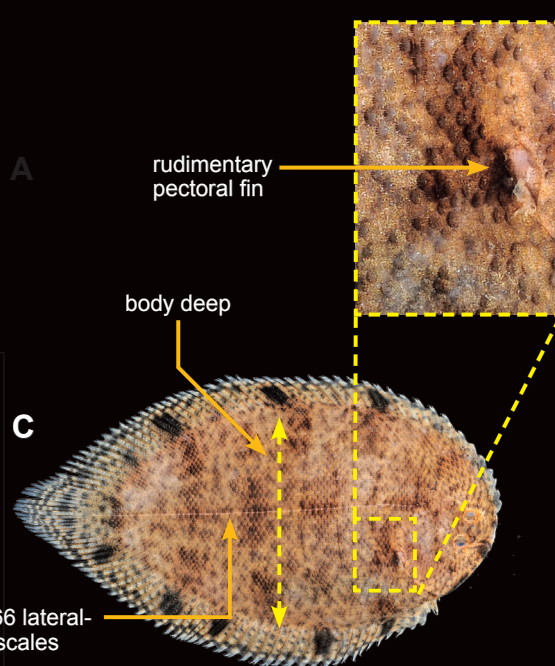
Brachirus is similar to *Achiroides* (p. 487) and *Typhlachirus* (left page), but has pectoral fins (may be rudimentary) and developed eyes. *Brachirus* and *Achiroides* were reviewed by Lapierre (2007) in his master's thesis, but the result has not yet been published formally (and is thus not cited here).

At least 4 species of *Brachirus* were known from the Mekong, and, of these, 3 species were collected during our field surveys in 2007–2013: *B. harmandi*, *B. panoides*, and *B. siamensis*. Of these, *Brachirus harmandi* is the smallest species, and is readily distinguished by its deeper body and fewer fin rays.

B



A



A) An aquarium fish, not preserved (Ubon Ratchathani, Thailand, photo: KS); B–D) CTU-P 2024 (photo: LXT)



Brachirus siamensis (Sauvage, 1878)

Family: Soleidae (FC: 501)

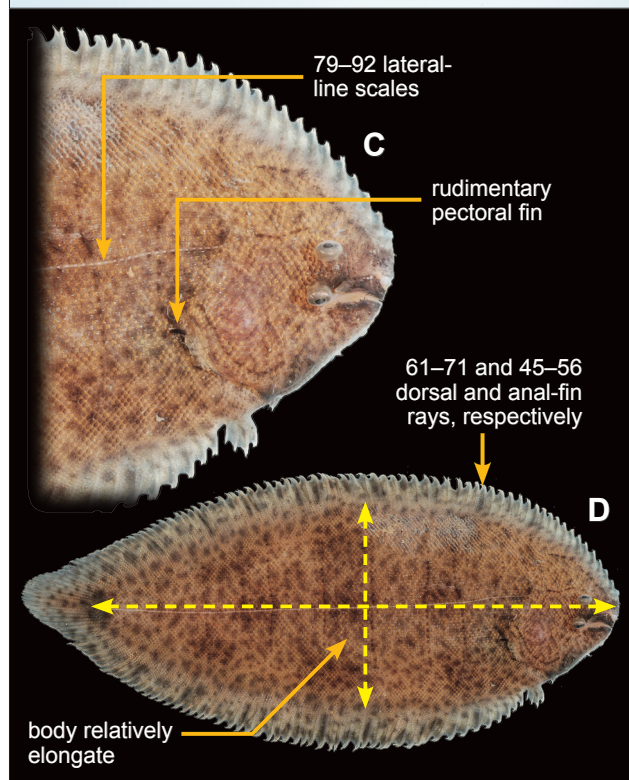
Size: 15.0 cm SL (Kottelat, 2001a: 164).

Distribution: Mekong Basin in Laos, Thailand, Cambodia, and Vietnam; Chao Phraya Basin and peninsular Thailand.

Notes: A medium-sized species of flatfishes (or soles), found in large freshwater rivers with muddy or sandy-mud bottoms; it is a common species everywhere in the Indochinese Mekong, and is sold fresh at the local markets.

This species was confused with the similar-looking congener *B. panoides* (next page) before Kottelat (1984a) regarded these to be non-conspecific. According to him (e.g., Kottelat, 1984a, 2001a; Kottelat *et al.*, 1993), *B. siamensis* is distinguished from *B. panoides* by having larger head [head length 4.5–5.2 in SL (19.2–22.2 % of SL) in *B. siamensis* vs. 5.4–5.7 (17.5–18.5 % of SL) in *B. panoides*], 65–70 dorsal-fin rays (vs. 80–83), 48–56 anal-fin rays (vs. 63), 79–92 (vs. 110–150) lateral-line scales from gill opening to caudal-fin base.

During our field surveys in the Mekong in 2007–2013, we were able to collect many specimens of *B. panoides/siamensis*-like soles from Laos, Thailand, Cambodia, and Vietnam. Of these, only 5 specimens (CTU-P 2382, 2379, 2398, 2399, and 2405, collected from Tiền Giang of Vietnam) could be identified as *B. panoides*, whereas all others were *B. siamensis*. These specimens expanded ranges of fin-ray counts of these 2 species, as follows: 79–86 dorsal-fin rays and 58–63 anal-fin rays in *B. panoides*; 61–71 dorsal-fin rays and 45–56 anal-fin rays in *B. siamensis*. Collecting localities of these specimens suggest that *B. panoides* appears to prefer the area closer to river mouth with higher salinity than the *B. siamensis*; in the Mekong Delta of Vietnam, all but a single specimen (CTU-P 3861, from Trà Vinh) of *B. siamensis* were collected from non-coastal provinces (An Giang, Đồng Tháp, Cần Thơ, Vĩnh Long, and Long An).



A) Marketed fish, not collected (Cần Thơ, Vietnam, photo: KS); B) IFREDI-P 3582 (photo: PT); C and D) CTU-P 697 (photo: LXT)

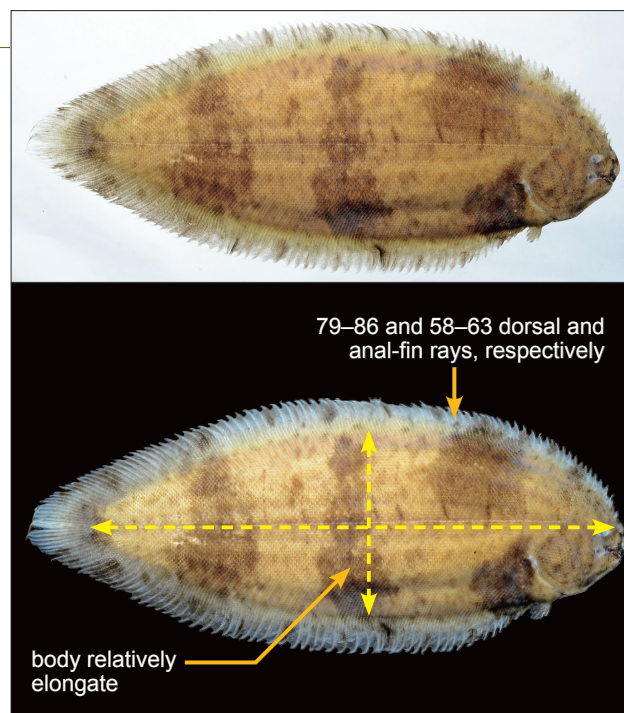
Brachirus panoides (Bleeker, 1851)

Family: Soleidae (FC: 501)

Size: 19.5 cm SL [Kottelat *et al.*, 1993: 171 (as *Synaptura panoides*)].

Distribution: Mekong Basin in Vietnam; Sumatra, Borneo, and Malay Peninsula.

Notes: A medium-sized species of flatfishes (or soles), found in brackish estuaries of large rivers. This species is probably not rare, but further careful investigations are needed to clarify the abundance of this species in the Mekong, since it may be easily confused with similar-looking congeners, particularly *B. siamensis* (see left page). Actually, Kottelat (2001a) regarded "*Euryglossa* cf. *panoides*" of Baird *et al.* (1999) as misidentification of *B. siamensis*. Likewise, judging from the general appearance, the fish in the figures of *B. panoides* shown by Rainboth *et al.* (2012, pl. 116, figs 2421–2422) are presumed to be *B. siamensis*; one of these photographs (fig. 2421), taken based on a fish from Tonlé Sap at Phnom Penh was also shown in Rainboth (1996b, pl. 27, fig. 212), but, in his book, the fish (inappropriately reversed left to right) was misidentified as "*Euryglossa orientalis*." See also "Notes" of *B. siamensis*, left page.



Alcohol-preserved specimen, CTU-P 2382 (photo: KS)

Dagetichthys commersonnii (Lacepède, 1802)

Family: Soleidae (FC: 501)

Size: 28.0 cm SL (Vachon *et al.*, 2007: 174).

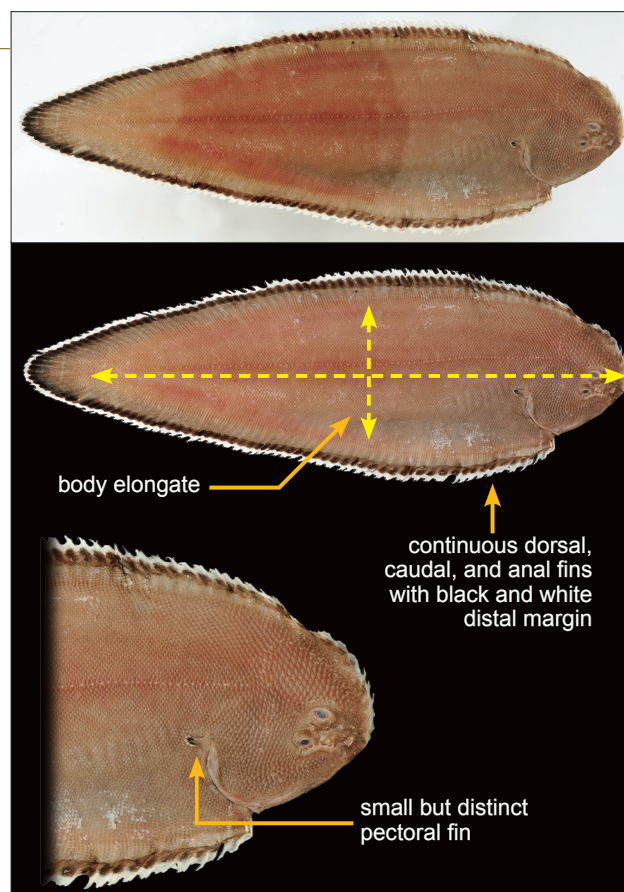
Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A relatively large-sized species of flatfishes (or soles), found in shallow coastal waters with muddy or sandy-mud bottoms; it is also known to enter brackish estuaries, and is frequently sold fresh at local markets in coastal provinces in the Mekong Delta of Vietnam.

Fishes of *Dagetichthys* have long been assigned to *Synaptura* (e.g., Munroe, 2001), until Vachon *et al.* (2007) placed them in the former genus. Note that *Synaptura* was regarded as an unnecessary replacement name and junior synonym of *Brachirus* by Desoutter *et al.* (2001), Vachon *et al.* (2008), and Kottelat (2013c).

Two species of *Dagetichthys*, i.e., *D. commersonnii* and *D. marginata*, are known from Southeast Asia including the Mekong (Vidthayanon, 2008, as *Synaptura commersonnii*; Kottelat, 2013c). Of these, we could collect a single species *D. commersonnii*. During our field surveys in the Mekong in 2007–2013. It is a very characteristic species, readily distinguished from the other Mekong flatfishes by its elongated body with eyes on the right side of the head and conspicuous black and white margins of continuous dorsal, anal, and caudal fins.

The records of *Dagetichthys marginata* from the Western Pacific, including Southeast Asian countries, need re-confirmation based on the voucher specimens. In their revisional study of *Dagetichthys*, Vachon *et al.* (2008) indicated the geographic distribution of *D. marginata* restricted to Durban of South Africa; they stated that the record from Japan and Taiwan by Ochiai in Masuda *et al.* (1984, as *Synaptura marginata*) was erroneous, and was based on a misidentification. The Mekong Delta fish, shown by Vidthayanon (2008, fig. 350), closely resembles the Japanese specimen (e.g., Ochiai in Masuda *et al.*, 1984, pl. 319, fig. H) rather than the Durban fish (Vachon *et al.*, 2008, fig. 2C). And, the record of *D. marginata* from Southeast



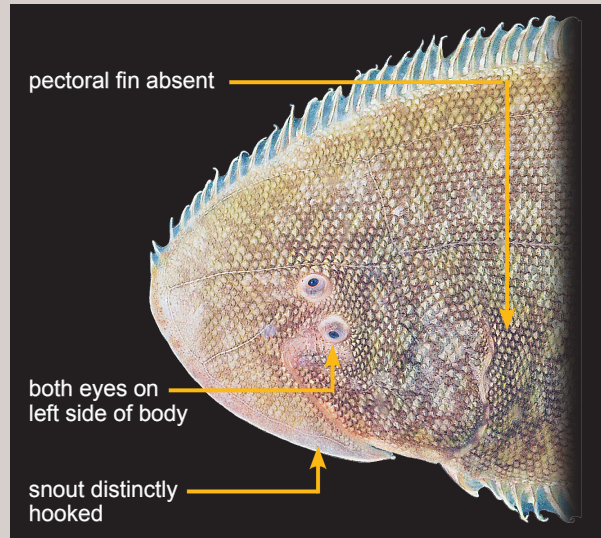
CTU-P 5252 (photo: HVM)

Asia by Kottelat (2013c) was based only on Vidthayanon (2008). In their checklists of the soleid fishes from the South China Sea and Western-Central Pacific by Munroe in Randall & Lim (2000) and Munroe (2001), respectively, the species (*D. marginata*) was not shown. The Western Pacific fish was, unfortunately, not identified to the species (and genus) by Vachon *et al.* (2008), and its taxonomic status appears to be currently unclear.

Tonguefishes

Fishes of the family Cynoglossidae, commonly known as "tonguefishes," resemble the soleid fishes (soles, pp. 487–491) in general appearance, *e.g.*, small mouth, margin of preoperculum completely embedded in the skin, and dorsal and anal fins united with the caudal fin, but they have both eyes on the left side of the head (*vs.* right side in the soleids). Three genera, *Cynoglossus*, *Paraplagusia*, and *Symphurus*, belong to Cynoglossidae, and, of these, the first 2 genera are found in the Mekong. These 2 genera represent a characteristic "face" with a distinctly hooked snout, and are never confused with the other flatfishes in the Mekong.

In the Mekong, only 2 species, *C. feldmanni* and *C. microlepis*, are seen in the freshwater areas, whereas the others appear to be confined to the brackish estuaries. Particularly in the Mekong Delta, the cynoglossid fishes are commonly sold fresh in the fish markets everywhere.



Cynoglossus microlepis (Bleeker, 1851)

Family: Cynoglossidae (FC: 502)

Size: 32.5 cm SL (Kottelat, 2001a: 164).

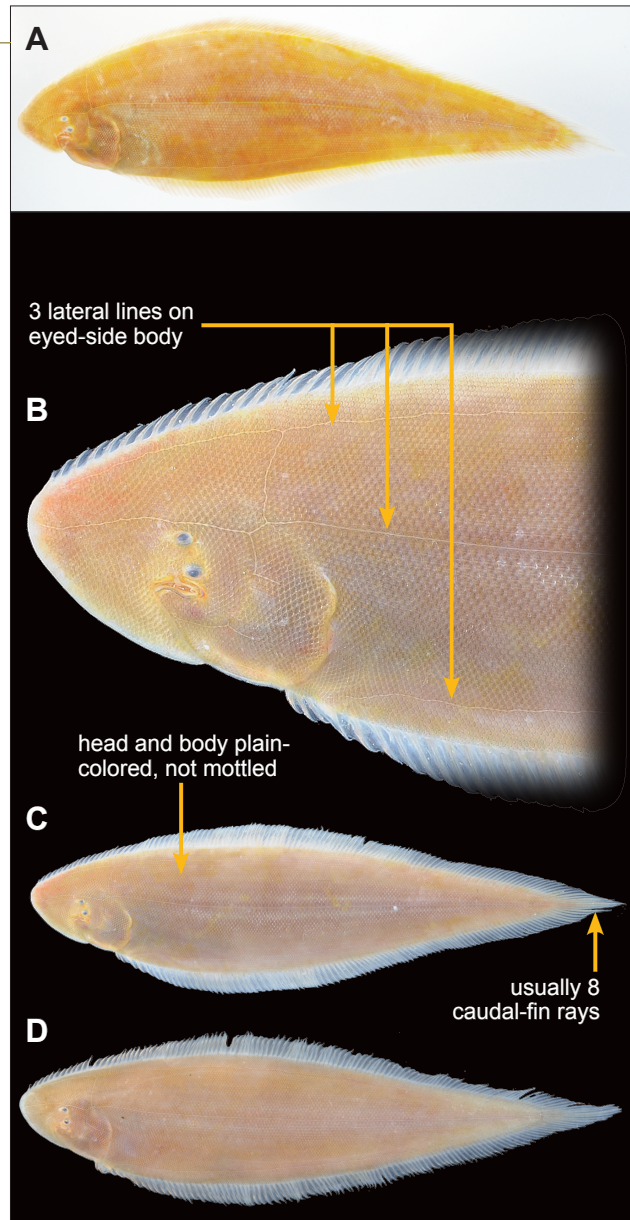
Distribution: Mekong Basin in Laos, Thailand, Cambodia, and Vietnam; Chao Phraya Basin, Sumatra, and Borneo.

Notes: A large-sized species of flatfishes (or tonguefishes), found in large rivers with sandy or muddy bottoms; it is the most common species of the family in freshwater areas of the Mekong (particularly Cambodia and Vietnam), and also found in the tidal areas in the Mekong Delta of Vietnam. This fish is commonly sold at local markets as fresh in Cambodia and Vietnam. The Laotian record refers to Baird *et al.* (1999) and Kottelat (2001a).

Cynoglossus is one of all 3 genera of the Cynoglossidae, and comprises about 50 species in the world (Nelson, 2006); the other cynoglossid genera are *Symphurus* (comprising deep-water species, not found in the Mekong) and *Paraplagusia* (p. 497). It resembles *Paraplagusia* by its distinctly hooked snout, but differs in the lips not fringed with labial papillae on the eyed side (*e.g.*, Menon, 1977; Munroe, 2001).

Cynoglossus microlepis was frequently collected with *C. feldmanni*, sharing 3 lateral lines on the eyed-side body (see "Notes" of *C. feldmanni*, netx page). It is readily distinguished from *C. feldmanni* by having a plain-colored (non-mottled) body on the eyed side (*vs.* mottled in *C. feldmanni*), smaller and more numerous scales on the body (116 or more midlateral-line scales and 21–22 scales between the middle and upper lateral lines *vs.* less than 100 and 17–18, respectively), and 8 caudal-fin rays (*vs.* 10).

The other species of *Cynoglossus* recorded from the Mekong have 10 or more caudal-fin rays (like *C. feldmanni*), except for *C. abbreviatus* and *C. gracilis*. Note that the records of *C. abbreviatus* and *C. gracilis* from the Mekong by Rainboth *et al.* (2012) are doubtful, and their identification needs to be re-confirmed based on the voucher specimens; the other records of these 2 species are confined to the area from Chinese to Japanese waters (*e.g.*, Menon, 1977; Nakabo, 2013), and are not shown in Kottelat's (2013c) catalog of fishes of the inland waters of Southeast Asia.



A) IFREDI-P 3481 (photo: PT); B and C) IFREDI-P 1698 (photo: PT); D) CTU-P 733 (photo: LXT)

Cynoglossus feldmanni (Bleeker, 1854)

Family: Cynoglossidae (FC: 502)

Size: 25.7 cm TL (Kottelat *et al.*, 1993: 169).

Distribution: Mekong Basin in Cambodia and Vietnam (and ?southern Laos); Sumatra and Borneo.

Notes: A relatively large-sized species of flatfishes (or tonguefishes), found in large rivers with sandy or muddy bottoms; it appears to be the next common species of the family in freshwater areas of the Mekong (particularly Cambodia and Vietnam), and is also found in tidal areas in the Mekong Delta of Vietnam; it is commonly sold fresh at local markets in Cambodia and Vietnam. Kottelat (2001a) expected *C. feldmanni* to be from the Laotian Mekong; although we did not collect any specimens from Laos during the course of our field surveys in 2007–2013, we concur with Kottelat (2001a), and expect to find the species from the southern part of Laos (*e.g.*, Champasak Province) at least.

Cynoglossus feldmanni appears to be one of 2 Mekong species of the genus with 3 lateral lines on the eyed-side of the body; the other one is *C. microlepis* (see "Notes" of the species, left page). In the Mekong Delta of Vietnam around the border between fresh- and brackish-water areas, at least 2 similar-looking species, *C. cynoglossus* (below) and *C. puncticeps* (next page), can be collected together with *C. feldmanni*; these 2 species are readily distinguished from *C. feldmanni* by having 2 lateral lines on the eyed side of the body (namely the ventral lateral line along the anal-fin base is absent vs. present in *C. feldmanni*).

Cynoglossus cynoglossus (Hamilton, 1822)

Family: Cynoglossidae (FC: 502)

Size: 14.7 cm TL (Kottelat *et al.*, 1993: 169).

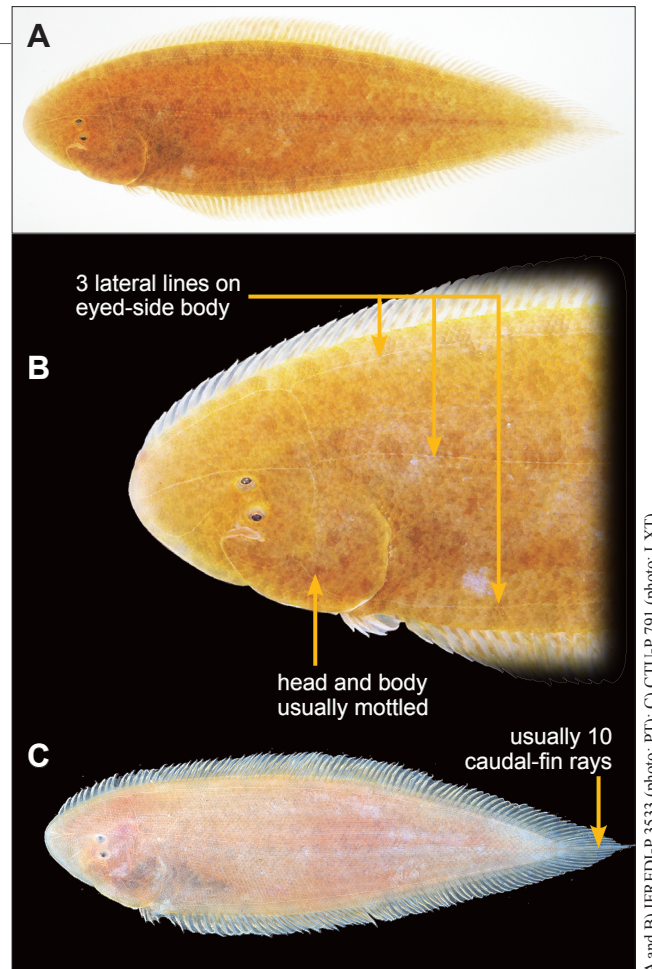
Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A small-sized species of flatfishes (or tonguefishes), found in coastal marine waters and brackish estuaries; it is fairly common in brackish estuaries of the Mekong, but, like the similar-looking congener *C. puncticeps* (next page), appears to do not enter into freshwater areas.

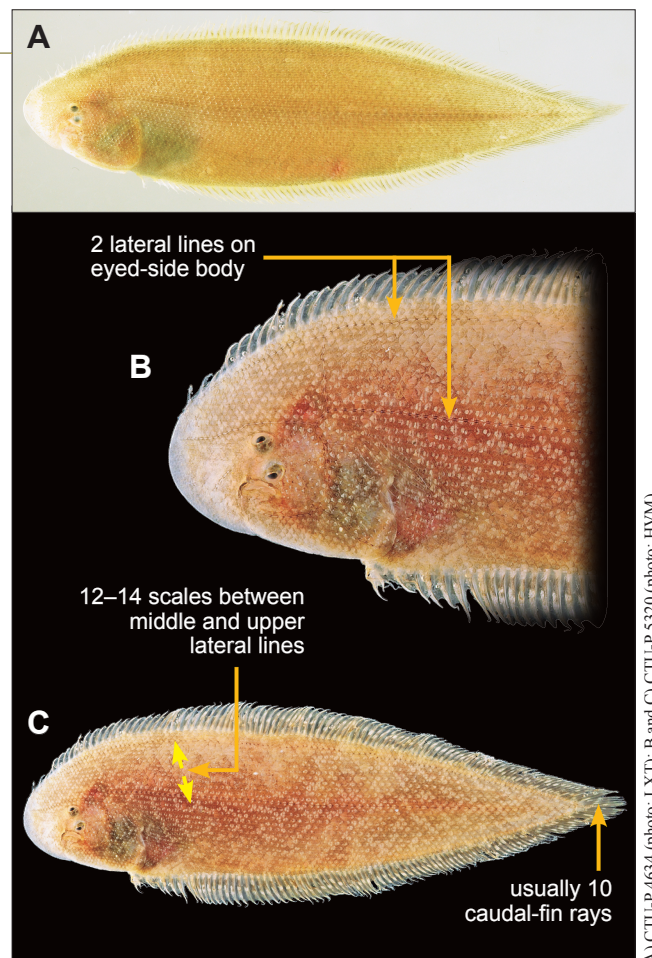
Our identification of the examined specimens from the Mekong as *Cynoglossus cynoglossus* is tentative; the specimens, all deposited in Can Tho University (total 29 specimens, CTU-P 3312, 3842, 3858, 4634, 4640, 4900, 5311, and 5320), possibly comprise more than a single species. These specimens have 10 caudal-fin rays, 2 lateral lines on the eyed-side of the body, ctenoid scales on both sides of the body, and 12–14 scales between the lateral lines on the eyed side of the body; following a key to species of cynoglossid fishes from Western-Central Pacific by Munroe (2001), the specimens with these characters can be identified as *C. cynoglossus*, although the general appearance, *e.g.*, shape and length of snout, depth of body, and coloration, is fairly variable (see photographs, right). From the Mekong estuaries, several specimens of a *C. cynoglossus*-like species with more scales between the lateral lines (17 or more) were collected (see photograph below). Further investigation is needed to identify the *C. cynoglossus*-like fishes in the Mekong. See also "Notes" of *C. puncticeps* (next page).



◀ *Cynoglossus* sp.
from Bón Tre,
Vietnam (CTU-P
5321, photo: HVM)



A and B) IFREDI-P 3533 (photo: PT); C) CTU-P 791 (photo: LXT)



A) CTU-P 4634 (photo: LXT); B and C) CTU-P 5320 (photo: HVM)



CTU researchers on a small trawl boat, collecting fishes at an estuarine area of the Mekong River (Bến Tre, Vietnam, photo: KS)

Cynoglossus puncticeps (Richardson, 1846)

Family: Cynoglossidae (FC: 502)

Size: 16.6 cm TL (Kottelat *et al.*, 1993: 169).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A small-sized species of flatfishes (or tonguefishes), found in estuaries and coastal waters [to 140 m depth (Munroe, 2001)] with sandy or muddy bottoms; it is commonly seen in trawled fishes from brackish estuaries in the Mekong Delta in Vietnam, and is frequently sold fresh with the other trawled fishes at local markets.

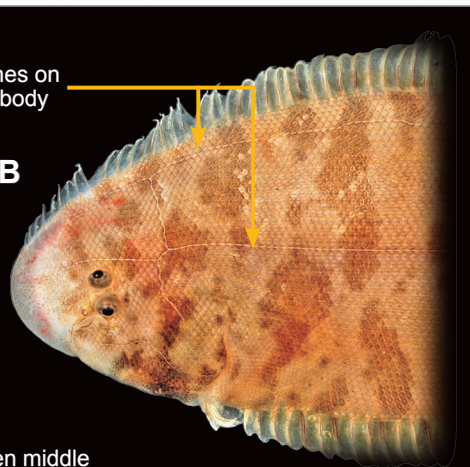
Cynoglossus puncticeps is a characteristic species, with irregularly-shaped, dark brown blotches on the eyed side of the body. The blotches vary in shape and depth depending on specimens, and are sometimes fainter and obscure; the specimens with indistinct blotches may look similar to sympatric congener *C. cynoglossus* (p. 493), although differ in having a higher number of scales between lateral lines.

A



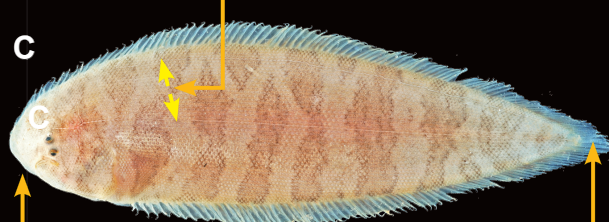
2 lateral lines on eyed-side body

B



15–19 scales between middle and upper lateral lines

C



snout moderately short and rounded

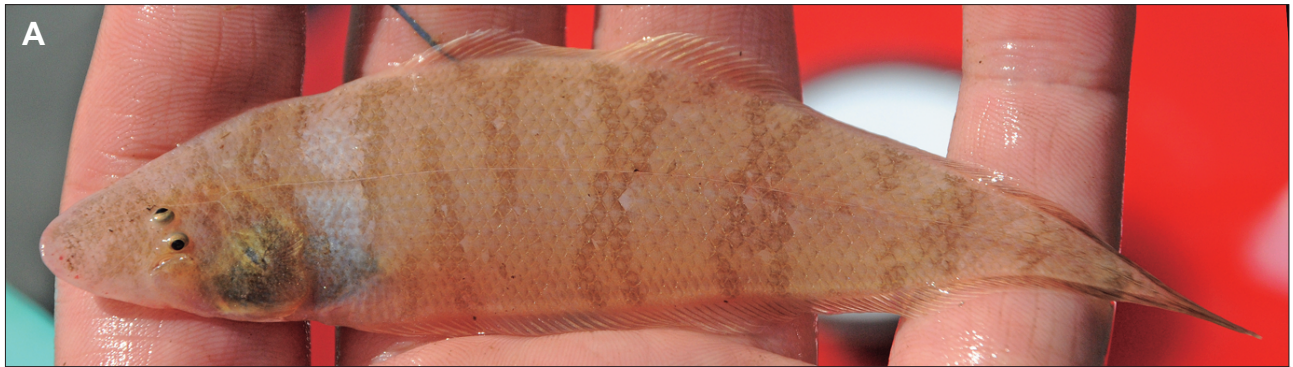
usually 10 caudal-fin rays

D



irregularly-shaped dark brown blotches on eyed-side body

A) CTU-P 3755 (photo: LXT); B) CTU-P 2240 (photo: LXT); C) CTU-P 1477 (photo: LXT); D) CTU-P 5319 (photo: HVM)



***Cynoglossus arel* (Bloch & Schneider 1801)**

Family: Cynoglossidae (FC: 502)

Size: 38.0 cm TL (Munroe, 2001: 3896).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A large-sized species of flatfishes (or tonguefishes), found in coastal marine waters [to 125 m depth (Munroe, 2001)] and brackish estuaries with sandy or muddy bottoms; it is fairly common in the Mekong estuaries (particularly the small fish), but appears to do not enter into freshwater areas. This fish is frequently sold fresh with the other trawled fishes at the local markets around the estuarine areas.

Its slender body and long and pointed snout resemble the other Mekong congener *C. lingua* (below), but *C. arel* differs from *C. lingua* by having larger and fewer scales on the body. In particular the small fish (see photos A and D), several irregularly-shaped brown blotches are usually found on the eyed side of the body; although the coloration is somewhat similar to that of *C. puncticeps* (left page), the shape of the snout and size and number of scales are readily distinguished the species from *C. puncticeps*.

***Cynoglossus lingua* Hamilton, 1822**

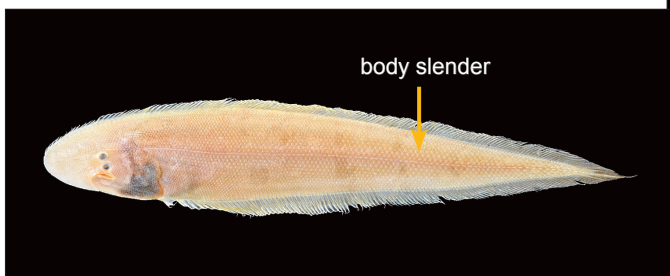
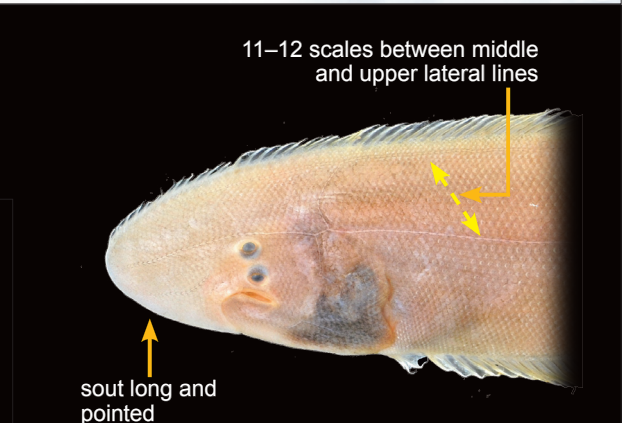
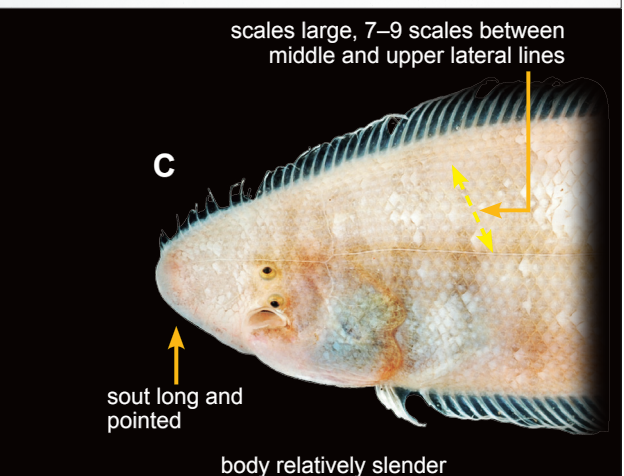
Family: Cynoglossidae (FC: 502)

Size: 40.0 cm SL (Munroe, 2001: 3899).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A large-sized species of flatfishes (or tonguefishes), found in coastal marine waters and brackish estuaries with sandy or muddy bottoms; it is fairly common in the Mekong estuaries (particularly the small fish), but appears to do not enter into freshwater areas. This fish is frequently sold fresh with the other trawled fishes at the local markets around the estuarine areas.

Its slender body and long and pointed snout readily distinguish *C. lingua* from the other Mekong species of *Cynoglossus*, except for *C. arel* (above), which has much larger and fewer scales. Like *C. arel*, several irregularly-shaped brown blotches are found on the eyed side of the body particularly in the small fish of *C. lingua* (see photographs), the blotches are usually much fainter than in *C. arel* (and *C. puncticeps*, left page).



A) One of CTU-P specimen, just after collected (Bén Tre, Vietnam, photo: KS); B) CTU-P 5318 (photo: HVM); C) CTU-P 2179 (photo: LXT); D) CTU-P 1143 (photo: LXT)

CTU-P 1510 (photo: LXT)

Cynoglossus trulla (Cantor, 1849)

Family: Cynoglossidae (FC: 502)

Size: 45.0 cm TL (Kottelat *et al.*, 1993: 169, as *Cynoglossus borneensis*).

Distribution: Mekong Basin in Vietnam; Western Pacific.

Notes: A large-sized species of flatfishes (or tonguefishes), found in coastal marine waters; although it is probably not rare in/ around the Mekong estuaries, we were able to take only a single specimen (together with a fish of *C. quadrilineatus*, below) at a local market in Bến Tre of Vietnam, during the course of our field surveys in 2007–2013.

Cynoglossus trulla, inappropriately treated as *C. borneensis* (a junior synonym of *C. trulla*) by some previous researchers (e.g., Menon, 1977; Kottelat *et al.*, 1993; Munroe, 2001) (see Kottelat, 2013b), differs from the Mekong congeners except for *C. quadrilineatus* (below) in having 12 caudal-fin rays (vs. 10 or less in the others). It is distinguished from *C. quadrilineatus* by having single lateral lines on the blind side of the body (vs. 2 lateral lines in *C. quadrilineatus*).

Cynoglossus quadrilineatus (Bleeker, 1851)

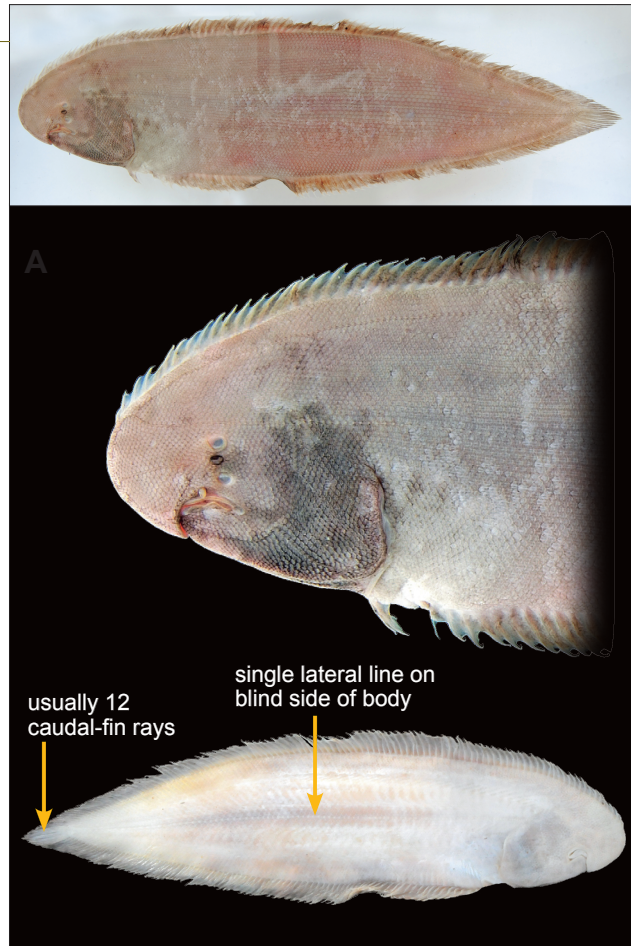
Family: Cynoglossidae (FC: 502)

Size: 40.0 cm TL (Munroe, 2001: 3897, as *Cynoglossus bilineatus*).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A large-sized species of flatfishes (or tonguefishes), found in coastal marine waters [to 80 m depth (Munroe, 2001)]; although it is probably not rare in the Mekong estuaries and around coastal areas, we could take only a single specimen at a local market in Bến Tre of Vietnam, during the course of our field surveys in 2007–2013. Rainboth (1996b) expected to find this species (as *C. bilineatus*) in the Cambodian Mekong together with some congeners (*C. cynoglossus*, *C. lingua*, *C. puncticeps*, and *C. trulla*), but we have difficulty concurring; these species are known to enter brackish estuaries, but appear to do not ascend to freshwater areas at least in the Mekong.

Cynoglossus quadrilineatus had long been known as *C. bilineatus* (Lacepède, 1802) (e.g., Menon, 1977; Munroe, 2001), until Kottelat (2013a) verified that the origin of the name, *Achirus bilineatus* of Lacepède (1802), was not the new species described by Lacepède but merely Lacepède's new combination (generic assignment) of *Pleuronectes bilineatus* Bloch, 1787. Bloch's species, which is a valid species of *Paraplagusia* (as shown in next page), is not identical to "*Cynoglossus bilineatus*" of earlier researchers before Kottelat (2013b), actually it is a species of *Cynoglossus*. Kottelat (2013b) thus adopted the true earliest available name, *Plagusia quadrilineatus* Bleeker, 1851 (= *Cynoglossus quadrilineatus*), for the latter. See also "Notes" on *C. trulla* (above) and 2 species of *Paraplagusia* (next page).



CTU-P 5251 (photo: HVM)



CTU-P 5250 (photo: HVM)

Paraplagusia bilineata (Bloch, 1787)

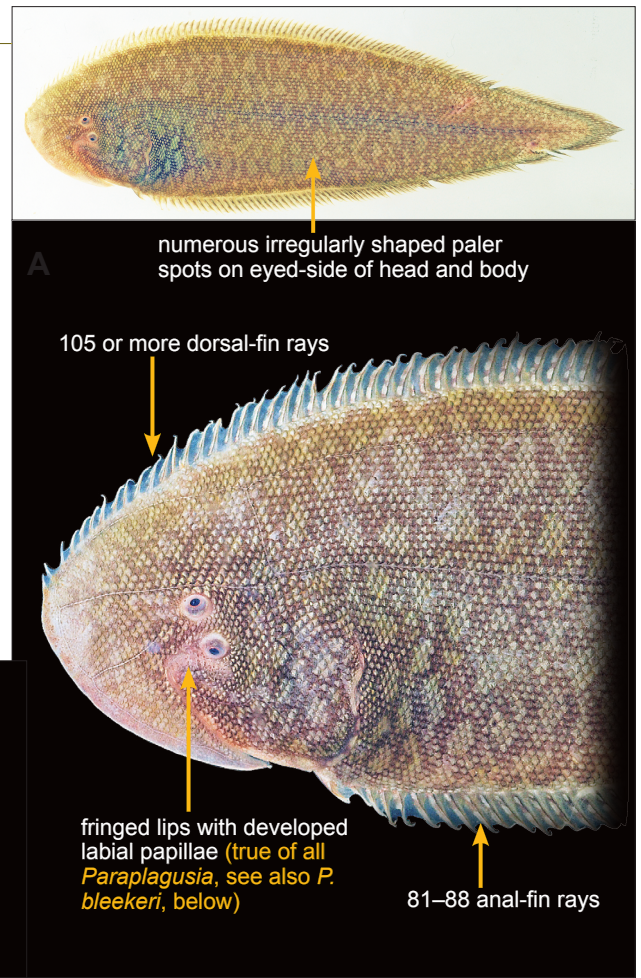
Family: Cynoglossidae (FC: 502)

Size: 35.0 cm TL (Munroe, 2001: 3901).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A large-sized species of flatfishes (or tonguefishes), found in coastal marine waters; it is probably not rare in/around the Mekong estuaries, but we could only collect a single small specimen from Bến Tre of Vietnam, during the course of our field surveys in 2007–2013. Vidthayanon (2008) also reported this species in his book of fishes of the Mekong Delta, and noted that (the species was found in) "Lower reaches" and "Commonly mixed in the markets."

Paraplagusia resembles *Cynoglossus* in general appearance, but differs in having fringed lips with developed labial papillae. About 5 species are known in *Paraplagusia*; of these, 2 species were collected from the Mekong: *P. bilineata* and *P. bleekeri* (below). *Paraplagusia bilineata* can be distinguished from *P. bleekeri* by the number of dorsal- and anal-fin rays and the coloration of the eyed side of the body.



CTU-P 4632 (photo: LXT)

Paraplagusia bleekeri Kottelat, 2013

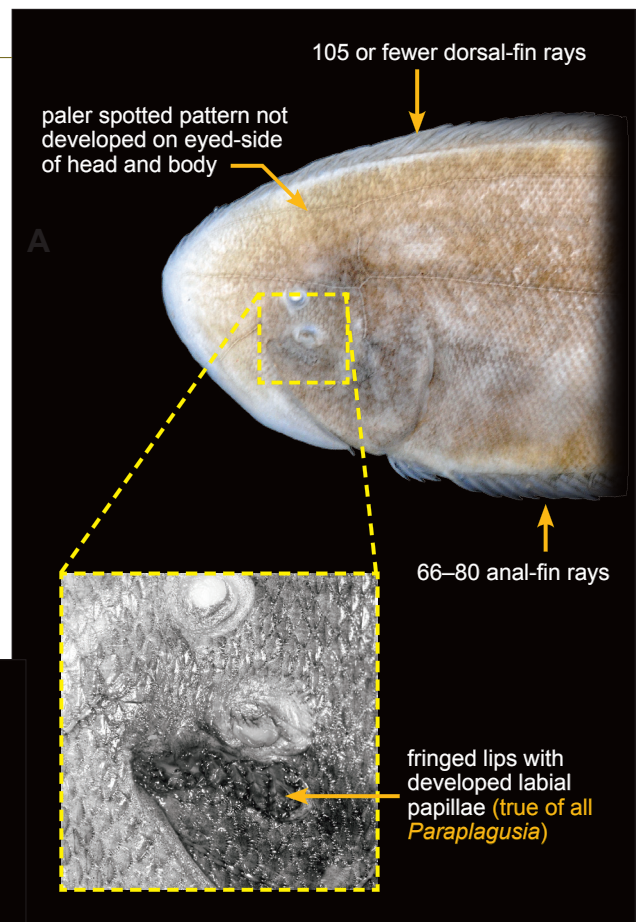
Family: Cynoglossidae (FC: 502)

Size: 16.95 cm SL (Chapleau & Renaud, 1993: 806, as *Paraplagusia blochii*).

Distribution: Mekong Basin in Vietnam; Indo-West Pacific.

Notes: A relatively small-sized species of flatfishes (or tonguefishes), found in coastal marine waters; it is probably not rare in/around the Mekong estuaries, but we could only collect a single small specimen from Trà Vinh of Vietnam, during the course of our field surveys in 2007–2013. It suggests that the small fish of this species occasionally enters into brackish estuaries (but it is not expected to ascend to freshwater areas).

Paraplagusia bleekeri had long been known as *P. blochii*, until Kottelat (2013b) verified the latter name (*Paraplagusia blochii*, originally described as *Plagusia blochii* Bleeker, 1851) as an unnecessary replacement name of *P. bilineata* (see also Kottelat, 2003b). Since any available names were known for the species identified as "*P. blochii*" by earlier researchers, Kottelat (2013b) created the new replacement name *P. bleekeri* for it.



Alcohol-preserved specimen, CTU-P 4857 (photo: KS)