



## Identification key to Pangasiid catfishes in Cambodia

អត្តសញ្ញាណកម្មសំខាន់ៗ សំរាប់ប្រភេទត្រីប្រាទៅប្រទេសកម្ពុជា

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### 1. Introduction

Pangasiid catfishes (*Trey pra* in Khmer) are among the 10 dominant fish taxa in catches in Cambodia, where they represent about 10% of the total harvest. The catch supplies the demands of local and external food markets, where they are highly appreciated, as attested by their market price that is among the top three highest prices per kilogram.

Pangasiids also play a major role in the regional aquaculture industry, the fingerlings being caught in the wild to be raised in cages and ponds. In Cambodia, pangasiids production from cage and pond culture has apparently increased from some 6,000 tonnes in the nineties to 10,000 tonnes in 2000. Some species are also well appreciated in the aquarium trade.

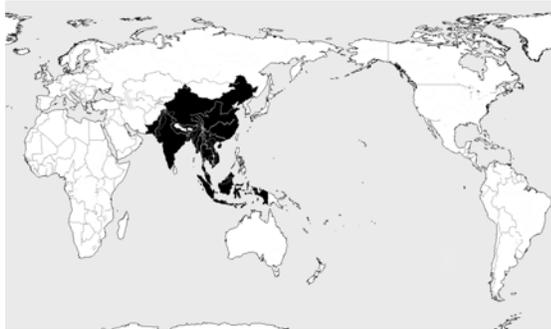
The behaviour of pangasiid fishes is remarkable in their annual pattern of migration over several hundreds of kilometres between spawning and feeding grounds. These catfishes are found in the main channel of the Mekong River and its tributaries, as well as in the Tonle Sap River, Great Lake and its floodplain. Most species spawn at the onset of rainy season from May to July, along the Mekong River (in Kratie and Stung Treng provinces in Cambodia, but also in Lao PDR and Thailand), or more upstream in tributaries.

Pangasiid catfishes comprise **15 species** in Cambodia. Some of these species are under serious threat, for instance the Mekong giant catfish *Pangasianodon gigas* that is considered as critically endangered: only seven individuals were caught in the 2007-2008 season. The Department of Fisheries conducts research, conservation, and education initiatives on vulnerable species; as a part of this program, 19 giant catfishes have been bought, tagged, and released into Tonle Sap River and Tonle Sap Lake since 2000.

Taxonomy of catfishes is quite complex since species names vary depending on dates of publication, places of publication, taxonomic revisions and the identification approach (morphological or genetical criteria). In this brochure a comprehensive literature review was conducted and the proposed key and names are based on the latest peer-reviewed publications. However this key of pangasiid catfishes is to be considered as a simple identification tool, and not as a reference taxonomic publication.

#### Taxonomy:

Family: Pangasiidae; order Siluriformes (catfishes); infraclass Teleostei (evolved ray-finned fishes); class Actinopterygii (ray-finned fishes); superclass Osteichthyes (bony fishes); subphylum Vertebrata (vertebrates); phylum Chordata (chordates); kingdom: Animalia (animals);



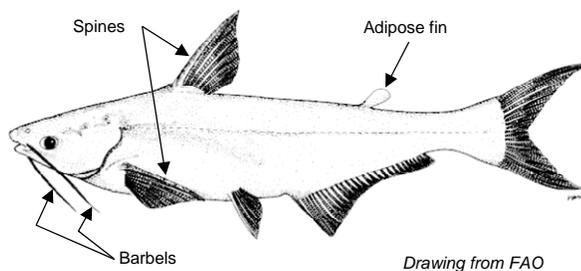
Countries with Pangasiidae (in black)

## 2. Difference between catfishes and other fish species

២- ភាពខុសគ្នារវាងប្រភេទត្រីគ្មានស្រក និងប្រភេទត្រីផ្សេងទៀត

### Catfish ត្រីគ្មានស្រក

- No scales (naked skin) AND up to four pairs of barbels on the head.
- គ្មានស្រក (ស្បែកទទេ) និងមានពុកមាត់រហូតដល់ទៅបួនគូរនៅពីលើ រឺផ្នែកក្បាល
- Dorsal and pectoral fins often with a strong spine.
- ព្រុយខ្នង និងព្រុយទ្រូង តែងតែមានទ្រនុងមួយរឹង
- Adipose fin often present
- តែងតែមានព្រុយខ្លាញ់



Drawing from FAO

## 3. Catfish families in Cambodia

There are eleven families of catfishes in Cambodia: Pangasiidae (shark catfishes), Akysidae (stream catfishes), Amblycipitidae (torrent catfish), Ariidae (sea catfishes), Bagridae, Clariidae (air breathing catfishes), Heteropneustidae (stinging catfishes, questionable), Plotosidae (eel tail catfishes), Schilbeidae, Siluridae (sheat fishes), and Sisoridae.

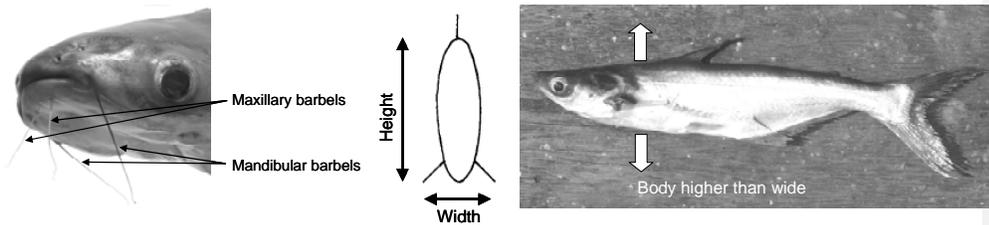
We focus here on Pangasiidae that is the family with most species, and the most important in Cambodia's inland catches.

#### 4. Identification of the Pangasiidae family

##### ៤- អត្តសញ្ញាណកម្មរបស់អំបូរត្រីប្រា (Pangasiidae)

##### Pangasiidae អំបូរត្រីប្រា

- Absence of nasal barbels (usually just one pair of maxillary barbels and one pair of mandibular barbels)
- មិនមានដុះពុកមាត់នៅត្រង់ច្រមុះទេ (ជាធម្មតាមានតែពុកមាត់ដុះនៅថ្ពាមខាងលើមួយគូរ និងមួយគូរ ឡើតដុះនៅត្រង់ថ្ពាមខាងក្រោម)
- Laterally compressed body (i.e. body height superior to body width)
- ដងខ្លួនសងខាងរាងសំប៉ែត (កំពស់ដងខ្លួនវែងជាងទទឹង រីកំរាស់ដងខ្លួន)



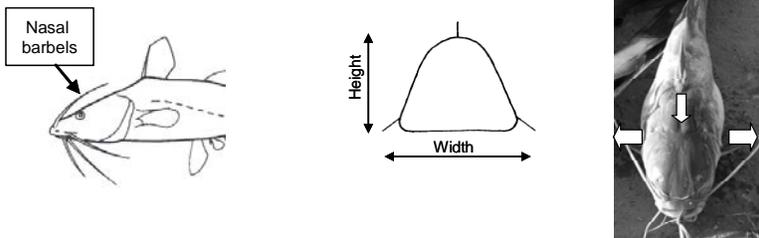
##### Additional criteria:

- a small adipose fin separate from the caudal fin
- a short dorsal fin with 2 spines (first spine small and hidden under the skin)
- 5-7 soft rays, close to the head region
- a relatively long anal fin with 26-46 rays

##### Other families

##### អំបូរផ្សេងទៀត

- Presence of nasal barbels
- មានដុះពុកមាត់នៅត្រង់ច្រមុះ
- Body width superior to body height
- ទទឹង រីកំរាស់ដងខ្លួន វែងជាងកំពស់ដងខ្លួន



## 5. Genera of the Pangasiidae family

According to Roberts and Vidthayanon (1991) supplemented by Pouyaud *et al.* (1999), Pouyaud and Teugels (2000), Ng and Kottelat (2000) and Gustiano *et al.* (2003), the tropical Asian catfish family Pangasiidae comprises two genera: *Helicophagus*, and *Pangasius*. Following Vidthayanon (1993) and Vidthayanon and Roongthongbaisuree (1993) refined later by Pouyaud *et al.* (2000), genus *Pangasius* includes three subgenera: *Pangasianodon*, *Pteropangasius*, and *Pangasius*. We follow here Ferraris' (2007) recent comprehensive review in which five genera are recognized worldwide for the family, and where *Pteropangasius* is reclassified as genus *Pseudolais*.

Thus in Cambodia, the Pangasiidae family includes:

ដូច្នោះនៅប្រទេសកម្ពុជាអំបូរត្រីប្រា (Pangasiidae) រួមមាន:

- four genera: *Helicophagus*, *Pangasianodon*, *Pangasius*, and *Pseudolais*.

- បួនពូក : *Helicophagus*, *Pangasianodon*, *Pangasius*, and *Pseudolais*.

- fifteen species:

- ដប់បួនប្រភេទ:

- genus *Helicophagus*

1 species only: *Helicophagus leptorhynchus*<sup>1</sup>.

- genus *Pangasianodon*

2 species: *Pangasianodon gigas* and *P. hypophthalmus*

- genus *Pangasius*

10 species: *Pangasius bocourti*, *P. conchophilus*, *P. djambal*, *P. elongatus*, *P. krempfi*, *P. larnaudii*, *P. macronema*, *P. mekongensis*, *P. polyuranodon*, and *P. sanitwongsei*.

- genus *Pseudolais*

2 species: *Pseudolais micronemus* and *P. pleurotaenia*

**Note:** Species *Pangasius nasutus* is absent from Cambodia: it is found only in Sumatra, Borneo, and the Malay peninsula (Roberts and Vidthayanon 1991). It has been mentioned as being present in Cambodia by Kottelat (1985<sup>2</sup>) and in MNHN records by T. Roberts in 1989; however Roberts and Vidthayanon (1991) consider that *Pangasius nasutus* individuals found in Thailand and Indo-China were actually *Pangasius conchophilus*, a species described in 1991.

## 6. Key of the Pangasiidae genera

៦- ចំនួនសំខាន់ៗនៃពូកត្រីប្រា

6.1. Does the fish have more than six pelvic fin rays?

៦-១ តើត្រីមានទ្រនុងព្រួយពោះច្រើនជាងប្រាំមួយមែនទេ?

**Yes** See § 6.1.1

បើមាន សូមមើល ៦-១-១

**No** See § 6.2.

បើគ្មាន សូមមើល ៦-២

<sup>1</sup> See section 7. for justification

<sup>2</sup> Kottelat, M., 1985. Fresh-water fishes of Kampuchea. Hydrobiologia 121:249-279.

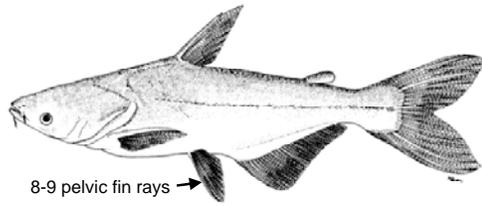
**6.1.1 Genus *Pangasianodon***

**៦-១-១ ពួក *Pangasianodon***

*Additional criteria:*

- Either 8 or 9 pelvic fin rays
- Long predorsal length (>37% of standard length)

*Note:* that genus is often mistakenly written *Pangasionodon*, but the proper name is *Pangasianodon*



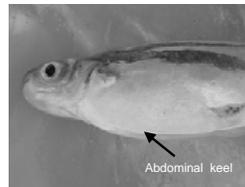
See § 8. for species identification

សូមមើលលេខ ៨ សំរាប់ប្រភេទអត្តសញ្ញាណកម្មនេះ

**6.2. Does the fish have very short barbels AND a very small adipose fin OR an abdominal keel?**

**៦-២ តើត្រីមានពុកមាត់យ៉ាងខ្លី និងមានព្រួយខ្លាញ់មួយតូច រឺឆ្អឹងពោះមួយមែនទេ?**

*Note:* a keel is a cartilaginous angle all along the chest and belly.



ចំណាំ: ឆ្អឹងពោះ គឺជាឆ្អឹងខ្លីទន់នៅតាមបណ្តោយទ្រូង និងពោះ

**Yes** See § 6.2.1

បើមាន សូមមើល ៦-២-១

**No** See § 6.3.

បើគ្មាន សូមមើល ៦-៣

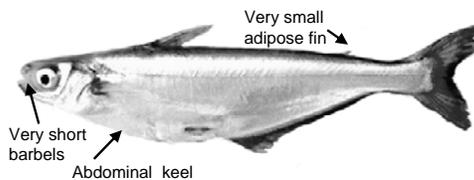
**6.2.1 Genus *Pseudolais***

**៦-២-១ ពួក *Pseudolais***

*Additional criteria:*

- Very short maxillary barbels (<192% of eye diameter)
- Relative thin dorsal and pectoral fins

*Note:* genus formerly called *Pteropangasius*. Revision by Ferraris (2007) validated by Eschmeyer. See § 10. for species identification



See § 10 for species identification

សូមមើលលេខ ១០ សំរាប់ប្រភេទអត្តសញ្ញាណកម្មនេះ

**6.3 Do maxillary barbels reach the basis of the pectoral fins (but not their tip)?**

៦-៣ តើពួកមាត់ដែលដុះនៅនឹងថ្នាមលើ វែងដល់គល់ព្រួយទ្រូង ដែររឺទេ?

**Yes** See § 6.3.1

បើមាន សូមមើល ៦-៣-១

**No** See § 6.3.2

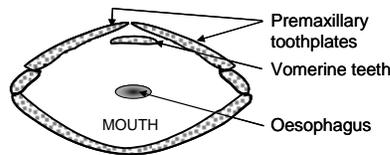
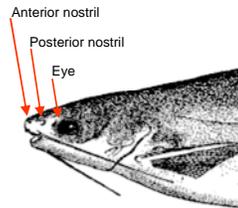
បើគ្មាន សូមមើល ៦-៣-២

**6.3.1 Genus *Helicophagus***

៦-៣-១ ពួក *Helicophagus*

*Additional criteria:*

- Absence of palatine teeth (vomerine teeth only); short and large premaxillary toothplates,
- Posterior nostril located midway between anterior nostril and eye;
- Mouth narrow (width less than 30% of head length)



See § 7 for species identification

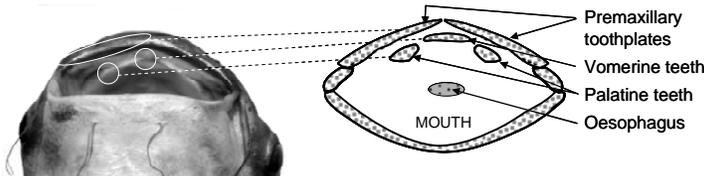
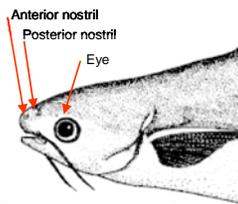
សូមមើលលេខ ៧ សំរាប់ប្រភេទអត្តសញ្ញាណកម្មនេះ

**6.3.2 Genus *Pangasius***

៦-៣-២ ពួក *Pangasius*

*Additional criteria:*

- Presence of both vomerine and palatine teeth; long and slender premaxillary toothplates
- Relative long maxillary barbell (> 192% of eye diameter)
- Mouth wide (width more than 30% of head length)
- Posterior nostril located near anterior nostril, distant from the eye
- Robust dorsal and pectoral fins, and relatively robust adipose fin



See § 9 for species identification

សូមមើលលេខ ៩ សំរាប់ប្រភេទអត្តសញ្ញាណកម្មនេះ

## 7. Identification of *Helicophagus* species

### ៧- អត្តសញ្ញាណកម្មរបស់ប្រភេទ *Helicophagus*

One species only in Indochina: *Helicophagus leptorhynchus*

មានតែមួយប្រភេទប៉ុណ្ណោះនៅឥណ្ឌូចិន : *Helicophagus leptorhynchus*

A number of studies mention *H. waandersii* as a Mekong *Helicophagus*. However we follow here Ng and Kottelat (2000) who showed that among the fish formerly identified as *H. waandersii*, two species had to be distinguished: *H. waandersii* found in Sumatra and peninsular Malaysia only, and *H. leptorhynchus*, new species with distinct characters, found in the Mekong and Chao Phraya basins. Therefore all specimens formerly named *H. waandersii* found in the Mekong Basin are actually *H. leptorhynchus*.

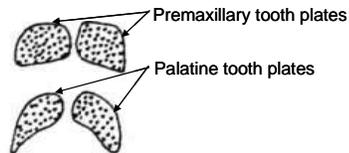
*Helicophagus leptorhynchus* differs from *Helicophagus waandersii* by having:

- a longer anal fin (34.5-38.2% of standard length for *H. leptorhynchus* vs. 31.9-34.3% for *H. waandersii*)
- a longer head (20.8-22.8% of standard length for *H. leptorhynchus* vs. 18.9-20.3% for *H. waandersii*)
- bigger eyes (16.1-21.2% of head length for *H. leptorhynchus* vs. 14.1-15.9% of head length for *H. waandersii*)

Furthermore *Helicophagus leptorhynchus* is characterized by premaxillary tooth plates separate at midline, and large palatine tooth plates



**Presence in Cambodia:** Roberts and Vidthayanon 1991, Rainboth 1996, Mekong Fish Database 2003, etc (under the name *Helicophagus waandersii*)



## 8. Identification of *Pangasianodon* species

៨- អត្តសញ្ញាណកម្មរបស់ប្រភេទ *Pangasianodon*

8.1 Does the fish have 6 dorsal fin rays?

៨-១ តើត្រីមានទ្រនុងព្រួយខ្នងច្រើនជាងប្រាំមួយរឺទេ?

**Yes** See § 8.1.1

បើមាន សូមមើល ៨-១-១

**No** See § 8.1.2

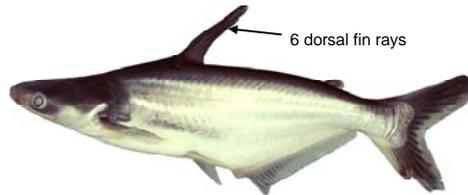
បើគ្មាន សូមមើល ៨-១-២

### 8.1.1 Species *Pangasianodon hypophthalmus*

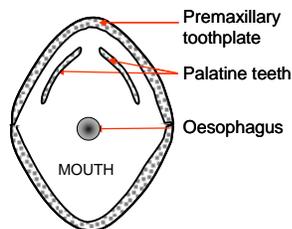
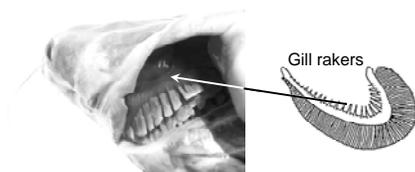
៨-១-១ ប្រភេទ *Pangasianodon hypophthalmus*

*Additional criteria:*

- Fins colour: dark grey or black
- Body colour: adults uniformly grey; juveniles with 1-2 black lateral stripes.
- Gill rakers normally developed
- Two pairs of narrow upper premaxillary and long palatine toothplates



*Presence in Cambodia:* Roberts and Vidthayanon 1991, Rainboth 1996, Mekong Fish Database 2003, etc

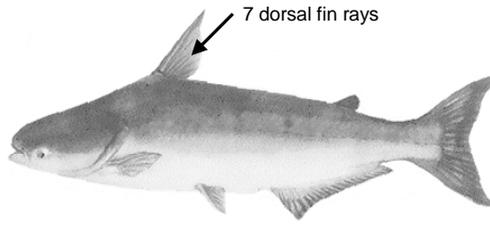


**8.1.2 Species *Pangasianodon gigas***

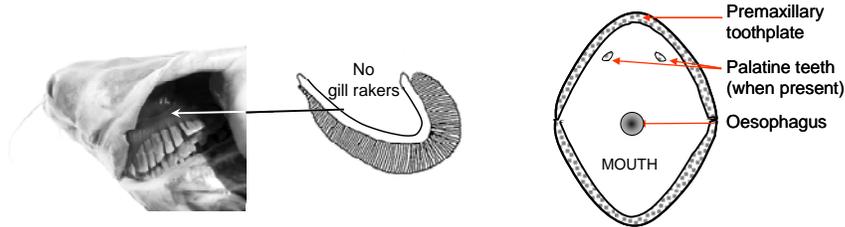
**៨-១-២ ប្រភេទ *Pangasianodon gigas***

*Additional criteria:*

- 7 dorsal fin rays
- Fins colour: grey, never black.
- Gill rakers rudimentary or absent when size > 30-50 cm
- No teeth when size > 30-50 cm, but narrow premaxillary toothplates in juveniles that disappear progressively;



**Presence in Cambodia:** Roberts and Vidthayanon 1991, Rainboth 1996, Mekong Fish Database 2003, etc



**9. Identification of *Pangasius* species**

**៩- អត្តសញ្ញាណកម្មរបស់ប្រភេទ *Pangasius***

All species have 6 pelvic fin rays.

គ្រប់ប្រភេទទាំងអស់នៃពួក *Pangasius* មានទ្រនុងព្រួយពោះប្រាំមួយ

**9.1. Do maxillary barbels reach the tip of pectoral fins?**

៩-១ តើពួកមាត់ដុះនៅនឹងផ្តាមលើវែងដល់ចំនុចចុងនៃព្រួយទ្រូងដែររឺទេ ?

**Yes** See § 9.1.1

បើមាន សូមមើល ៩-១-១

**No** See § 9.2

បើគ្មាន សូមមើល ៩-២

**9.1.1 Species *Pangasius macronema***

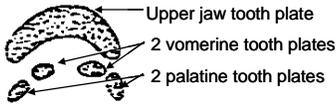
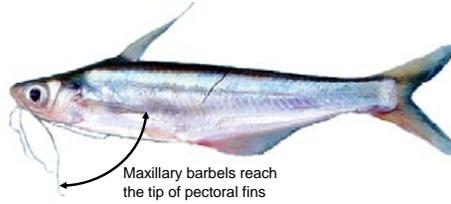
៩-១-១ ប្រភេទ *Pangasius macronema*

*Additional criteria:*

- 37-45 slender gill rakers on first gill arch
- Vomerine and palatine teeth form 4 ovoid plates

**Presence in Cambodia:** Rainboth 1996, Mekong Fish Database 2003

*Note:* According to FishBase and Mekong Fish Database, *Pangasius siamensis*, also listed in Rainboth (1996), is an invalid synonym of *Pangasius macronema*



**9.2. Is the dorsal fin extended by a long filament?**

៩-២ តើព្រួយខ្នង បានពន្លាតវែងដោយសារ សរសៃឆ្មារវែងមួយដែររឺទេ ?

**Yes** See § 9.2.1

បើមាន សូមមើល ៩-២-១

**No** See § 9.3

បើគ្មាន សូមមើល ៩-៣

**9.2.1. Is there a black spot behind gills?**

៩-២-១ តើមានចំណុចខ្មៅមួយនៅពីខាងក្រោយស្រកីដែររឺទេ?

**Yes** See § 9.2.1.1

បើមាន សូមមើល ៩-២-១-១

**No** See § 9.2.2

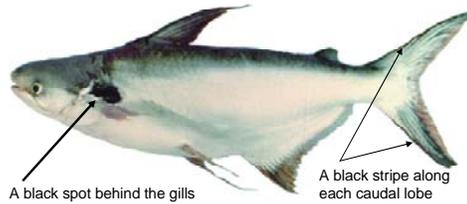
បើគ្មាន សូមមើល ៩-២-២

**9.2.1.1 Species *Pangasius larnaudii***

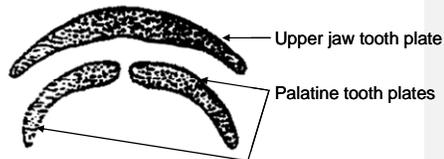
៩-២-១-១ ប្រភេទ *Pangasius larnaudii*

*Additional criteria:*

- A black longitudinal stripe along each caudal lobe
- 28-32 anal-fin rays
- 13-17 gill rakers in 1st arch
- the palatine teeth form 2 curved tooth plates separated at the midline



**Presence in Cambodia:** Rainboth 1996, Mekong Fish Database 2003



Note: confusion possible with *P. bocourti* whose juveniles can also have black stripes on the caudal fin, but have not filament at the dorsal fin

**9.2.2. Is the tip of the anal fin black?**

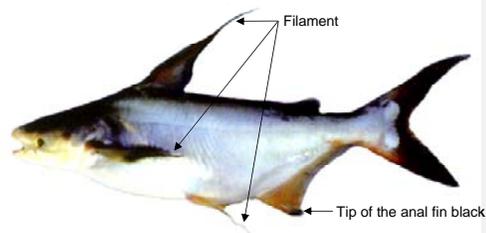
៩-២-២ តើនៅខាងចុងនៃព្រួយកូទមានពណ៌ខ្មៅរឺ?

**Yes** See § 9.2.2.1

បើមាន សូមមើល ៩-២-២-១

**No** See § 9.2.3

បើគ្មាន សូមមើល ៩-២-៣



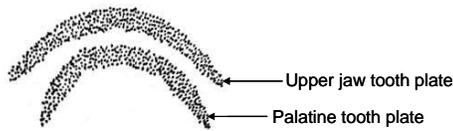
9.2.2.1 Species *Pangasius sanitwongsei*

៩-២-២-១ ប្រភេទ *Pangasius sanitwongsei*

Additional criteria:

- Dorsal, pectoral, pelvic and anal fins prolonged into a filament (although pectoral and anal filaments are often missing)
- Mouth wide (more than 17% of standard length)
- 16-21 gill rakers on first gill arch
- Vomerine and palatine teeth form two single arched bands.

Presence in Cambodia: Roberts and Vidthayanon 1991, Rainboth 1996, Mekong Fish Database 2003



9.2.3. Are the 3-4 lower caudal rays whitish?

៩-២-៣ តើទ្រនុងព្រួយកន្ទុយ៣-៤ ខាងក្រោម មានពណ៌សដិតរឺទេ?

**Yes** See § 9.2.3.1

បើមាន សូមមើល ៩-២-៣-១

**No** See § 9.2.3.2

បើគ្មាន សូមមើល ៩-២-៣-២

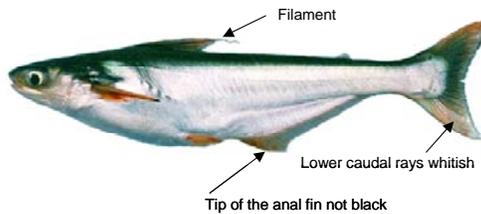
**PROBLEM HERE**

9.2.3.1 Species *Pangasius polyuranodon*

៩-២-៣-១ ប្រភេទ *Pangasius polyuranodon*

Additional criteria:

- Short predorsal length (from snout to base of dorsal fin = 25.2-29.2% of standard length)
- One large, nearly square, vomerine tooth plate and 2 adjacent small palatine tooth plates



Presence in Cambodia: Rainboth 1996, Mekong Fish Database 2003, etc

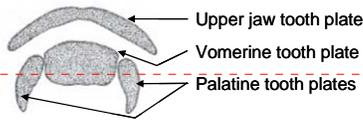
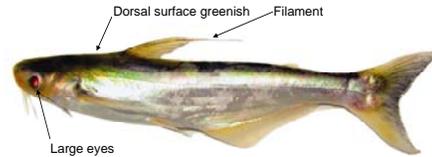
**Note:** According to Pouyaud *et al.* 2005, *P. polyuranodon* is actually a complex of several species including *P. elongatus*, and *P. polyuranodon sensu stricto* is present only in Sumatra and Borneo. **WHAT DO WE DO? Do we keep only *P. elongatus*?**

**9.2.3.2 Species *Pangasius elongatus***

៩-២-៣-២ ប្រភេទ *Pangasius elongatus*

**Additional criteria:**

- Dorsal surface of head and body greenish
- Large eyes (19.2-25.5% of head length)
- Body elongated (predorsal length = 30.1-33.9% of standard length)
- Short snout (length = 35.2-42.8% of head length)
- Short mandibular barbels (length 10.4-39.3% of head length).
- Continuous upper jaw tooth plate, large median vomerine tooth plate and 2 lateral palatine tooth plates
- the palatine and vomerine tooth plates form a virtually uninterrupted broad, strongly curved palatal tooth band.
- palatal teeth in three or four patches



**Comment [EB1]:** Check (several descriptions available)

**Presence in Cambodia:** So Nam pers. comm.. (Pouyaud *et al.* 2002, who have described this species, have identified it in Vietnam, including at Chau Doc, i.e. a few kilometres away from the Cambodian border).

**9.3. Are fins yellow or yellowish?**

៩-៣ តើព្រួញមានពណ៌លឿងរឺ?

**Yes** See § 9.3.1

បើមាន សូមមើល ៩-៣-១

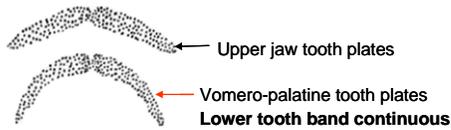
**No** See § 9.4

បើគ្មាន សូមមើល ៩-៤

**9.3.1. Do teeth form two almost uninterrupted bands?**

**Yes** Species *Pangasius krempfi*

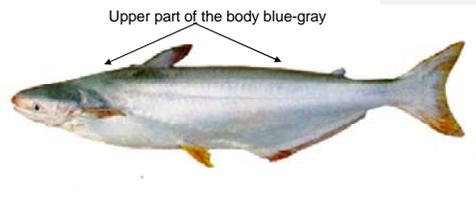
ប្រភេទ *Pangasius krempfi*



**Additional criteria:**

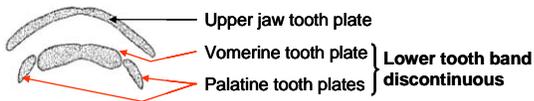
- upper part of the body blue-gray, and belly white
- 31-34 anal soft rays
- 18-22 gill rakers on the first branchial arch.
- Submarginal caudal-fin stripes absent.

**Presence in Cambodia:** Rainboth 1996, T. Roberts 1996 (California Academy of Sciences record CAS 94793); Mekong Fish Database 2003.



**Note:** *Pangasius elongates* also has yellow fins, but has a filament at the tip of the dorsal fin, that *Pangasius krempfi* does not have

**No** Species *Pangasius mekongensis*



**Additional criteria:**

- Large head (head width 14.8–20% of standard length)
- Belly greyish, not plain white
- 25-38 anal soft rays
- Pelvic fins possibly with filaments
- Strong barbs on spine of dorsal and pectoral fins
- 16–23 gill rakers on the first branchial arch

**Presence in Cambodia:** So Nam *pers. comm.* (Gustiano *et al.* 2003, who have described this species, have identified it in Vietnam at Chau Doc, a few kilometres away from the Cambodian border).



**9.4. Is the upper part of the body dark blue to black?**

៩-៤ តើផ្នែកខាងលើនៃដងខ្លួនមានពណ៌ខៀវវែង រឺពណ៌ខ្មៅរឺ?

**Yes** See § 9.4.1

បើមាន សូមមើល ៩-៤-១

**No** See § 9.5

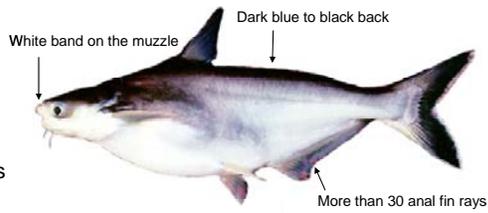
បើគ្មាន សូមមើល ៩-៥

**9.4.1 Species *Pangasius bocourti***

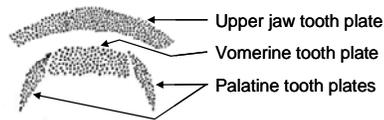
**៩-៤-១ ប្រភេទ *Pangasius bocourti***

*Additional criteria*

- broad white band on muzzle;
- More than 30 anal fin rays
- Head broader than long;
- Juveniles have submarginal dark stripes on the caudal fin lobes
- One large vomerine tooth plate and 2 lateral palatine tooth plates



**Presence in Cambodia:** Roberts and Vidthayanon 1991, Rainboth 1996, Mekong Fish Database 2003



**9.5 Is the upper part of the body iridescent, from pale green to gold?**

៩-៥ តើផ្នែកខាងលើនៃដងខ្លួន មានពណ៌ដូចប្រស្រីភ្នែក (ពណ៌បៃតងស្លេក រឺពណ៌មាស) រឺ?

**Yes** See § 9.5.1

បើមាន សូមមើល ៩-៥-១

**No** See § 9.6

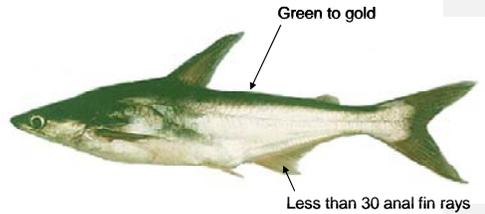
បើគ្មាន សូមមើល ៩-៦

**9.5.1 Species *Pangasius conchophilus***

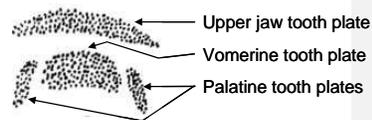
**៩-៥-១ ប្រភេទ *Pangasius conchophilus***

*Additional criteria*

- upper jaw tooth bands partly exposed when mouth is closed
- Less than 30 anal fin rays
- Continuous upper jaw tooth plate, large median vomerine tooth plate and 2 lateral palatine tooth plates



**Presence in Cambodia:** Roberts and Vidthayanon 1991, Rainboth 1996, Mekong Fish Database 2003, etc



**9.6 Is the upper part of the body dull grey to brown?**

៩-៦ តើផ្នែកខាងលើនៃដងខ្លួន មានពណ៌ប្រផេះ រឺពណ៌ត្នោតរឺ?

**Yes** See § 9.6.1

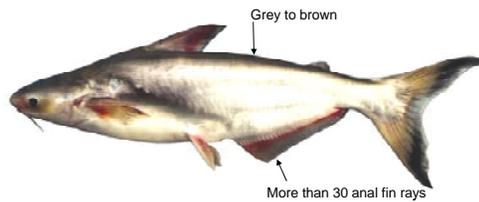
បើមាន សូមមើល ៩-៦-១

**9.6.1 Species *Pangasius djambal***

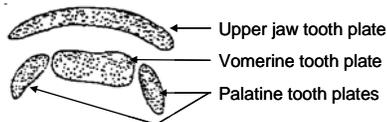
**៩-៦-១ ប្រភេទ *Pangasius djambal***

*Additional criteria:*

- 31 to 34 anal-fin rays.
- 24-35 gill rakers in 1st arch;
- maxillary barbels extending to gill opening;
- wide median vomerine tooth plate and 2 large lateral palatine tooth plates



**Presence in Cambodia:** Kottelat 1985, So Nam *pers. comm.*; in fact this species would be a non-native species coming from aquaculture farms in Vietnam.

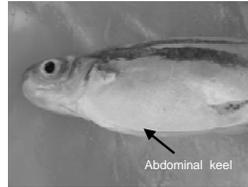


**10. Identification of *Pseudolais* species**

១០- អត្តសញ្ញាណកម្មរបស់ប្រភេទ *Pseudolais*

**10.1 Is the abdomen entirely keeled, from throat to the anal fin?**

១០-១ តើផ្នែកពោះ មានទ្រនុងឆ្អឹងទន់ ពីបំពង់កទៅព្រួយតូទី?



**Yes** See § 10.1.1

បើមាន សូមមើល ១០-១-១

**No** See § 10.1.2

បើគ្មាន សូមមើល ១០-១-២

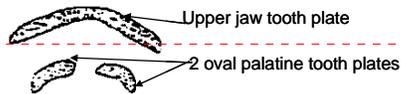
**10.1.1 Species *Pseudolais pleurotaenia***

១០-១-១ ប្រភេទ *Pseudolais pleurotaenia*

*Additional criteria:*

- Big eyes
- submarginal dark stripes on the caudal fin lobes
- 15-18 gill rakers.
- 2 oval-shaped palatine tooth plates widely separated at midline

**Presence in Cambodia:** Roberts and Vidthayanon 1991, Rainboth 1996 (under the name *Pangasius pleurotaenia*).



**Comment [EB2]:** Check teeth

**10.1.2 Species *Pseudolais micronemus***

១០-១-២ ប្រភេទ *Pseudolais micronemus*

*Additional criteria:*

- Eye very large (20-25% if head length)
- Dark grey caudal fin
- 13-20 gill rakers on upper arm of 1st arch.
- Vomeropalatine teeth in 4 ovoid patches



**Presence in Cambodia:** Roberts and Vidthayanon 1991, Rainboth 1996 (under the name *Pangasius micronema*).

**Note:** this species is often improperly called *Pangasius macronemus* or *P. macronema*

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Illustrations based on pictures from E. Baran, Chan Sokhen, I. Baird, W. Rainboth, T. Roberts and T. Warren.