BIOLOGICAL REVIEWS OF IMPORTANT CAMBODIAN FISH SPECIES, BASED ON FISHBASE 2004.

Volume 2: Pangasius larnaudii; Clarias batrachus; Cirrhinus microlepis; Leptobarbus hoevenii; Thynnichthys thynnoides; Trichogaster microlepis; Trichogaster pectoralis; Anabas testudineus; Boesemania microlepis; Oxyeleotris marmorata.

Leng Sy Vann, Eric Baran, Chheng Phen, Touch Bun Thang
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Volume 2:
Catfishes  
Pangasius larnaudii; Clarias batrachus
Cyprinids  
Cirrhinus microlepis; Leptobarbus hoevenii; Thynnichthys thynnoides
Gouramis  
Trichogaster microlepis; Trichogaster pectoralis
Perch  
Anabas testudineus;
Croaker  
Boesemania microlepis
Goby  
Oxyeleotris marmorata

Leng Sy Vann, Eric Baran, Chheng Phen, Touch Bun Thang

WorldFish Center
formerly known as "ICLARM - The World Fish Center"

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to contribute to food security and poverty eradication in developing countries.

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We believe this work will be most successful when undertaken in partnership with governments and nongovernment institutions and with the participation of the users of the research results.
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2006

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Contents

I. Pangasius larnaudii ................................................................. 1
  1.1. Summary information on the family Pangasiidae...................... 1
  1.2. Information on the genus Pangasius and its synonyms.............. 1
  1.3. General information on Pangasius larnaudii.......................... 2
  1.4. Synonyms, misidentifications, etc. used for Pangasius larnaudii... 3
  1.5. Common names for Pangasius larnaudii.................................. 3
  1.6. Distribution of Pangasius larnaudii...................................... 3
  1.7. Summary information (no. of records) available for Pangasius larnaudii... 4
  1.8. Morphology of Pangasius larnaudii....................................... 4
  1.9. Genetic information for Pangasius larnaudii.......................... 5
  1.10. General information on the reproduction of Pangasius larnaudii.... 5
  1.11. Ecology of Pangasius larnaudii......................................... 6
  1.12. Food items for Pangasius larnaudii................................... 6
  1.13. Length-Weight relationships of Pangasius larnaudii................ 7
  1.14. References used for Pangasius larnaudii............................. 8

II. Clarias batrachus ............................................................... 13
  2.1. Summary information on the family Claridae.......................... 13
  2.2. Information on the genus Clarias and its synonyms.................. 13
  2.3. General information on Clarias batrachus............................. 14
  2.4. Synonyms, misidentifications, etc. used for Clarias batrachus...... 15
  2.5. Common names for Clarias batrachus.................................. 15
  2.6. Distribution of Clarias batrachus..................................... 16
  2.7. Introductions of Clarias batrachus.................................... 17
  2.8. Summary information (no. of records) available for Clarias batrachus... 19
  2.9. Morphology of Clarias batrachus..................................... 19
  2.10. Genetic information for Clarias batrachus............................ 20
  2.11. FAO aquaculture production data for Clarias batrachus............. 21
  2.12. Weight proportions and chemical composition of Clarias batrachus.... 21
  2.13. Gill area of Clarias batrachus....................................... 22
  2.14. General information on the reproduction of Clarias batrachus...... 23
  2.15. Ecology of Clarias batrachus....................................... 24
  2.16. Food items for Clarias batrachus.................................... 24
  2.17. Maximum weight/length/age of Clarias batrachus.................... 25
  2.18. Length-Weight relationships of Clarias batrachus................... 25
  2.19. Diseases reported for Clarias batrachus................................... 25
  2.20. References used for Clarias batrachus................................. 33

III. Cirrhinus microlepis ......................................................... 41
  3.1. Summary information on the family Cyprinidae....................... 41
  3.2. Information on the genus Cirrhus and its synonyms.................. 41
  3.3. General information on Cirrhinus microlepis.......................... 42
  3.4. Synonyms, misidentifications, etc. used for Cirrhinus microlepis.... 43
  3.5. Common names for Cirrhinus microlepis.................................. 43
  3.6. Distribution of Cirrhinus microlepis.................................. 43
  3.7. Summary information (no. of records) available for Cirrhinus microlepis... 44
  3.8. Morphology of Cirrhinus microlepis.................................. 44
  3.9. General Information on the reproduction of Cirrhinus microlepis....... 45
  3.10. Ecology of Cirrhinus microlepis...................................... 46
  3.11. Food items for Cirrhinus microlepis.................................. 46
  3.12. Length-Weight relationships of Cirrhinus microlepis................ 46
  3.13. References used for Cirrhinus microlepis............................ 50
IV. Leptobarbus hoevenii ................................................................. 51
  4.1. Summary information on the family Cyprinidae........................... 51
  4.2. Information on the genus Leptobarbus and its synonyms................. 51
  4.3. General information on Leptobarbus hoevenii ............................ 51
  4.4. Synonyms, misidentifications, etc. used for Leptobarbus hoevenii .... 52
  4.5. Common names for Leptobarbus hoevenii .................................. 52
  4.6. Distribution of Leptobarbus hoevenii ....................................... 53
  4.7. Introductions of Leptobarbus hoevenii ..................................... 54
  4.8. Summary information (no. of records) available for Leptobarbus hoevenii 54
  4.9. Morphology of Leptobarbus hoevenii ....................................... 54
  4.10. Genetic information for Leptobarbus hoevenii ............................ 55
  4.11. FAO aquaculture production data for Leptobarbus hoevenii ........... 55
  4.12. General information on the reproduction of Leptobarbus hoevenii ... 56
  4.13. Ecology of Leptobarbus hoevenii .......................................... 56
  4.14. Food items for Leptobarbus hoevenii ...................................... 57
  4.15. FAO annual catch data (in tonnes) for Leptobarbus hoevenii ......... 57
  4.16. References used for Leptobarbus hoevenii ................................ 58

V. Thynnichthys thynnoides ................................................................. 63
  5.1. Summary information on the family Cyprinidae ........................... 63
  5.2. Information on the genus Thynnichthys and its synonyms ............... 63
  5.3. General information on Thynnichthys thynnoides ........................ 63
  5.4. Synonyms, misidentifications, etc. used for Thynnichthys thynnoides 64
  5.5. Common names for Thynnichthys thynnoides ................................ 64
  5.6. Distribution of Thynnichthys thynnoides .................................. 65
  5.7. Summary information (no. of records) available for Thynnichthys thynnoides 65
  5.8. Morphology of Thynnichthys thynnoides .................................. 66
  5.9. Ecology of Thynnichthys thynnoides ....................................... 66
  5.10. Food items for Thynnichthys thynnoides .................................. 67
  5.11. References used for Thynnichthys thynnoides ............................ 68

VI. Trichogaster microlepis ................................................................. 73
  6.1. Summary information on the family Osphronemidae ....................... 73
  6.2. Information on the genus Trichogaster and its synonyms ............... 73
  6.3. General information on Trichogaster microlepis ........................ 74
  6.4. Synonyms, misidentifications, etc. used for Trichogaster microlepis 74
  6.5. Common names for Trichogaster microlepis ................................ 74
  6.6. Distribution of Trichogaster microlepis .................................... 75
  6.7. Introductions of Trichogaster microlepis .................................. 75
  6.8. Summary information (no. of records) available for Trichogaster microlepis 75
  6.9. Morphology of Trichogaster microlepis .................................... 76
  6.10. Genetic information for Trichogaster microlepis ....................... 76
  6.11. General information on the reproduction of Trichogaster microlepis 77
  6.12. Ecology of Trichogaster microlepis ....................................... 77
  6.13. Food items for Trichogaster microlepis .................................. 77
  6.14. Diseases reported for Trichogaster microlepis ........................... 77
  6.15. References used for Trichogaster microlepis ............................ 79

VII. Trichogaster pectoralis ................................................................. 83
    7.1. Summary information on the family Osphronemidae ........................ 83
    7.2. Information on the genus Trichogaster and its synonyms .............. 83
    7.3. General information on Trichogaster pectoralis ........................ 84
    7.4. Synonyms, misidentifications, etc. used for Trichogaster pectoralis 84
    7.5. Common names for Trichogaster pectoralis ................................ 85
    7.6. Distribution of Trichogaster pectoralis ................................... 85
    7.7. Introductions of Trichogaster pectoralis .................................. 86
    7.8. Summary information (no. of records) available for Trichogaster pectoralis 87
    7.9. Morphology of Trichogaster pectoralis .................................... 88
    7.10. Genetic information for Trichogaster pectoralis ........................ 88
    7.11. FAO aquaculture production data for Trichogaster pectoralis ........ 89
    7.12. General information on the reproduction of Trichogaster pectoralis 89
    7.13. Ecology of Trichogaster pectoralis ....................................... 90
    7.14. Diet composition of Trichogaster pectoralis ............................. 90
    7.15. Diseases reported for Trichogaster pectoralis ........................... 91
    7.16. FAO annual catch data (in tonnes) for Trichogaster pectoralis ....... 91
    7.17. References used for Trichogaster pectoralis ............................ 93
VIII. Anabas testudineus

8.1. Summary information on the family Anabantidae
8.2. Information on the genus Anabas and its synonyms
8.3. General information on Anabas testudineus
8.4. Synonyms, misidentifications, etc. used for Anabas testudineus
8.5. Common names for Anabas testudineus
8.6. Distribution of Anabas testudineus
8.7. Introductions of Anabas testudineus
8.8. Summary information (no. of records) available for Anabas testudineus
8.9. Morphology of Anabas testudineus
8.10. Genetic information for Anabas testudineus
8.11. FAO aquaculture production data for Anabas testudineus
8.12. General information on the reproduction of Anabas testudineus
8.13. Available information on eggs of Anabas testudineus
8.15. Food items for Anabas testudineus
8.16. Maximum weight/length/age of Anabas testudineus
8.17. Diseases reported for Anabas testudineus
8.18. Ecotoxicology of Anabas testudineus
8.19. References used for Anabas testudineus

IX. Boesemania microlepis

9.1. Summary information on the family Sciaenidae
9.2. Information on the genus Boesemania and its synonyms
9.3. General information on Boesemania microlepis
9.4. Synonyms, misidentifications, etc. used for Boesemania microlepis
9.5. Common names for Boesemania microlepis
9.6. Distribution of Boesemania microlepis
9.7. Summary information (no. of records) available for Boesemania microlepis
9.8. General information on the reproduction of Boesemania microlepis
9.9. Ecology of Boesemania microlepis
9.10. Food items for Boesemania microlepis
9.11. References used for Boesemania microlepis

X. Oxyeleotris marmorata

10.1. Summary information on the family Eleotridae
10.2. Information on the genus Oxyeleotris and its synonyms
10.3. General information on Oxyeleotris marmorata
10.4. Synonyms, misidentifications, etc. used for Oxyeleotris marmorata
10.5. Common names for Oxyeleotris marmorata
10.6. Distribution of Oxyeleotris marmorata
10.7. Introductions of Oxyeleotris marmorata
10.8. Summary information (no. of records) available for Oxyeleotris marmorata
10.9. Morphology of Oxyeleotris marmorata
10.10. Genetic information for Oxyeleotris marmorata
10.11. FAO aquaculture production data for Oxyeleotris marmorata
10.12. General information on the reproduction of Oxyeleotris marmorata
10.13. Ecology of Oxyeleotris marmorata
10.14. Food items for Oxyeleotris marmorata
10.15. Maximum weight/length/age of Oxyeleotris marmorata
10.16. Length-Weight relationships of Oxyeleotris marmorata
10.17. Diseases reported for Oxyeleotris marmorata
10.18. References used for Oxyeleotris marmorata

Acknowledgements
Introduction

This document results from the extraction and the editing by the authors of the information available in FishBase 2004.

FishBase is a biological database on fishes developed by the WorldFish Center (formerly ICLARM, the International Center for Living Aquatic Resources Management) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and with the support of the European Commission (EC).

These synopses present a standardized printout of the information on the above-mentioned species incorporated in FishBase as of 11 May 2004 and are inspired by the format suggested for such documents by H. Rosa Jr. (1965, FAO Fish. Syn. (1) Rev 1, 84 p.)

We cannot guarantee the total accuracy of the information herein; also we are aware that it is incomplete and readers are invited to send complementary information and/or corrections, preferably in the form of reprints or reports to the FishBase Project, WorldFish Center, MC P.O. Box 2631, Makati, Metro Manila, 0718, Philippines.

Some hints on how to use the synopses

The following definitions are meant to help you better understand the way this synopsis presents information and documents its sources.

Please refer to the FishBase book for more details and do not hesitate to contact FishBase staff if you have suggestions or information that would improve the format or the contents of this synopsis.

SpecCode : Numeric FishBase code, assigned to a species and used for internal purposes only.
StockCode : Numeric FishBase code, assigned to the species in general, a wild population, or a cultured strain. Since, to date, only a few species have been separated into stocks, the StockCode usually refers to the species in general.
MainRef. : Numeric FishBase code corresponding to the reference used as a source for most of the information within a table.
Ref. : Numeric FishBase code corresponding to the reference associated with a specific entry or set of entries; when left empty, the source of information is the MainRef. Note that the references listed at the end of this synopsis are arranged according to their numeric codes, and not alphabetically.
Empty fields : Imply information that is currently not available to the FishBase project and/or information which is available but which has not been entered as of 31-Mar-04. Note that the character 0 (zero) is used as a valid numerical value, and does not indicate that no information is available.
Choice fields : Much of the information in this synopsis was entered via multiple choice fields; the available alternatives must be considered when evaluating the wisdom of a given choice.
Remarks or Comment fields : The free text included in such fields may have been taken verbatim from the source in "Ref.", in which case this should be regarded as a direct citation (but lacking quotation marks); alternatively, the text may have been modified/adapted from one or several sources. In the latter case, additional "Ref." numbers may be incorporated in the text.
PANGASIIUS LARNAUDII
(Bocourt, 1866)
Spot pangasius
ังงะตา
1.1. Summary information on the family Pangasiidae

Family : Pangasiidae (Shark catfishes)
Order : Siluriformes
Class : Actinopterygii (Ray-finned fishes)
Number of genera : 2
Number of species : 21
Occurs in : O Marine
@ Brackish
@ Freshwater
Aquarium fishes : some
First fossil record : Lower Tertiary Eocene

Species currently in FishBase: Genera: 5  Species: 30 (Including subspecies) Complete: Yes

Remarks:
Etymology : The Vietnamese name of a fish

1.2. Information on the genus Pangasius and its synonyms

After Eschmeyer, March 2003 (Ref. 46206)

Neopangasius  Status : synonym  Gender : masculine
Popta, 1904, p. 180, CAS Ref: 3547
Type by monotypy.
Type species : Neopangasius nieuwenhuisii  Popta, 1904
Current genus : Pangasius

Pangasianodon  Status : valid  Gender : masculine
Chevey, 1931, p. 538, CAS Ref: 830
Type by monotypy.
Type species : Pangasianodon gigas  Chevey, 1931
Current genus : Pangasius

Pangasius  Status : valid  Gender : masculine
Valenciennes in Cuvier & Valenciennes, 1840, p. 45, CAS Ref: 1008
Type by monotypy.
Type species : Pangasius buchanani  Valenciennes, 1840
Current genus : Pangasius

Pseudolais  Status : synonym  Gender : feminine
Vaillant, 1902, p. 51, CAS Ref: 4490
Type by monotypy.
Type species : Pseudolais tetranema  Vaillant, 1902
Current genus : Pangasius

Pseudopangasius  Status : synonym  Gender : masculine
Bleeker, 1862, p. 399, CAS Ref: 391
Type by original designation (also monotypic).
Type species : Pangasius polyuranodon  Bleeker, 1852
Current genus : Pangasius
Pteropangasius
Status : valid  Gender : masculine
Fowler, 1937, p. 142, CAS Ref: 1425
Type by original designation (also monotypic).
Type species : Pangasius cultratus  Smith, 1931
Current genus : Pangasius

1.3. General information on Pangasius larnaudii

Class : Actinopterygii (Ray-finned fishes)
Order : Siluriformes
Family : Pangasiidae (Shark catfishes)
Species : Pangasius larnaudii
Author : Bocourt, 1866
Spelling Eschmeyer, pers. comm.

Environment
Freshwater : Yes  Habitat : Benthopelagic
Brackish : No
Saltwater : No

Importance
Importance to fisheries : Commercial  Ref. 037772
Main catching method : Seines  Gillnets  Castnets  Traps  Spears  Trawls  Dredges  Liftnets  Hooks+Lines  Other  Ref. 004537
Other methods :
Used for aquaculture : Commercial
Used as bait : Never/rarely
Aquarium fish : Never/rarely
Game fish : No
Dangerous fish : Harmless
Electrobiology : No special ability

Size and age
Maximum length (cm) (male/unsexed) : 130  SL  (female) :  Ref. 030857

Remarks:
Occurs in medium to large-sized rivers (Ref. 12975). Inhabits deep pools in the river (Ref. 37770). Found in rapids and riffle (Ref. 37771). Enters flooded forest (Ref. 9497). Artificially reared fry of 3.5 mm at 12 hrs., 8.4 mm at 4 days, 8.8 mm at 8 days and 23 mm at 18 days. Larval teeth present in 12 hr and 4 day larvae. Feeds on shrimps, small fishes, gastropods and plants (Ref. 6459). Migrates into floodplains and spawns at the beginning of the flood season (Ref. 12693).
1.4. Synonyms, misidentifications, etc. used for *Pangasius larnaudii*

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<th>Author</th>
<th>Status</th>
<th>Ref.</th>
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<td>Fowler, 1937</td>
<td>junior synonym</td>
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<td>Pangasius larnaudei</td>
<td>Bocourt, 1866</td>
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<td>junior synonym</td>
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<tr>
<td>Pangasius taeniurus</td>
<td>Fowler, 1935</td>
<td>junior synonym</td>
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1.5. Common names for *Pangasius larnaudii*

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<th>Language</th>
<th>Country</th>
<th>Ref.</th>
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<td>Cambodia</td>
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<tr>
<td>Trey po</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
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<td>Trey Po Thmau Trâchiek</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Beung</td>
<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>040382</td>
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<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>004792</td>
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<td>Pa pboong</td>
<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>009497</td>
</tr>
<tr>
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<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>037767</td>
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<td>Lao People's Dem. Rep.</td>
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<tr>
<td>Pla chai por</td>
<td>Thai</td>
<td>Thailand</td>
<td>042982</td>
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<tr>
<td>Pla hou mat</td>
<td>Thai</td>
<td>Thailand</td>
<td>006459</td>
</tr>
<tr>
<td>Pla the pho</td>
<td>Thai</td>
<td>Thailand</td>
<td>006459</td>
</tr>
<tr>
<td>Sang kaward</td>
<td>Thai</td>
<td>Thailand</td>
<td>009648</td>
</tr>
<tr>
<td>Tepo</td>
<td>Thai</td>
<td>Thailand</td>
<td>009648</td>
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<td>Spot pangasius</td>
<td>English</td>
<td>USA (contiguous states)</td>
<td>004537</td>
</tr>
<tr>
<td>Cà vo dém</td>
<td>Vietnamese</td>
<td>Viet Nam</td>
<td>036625</td>
</tr>
</tbody>
</table>

1.6. Distribution of *Pangasius larnaudii*

Asia: Mekong and Chao Phraya Basins.

Latitudinal range: 20° N- 10° N Temperature range: - °C

Status of threat: NL.

**Country** | **Status** | **Ref.**   | **Details**                                                                                                                                                                                                 |
------------|------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
Cambodia    | native     | 012693     | Occurs in the Mekong Basin (Ref. 12693, 27732). Found below the Khone Falls to the Tonle Sap River and the Tonle Sap Lake (Ref. 37772). Reared in ponds as well as in weirs around the Tonle Sap Lake (Ref. 36686). May be put on ice around the Tonle Sap Lake for shipment to Thailand (Ref. 12693). Also Ref. 36654, 33813.  |
Lao People's Dem. Rep. | native | 027732     | Occurs in the Mekong tributary, the lower Xe Bangfai Basin (Ref. 27732). Found in the Khone Falls (Ref. 37772). Collected from Tha Ngon in the Mekong Basin (Ref. 4792) and from Ban Hang Khone, a village on an island in the middle of the mainstream Mekong River just below the Great Khone Waterfalls in Khong District, Champasak Province (Ref. 37767). Enters flooded forest in Ban Hang Khone, Don Khone, just below the great waterfalls at Lee Pee (Ref. 9497). Undertakes upstream migration during the wet season in May-July through Hoo SomYai at the Great Fault Line on the Mekong River, Champasak Province (Ref. 37771). Also Ref. 9497, 30857, 37771, 43281, 44002. |
Myanmar native 041485
Upstream migration during May to September in Khone Falls, downstream migration at Chien Khan, Loei province from May to September (Ref. 41485).

Thailand native 026336
Occurs in the Mekong and Chao Phraya Basins (Ref. 27732) and Maeklong Basin (Ref. 26336). Not found in the markets of Bangkok a century ago because it was expensive and reserved for consumption by important people; it was raised in water courses closed off by bamboo grills (Ref. 7432). Also Ref 1632, 6459, 9648, 41485.

Viet Nam native 027732
Occurs in the Mekong Basin (Ref. 27732). Below the Khone Falls from Dong Thap Province to the Khone Falls, it migrates upstream at the start of the dry the season, triggered by the receding water levels (Ref. 37770). Also Ref. 36625, 37770.

1.7. Summary information (no. of records) available for Pangasius larnaudii

<table>
<thead>
<tr>
<th>Level: species in general</th>
<th>StockCode: 07432</th>
<th>MainRef.: 007432</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia: Mekong and Chao Phraya Basins.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecology</td>
<td>1</td>
<td>Max. sizes</td>
</tr>
<tr>
<td>Food Items</td>
<td>7</td>
<td>FAO catches</td>
</tr>
<tr>
<td>Food consumption</td>
<td>0</td>
<td>Genetics</td>
</tr>
<tr>
<td>Diet composition</td>
<td>0</td>
<td>Allele frequency</td>
</tr>
<tr>
<td>Ration</td>
<td>0</td>
<td>Heritability</td>
</tr>
<tr>
<td>Predators</td>
<td>0</td>
<td>Reproduction</td>
</tr>
<tr>
<td>Morphology</td>
<td>1</td>
<td>Spawning</td>
</tr>
<tr>
<td>Processing</td>
<td>0</td>
<td>Eggs</td>
</tr>
<tr>
<td>Growth/mortality</td>
<td>0</td>
<td>Egg dev't.</td>
</tr>
<tr>
<td>Maturity</td>
<td>0</td>
<td>Larvae</td>
</tr>
<tr>
<td>Recruitment</td>
<td>0</td>
<td>Larval dynamics</td>
</tr>
<tr>
<td>L/W relat.</td>
<td>1</td>
<td>Aquaculture</td>
</tr>
</tbody>
</table>

Total = 1

1.8. Morphology of Pangasius larnaudii

<table>
<thead>
<tr>
<th>Level: species in general</th>
<th>StockCode: 012326</th>
<th>Main Ref.: 027732</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Characters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A large black spot above the base of the pectoral fin and a black longitudinal stripe along each caudal lobe (Ref. 27732). Dorsal and pectoral fins with a strong spine and a long, filamentous ray (Ref. 4792). With 13-17 gill rakers in first arch (Ref. 12693)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive Characters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Striking features         : none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operculum                 : present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomerine                  : present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palatine                  : present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pigmentation on trunk and tail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal stripes        : absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical stripes          : absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagonal stripes          : absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curved stripes            : absent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Monograph on Pangasius larnaudii
Spots : one spot only
Caudal fin anal : one spot on stripe

**Meristic Characters**
Gill rakers : on lower limb total: 13-17

**Dorsal fins**
Number of fins : 1

**Caudal fin**
Shape of fin : forked
Attributes : more or less normal

**Anal fin**
Number of fins soft rays total: 28-32

**Paired fins**
Pectoral attributes : more or less normal
Pelvics attributes : more or less normal
Position : abdominal, behind origin of D1

1.9. Genetic information for *Pangasius larnaudii*

**Level : species in general**
MainRef.: 009461
Locality : Unspecified
Chromosome number (haploid) : 30
Chromosome number (diploid) : 60
Genetic marker(s) present : No

![Graph showing expected vs observed heterozygosity of Pangasius larnaudii](image)

1.10. General information on the reproduction of *Pangasius larnaudii*

**Level : species in general**
StockCode : 012326
MainRef : 041485

**Mode and type of reproduction**
Mode : dioecism
Fertilization : external
Spawning frequency : one clear seasonal peak per year
Batch spawner : no
Reproductive guild : nonguarders Open water/substratum egg scatterers
Spawning Information for *Pangasius larnaudii*

**Locality:** Laos, Mekong River at Hoo Som Yai on the Great Fault

**Line, Champassack Season** (% of mature females; 111 = presence of mature females):

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>111</td>
<td>111</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stockcode: 012326

Main Ref.: 037771

1.11. Ecology of *Pangasius larnaudii*

**Level:** species in general

**Habitats**

- Streams: Yes
- Lake: Yes
- Cave: No
- Estuaries/lagoons.brackish seas: No
- Intertidal: No
- Soft: No
- Rocky: No
- Mangroves/marshes/swamps: No
- Marine: No
- Oceanic: Yes
- Neritic: No
- Coral reefs: No
- Tropical soft bottom: No
- Hard bottom: No
- Seagrass beds: No
- Macrophyte: No

**Feeding**

- Feeding type: mainly animals (troph. 2.8 and up)
- Feeding habit: hunting macrofauna (predator)

**Trophic level(s):**

<table>
<thead>
<tr>
<th>Estimation method</th>
<th>Original sample</th>
<th>Unfished population</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>From indiv. food item</td>
<td>3.3 0.53</td>
<td>- -</td>
<td>Trophic level estimate</td>
</tr>
</tbody>
</table>

**Additional remarks**

Feeds heavily on fruits and enters the flooded forest in high water (Ref. 9497). Also feeds on fish, crustaceans and mollusks (Ref. 9459).

1.12. Food items for *Pangasius larnaudii*

**Level:** species in general

**Food item**

- detritus
  - detritus
  - debris
  - unidentified
- nekton
  - finfish
  - bony fish
  - unidentified
  - unidentified fish
- plants
  - other plants
  - terrestrial plants
  - unidentified fruits
- zoobenthos
  - benth. crust.
  - n.a./other benth. crustaceans
  - unidentified crustaceans
  - shrimps/prawns
  - unidentified
  - gastropods
  - unidentified

Total: 7

StockCode: 012326

Ref.

<table>
<thead>
<tr>
<th>Detritus</th>
<th>Nekton</th>
<th>Plants</th>
<th>Zoobenthos</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ref.: 037771, 033813, 049196, 009497, 006459
1.13. Length-Weight relationships of *Pangasius larnaudii*

\( W = a \cdot L^b \) with Length in cm and Weight in g

Locality: Laos, Mekong River at Hoo Som Yai on the Great Fault Line

StockCode: 012326

Length range: 34 - 75 TL

Sample size: 194

MainRef.: 037771

Correlation coefficient: 0.9643

Ref.: 037771

Sex: unsexed

This graph is meant to provide a general impression of the relationship between body length and weight in this species. See the L-W tables for details.
1.14. References used for *Pangasius larnaudii*

001632 Suvatti, C. 1981. Fishes of Thailand. Royal Institute of Thailand, Bangkok. 379 p. [not seen]


009648 Sidthimunka, A. 1970. A report on the fisheries survey of the Mekong River in the vicinity of the Pa Mong Dam site. Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand. 75 p.

010937 Anon. 1996. Fish collection database of the University of British Columbia Fish Museum. University of British Columbia, Vancouver, Canada.


031982 Anon. 1999. Fish collection database of the Natural History Museum, London (formerly British Museum of Natural History (BMNH)). Natural History Museum, London (formerly British Museum of Natural History (BMNH))


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


CLARIAS BATRACHUS

(Linnaeus, 1758)
Walking catfish

Picture by FAO
Picture by Baird I.G
2.1. Summary information on the family Clariidae

Family: Clariidae (Airbreathing catfishes)  
MainRef.: 007463
Order: Siluriformes  
FamCode: 139
Class: Actinopterygii (Ray-finned fishes)
Number of genera: 13
Number of species: 100
Occurs in: Marine, Brackish, Freshwater

Aquarium fishes: some
Species currently in FishBase: Genera: 15  Species: 104 (Including subspecies)  Complete: Yes

**Remarks:** Distribution: Africa, Syria and southern and western Asia (Philippines to Java). Dorsal fin extending over much of body length. Dorsal fin rays usually over 30 without a leading spine. Dorsal fin discontinuous or united to caudal fin. Rounded caudal fin. Wide gill openings. Barbels: 4 pairs. Airbreathing is accomplished with a labyrinthic organ arising from the gill arches ('labyrinth catfishes'). Some species are capable of travelling over short distances on land ('walking catfishes'). Some are burrowers with small eyes and the pectoral and pelvic fins small or lacking.

Etymology: Clariidae: Latin, clarias, -a, -um = shining

2.2. Information on the genus *Clarias* and its synonyms

After Eschmeyer, March 2003 (Ref. 46206)

**Anguilloclarias**  
Teugels, 1982, p. 13, CAS  
Type by original designation.  
Type species: *Clarias theodorae*  
Current genus: *Clarias*  
Status: synonym  
Gender: masculine  
Ref: 6670  
Weber, 1897

**Brevicephalooides**  
Teugels, 1982, p. 14, CAS  
Type by original designation.  
Type species: *Clarias camerunensis*  
Current genus: *Clarias*  
Status: synonym  
Gender: masculine  
Ref: 6670  
Lönnberg, 1895

**Clarias**  
Scopoli (exGronow), 1777, p. 455, CAS  
Type by subsequent designation.  
Type species: *Silurus anguillaris*  
Current genus: *Clarias*  
Status: valid  
Gender: masculine  
Ref: 3990  
Linnaeus, 1758

**Clarias**  
Gronow, 1763, p. 100, CAS  
Type of species:  
Current genus: *Clarias*  
Status: on official index  
Gender: masculine  
Ref: 1910

**Clarioides**  
David in David & Poll. 1937, p. 231, CAS  
Type of species: *clarias angolensis*  
Status: not valid  
Gender: masculine  
Ref.: 1043  
Steindachner, 1866

Monograph on *Clarias batrachus* 13
**Cossyphus**
McClelland, 1844, p. 403, CAS
Type by monotypy.
Type species: *Cossyphus ater* McClelland, 1844
Current genus: *Clarias*

**Dinotopteroides**
Fowler, 1930, p. 41, CAS
Type by original designation (also monotypic)
Type species: *Dinotopteroides prentissgrayi* Fowler, 1930
Current genus: *Claria*

**Heterobranchoides**
David, 1935, p. 82, 99, CAS
Type species: *Current genus*

**Macropteronotus**
Lacepède, 1803, p. 84, CAS
Type by monotypy.
Type species: *Macropteronotus charmuth* Lacepède, 1803
Current genus: *Clarias*

**Phagorus**
McClelland, 1844, p. 225, CAS
Type by monotypy.
Type species: *Cossyphus ater* McClelland, 1844
Current genus: *Clarias*

**Platycephaloides**
Teugels, 1982, p. 11, CAS
Type by original designation.
Type species: *Clarias platycephalus* Boulenger, 1902
Current genus: *Clarias*

**Prophagorus**
Smith, 1939, p. 236, CAS
Type by original designation (also monotypic).
Type species: *Clarias nieuhofii* Valenciennes, 1840
Current genus: *Clarias*

### 2.3. General information on *Clarias batrachus*

**Classification**

<table>
<thead>
<tr>
<th>Class</th>
<th>Actinopterygii (Ray-finned fishes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
<td>Siluriformes</td>
</tr>
<tr>
<td>Family</td>
<td>Clariidae (Airbreathing catfishes)</td>
</tr>
<tr>
<td>Species</td>
<td><em>Clarias batrachus</em></td>
</tr>
<tr>
<td>Author</td>
<td>(Linnaeus, 1758)</td>
</tr>
</tbody>
</table>

**Environment**

<table>
<thead>
<tr>
<th>Freshwater</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>Demersal</td>
</tr>
<tr>
<td>Brackish</td>
<td>Yes</td>
</tr>
<tr>
<td>Migrations</td>
<td>Potamodromous</td>
</tr>
<tr>
<td>Saltwater</td>
<td>No</td>
</tr>
<tr>
<td>Depth range</td>
<td>1</td>
</tr>
</tbody>
</table>

---

Monograph on *Clarias batrachus*
Importance
Importance to fisheries: Commercial
Other methods: ⊗ Seines ⊗ Gillnets ⊗ Castnets O Traps O Spears
O Trawls O Dredges O Liftnets ⊗ Hooks+Lines O Other

Used for aquaculture: Commercial Ref.007306
Used as bait: Never/rarely Ref.001672
Aquarium fish: Commercial based mainly on capture Ref.004690
Game fish: No Ref.004690
Dangerous fish: Potential pest Ref.004690
Electrobiology: No special ability

Size and age
Maximum length (cm) (male/unsexed): 47 TL (female): Ref. 040637
Common length (cm) (male/unsexed): 26.25 TL (female): Ref. 012193
Maximum weight (g) (male/unsexed): 1,190.00 (female): Ref. 040637

2.4. Synonyms, misidentifications, etc. used for *Clarias batrachus*

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Author</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Clarias assamensis</em></td>
<td>Day, 1877</td>
<td>junior synonym</td>
<td>004833</td>
</tr>
<tr>
<td><em>Silurus batrachus</em></td>
<td>Linnaeus, 1758</td>
<td>original combination</td>
<td>041236</td>
</tr>
<tr>
<td><em>Clarias batrachus</em></td>
<td>Linnaeus, 1758</td>
<td>new combination</td>
<td>041236</td>
</tr>
<tr>
<td><em>Macropteronotus jagur</em></td>
<td>Hamilton, 1822</td>
<td>junior synonym</td>
<td>041236</td>
</tr>
<tr>
<td><em>Clarias jagur</em></td>
<td>Hamilton, 1822</td>
<td>junior synonym</td>
<td>041236</td>
</tr>
<tr>
<td><em>Macropteronotus magur</em></td>
<td>Hamilton, 1822</td>
<td>questionable</td>
<td>001479</td>
</tr>
<tr>
<td><em>Clarias magur</em></td>
<td>Hamilton, 1822</td>
<td>questionable</td>
<td>004833</td>
</tr>
<tr>
<td><em>Clarias punctatus</em></td>
<td>Valenciennes, 1840</td>
<td>junior synonym</td>
<td>041236</td>
</tr>
</tbody>
</table>

2.5. Common names for *Clarias batrachus*

<table>
<thead>
<tr>
<th>Name</th>
<th>Language</th>
<th>Country</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trey andaing roueng</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
</tr>
<tr>
<td>Trey andeng</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>002686</td>
</tr>
<tr>
<td>Trey andêng</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Magur</td>
<td>English</td>
<td>India</td>
<td>004833</td>
</tr>
<tr>
<td>Ikan lele</td>
<td>Malay</td>
<td>Malaysia</td>
<td>002686</td>
</tr>
<tr>
<td>Keli</td>
<td>Malay</td>
<td>Malaysia</td>
<td>004789</td>
</tr>
<tr>
<td>Ikan keling</td>
<td>Malay</td>
<td>Indonesia</td>
<td>006107</td>
</tr>
<tr>
<td>Ikan lele</td>
<td>Malay</td>
<td>Indonesia</td>
<td>040977</td>
</tr>
<tr>
<td>Leleh</td>
<td>Malay</td>
<td>Indonesia</td>
<td>006107</td>
</tr>
</tbody>
</table>

Inhabits swamps, ponds, ditches, rice paddies, and pools left in low spots after rivers have been in flood (Ref. 2854). Usually confined to stagnant, muddy water (Ref. 1479). Found in medium to large-sized rivers, flooded fields and stagnant water bodies including sluggish flowing canals (Ref. 12975). Undertakes lateral migrations from the Mekong mainstream, or other permanent water bodies, to flooded areas during the flood season and returns to the permanent water bodies at the onset of the dry season (Ref. 37770). Can live out of water for quite some time and move short distances over land (Ref. 4833). Can walk and leave the water to migrate to other water bodies using its auxiliary breathing organs. The Lao use this fish as lap pa or ponne pa. Feeds on insect larvae, earthworms, shells, shrimps, small fish, aquatic plants and debris (Ref. 6459). An important food fish (Ref. 4833). Marketed live, fresh and frozen (Ref. 9987).
2.6. Distribution of *Clarias batrachus*

**Asia**: Mekong and Chao Phraya Basins, Malay Peninsula, Sumatra, Java, Borneo. MainRef.: 027732

Reported from Sri Lanka; popular for aquaculture in its native range but not regarded as such in other Southeast Asian countries. Trade restricted in Germany (Ref. 1739). Several countries report adverse ecological impact after introduction.

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh native</td>
<td></td>
<td>001479</td>
</tr>
<tr>
<td>Cambodia introduced</td>
<td></td>
<td>027732</td>
</tr>
<tr>
<td>China introduced</td>
<td></td>
<td>001739</td>
</tr>
<tr>
<td>Guam introduced</td>
<td></td>
<td>001739</td>
</tr>
<tr>
<td>India native</td>
<td></td>
<td>004833</td>
</tr>
<tr>
<td>Indonesia native</td>
<td></td>
<td>002847</td>
</tr>
<tr>
<td>Lao People's Dem. Rep. native</td>
<td></td>
<td>043281</td>
</tr>
<tr>
<td>Malaysia native</td>
<td></td>
<td>027732</td>
</tr>
<tr>
<td>Myanmar native</td>
<td></td>
<td>004833</td>
</tr>
</tbody>
</table>

**Latitudinal range**: 29° N - 7° S  
**Temperature range**: 20 - 25 °C  
**Ref.**: 1672

Status of threat: NL.

**Main Ref.**

- 027732
- 33813
- 1739
- 45255
- 36654
- 39637
- 41236
- 43638
- 30857
- 37767
- 37770
- 37772
- 29108
- 33813
- 36654
- 2847
- 39637
- 39638
- 37770
- 30857
Nepal

Nepal native 009496

Found in Bheri, Janakpur, Gandaki, Koshi, Lumbini and Narayani zones at 76-120 m altitude.
Also Ref. 41236, 43638.

Pakistan

Pakistan native 036654

Also Ref. 41236, 43638.

Papua New Guinea

Papua New Guinea introduced 002847

Known from the Lake Sentani region, Vogelkop Peninsula on the Prafi Plain near Manokwari, in the Sorong district (Ref. 2847) and in Western Province (Ref. 50786). Also Ref. 9420.

Philippines

Philippines introduced 012157

Completely dominated natural populations in lakes and rivers and the indigenous *Clarias macrocephalus* which can hardly be found in the markets today. Occurs in swamps, ponds, ditches, rice paddies, and pools left in low spots after rivers have flooded (Ref. 2854). Specimens were collected from Ambacan River at Makinhas and Butigan, Leyte in 1993 (Ref. 7223). Known from Lake Mainit, Mindanao (Ref. 4867). A cheap food fish in Laguna de Bay and not a preferred fish because of its tough flesh. Museum specimens collected in 1984 from east bay, LRS-83120 (Ref. 13460). Also found in Lake Buluan (Ref. 13492) and Lake Taal (Ref. 13446). Used in the aquarium trade (Ref. 12157). Also Ref. 1739, 7050, 12550, 36654, 43638.

Singapore

Singapore native 041236

Also Ref. 43638.

Sri Lanka

Sri Lanka native 006028

Occurrence needs verification; possibly a misidentification of *C. brachysoma*. Also Ref. 1739, 4833.

Taiwan

Taiwan introduced 001739

First successful larviculture in Taiwan not known (Ref. 40297).

Thailand

Thailand native 026336

Occurs in the Chao Phraya, Mekong, Maeklong, Salween, Peninsular and Southeast Thailand river systems (Ref. 26336). Recorded from Chiengmai (Chiang Mai), Me Poon, Pitsanulok, Bangkok, and Tale Sap (Ref. 1632). Highly priced food fish. Consumed fresh (Ref. 6459). Also Ref. 9648, 27732, 37773, 39637.

USA (contiguous states)

USA (contiguous states) introduced 001739

Established in peninsular Florida. Abundant in southern and central Florida (Ref. 5723). Also Ref. 9987.

Viet Nam

Viet Nam native 027732

Occurs in the Mekong Basin (Ref. 27732). Also Ref. 2682, 36625, 46452.

### 2.7. Introductions of *Clarias batrachus*

**Level: species in general**

**Asia:** Mekong and Chao Phraya Basins, Malay Peninsula, Sumatra, Java, Borneo. Reported from Sri Lanka; popular for aquaculture in its native range but not regarded as such in other Southeast Asian countries. Trade restricted in Germany (Ref. 1739). Several countries report adverse ecological impact after introduction.

<table>
<thead>
<tr>
<th>Year</th>
<th>Introduced</th>
<th>Reason</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>to China Main from Thailand</td>
<td>aquaculture</td>
<td>Established in ponds in Kwantung and Yunnan provinces; useful and widely used for small pond culture.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Introduced</th>
<th>Reason</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>Thailand to Taiwan</td>
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2.8. Summary information (no. of records) available for *Clarias batrachus*

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2.9. Morphology of *Clarias batrachus*

**Diagnostic Characters**

Body compressed posteriorly. Upper jaw a little projecting. Spine of pectoral fins rough on its outer edge and serrated on its inner edge (Ref. 4792). Occipital process more or less triangular, its length about 2 times its width (Ref. 27732); distance between dorsal and occipital process 4-5.5 times of distance from tip of snout to end of occipital process (Ref. 43281).

**Descriptive Characters**

- Striking features: none
- Body shape lateral: elongated dorsal head profile: more or less straight
- Operculum present: Yes
- Type of eyes: more or less normal

**Teeth Presence**

- upper jaw: present

**Pigmentation on trunk and tail**

- Horizontal stripes: absent
- Vertical stripes: absent
- Diagonal stripes: absent
- Curved stripes: absent
- Spots: no spots
- Dorsal fin (D1): no spots or stripes
- Caudal fin: no spots or stripes
- Anal fin (A1): no spots or stripes

**Meristic Characters**

**Lateral Lines**

- Interrupted: No
- Scales on lateral line: -
- Pored lateral line scales: -
- Scales in lateral series: -
- Scale rows above lateral line: -
- Scale rows below lateral line: -
- Scales around caudal peduncle: -
Barbels
Gill clefts (sharks/rays only) Spiracle :
Gill rakers on lower limb total : 23-23
on upper limb : -
Vertebrae preanal total : -

Dorsal fins
Dorsal attributes : no striking attributes
Number of fins : - spines total : 00- soft-rays total : 6076
Adipose fin : absent finlets dorsal : 0-0 finlets ventral : 0-0

Caudal fin
Shape of fin : more or less truncate
Attributes : more or less normal

Anal fin
Number of fins : - spines total : -00 soft-rays total : 4758

Paired fins
Pectoral attributes : more or less normal
spines : 1 soft-rays : 811
Pelvics attributes : more or less normal
position : abdominal behind origin of D1
spines : soft-rays : 66

2.10. Genetic information for *Clarias batrachus*

Locality : Unspecified
Chromosome number (haploid) : 25
Chromosome number (diploid) : 0
Genetic marker(s) present : No
DNA content (picogram, haploid) : 1.2
Ref.: 002209
Chromosome arm no. : 88
Sex-determining mechanism : Chromosomes
Ref: 027239

Remarks: 2n = 52 (Ref. 27272). Two NORs are present and these are situated at the terminal end of the short arms of chromosome 2 (Ref. 8941). CF = 16m + 8sm+ 14st and 12a. AN = 74 (Ref. 8947 and 27239). n = 27 (Ref. 2209). 2n = 56 and DNA content of haploid 0.92 (Ref. 12384). 2n = 52 (Ref. 8973). NORs present on the 11th pair of chromosomes.

Locality : China
Chromosome number (haploid) : 50
Chromosome number (diploid) : 100
Genetic marker(s) present : No
Chromosome arm no. : 110

Remarks: CF = 4m + 6sm+ 78A, microchromosomes = 12.

Locality : Delhi, India
Chromosome number (haploid) : 26
Chromosome number (diploid) : 52
Genetic marker(s) present : No
Chromosome arm no. : 52

Main Ref.: 008943
Main Ref.: 030184
Main Ref.: 030184
### 2.11. FAO aquaculture production data for *Clarias batrachus*

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2.12. Weight proportions and chemical composition of *Clarias batrachus*

**Level**: species in general  
**Stockcode**: 003250  
**Locality**: Not specified  
**Main Ref.**: 009987

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**Comment**: Based on 100 g edible weight; contains 103 kcal. Can be fried, broiled and baked

2.13. Gill area of *Clarias batrachus*

- **Gill area**: 146 (cm²)  
- **Body weight**: 51.5 (g)  
- **Gill area / weight**: 2.83 (cm²/g)  

**Main Ref.**: 002302  
**Data Ref.**: 002330

Relative oxygen consumption of *Clarias batrachus*  
(Standard / Routine without Stress)

DNA content vs. phylogenetic sequence of *Clarias batrachus*

Relative oxygen consumption of *Clarias batrachus*  
(All experiments)
2.14. General information on the reproduction of *Clarias batrachus*

**Level**: species in general  
**StockCode**: 003250  
**MainRef**: 006868

**Mode and Type of Reproduction**
- **Mode**: dioecism  
- **Fertilization**: external  
- **Spawning frequency**: one clear seasonal peak per year  
- **Batch spawner**: no

**Reproductive guild: guarders, nesters**
The pair manifests the 'spawning embrace' which is widely observed in other catfish species (Ref. 33313). The pair gently nudges each other in the genital region and flicks their dorsal fins; male wraps his body around the female. Then the female releases a stream of adhesive eggs into the nest (Ref. 44091). In Southeast Asia, spawning period is during the rainy season, when rivers rise and fish are able to excavate nests in submerged mud banks and dikes of flooded rice fields (Ref. 40977).

**Spawning Information for Clarias batrachus**

**Locality**: Mekong mainstream  
**Stockcode**: 003250  
**Main Ref.**: 037770

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**Comment**: Based on the occurrence of eggs during March-July and in October.

**Locality**: Bangladesh  
**Stockcode**: 003250  
**Main Ref.**: 001479

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**Comment**: Spawns in shallow waters in inundated paddy fields.

**Locality**: India  
**Stockcode**: 003250  
**Main Ref.**: 004833

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<tr>
<th>Fecundity</th>
<th>min</th>
<th>(n)</th>
<th>Female size</th>
<th>(g)</th>
<th>(cm)</th>
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<td>max</td>
<td>(n)</td>
<td>(g)</td>
<td>(cm)</td>
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</table>

**Locality**: Viet Nam, Mekong Delta  
**Stockcode**: 003250  
**MainRef**: 037770

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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</table>

**Comment**: Based on the occurrence of eggs throughout the year.

**Locality**: Viet Nam, Mekong Basin at at Tien Giang province  
**Stockcode**: 003250  
**Main Ref.**: 037770

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<th>Month</th>
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**Comment**: Spawning occurs in the paddy field.
Locality: Thailand

Stockcode: 003250

Season (% of mature females; 111 = presence of mature females): Main Ref.: 006459

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</table>

Fecundity: min 5,000 (n) Female size 300 (g) (cm) Ref.: 001479
max 13,400 (n) 800 (g) (cm)

Comment: Eggs hatch within 20 hours at 25° - 32 ° C.

2.15. Ecology of Clarias batrachus

Level: species in general

StockCode: 003250, 003054 Main Ref.: 013497

Habitats
Streams: No Lakes: Yes Caves: No (exclusively): No
Estuaries/lagoons/brackish seas: No Rocky: No Mangroves/marshes/swamps: No
Intertidal: No Soft: No Neritic: No Coral reefs: No
Marine: No Oceanic: No Seagrass beds: No
Tropical soft bottom: No Hard bottom: No Macrophyte: No

Feeding
Feeding type: mainly animals (troph. 2.8 and up)
Feeding habit: hunting macrofauna (predator) Ref 012975

Trophic level(s): Original Unfished Remarks
Estimation method sample population Troph s.e. Troph s.e. Troph of recruits/juven.
From diet composition 3.3 0.50 3.3 0.50 Troph of level estimate
From indiv. food item 3.2 0.44 - -

Additional Remarks
Feeds mainly insects (Ref. 13479)

2.16. Food items for Clarias batrachus

Level: species in general

StockCode: 003250

Food item Ref.
detritus
detritus debris unidentified 006459
nektont
finfish bony fish unidentified 006459
n.a./other finfish unidentified 012975
plants
other plants benthic algae/weeds unidentified 006459
zoobenthos
benth. crust. shrimps/prawns unidentified 006459
insects unidentified 006459
mollusks n.a./other mollusks unidentified shells 006459
worms n.a./other annelids unidentified 012975
2.17. Maximum weight/length/age of *Clarias batrachus*

**Locality:** India, Maharashtra  
Max weight (g): 350 total weight  
Max length (cm): Same specimen for WL: No  
Max age (yrs): Sex: unsexed

**Locality:** Nepal, None specified  
Max weight (g):  
Max length (cm): 17.5 Same specimen for WL: No  
Max age (yrs): Same specimen for LT: No

2.18. Length-Weight relationships of *Clarias batrachus*

\[ W = a \times L^b \]  
(Length in cm and Weight in g.)

**Locality:** India, Bankura, West Bengal (aquaria)  
Length range: Main Ref: 009969

\[ a = 0.024 \]  
\[ b = 2.5 \]

Sex: unsexed

2.19. Diseases reported for *Clarias batrachus*

StockCode: 003250  
Parasitic infestations (protozoa, worms, etc.): Lytocestus disease  
Causative agent: *Lytocestus birmanicus*

Occurrence: Barisal, Bangladesh, 1981

- Eggs  
- Larvae


Parasitic infestations (protozoa, worms, etc.): *Boviena serialis*

Occurrence: Barisal and Dhaka, Bangladesh, 1981

Remarks: Infestation commonly occurs in the intestine. Besides 1981 (Ahmed), the infestation also occurred in 1984 and 1985 (Ahmed et al.) in the locality of Dhaka. Another infestation was recorded in 1997 (Ahmed and Ezaz) but without a specific locality.

Parasitic infestations (protozoa, worms, etc.): *Palaeorchis* sp.

Occurrence: Barisal and Dhaka, Bangladesh, 1983

- Eggs  
- Larvae

Remarks: Infestation commonly occurs in the wild. Another infestation was recorded in 1997 (Ahmed and Ezaz) but without a specific locality.
Remarks: Infestation commonly occurs in the stomach and intestine.

Parasitic infestations (protozoa, worms, etc.): Pseudocaryophyllaeus infestation
Causative agent: *Pseudocaryophyllaeus indica*
Occurrence: Barisal and Dhaka, Bangladesh, 1981

Remarks: Infestation commonly occurs in the intestine. Besides 1981 (Ahmed), the infestation was also recorded in 1984 (Ahmed et al.) in Barisal and Dhaka, 1985 (Ahmed et al.) in Dhaka and in 1997 (Ahmed and Ezaz) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Pseudolytocestus infestation
Causative agent: *Pseudolytocestus clariae*
Occurrence: Barisal, Chittagong, Dhaka, and Sylhet, Bangladesh, 1984

Remarks: Infestation commonly occurs in the intestine. Besides 1984 (Ahmed et al.), the infestation was also recorded in 1985 (Ahmed et al.) in Dhaka, and in 1974 (Anon.) and 1997 (Ahmed and Ezaz) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Lytocestus infestation
Causative agent: *Lytocestus indicus*
Occurrence: Barisal, Chittagong, Dhaka, Rajshani, Sylhet, Bangladesh, 1977


Parasitic infestations (protozoa, worms, etc.): Lytocestus infestation
Causative agent: *Lytocestus parvulus*
Occurrence: Barisal, Chittagong, Dhaka, Sylhet, Bangladesh, 1984


Parasitic infestations (protozoa, worms, etc.): Procamallanus infestation
Causative agent: *Procamallanus clarius*
Remarks: Infestation commonly occurs in the stomach and intestine. Besides 1968 (Rahman and Ali), the infestation also occurred in 1974 (Anon.) in Chittagong, 1983 (Rashid et al.) in Dhaka, 1984 (Rashid and Haque) in Dhaka, 1990 (Rashid) also in the locality of Dhaka, and in 1968 (Ali) and 1997 (Ahmed and Ezaz) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Orientocreadium infestation
Causative agent: Orientocreadium batrachoides
Occurrence: Dhaka, Bangladesh, 1983

Remarks: Infestation commonly occurs in the intestine. Besides 1983 (Rashid et al.), the infestation also occurred in 1984 (Rashid et al.; Rashid and Haque) in the locality of Dhaka and 1997 (Ahmed and Ezaz) in which the specific locality is not mentioned.

Parasitic infestations (protozoa, worms, etc.): Dactylogyrus gill flukes disease
Helminthosporid (gills)
Causative agent: Dactylogyrus sp.
Occurrence: Dhaka, Bangladesh, 1993

Remarks: Infestation occurs most commonly in the gills and skin.

Parasitic infestations (protozoa, worms, etc.): Trichodinosis
Trichodinella sp.; Trichodina infestation
Causative agent: Trichodina sp.
Occurrence: Dhaka, Bangladesh, 1993

Remarks: Infestation commonly occurs in the gills and skin.

Parasitic infestations (protozoa, worms, etc.): Clinostomum infestation
(metacercaria)
Causative agent: Clinostomum sp.
Occurrence: Dhaka, Bangladesh, 1993

Remarks: Infestation commonly occurs in the body cavity and muscle.

Parasitic infestations (protozoa, worms, etc.): Gnathostoma infestation
Causative agent: Gnathostoma spinigerum
Occurrence: Dhaka, Bangladesh, 1972

Remarks: Infestation commonly occurs in the viscera, stomach, intestine, body cavity and muscles. Besides 1972 (Bashirullah), the infestation also occurred in 1977 (Ahmed and Sanaullah) in the localities of Chittagong, Dhaka and Sylhet, 1978 (Sanaullah) in Chittagong and Dhaka, and in 1976 (Ahmed and Sanaullah) and 1997 (Ahmed and Ezaz) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Sporozoa infection (Myxobolus sp.)
Causative agent: Myxobolus sp.
Occurrence: Dhaka, Bangladesh, 1993

Remarks: Infestation commonly occurs in the gills and skin.

Parasitic infestations (protozoa, worms, etc.): Procamallanus disease
Causative agent: Procamallanus sp.
Occurrence: Dhaka, Bangladesh, 1993

Remarks: Infestation commonly occurs in the body cavity and intestine.
Parasitic infestations (protozoa, worms, etc.): Procamallanus disease 2
Causative agent: *Procamallanus sp.*
Occurrence: Dhaka, Bangladesh, 1983

Remarks: Infestation commonly occurs in the stomach and intestine. Besides 1983 (Rashid et al.), the infestation was also recorded in 1984 (Rashid and Haque) and 1990 (Rashid).

Parasitic infestations (protozoa, worms, etc.): Spirocamallanus sp.
Causative agent: *Spirocamallanus mysti*
Occurrence: Dhaka, Bangladesh, 1983

Remarks: Infestation commonly occurs in the stomach and intestine. Besides 1983 (Rashid et al.), the infestation was also recorded in 1984 (Rashid and Haque) and 1990 (Rashid).

Parasitic infestations (protozoa, worms, etc.): Capingentoides infestation
Causative agent: *Capingentoides batrachii*
Occurrence: Dhaka, Bangladesh, 1981

Remarks: Common infestation. The infestation was recorded in 1984 (Ahmed et al.) in the localities of Dhaka, Chittagong and Sylhet, 1985 (Ahmed et al.) in Dhaka, and 1997 (Ahmed and Ezaz) without a specific locality mentioned. This parasite species was listed as a species inquirenda.

Parasitic infestations (protozoa, worms, etc.): Capingentoides infestation
Causative agent: *Capingentoides batrachii*
Occurrence: Dhaka, Bangladesh, 1981

Remarks: Common infestation. The infestation was recorded in 1984 (Ahmed et al.) in the localities of Dhaka, Chittagong and Sylhet, 1985 (Ahmed et al.) in Dhaka, and 1997 (Ahmed and Ezaz) without a specific locality mentioned. This parasite species was listed as a species inquirenda.

Parasitic infestations (protozoa, worms, etc.): Monobothrioides disease
Causative agent: *Monobothrioides sp.*
Occurrence: Dhaka, Bangladesh, 1983

Remarks: Infestation commonly occurs in the intestine. Besides 1983 (Rashid et al.), the infestation was also recorded in 1985 (Rashid et al.) and 1984 (Rashid and Haque) in the locality of Dhaka.

Parasitic infestations (protozoa, worms, etc.): Ascaridia disease
Causative agent: *Ascaridia sp.*
Occurrence: Dhaka, Bangladesh, 1983

Remarks: Infestation commonly occurs in the viscera, digestive tract and body cavity. Besides 1983 (Rashid et al.), the infestation was also recorded in 1984 (Rashid and Haque) and 1990 (Rashid) in the locality of Dhaka.

Parasitic infestations (protozoa, worms, etc.): Acanthogyrus infestation
Causative agent: *Acanthogyrus sp.*
Occurrence: Dhaka and Rajshani, Bangladesh, 1977

Remarks: Infestation commonly occurs in the intestine. Besides 1977 (Ahmed and Sanaullah), the infestation also occurred in 1978 (Sanaullah and Ahmed) in the locality of Rajshani and 1976 (Ahmed and Sanaullah) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Procamallanus infestation 5
Causative agent: *Procamallanus mysti*
Occurrence: Dhaka and Rajshani, Bangladesh, 1977

Remarks: Infestation commonly occurs in the stomach, intestine, and liver. Besides 1977 (Ahmed and Sanaullah), the infestation also occurred in 1978 (Sanaullah and Ahmed) in the localities of Dhaka and Rajshani, and 1976 (Ahmed and Sanaullah) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Djombangia infestation
Causative agent: *Djombangia penetrans*
Occurrence: Dhaka, Chittagong, Rajshani, and Sylhet, Bangladesh, 1977

Rajshani, and Sylhet. There are records in 1976 (Ahmed and Sanaullah) and 1997 (Ahmed and Ezaz) but did not indicate specific collection localities for individual host or parasite species.

Parasitic infestations (protozoa, worms, etc.): Gauhatian infestation  
Causative agent: *Gauhatian batrachii*  
Occurrence: Luzon, Philippines, 1988  
Remarks: Infestation commonly occurs in the stomach and intestine.

Parasitic infestations (protozoa, worms, etc.): Cristaria infestation  
Causative agent: *Cristaria plicata*  
Occurrence: Luzon, Philippines, 1986  
Remarks: Infestation commonly occurs in the gills and skin. Besides 1986 (Velasquez), there are also records from 1988 (Velasquez).

Parasitic infestations (protozoa, worms, etc.): Procamallanus infestation 1  
Causative agent: *Procamallanus clarius*  
Occurrence: Luzon, Philippines, 1986  
Remarks: Infestation commonly occurs in the stomach and intestine. This record occurred in 1986 and 1988 (Velasquez; Lopez). The disease also occurred in 1987 (Natividad).

Parasitic infestations (protozoa, worms, etc.): Gnathostoma infestation  
Causative agent: *Gnathostoma spinigerum*  
Occurrence: Luzon, Philippines, 1938  
Remarks: Infestation commonly occurs in the musculature and visceral linings.

Parasitic infestations (protozoa, worms, etc.): Boviena disease  
Causative agent: *Boviena serialis*  
Occurrence: Luzon, Philippines, 1978  
Remarks: Infestation commonly occurs in the intestine. Besides 1978 (Velasquez), the disease also occurred in 1986 and 1988 (Lopez).

Parasitic infestations (protozoa, worms, etc.): Dactylogyrus gill flukes disease  
Causative agent: *Dactylogyrus sp.*  
Occurrence: Luzon, Philippines, 1981  
Remarks: Infestation commonly occurs.

Parasitic infestations (protozoa, worms, etc.): Opegaster infestation  
Causative agent: *Opegaster minima*  
Occurrence: Luzon, Philippines, 1944  
Remarks: Infestation commonly occurs in the intestine. Besides 1944 (Tubangui and Masiluñgan), the disease also occurred in 1986 and 1988 (Lopez).

Parasitic infestations (protozoa, worms, etc.): Orientocreadium infestation  
Causative agent: *Orientocreadium batrachoides*  
Occurrence: Luzon, Philippines, 1931  
Remarks: Infestation occurs most commonly in the intestine. Besides 1931 (Tubangui), the disease also occurred in 1944 (Tubangui and Masiluñgan).
Parasitic infestations (protozoa, worms, etc.): Neodiplostomum disease
Causative agent: *Neodiplostomum sp.*
Occurrence: Luzon, Philippines, 1939

**Remarks:** Infestation commonly occurs in the scales and skin.

Parasitic infestations (protozoa, worms, etc.): Clinostomoides infestation
Causative agent: *Clinostomoides brieni*
Occurrence: Luzon, Philippines, 1960

**Remarks:** Infestation occurs most commonly in the gill cavity, gills, gall bladder, periocular tissues, branchiostegal musculature and the pericardium. Besides 1960 (Velasquez) the disease also occurred in 1988 (Velasquez).

Parasitic infestations (protozoa, worms, etc.): Haplorchis infestation 1
Causative agent: *Haplorchis yokogawai*
Occurrence: Luzon, Philippines, 1937

**Remarks:** Infestation occurs most commonly in the musculature. Besides 1937 (Africa), the disease also occurred in 1938 (Africa), 1937 (Africa et al.), 1938, 1939, 1940 (Vazquez-Colet and Africa).

Parasitic infestations (protozoa, worms, etc.): Sporozoa infection (*Myxobolus sp.*)
Causative agent: *Myxobolus sp.*
Occurrence: Luzon, Philippines, 1975

**Remarks:** Infestation commonly occurs in the gills, mesenteries and skin.

Parasitic infestations (protozoa, worms, etc.): Sporozoa infection (*Henneguya sp.*)
Causative agent: *Henneguya sp.*
Occurrence: Luzon, Philippines, 1975

**Remarks:** Infestation commonly occurs in the fins.

Parasitic infestations (protozoa, worms, etc.): Philometra disease
Causative agent: *Philometra sp.*

**Remarks:** Infestation occurs most commonly in the musculature and palate. Besides 1986 (Lopez), the disease also occurred in 1988 (Lopez).

Parasitic infestations (protozoa, worms, etc.): Skin flukes
Helminthose (skin and eventually gills afflicted)
Causative agent: *Gyrodactilus sp.*
Occurrence: Luzon, Philippines, 1975

**Remarks:** Infestation commonly occurs in the gills and skin.

Parasitic infestations (protozoa, worms, etc.): Phyllodistomum infestation
Causative agent: *Phyllodistomum sp.*
Occurrence: Luzon, Philippines, 1986

**Remarks:** Common infestation. The disease occurred in 1988 (Lopez).

Bacterial diseases: Bacterial infections (general)
Causative agent: N.A.
Occurrence: not specified
Parasitic infestations (protozoa, worms, etc.): Anchor worm disease  
Ref.: 042533, 000060  
Lernaeosis  
Causative agent: *Lernaea cyprinacea*  
Occurrence: not specified, Bangladesh, 1990  
Remarks: Infestation commonly occurs in the skin, above gill clefts, under accessory respiratory organs, abdominal muscles and liver.

Parasitic infestations (protozoa, worms, etc.): Lytocestus disease (*Lytocestus sp.*)  
Ref.: 042533  
Causative agent: *Lytocestus sp.*  
Occurrence: not specified, Bangladesh, 1968  
Remarks: Infestation commonly occurs in the intestine. Besides 1968 (Ali), the infestation was also recorded in 1974 (Anon.) but no specific locality was sited.

Parasitic infestations (protozoa, worms, etc.): Dactylogyrus infestation  
Ref.: 042533  
Causative agent: *Dactylogyrus vastator*  
Occurrence: not specified, Bangladesh, 1999  
Remarks: Infestation occurs most commonly in the gills.

Parasitic infestations (protozoa, worms, etc.): Posthodiplostomum infestation  
Ref.: 042533  
Causative agent: *Posthodiplostomum minimum*  
Occurrence: not specified, Bangladesh, 1997  
Remarks: Infestation commonly occurs in the muscles and viscera.

Parasitic infestations (protozoa, worms, etc.): Phyllodistomum infestation  
Ref.: 042533  
Causative agent: *Phyllodistomum folium*  
Occurrence: not specified, Bangladesh, 1997  
Remarks: Infestation commonly occurs in the intestine, urinary bladder, body cavity, and mesenteries.

Parasitic infestations (protozoa, worms, etc.): Masenia infestation  
Ref.: 042533  
Causative agent: *Masename dayali*  
Occurrence: not specified, Bangladesh, 1997  
Remarks: Infestation commonly occurs in the intestine.

Parasitic infestations (protozoa, worms, etc.): Procamallanus infestation  
Ref.: 042533  
Procamallanus spiculogubernaculus  
Causative agent: *Procamallanus spiculogubernaculus*  
Occurrence: not specified, Bangladesh, 1997  
Remarks: Infestation commonly occurs in the stomach and intestine.

Fungal diseases: Fungal infection (general)  
Ref.: 048502  
Secondary Fungal infection  
Causative agent: N.A.  
Occurrence: not specified

Parasitic infestations (protozoa, worms, etc.): Hemiclepsis infestation  
Ref.: 042533  
Causative agent: *Hemiclepsis marginata*  
Occurrence: not specified, Bangladesh, 1974  
Remarks: Infestation commonly occurs in the skin.
Parasitic infestations (protozoa, worms, etc.): Yellow grub
Causative agent: *Clinostomum complanatum*
Occurrence: not specified, Bangladesh, 1997
Remarks: Infestation commonly occurs in the skin, fins, gills, and muscles.

Parasitic infestations (protozoa, worms, etc.): Gyrocotyle disease
Causative agent: *Gyrocotyle sp.*
Occurrence: not specified, Bangladesh, 1968
Remarks: Infestation occurs most commonly in the intestine. Besides 1968 (Ali), the infestation was also reported to have occurred in 1974 (Anon.) but also did not indicate specific collection localities.

Parasitic infestations (protozoa, worms, etc.): Echinocephalus disease
Causative agent: *Echinocephalus sp.*
Occurrence: not specified, Bangladesh, 1968
Remarks: Infestation commonly occurs in the intestine. Besides 1968 (Ali), the infestation was also recorded in 1974 (Anon.) with no specific locality mentioned.

Parasitic infestations (protozoa, worms, etc.): Enteric Septicaemia of catfish
Causative agent: *Edwardsiella ictaluri*
Occurrence: not specified, 1987
Remarks: The infection was recorded by Kasornchandra et al. (1987).

Bacterial diseases: Aeromonos
Infectious Ascites; Haemorrhagic Septicaemia; Red Fin disease
Causative agent: *Aeromonas hydrophila*
Occurrence: not specified, 1971
Remarks: The infection were recorded in 1971 (Bullock et al.), 1978 (Egusa) and later in 1986 (Saitanu).

Parasitic infestations (protozoa, worms, etc.): Pallisentis infestation
Causative agent: *Pallisentis gabeos*
Occurrence: not specified, Bangladesh, 1997
Remarks: Infestation commonly occurs in the body cavity, mesenteries and intestine.

Parasitic infestations (protozoa, worms, etc.): Lytocestus infestation 2
Causative agent: *Lytocestus lativitellarium*
Occurrence: not specified, Bangladesh, 1997
Remarks: Infestation occurs most commonly in the intestine.

Parasitic infestations: (protozoa, worms, etc.): Acanthogyrus infestation
Causative agent: *Acanthogyrus tilapiae*
Occurrence: not specified, Bangladesh, 1997
Remarks: Infestation commonly occurs in the intestine.
2.20. References used for Clarias batrachus


001632 Suvatti, C. 1981. Fishes of Thailand. Royal Institute of Thailand, Bangkok. 379 p. [not seen]


Anon. 1999. Fish collection database of the Natural History Museum, London (formerly British Museum of Natural History (BMNH)). Natural History Museum, London (formerly British Museum of Natural History (BMNH)).


Monograph on Clarias batrachus

37


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


Anon. 2002. Fish collection of the University of the Philippines in the Visayas Museum. UPV Museum.


Anon. 2002. Fish collection of the Mindanao State University - Iligan Institute of Technology (MSU-IIT), MSU-IIT, Iligan City, Philippines.


*Clarias batrachus* (L.), using low doses of steroid hormones and salmon gonadotropin. Aquacult. Fish. Mgt. 25:401-408.


047569 Chandy, M. 1970. Fishes. New Delhi, National Book Trust India. [not seen]


CIRRHINUS MICROLEPIS
(Sauvage, 1878)
Small scale mud carp

Picture by FAO

Picture by Roberts, T.R.

[Map of global distribution]
3.1. Summary information on the family Cyprinidae

Family: Cyprinidae (Minnows or carps)  
MainRef.: 007463
Order: Cypriniformes  
FamCode: 122
Class: Actinopterygii (Ray-finned fishes)
Number of genera: 210
Number of species: 2010
Occurs in:   
 Ø Marine  
 Ø Brackish  
 Ø Freshwater
Aquarium fishes: many

Species currently in FishBase: Genera: 331  Species: 2408  (Including subspecies)  Complete: Yes

Remarks:

Distribution: North America (Northern Canada to Southern Mexico), Africa, and Eurasia. Pharynx with 1-3 rows of teeth, each row with a maximum of 8 teeth. Usually thin lips, plicae or papillae absent; mouth sometimes suckerlike (Garra and Labeo). With or without barbels. Premaxilla usually borders the upper jaw making the maxilla entirely or almost entirely excluded from the gape. Usually protrusible upper jaw. Dorsal fin with spinelike rays in some. Primitive number of chromosomes 2n=50, some with 48; polyploidy exists. Maximum length at least 2.5 m to probably 3 m in Catlocarpio siamensis; many species less than 5 cm. mainly non-guarders, but in some species males build nests and/or protect the eggs. Etymology: Greek, kyprinos = goldfish. 1828 (Ref. 45335).

3.2. Information on the genus Cirrhinus and its synonyms

After Eschmeyer, March 2003 (Ref. 46206)

**Cirrhinichthys**  
Status: synonym  
Gender: masculine

Bleeker, 1863, p. 202, CAS Ref: 397
Type by original designation (also monotypic).
Type species: *Cirrhina dussumieri* Valenciennes, 1842
Current genus: *Cirrhinus*

**Cirrhinus**  
Status: valid  
Gender: masculine

Oken (ex Cuvier), 1817, p. 1183, CAS Ref: 3303
Type by monotypy.
Type species: *Cyprinus cirrhosus* Bloch, 1795
Current genus: *Cirrhinus*

**Henicorhynchus**  
Status: synonym  
Gender: masculine

Smith, 1945, p. 256, CAS Ref: 4056
Type by original designation (also monotypic).
Type species: *Henicorhynchus lobatus* Smith, 1945
Current genus: *Cirrhinus*

**Isocephalus**  
Status: synonym  
Gender: masculine

Heckel, 1843, p. 1029, CAS Ref: 2067
Type by subsequent designation.
Type species: *Cyprinus cirrhosus* Bloch, 1795
Current genus: *Cirrhinus*
3.3. General information on *Cirrhinus microlepis*

**Classification**

Class: Actinopterygii (Ray-finned fishes)  
Order: Cypriniformes  
Family: Cyprinidae (Minnows or carps)  
Species: *Cirrhinus microlepis*  
Author: Sauvage, 1878

**Environment**

Freshwater: Yes  
Habitat: Benthopelagic  
Brackish: No  
Saltwater: No

**Importance**

Importance to fisheries: Commercial  
Ref. 012693  
Main catching method:  
Other methods: ☑ Seines ☑ Gillnets ☑ Castnets ☑ Traps ☑ Trawls ☑ Dredges ☑ Liftnets ☑ Hooks+Lines ☑ Other  
Used for aquaculture: Never/rarely  
Used as bait: Never/rarely  
Aquarium fish: Never/rarely  
Game fish: No  
Dangerous fish: Harmless  
Electrobiology: No special ability

Maximum length (cm) (male/unsexed): 65 SL  
Maximum weight (g) (male/unsexed): 5,000.00  
Ref. 030857

**Remarks:**

Inhabits large rivers and lowland floodplains (Ref. 12693). Occurs in riffle and deep slow reaches (Ref. 37769). Moves out into the flooded forest where it feeds on leafy plant matter, phytoplankton and insects (Ref. 12693). Migration pattern is markedly different above and below the Khone Falls in the Mekong Basin. Below the falls, it makes an upstream migration from Phnom Penh to the Khone Falls between November and February, consisting mainly of sub-adults of sizes 10 to 50 cm. From April to July, it migrates in the opposite direction, from Khone Falls and downstream, consisting mainly of sub-adults up to about 50 cm (Ref. 37770). Above the Khone Falls, from Klong Kaem District, Ubolratchatani in Thailand, it migrates upstream in February; at Khemmaratch further upstream in Ubolratchatani, it moves upstream in March-April; and at Mukdahan, it goes upstream in May. However, it migrates downstream at Klong Kaem in June-July (Ref. 37770). Only downstream migrations are reported in the Mekong Delta in Viet Nam, consisting mainly of juveniles (2-20 cm), with the smallest fish mainly in June-July and fish between 10 and 20cm mainly from September to November (Ref. 37770). From Xayabouri in Laos to Chiang Saen in Thailand, upstream migrations take place from March to August. This appears to be two distinct migrations: one of sub-adults measuring 15-50 cm during March-April and another of larger fishes of sizes 40 to 90 cm during June-July (Ref. 37770). Not known to persist in impoundments. Individuals caught with dais or
3.4. Synonyms, misidentifications, etc. used for Cirrhinus microlepis

<table>
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3.5. Common names for Cirrhinus microlepis

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<td>Trey krawlang</td>
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<td>Trey pruol</td>
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<td>012693</td>
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<td>Pa pawn</td>
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<td>Lao People's Dem. Rep.</td>
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<tr>
<td>Small scale mud carp</td>
<td>English</td>
<td>Thailand</td>
<td>041767</td>
</tr>
</tbody>
</table>

3.6. Distribution of Cirrhinus microlepis

Asia: Chao Phraya and Mekong Basins in Thailand, Laos, Cambodia and Viet Nam. MainRef.: 27732
Latitudinal range: 19° N-9° N Temperature range: - °C Ref.: Status of threat: NL.

Country                  | Status | Ref.    |
--------------------------|--------|---------|
Cambodia                  | native | 012693  |

Found in the Mekong River. Known from below the Khone Falls to the Tonle Sap River and the Great Lake (Ref. 37772). Occurs in large numbers in the Tonle Sap in December, with catch steadily declining as the fishing season progresses (Ref. 12693). It is an important species in the dai fisheries in the Tonle Sap River when it migrates downstream the Tonle Sap and into the Mekong during December to February (Ref. 37770). Also Ref. 10431, 27732, 36654, 33813, 43281, 45353.

Lao People's Dem. Rep.    | native | 043281  |

Occurs in the Mekong Basin. A migratory species known from above Pak Beng to the Khone Falls (Ref. 37772). Found in the Lower Xe Bangfai (Ref. 27732) and Ban Hang Khone at Don Khone, 3 km below the fall line of the great waterfalls of the Mekong Basin at Lee Pee (Ref. 9497). Inhabits riffle, deep slow reaches of the Mekong Basin at Muang Khong (Ref. 37769). Undertakes non-reproductive upstream migration in December-March and downstream migration in June-July at Hat Village, Muang Khong District (Ref. 37769). Observed also to undergo traps are often immediately kept alive in fish cages for future sale. Marketed fresh and sometimes dried and salted (Ref. 12693). Known to reach up to 15 kg in Thailand (Jean-Francois, pers. comm. 11/02).
migration at the fishing village of Ban Wernsonkhram on Don Hat (Hat Island) above the Lee Pee Waterfalls (Ref. 10431). Also migrates downstream during the wet season in July-August through Hoo Som Yai at the Great Fault Line on the Mekong River, Champassack Province (Ref. 37771). Moves into flooded forest on Don Khone and Don Saddam to forage (Ref. 37772). From Xayabouri in Laos to Chiang Saen in Thailand, it undertakes upstream migrations from March to August. One of the most important fishes at the Khone Falls during the dry season from January to March, when it migrates upstream. Has been artificially induced to spawn in Pakse in Champassak Province (Ref. 37770). Also Ref. 4792, 10431, 30857, 36654, 37767.

**Thailand** native 033488

Found in the Chao Phraya and Mekong Basins (Ref. 26336, 33488). From Xayabouri in Laos to Chiang Saen in Thailand, it undertakes upstream migrations from March to August. From Klong Kaem District, Ubolratchani, this species migrates upstream in February; at Khemmaratch further upstream in Ubolratchani, it moves upstream in March-April; at Mukdahan, it goes upstream in May. However, it migrates downstream at Klong Kaem in June-July (Ref. 37770). Fish caught in dams are known to reach up to 15 kg in (Jean-Francois, pers. comm. 11/02). Also Ref. 12041, 26336, 27732, 37772, 43281.

**Viet Nam** native 036625

Known from the Mekong Basin (Ref. 33488). Undertakes downstream migration in the Mekong Delta, consisting mainly juveniles of sizes between 2 and 20 cm, with the smallest fish mainly in June-July, while sizes from 10-20 cm in September to November (Ref. 37770). Also Ref. 27732.

### 3.7. Summary information (no. of records) available for *Cirrhinus microlepis*

**Asia:** Chao Phraya and Mekong Basins in Thailand, Laos, Cambodia and Viet Nam.

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<tr>
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<td>Occurrence</td>
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</table>

### 3.8. Morphology of *Cirrhinus microlepis*

**Diagnostic Characters**

Distinguished from other species of the genus in the area by its count of lateral line scales: 53-60 (Ref. 27732). A large species with very small scales, no barbels, and distinctive coloration. Juveniles silvery with red caudal fin, larger fish with head and body violaceous, rosy, or bluish and caudal fin dusky (Ref. 33488)

**Descriptive Characters**

Operculum present : no
Meristic Characters
Lateral Lines
Interrupted: no
Scales on lateral line: 53-60
Scales in lateral series: 56-60
Gill rakers:
  on lower limb: total: 102 - 102
  on upper limb: -
Vertebrae:
  preanal: 27 - 27 total: 4040

Dorsal fins
Number of fins: 1 spines total: 0 soft-rays total: 15-16

Caudal fin
Shape of fin: forked
Attributes: more or less normal

Paired fins
Pectoral attributes: more or less normal
  spines: soft-rays:
Pelvic attributes: more or less normal
  position: abdominal behind origin of D1

Body proportions (based on picture)

3.9. General Information on the reproduction of Cirrhinus microlepis

Level: species in general
Mode and Type of Reproduction
Mode: dioecism
Fertilization: external
Spawning frequency
Batch spawner: no reproductive guild: non guarders
Open water/substratum egg scatterers

Reproductive behavior assumed only. Replace ASAP (RF).

Spawning Information for Cirrhinus microlepis

Locality: Laos, Xayabouri, Mekong Basin
Season (% of mature females; 111 = presence of mature females):
Main Ref.: 037770
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111
Comment: Based on mature fishes bearing eggs.

Locality: Laos, Mekong basin at Kinnak market close to Muang Khong
Season (% of mature females; 111 = presence of mature females):
Main Ref.: 037769
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111
Comment: Samples were purchased from the Kinnak market close to Muang Khong District (Ref. 37769). Large fish in spawning condition migrate downstream in February and again late in the rainy season, July (Ref. 9497).
3.10. Ecology of *Cirrhinus microlepis*

**Level**: species in general  
**StockCode**: 027149  
**Main Ref.**: 012693

**Habitats**

- Streams: Yes  
- Lakes: Yes  
- Caves: No  
- Estuaries/lagoons/brackish seas: No  
- Intertidal: No  
- Soft: No  
- Rocky: No  
- Mangroves/marshes/swamps: No  
- Marine: No  
- Oceanic: No  
- Neritic: No  
- Coral reef: No  
- Tropical soft bottom: No  
- Hard bottom: No  
- Seagrass beds: No  
- Macrophyte: No

**Feeding**

- Feeding Type: mainly plants/detritus (troph. 2-2.19)  
  
- From indiv. food items: 2.4  0.21

3.11. Food items for *Cirrhinus microlepis*

**Level**: species in general  
**StockCode**: 021234

**Food item**

- **plants**
  - other plants  
  - benthic algae/weeds  
  - Chlorophyta  
  - unidentified aquatic chlorophytes  
  
- **phytoplankton**
  - n.a./other phytoplankton  
  - terrestrial plants  
  - unidentified  
  - unidentified  
  - unidentified  
  
- **zoobenthos**
  - insects  
  - unidentified  
  - unidentified  
  
- Total: 4

3.12. Length-Weight relationships of *Cirrhinus microlepis*

(\( W = a \cdot L^b \) with Length in cm and Weight in g)

**Locality**: Laos, Mekong Mainstream  
**StockCode**: 021234

- Length range: 20.7 - 37  81  
- Sample size: 181  
- a: 0.0137  
- b: 2.861  
- Correlation coefficient: 0.9582  
- Main Ref. : 037769

**Sex**: unsexed

Comment: Pooled data from 1994 to 1996 from Hat Village, Muang Khong District and from Hee Village
3.13. References used for Cirrhinus microlepis


036662 Lamberts, D and T. Sarath. 1997. Base line information on the ecology of the fish and the habitats of the flood area of the Tonlé Sap Lake in Siem Reap province, Cambodia. GCP/CMB/002/BEL.


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


Akkhathawiwat, S. 1997. Pictures of fish and marine animals from Thailand. 3rd printing, Bangkok Trade Organization Kurusapa, 325 pp. [not seen]


LEPTOBARBUS HOEVENII
(Bleeker, 1891)
Mad barb
អាក្រក់ចាស់
4.1. Summary information on the family Cyprinidae

- **Family**: Cyprinidae (Minnows or carps)  
- **Order**: Cypriniformes  
- **Class**: Actinopterygii (Ray-finned fishes)

- **Number of genera**: 210
- **Number of species**: 2010
- **Occurs in**: O Marine, Brackish, Freshwater
- **Aquarium fishes**: many

**Species currently in FishBase**:
- Genera: 331
- Species: 2408 (Including subspecies)
- Complete: Yes

**Remarks**:

*Distribution: North America (Northern Canada to Southern Mexico), Africa, and Eurasia. Pharynx with 1-3 rows of teeth, each row with a maximum of 8 teeth. Usually thin lips, plicae or papillae absent; mouth sometimes suckerlike (Garra and Labeo). With or without barbels. Premaxilla usually borders the upper jaw making the maxilla entirely or almost entirely excluded from the gape. Usually protrusible upper jaw. Dorsal fin with spinelike rays in some. Primitive number of chromosomes 2n=50, some with 48; polyploidy exists. Maximum length at least 2.5 m to probably 3 m in *Catlocarpio siamensis*; many species less than 5 cm. Mainly non-guarders, but in some species males build nests and/or protect the eggs. Etymology: Greek, kyprinos = goldfish. (Ref. 45335).*

4.2. Information on the genus *Leptobarbus* and its synonyms

**After Eschmeyer, March 2003 (Ref. 46206)**

**Filirasbora**  
Status: synonym  
Gender: feminine  
Fowler, 1937, p. 172, CAS Ref: 1425  
Type by original designation (also monotypic).  
Type species: *Filirasbora rubripinna* Fowler, 1937  
Current genus: *Leptobarbus*

**Leptobarbus**  
Status: valid  
Gender: masculine  
Bleeker, 1860, p. 435, CAS Ref: 370  
Type by subsequent monotypy.  
Type species: *Barbus hoevenii* Bleeker, 1851  
Current genus: *Leptobarbus*

4.3. General information on *Leptobarbus hoevenii*

**Classification**

- **Class**: Actinopterygii (Ray-finned fishes)  
- **Order**: Cypriniformes  
- **Family**: Cyprinidae (Minnows or carps)  
- **Subfamily**:  
- **Species**: *Leptobarbus hoevenii*  
- **Author**: (Bleeker, 1851).
Environment
Freshwater : Yes    Habitat : Benthopelagic
Brackish : No    Migrations : Potamodromous
Saltwater : No    Depth range : 3

Importance
Landing statistics : From 1,000 to 10,000 tonnes    Ref. 004931
Importance to fisheries : Commercial Food fish.

Main catching method :
Other methods : ☒ Seines    ☒ Gillnets    ☒ Castnets    ☒ Traps    ☒ Spears
                ☒ Trawls    ☒ Dredges    ☒ Liftnet    ☒ Hooks+Line    ☒ Other

Used for aquaculture : Commercial    Ref. 012108
Aquarium fish : Commercial based mainly on breeding    Ref. 001672
Game fish : No
Dangerous fish : Other    Ref. 043281
Electrobiology : No special ability

Maximum length (cm) (male/unsexed) : 100 SL  (female):    Ref. 030857
Common length (cm) (male/unsexed) : 50 SL  (female):    Ref. 012693
Maximum weight (g) (male/unsexed) : 10,000.00  (female):    Ref. 009497

Remarks:

4.4. Synonyms, misidentifications, etc. used for Leptobarbus hoevenii

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<th>Author</th>
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4.5. Common names for Leptobarbus hoevenii

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<th>Language</th>
<th>Country</th>
<th>Ref.</th>
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<tr>
<td>Trey prâloung</td>
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<td>002686</td>
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4.6. Distribution of *Leptobarbus hoevenii*

**Asia:** Thailand to Sumatra and Borneo.  
Latitudinal range: 23° N - 3° S  
Temperature range: 23 - 26 °C  
Ref.: 026336

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<tr>
<td></td>
<td>A migratory species occurring in the Mekong Basin (Ref. 37772). Found around the Tonle Sap River and Great Lake (Ref. 36651), Mae Khong at Phum Rey Shsach (Ref. 36654). Also Ref. 3902, 36662, 33813, 43281.</td>
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<td>Known from Sumatra and Lake Tundai, South Borneo (Ref. 42107). Museum: Kapuas, CAS 49215 (Ref. 2091). Important food fish kept in cages or caught in open waters. Its flesh is expensive (Ref. 7050).</td>
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<tr>
<td>Lao People's Dem. Rep.</td>
<td>native</td>
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<tr>
<td></td>
<td>Known from the Mekong River. A migratory species occurring at the Khone Falls (Ref. 37772). Found in Ban Hang Khone, a village on an island in the middle of the mainstream Mekong River just below the Great Khone Waterfalls in Khong District, Champasak Province (Ref. 37767). Inedible; eating this fish reportedly induces nausea &amp; vomiting. The poison comes from Hydnocarpus fruits (mak gabao &amp; mak ngoon) on which it feeds. Dorsal musculature eaten as lap (raw meat) marinated in vinegar &amp; pepper (Ref. 9497). According to Ban Hang Khone fisherman, this species enters the flooded forest in July-September, feeds heavily on fallen fruit and attains a maximum weight of about 10 kg (Ref. 9497). Also Ref. 4792, 30857, 36654.</td>
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<td>First successful larviculture in Taiwan occurred in 1984 (Ref. 40297).</td>
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<td>Occurs in Maeklong, Chao Phraya, Mekong, Peninsular and Southeast Thailand river sytems (Ref. 26336). Main culture location is Bangkok (Ref. 6459). Also Ref. 1632, 2091, 7050, 9648, 26580, 36654, 43281.</td>
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<tr>
<td>Viet Nam</td>
<td>native</td>
<td>036625</td>
</tr>
<tr>
<td></td>
<td>Found in Mekong Delta (Ref. 36625). Also Ref. 2682, 36654, 43281.</td>
<td></td>
</tr>
</tbody>
</table>
4.7. Introductions of *Leptobarbus hoevenii*

**Level:** species in general  
**Asia:** Thailand to Sumatra and Borneo.

<table>
<thead>
<tr>
<th>Year</th>
<th>Introduced</th>
<th>Reason</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>to Taiwan</td>
<td>research</td>
<td>Currently being cultured experimentally at Lukang branch of Taiwan Fisheries Research Institute.</td>
</tr>
<tr>
<td>1980-1989</td>
<td>to Philippines</td>
<td>ornamental</td>
<td></td>
</tr>
<tr>
<td>unknown</td>
<td>to Singapore</td>
<td>aquaculture</td>
<td></td>
</tr>
</tbody>
</table>

4.8. Summary information (no. of records) available for *Leptobarbus hoevenii*

<table>
<thead>
<tr>
<th>Ecology</th>
<th>Max. sizes</th>
<th>Strains</th>
<th>Food items</th>
<th>FAO catches</th>
<th>Diseases</th>
<th>Food consumption</th>
<th>Genetics</th>
<th>Ciguatera</th>
<th>Diet composition</th>
<th>Allele frequency</th>
<th>Ecotoxicology</th>
<th>Ration</th>
<th>Heritability</th>
<th>Metabolism</th>
<th>Predator</th>
<th>Reproduction</th>
<th>Swimming type</th>
<th>Gill area</th>
<th>Morphology</th>
<th>Spawning</th>
<th>Swimming speed</th>
<th>Egg dev't.</th>
<th>Visual</th>
<th>Maturity</th>
<th>Larvae</th>
<th>Brains</th>
<th>Recruitment</th>
<th>Larval dynamics</th>
<th>Introductions</th>
<th>Occurrence</th>
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<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>15502</td>
<td>0</td>
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<td>1</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>

4.9. Morphology of *Leptobarbus hoevenii*

**Descriptive Characters**

- **Striking features:** none
- **Body shape lateral:** elongated, Dorsal head profile: more or less straight
- **Operculum present:** yes
- **Type of eyes:** more or less normal
- **Position/type of mouth:** terminal

**Pigmentation on trunk and tail**

- **Horizontal stripes:** present, lateral
- **Vertical stripes:** absent
- **Diagonal stripes:** absent
- **Curved stripes:** absent
- **Spots:** no spots
- **Dorsal fin (D1):** no spots or stripes
- **Caudal fin:** no spots or stripes
- **Anal fin (A1):** no spots or stripes

54  *Monograph on Leptobarbus hoevenii*
Meristic Characters

Lateral Lines : 1        Interrupted: no
Scales on lateral line : 32-38
Scale rows above lateral line : 4-4
Barbels : 0
Gill clefts (sharks/rays only) : Spiracle :
Gill rakers on lower limb total : 16-19
on upper limb -
Vertebrae preanal total : -

Dorsal fins
Dorsal attributes : no striking attributes
Number of fins : - spines total : soft-rays total : 9-9
Adipose fin : absent finlets dorsal : 0-0 finlets ventral : 0-0

Caudal fin
Shape of fin : forked
Attributes : more or less normal

Anal fin
Number of fins : spines total : soft-rays total : 8-8

Paired fins
Pectoral attributes : more or less normal
spines : soft-rays :
Pelvic attributes : more or less normal
position : abdominal behind origin of D1

4.10. Genetic information for Leptobarbus hoevenii

Main Ref.: 034850
Locality : Southeast Asia
Chromosome number (haploid) : 25 Ref.:034850
Chromosome number (diploid) : 50 Ref.:034850
Genetic marker(s) present : No
DNA content (picogram, haploid)
Chromosome arm no. : 94 Ref.:034850
Sex-determining mechanism : chromosomes

Remarks: CF = 10m+ 34sm-st+ 6a.

4.11. FAO aquaculture production data for Leptobarbus hoevenii

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia (4)</td>
<td>(t)</td>
<td>40</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>120</td>
<td>150</td>
<td>170</td>
<td>180</td>
<td>230</td>
<td>205</td>
<td>230</td>
<td>240</td>
<td>310</td>
<td>850</td>
<td>936</td>
<td>912</td>
<td>984</td>
</tr>
<tr>
<td></td>
<td>(US$’000)</td>
<td>80</td>
<td>160</td>
<td>132</td>
<td>154</td>
<td>300</td>
<td>375</td>
<td>425</td>
<td>180</td>
<td>230</td>
<td>205</td>
<td>230</td>
<td>240</td>
<td>310</td>
<td>468</td>
<td>598</td>
<td>520</td>
<td>533</td>
</tr>
</tbody>
</table>
4.12. General information on the reproduction of *Leptobarbus hoevenii*

**Level : species in general**  
**StockCode : 005026**

**Mode and Type of Reproduction**

- **Mode** : dioecism  
- **Fertilization** : external  
- **Batch spawner** : no  
- **Reproductive guild** : nonguarders  
  Open water/substratum egg scatterers

4.13. Ecology of *Leptobarbus hoevenii*

**Level : species in general**  
**StockCode : 005026, 004797**  
**Main Ref.: 009497**

**Habits**

- **Streams**: Yes  
- **Lakes**: Yes  
- **Caves**: No  
- **Estuaries/lagoons/brackish sea**: No  
- **Intertidal**: No  
- **Soft**: No  
- **Rocky**: No  
- **Mangroves/marshes/swamps**: No  
- **Marine**: No  
- **Oceanic**: N  
- **Neritic**: No  
- **Coral reefs**: No  
- **Tropical soft bottom**: No  
- **Hard bottom**: No  
- **Seagrass beds**: No  
- **Macrophyte**: No

**Feeding**

- **Feeding Type** : mainly animals (troph. 2.8 and up)  
- **Feeding Habit** : hunting macrofauna (predator)

**Trophic level(s) :**

<table>
<thead>
<tr>
<th>Troph from diet composition</th>
<th>s.e.</th>
<th>Troph from indiv. food items</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>From diet composition</td>
<td>2.9</td>
<td>From indiv. food items</td>
<td>0.32</td>
</tr>
</tbody>
</table>

**Additional remarks**

Feeds on the seeds of terrestrial plants (Ref. 9497) and on insects and zooplankton (Ref. 33813). Adults consume more plant matter (Ref. 12693).
4.14. Food items for *Leptobarbus hoevenii*

**Food item**

<table>
<thead>
<tr>
<th>Food item</th>
<th>plants</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>other plants</td>
<td>terrestrial plants, fruit trees</td>
<td>Hydnocarpus anthelminthica, Quassia harmandina</td>
</tr>
<tr>
<td>zoobenthos insects</td>
<td>insects</td>
<td>unidentified, unidentified terrestrial insects</td>
</tr>
<tr>
<td>worms</td>
<td>n.a./other annelids, Tubificidae</td>
<td>unidentified tubificid worms</td>
</tr>
<tr>
<td>zooplankton other plank. invertebrates</td>
<td>n.a./other plank.</td>
<td>unidentified</td>
</tr>
</tbody>
</table>

4.15. FAO annual catch data (in tonnes) for *Leptobarbus hoevenii*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>FAO Area : 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,400</td>
<td>3,400</td>
<td>3,900</td>
<td>4,500</td>
<td>4,200</td>
<td>4,800</td>
<td>5,500</td>
<td>6,000</td>
<td>5,000</td>
<td>6,600</td>
<td></td>
</tr>
<tr>
<td>6,500</td>
<td>7,200</td>
<td>7,500</td>
<td>7,50</td>
<td>7,600</td>
<td>7,500</td>
<td>9,000</td>
<td>9,400</td>
<td>8,100</td>
<td>8,000</td>
<td></td>
</tr>
<tr>
<td>8,100</td>
<td>8,200</td>
<td>8,400</td>
<td>7,400</td>
<td>5,962</td>
<td>6,948</td>
<td>5,637</td>
<td>5,319</td>
<td>6,633</td>
<td>5,004</td>
<td></td>
</tr>
<tr>
<td>5,136</td>
<td>5,096</td>
<td>5,016</td>
<td>5,387</td>
<td>5,688</td>
<td>6,394</td>
<td>7,761</td>
<td>6,308</td>
<td>5,077</td>
<td>4,905</td>
<td></td>
</tr>
<tr>
<td>4,348</td>
<td>4,937</td>
<td>3,702</td>
<td>4,606</td>
<td>5,376</td>
<td>5,454</td>
<td>6,892</td>
<td>5,836</td>
<td>3,241</td>
<td>4,608</td>
<td></td>
</tr>
<tr>
<td>3,149</td>
<td>3,260</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Monograph on *Leptobarbus hoevenii* 57
4.16. References used for *Leptobarbus hoevenii*

001632 Suvatti, C. 1981. Fishes of Thailand. Royal Institute of Thailand, Bangkok. 379 p. [not seen]
010937 Anon. 1996. Fish collection database of the University of British Columbia Fish Museum. University of British Columbia, Vancouver, Canada.


031982  Anon. 1999. Fish collection database of the Natural History Museum, London (formerly British Museum of Natural History (BMNH)). Natural History Museum, London (formerly British Museum of Natural History (BMNH)).


036662  Lamberts, D and T. Sarath. 1997. Base line information on the ecology of the fish and the habitats of the flood area of the Tonlé Sap Lake in Siem Reap province, Cambodia. GC/P/95/002/BEL.


038732  Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


THYNNICHTHYS THYNNOIDES

(Bleeker, 1852)

Picture by FAO

Picture by Baird, I.G.

Map showing distribution of Thynnichthys thynnoides.
5.1. Summary information on the family Cyprinidae

<table>
<thead>
<tr>
<th>Family</th>
<th>Cyprinidae (Minnows or carps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
<td>Cypriniformes</td>
</tr>
<tr>
<td>Class</td>
<td>Actinopterygii (Ray-finned fishes)</td>
</tr>
<tr>
<td>Number of genera</td>
<td>210</td>
</tr>
<tr>
<td>Number of species</td>
<td>2010</td>
</tr>
<tr>
<td>Occurs in</td>
<td>O Marine, Brackish, Freshwater</td>
</tr>
<tr>
<td>Aquarium fishes</td>
<td>many</td>
</tr>
<tr>
<td>First fossil record</td>
<td>Lower Tertiary Eocene</td>
</tr>
</tbody>
</table>

Species currently in FishBase: Genera: 331 Species: 2408 (Including subspecies) Complete: Yes

5.2. Information on the genus *Thynnichthys* and its synonyms

After Eschmeyer, March 2003 (Ref. 4626)

**Thynnichthyina**

Status : synonym  
Gender : feminine  
Fowler, 1937, p. 177, CAS Ref: 1425  
Type by original designation (also monotypic).  
Type species : *Thynnichthys thai* Fowler, 1937  
Current genus : *Thynnichthys*

**Thynnichthys**

Status : preoccupied  
Gender : masculine  
Giglioli, 1880, p. 25, CAS Ref: 1617  
Type by subsequent designation.  
Type species : *Thynnus thunina* Cuvier, 1829  
Current genus : *Euthynnus*

**Thynnichthys**

Status : valid  
Gender : masculine  
Bleeker, 1860, p. 433, CAS Ref: 370  
Type by subsequent designation.  
Type species : *Leuciscus thynnoides* Bleeker, 1852  
Current genus : *Thynnichthys*

5.3. General information on *Thynnichthys thynnoides*

**Classification**

Class : Actinopterygii (Ray-finned fishes)  
Order : Cypriniformes
Family           : Cyprinidae (Minnows or carps)
Species           : Thynnichthys thynnoides
Author           : (Bleeker, 1852)

Environment
Freshwater     : Yes            Habitat      : Benthopelagic
Brackish     : No
Saltwater     : No

Importance
Main catching method :
Other methods :     Seines Gillnets Castnets Traps O Spears
O Trawls O Dredges O Liftnets O Hooks+Lines O Other
Used for aquaculture : Never/rarely
Used as bait : Never/rarely
Aquarium fish                 : No
Game fish                 : No
Dangerous fish            : Harmless
Electrobiology            : No special ability

Size and age
Maximum length (cm) (male/unsexed) :                  25  TL (female) : Ref. : 004792

5.4. Synonyms, misidentifications, etc. used for
Thynnichthys thynnoides

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Author</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thynnichthys thai</td>
<td>Fowler, 1937</td>
<td>junior synonym</td>
<td>033021</td>
</tr>
<tr>
<td>Thynnichthys thynnoides</td>
<td>Bleeker, 1852</td>
<td>new combination</td>
<td>010421</td>
</tr>
<tr>
<td>Thinnichthys thynnoides</td>
<td>Bleeker, 1852</td>
<td>misspelling</td>
<td>040966</td>
</tr>
<tr>
<td>Leuciscus thynnoides</td>
<td>Bleeker, 1852</td>
<td>original combination</td>
<td>002091</td>
</tr>
</tbody>
</table>

Total = 4

5.5. Common names for Thynnichthys thynnoides

<table>
<thead>
<tr>
<th>Name</th>
<th>Language</th>
<th>Country</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linh</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036651</td>
</tr>
<tr>
<td>Trey lenh</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Trey linh</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
</tr>
<tr>
<td>Pa goom</td>
<td>Laotian</td>
<td>Lao People’s Dem. Rep.</td>
<td>009497</td>
</tr>
<tr>
<td>Pa keum</td>
<td>Laotian</td>
<td>Lao People’s Dem. Rep.</td>
<td>004792</td>
</tr>
<tr>
<td>Pa koum</td>
<td>Laotian</td>
<td>Lao People’s Dem. Rep.</td>
<td>037767</td>
</tr>
</tbody>
</table>

Remarks:
Occurs in large rivers, canal, oxbows and floodplains. Microphagous, feeds mainly on phytoplankton and periphyton with lesser amounts of bottom algae and small zooplankton. Migrates for spawning to the floodplains when water level is high. Young of the year are caught as they begin to return to the rivers in October. In the Tonle Sap, adults make nearly all of the October catch, with larger and larger proportions of young in subsequent months. Used to make prahoc and nuoc mam (Ref. 12693).
5.6. Distribution of *Thynnichthys thynnoides*

**Asia:** Mekong and Chao Phraya Basins, Malay Peninsula, Sumatra, Borneo (Ref. 43281). Reported from the Maeklong river (Ref. 26336).

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
<th>Ref.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei Darussalam</td>
<td>Native</td>
<td>007050</td>
<td>Known from the Mekong River (Ref. 12693, 26580). Found around the Tonle Sap River, Tonle Sap Lake (Ref. 36651), Prek Phnan (Ref. 36654), Sangke River, Battambang province (Ref. 41486). Also Ref. 7050, 36662, 33813, 34535.</td>
</tr>
<tr>
<td>Cambodia</td>
<td>Native</td>
<td>012693</td>
<td>Known from Sumatra (Palembang, Djambi, Kampar R., Gunung Sahilan, Kwantan R. and Danau Sialong Lotong) and Borneo (Kapuas, Lake Tundai (Ref. 42107). Also Ref. 26580.</td>
</tr>
<tr>
<td>Lao People’s Dem. Rep.</td>
<td>native</td>
<td>043281</td>
<td>Known from the Mekong River (Ref. 43281). Found in Ban Hang Khone at Don Khone, 3 km below the fall line of the great waterfalls of the Mekong Basin at Lee Pee (Ref. 9497). Collected from Tha Ngon, Vientiane, Tha Bo, Khouai Deng (Ref. 4792). Museum: Mekong at Ban Hang Khone, just below Khone Falls, CAS 96961 (Ref. 5515). Also Ref. 4792, 30857, 36654, 37767, 37769.</td>
</tr>
<tr>
<td>Malaysia</td>
<td>native</td>
<td>002091</td>
<td>Known from Sumatra (Palembang, Djambi, Kampar R., Gunung Sahilan, Kwantan R. and Danau Sialong Lotong) and Borneo (Kapuas, Lake Tundai (Ref. 42107). Also Ref. 26580.</td>
</tr>
<tr>
<td>Thailand</td>
<td>native</td>
<td>026336</td>
<td>Occurs in Mekong River and its tributaries (Ref. 9648, 26336), Maeklong, Chao Phraya and Peninsular Thailand river systems (Ref. 26336). Also Ref. 26580, 36654.</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>native</td>
<td>036625</td>
<td>Found in the Mekong Delta (Ref. 36625). Also Ref. 7050, 36654, 43281.</td>
</tr>
</tbody>
</table>

Total native = 7  
Total introduced = 0

5.7. Summary information (no. of records) available for *Thynnichthys thynnoides*

**Level:** species in general  
**StockCode:** 043281  
**MainRef.:** 043281

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology</td>
<td>1</td>
</tr>
<tr>
<td>Max. sizes</td>
<td>0</td>
</tr>
<tr>
<td>Strains</td>
<td>0</td>
</tr>
<tr>
<td>Food items</td>
<td>4</td>
</tr>
<tr>
<td>FAO catches</td>
<td>15502</td>
</tr>
<tr>
<td>Diseases</td>
<td>0</td>
</tr>
<tr>
<td>Food consumption</td>
<td>0</td>
</tr>
<tr>
<td>Genetics</td>
<td>0</td>
</tr>
<tr>
<td>Ciguatera</td>
<td>0</td>
</tr>
<tr>
<td>Diet composition</td>
<td>0</td>
</tr>
<tr>
<td>Allele frequency</td>
<td>0</td>
</tr>
<tr>
<td>Ecotoxicology</td>
<td>0</td>
</tr>
<tr>
<td>Ration</td>
<td>0</td>
</tr>
<tr>
<td>Heritability</td>
<td>0</td>
</tr>
<tr>
<td>Metabolism</td>
<td>0</td>
</tr>
<tr>
<td>Predators</td>
<td>0</td>
</tr>
<tr>
<td>Reproduction</td>
<td>0</td>
</tr>
<tr>
<td>Gill area</td>
<td>0</td>
</tr>
</tbody>
</table>
5.8. Morphology of *Thynnichthys thynnoides*

**Level**: species in general  
**StockCode**: 014994  
**Main Ref.**: 043281

**Diagnostic Characters**  
No Lips; plain silvery body (Ref. 43281).

**Descriptive Characters**  
Operculum present: no

**Meristic Characters**  
- Scales on lateral line: 57-60  
- Scale rows above lateral line: 13-13

**Dorsal fins**  
Number of fins: 1

**Paired fins**  
- Pectoral attributes: more or less normal  
- Pelvic attributes: more or less normal  
  position: abdominal

5.9. Ecology of *Thynnichthys thynnoides*

**Level**: species in general  
**StockCode**: 014994, 016209  
**Main Ref.**: 033813

**Habitats**  
- Streams: Yes  
- Lake: Yes  
- Cave: No  
- Estuaries/lagoons/brackish seas: No  
- Intertidal: No  
- Soft: No  
- Rocky: No  
- Mangroves/marches/swamps: No  
- Marine: No  
- Oceanic: No  
- Neritic: No  
- Coral reefs: No  
- Tropical soft bottom: No  
- Hard bottom: No  
- Seagrass beds: No  
- Macrophyte: No

**Feeding**  
**Feeding Type**: plants/detritus+animals (troph. 2 - 2.19)  
Ref: 033813

**Trophic level(s):**  
- **Original sample**: Troph s.e  
- **Unfished population**: troph s.e

- **From indiv. food item**: 2.3, 0.18  
  - **Remarks**: Trophic level estimate
### 5.10. Food items for *Thynnichthys thynnoides*

**Level: species in general**

<table>
<thead>
<tr>
<th>Food item</th>
<th>Ref.</th>
<th>StockCode: 014994</th>
</tr>
</thead>
<tbody>
<tr>
<td>plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>other plants</td>
<td>benthic algae/weeds</td>
<td>unidentified</td>
</tr>
<tr>
<td></td>
<td>periphyton</td>
<td>unidentified</td>
</tr>
<tr>
<td>phytoplankton</td>
<td>n.a./other</td>
<td>unidentified</td>
</tr>
<tr>
<td></td>
<td>phytoplankton</td>
<td></td>
</tr>
<tr>
<td>zooplankton</td>
<td>n.a./other plank.</td>
<td>unidentified</td>
</tr>
<tr>
<td>other plank.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>invertebrates</td>
<td>invertebrates</td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

*Ref.* indicates the reference number for identification.
5.11. References used for *Thynnichthys thynnoides*


009648 Sidthimunka, A. 1970. A report on the fisheries survey of the Mekong River in the vicinity of the Pa Mong Dam site. Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand. 75 p.


031982 Anon. 1999. Fish collection database of the Natural History Museum, London (formerly British Museum of Natural History (BMNH)). Natural History Museum, London (formerly British Museum of Natural History (BMNH)).


036662 Lamberts, D and T. Sarath. 1997. Base line information on the ecology of the fish and the habitats of the flood area of the Tonlé Sap Lake in Siem Reap province, Cambodia. GCP/CMB/002/BEL.


038732 Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.

Monograph on Thynnichthys thynnoides 69
TRICHOGASTER MICROLEPIPS
(Günther, 1868)
Moonlight gourami

Picture by FAO

Picture by JJPhoto

Map showing distribution of Trichogaster microlepis

Native and introduced areas
6.1. Summary information on the family Osphronemidae

Family : Osphronemidae (Gouramies)
Order : Perciformes  
Class : Actinopterygii (Ray-finned fishes)
Number of genera : 13
Number of species : 49
Occurs in : O Marine
           : O Brackish
           : ☒ Freshwater
Aquarium fishes : some
First fossil record : Lower Tertiary Eocene

Species currently in FishBase: Genera: 14   Species: 91   (Including subspecies)   Complete : Yes

Distribution: Pakistan and India to Malay Archipelago and Korea. Teeth absent on prevomer and palatine. Protractile upper jaw. Lateral line single, complete and continuous in Osphroneminae; vestigial in other subfamilies, when present. Maximum dorsal soft rays 10; in Osphroneminae dorsal fin spines 11-13; soft rays 11-13, anal fin spines 9-12; soft rays 16-22, all scales ctenoid, about 80 cm maximum length. Pelvic fins with an elongate ray in many species. Some species are oral brooders and others build bubble nests. Other family name = Polyacanthidae. Four subfamilies recognized: Belontiinae (combtail gouramies), Macropodinae (Siamese fighting fishes, paradise fishes), Osphroneminae (giant gouramies) and Trichogastrinae (gouramies) (Eschmeyer CoF 2003, Ref. 46206). Family Belontidae in Ref. 36739.

Etymology: Greek, osphra, -as = smell + Greek, nema = filament (Ref. 45335).

6.2. Information on the genus Trichogaster and its synonyms

After Eschmeyer, March 2003 (Ref. 46206)

Colisa  
Cuvier in Cuvier & Valenciennes, 1831, p. 359, CAS Ref: 4881
Status: synonym  
Gender: feminine
Type by absolute tautonymy of senior objective synonym.
Type species : Colisa vulgaris  
Cuvier, 1831
Current genus : Trichogaster

Deschauenseeia  
Fowler, 1934, p. 147, CAS Ref: 1417
Status: synonym  
Gender: feminine
Type by original designation (also monotypic).
Type species : Deschauenseeia chryseus  
Fowler, 1934
Current genus : Trichogaster

Trichogaster  
Bloch& Schneider, 1801, p. 164, CAS Ref: 471
Status: valid  
Gender: feminine
Type by subsequent designation.
Type species : Trichogaster fasciatus  
Bloch& Schneider, 1801
Current genus : Trichogaster

Trichopodus  
Lacepède, 1801, p. 125, CAS Ref: 2710
Status: synonym  
Gender: masculine
Type by subsequent designation.
Type species : Labrus trichopterus  
Pallas, 1770
Current genus : Trichogaster

Monograph on Trichogaster microlepis  73
6.3. General information on *Trichogaster microlepis*

**Classification**
- Class: Actinopterygii (Ray-finned fishes)  
  MainRef. 012693
- Order: Perciformes
- Family: Osphronemidae (Gouramies)
- Subfamily: Trichogasterinae
- Species: *Trichogaster microlepis*
- Author: (Günther, 1861)

**Environment**
- Freshwater: Yes
- Brackish: No
- Saltwater: No

**Habitat**: Demersal

**Importance**
- Importance to fisheries: Minor commercial
- Main catching method:  
  - Seines
  - Gillnets
  - Castnets
  - Traps
  - Spears
  - Trawls
  - Dredges
  - Liftnets
  - Hooks+Lines
  - Other

**Other methods**:  
- Used for aquaculture: Never/rarely
- Used as bait: Never/rarely
- Aquarium fish: Commercial based mainly on breeding  
  Ref. 001672
- Game fish: No
- Dangerous fish: Harmless
- Electrobiology: No special ability

**Size and age**
- Maximum length (cm) (male/unsexed): 13 SL  
  Ref. 043281

**Remarks:**
*Found in ponds and swamps (Ref. 43281). Occurs in shallow sluggish or standing water habitats with a lot of aquatic vegetation. Common in the floodplain of the Lower Mekong. Feeds on zooplankton, crustaceans and aquatic insects. Marketed fresh (Ref. 12693).*

6.4. Synonyms, misidentifications, etc. used for *Trichogaster microlepis*

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Author</th>
<th>Status</th>
<th>Ref.</th>
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<tbody>
<tr>
<td><em>Trichogaster microlepis</em></td>
<td>Günther, 1861</td>
<td>new combination</td>
<td>012693</td>
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<tr>
<td><em>Osphronemus microlepis</em></td>
<td>Günther, 1861</td>
<td>original combination</td>
<td>012965</td>
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</table>

6.5. Common names for *Trichogaster microlepis*

<table>
<thead>
<tr>
<th>Name</th>
<th>Language</th>
<th>Country</th>
<th>Ref.</th>
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<tbody>
<tr>
<td>Kamphleanh</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036651</td>
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<tr>
<td>Trey kamppha npluk</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Trey Kanphleanh plhuk</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Trey Kawmpheanplhuk</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
</tr>
<tr>
<td>Pla kra di nang</td>
<td>Thai</td>
<td>Thailand</td>
<td>009648</td>
</tr>
<tr>
<td>Moonlight gourami</td>
<td>English</td>
<td>United Kingdom</td>
<td>001739</td>
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<td>Moonbeam gourami</td>
<td>English</td>
<td>USA (contiguous states)</td>
<td>004537</td>
</tr>
<tr>
<td>Moonlight gourami</td>
<td>English</td>
<td>USA (contiguous states)</td>
<td>004537</td>
</tr>
<tr>
<td>Cà sac diep</td>
<td>Vietnamese</td>
<td>Viet Nam</td>
<td>036625</td>
</tr>
</tbody>
</table>
6.6. Distribution of *Trichogaster microlepis*

**Asia:** originally occurring in the Mekong in Cambodia and Viet Nam and Chao Phraya Basins (Ref. 43281). Introduced in the Mekong Basin in Thailand and expected in Laos (Ref. 43281). A popular aquarium species which appeared in Colombia because of escapes from aquarium rearing facilities (Ref. 1739).

Latitudinal range: ° - ° Temperature range: 26 - 30 °C Ref.: 1672
Status of threat : NL.

Country | Status | Ref.
--- | --- | ---
Cambodia | native | 012693
Colombia | introduced | 001739
Singapore | introduced | 038466
Thailand | native | 043281
Viet Nam | native | 043281

Total native = 3 Total introduced = 2

6.7. Introductions of *Trichogaster microlepis*

**Asia:** originally occurring in the Mekong in Cambodia and Viet Nam and Chao Phraya Basins (Ref. 43281). Introduced in the Mekong Basin in Thailand and expected in Laos (Ref. 43281). A popular aquarium species which appeared in Colombia because of escapes from aquarium rearing facilities (Ref. 1739).

Year : unknown Established : yes Ref. 001739
Introduced : to Colombia from Unknown
Reason : ornamental
Comments : Established in the Magdalena and Orinoco watersheds. Widespread in fish rearing facilities and has presumably escaped into local waters. Also Ref. 13364.

Year : unknown Established : probably yes Ref. 038466
Introduced : to Singapore from Unknown
Reason : unknown
Total = 12 Established: yes = 1 probably yes = 1

6.8. Summary information (no. of records) available for *Trichogaster microlepis*

<table>
<thead>
<tr>
<th>Level: species in general</th>
<th>StockCode: 043281</th>
<th>MainRef.: 043281</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology</td>
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<td>Max. sizes</td>
</tr>
<tr>
<td>Food items</td>
<td>3</td>
<td>FAO catches</td>
</tr>
<tr>
<td>Food consumption</td>
<td>0</td>
<td>Genetics</td>
</tr>
<tr>
<td>Diet composition</td>
<td>0</td>
<td>Allele frequency</td>
</tr>
<tr>
<td>Ration</td>
<td>0</td>
<td>Heritability</td>
</tr>
</tbody>
</table>
6.9. Morphology of *Trichogaster microlepis*

**Diagnostic Characters**

Body plain silvery (Ref. 43281)

**Descriptive Characters**

- **Striking features**: striking fins
- **Body shape lateral**: short and / or deep  
  **Dorsal head profile**: clearly concave
- **Operculum present**: no
- **Type of eyes**: more or less normal
- **Position/type of mouth**: terminal

**Pigmentation on trunk and tail**

- **Horizontal stripes**: absent
- **Vertical stripes**: absent
- **Diagonal stripes**: absent
- **Curved stripes**: absent
- **Spots**: no spots

**Meristic Characters**

**Dorsal fins**

- **Number of fins**: 1  
  **Spine total**: 3-4
- **Adipose fin**: absent

**Caudal fin**

- **Shape of fin**: more or less truncate
- **Attributes**: more or less normal

**Paired fins**

- **Pelvic attribution**: more or less normal
- **Pelvic attribution**: reduced to filaments
- **Position**: thoracic  
  **before origin of D1**

6.10. Genetic information for *Trichogaster microlepis*

- **Locality**: Unspecified
- **Chromosome number (haploid)**: 23
- **Chromosome number (diploid)**: 46  
  **Ref**: 034766
- **Genetic marker(s) present**: No
- **DNA content (picogram, haploid)**
- **Chromosome arm no**: 46  
  **Ref**: 034766
6.11. General information on the reproduction of *Trichogaster microlepis*

**Level**: species in general  
**StockCode**: 004953  
**MainRef**: 001672

**Mode and Type of Reproduction**
- **Mode**: dioecism  
- **Fertilization**: externa  
- **Batch spawner**: no  
- **Reproductive guild**: guarders/nesters  
Builds bubble nest. Produces 500-1000 eggs

6.12. Ecology of *Trichogaster microlepis*

**Level**: species in general  
**StockCode**: 00495, 004729  
**Ref**: 012693

**Habitats**
- Streams: Yes  
- Lakes: Yes  
- Caves: No  
- Estuaries/lagoons/brackish seas: No  
- Intertidal: No  
- Soft: No  
- Rocky: No  
- Mangroves/marshes/swamps: No  
- Marine: No  
- Oceanic: No  
- Neritic: No  
- Coral reefs: No  
- Tropical soft bottom: No  
- Hard bottom: No  
- Seagrass beds: No  
- Macrophyte: No

**Feeding**
- **Feeding Type**: mainly animals (troph. 2.8 and up)  
**Ref.**: 012693

**Trophic level(s)**

<table>
<thead>
<tr>
<th>Original sample</th>
<th>Unfished population</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation method</td>
<td>Troph s.e</td>
<td>Troph s.e</td>
</tr>
<tr>
<td>From indiv. food items</td>
<td>3.4 0.40</td>
<td>-</td>
</tr>
</tbody>
</table>

6.13. Food items for *Trichogaster microlepis*

**Level**: species in general  
**StockCode**: 004953

**Food item**
- **zoobenthos**
  - insects  
    - insects unidentified  
    - 012693  
  - other benth.  
    - n.a./other benth. unidentified  
    - 012693
  - invertebrates  
    - Invertebrates  
  - zooplankton  
    - n.a./other plank. unidentified  
    - 012693  
  - invertebrates  
    - invertebrates

6.14. Diseases reported for *Trichogaster microlepis*

**StockCode**: 004953  
**Main Ref**: 041805

**Bacterial diseases**: Bacterial infections (general)  
**Occurrence**:
- O eggs  
- O fry  
- Ø females  
- O in the wild  
- O larvae  
- O juveniles  
- Ø males  
- Ø in culture
Bacterial diseases: Pop-eye disease
Exophthalmus:
Occurrence:

<table>
<thead>
<tr>
<th></th>
<th>O eggs</th>
<th>O fry</th>
<th>☒ females</th>
<th>☒ in the wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>O larvae</td>
<td>☒</td>
<td>☒</td>
<td>☒ males</td>
<td>☒ in culture</td>
</tr>
</tbody>
</table>

Parasitic infestations (protozoa, worms, etc.)
Helminthos (gills)
Causative agent: *Dactylogyrus sp.*
Occurrence: not specified

<table>
<thead>
<tr>
<th></th>
<th>O eggs</th>
<th>O fry</th>
<th>☒ females</th>
<th>☒ in the wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>O larvae</td>
<td>☒</td>
<td>☒</td>
<td>☒ males</td>
<td>☒ in culture</td>
</tr>
</tbody>
</table>

Parasitic infestations (protozoa, worms, etc.)
Helminthose (gills)
Causative agent: *Dactylogyrus sp.*
Occurrence: not specified

<table>
<thead>
<tr>
<th></th>
<th>O eggs</th>
<th>O fry</th>
<th>☒ females</th>
<th>☒ in the wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>O larvae</td>
<td>☒</td>
<td>☒</td>
<td>☒ males</td>
<td>☒ in culture</td>
</tr>
</tbody>
</table>

---

**Monograph on Trichogaster microlepis**
6.15. References used for *Trichogaster microlepis*

- Sidthimunka, A. 1970. A report on the fisheries survey of the Mekong River in the vicinity of the Pa Mong Dam site. Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand. 75 p.
- Lamberts, D and T. Sarath. 1997. Base line information on the ecology of the fish and the habitats of the flood area of the Tonle Sap Lake in Siem Reap province, Cambodia. GCP/CMB/002/BEL.


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


TRICHOGASTER PECTORALIS
(Regan, 1910)
Snakeskin gourami

Picture by Escudero P.T

Picture by Baird, I.G.
7.1. Summary information on the family Osphronemidae

Family : Osphronemidae (Gouramies)  
Order : Perciformes  
Class : Actinopterygii (Ray-finned fishes)  
MainRef. : 007463  
FamCode : 429  
Number of genera: 13  
Number of species: 49  
Occurs in : O Marine  
O Brackish  
Ø Freshwater  
Aquarium fishes : some  
First fossil record : Lower Tertiary Eocene  
Ref.: 004830  
Species currently in FishBase: Genera: 14  
Species: 91 (Including subspecies)  
Complete: Yes

7.2. Information on the genus Trichogaster and its synonyms

After Eschmeyer March 2003 (Ref. 46206)

Colisa  
Status: synonym  
Gender: feminine  
Cuvier in Cuvier & Valenciennes, 1831, p. 359, CAS Ref: 4881  
Type by absolute tautonymy of senior objective synonym.  
Type species : Colisa vulgaris  
Cuvier, 1831  
Current genus : Trichogaster

Deschauenseeia  
Status: synonym  
Gender: feminine  
Fowler, 1934, p. 147, CAS Ref: 1417  
Type by original designation (also monotypic).  
Type species : Deschauenseeia chryseus  
Fowler, 1934  
Current genus : Trichogaster

Trichogaster  
Status: valid  
Gender: feminine  
Bloch& Schneider, 1801, p. 164, CAS Ref: 471  
Type by subsequent designation.  
Type species : Trichogaster fasciatus  
Bloch& Schneider, 1801  
Current genus : Trichogaster

Trichopodus  
Status: synonym  
Gender: masculine  
Lacepède, 1801, p. 125, CAS Ref: 2710  
Type by subsequent designation.  
Type species : Labrus trichopterus  
Pallas, 1770  
Current genus : Trichogaster

Distribution: Pakistan and India to Malay Archipelago and Korea. Teeth absent on prevomer and palatine. Protractile upper jaw. Lateral line single, complete and continuous in Osphroneminae; vestigial in other subfamilies, when present. Maximum dorsal soft rays 10; in Osphroneminae dorsal fin spines 11-13; soft rays 11-13, anal fin spines 9-12; soft rays 16-22, all scales ctenoid, about 80 cm maximum length. Pelvic fins with an elongated ray in many species. Some species are oral brooders and others build bubble nests. Other family name = Polyacanthidae. Four subfamilies recognized: Belontiinae (combtail gouramies), Macropodinae (Siamese fighting fishes, paradisefishes), Osphroneminae (giant gouramies) and Trichogastriinae (gouramies) (Eschmeyer CoF 2003, Ref. 46206). Family Belontiidae in Ref. 36739. Etymology: Greek, osphra, -as = smell & Greek, nema = filament (Ref. 45335).
7.3. General information on *Trichogaster pectoralis*

**Classification**
- **Class**: Actinopterygii (Ray-finned fishes) [MainRef. 012693]
- **Order**: Perciformes
- **Family**: Osphronemidae (Gouramies)
- **Subfamily**: Trichogastrinae
- **Species**: *Trichogaster pectoralis*
- **Author**: (Regan, 1910)

**Environment**
- **Freshwater**: Yes
- **Brackish**: No
- **Saltwater**: No
- **Habitat**: Benthopelagic
- **Depth range**: 4

**Importance**
- **Landing statistics**: from 10,000 to 50,000 tonnes [Ref. 004931]
- **Importance to fisheries**: Commercial
- **Main catching method**: Seines, Gillnets, Castnets, Traps, Spears, Trawls, Dredges, Liftnets, Hooks+Lines, Other
- **Used for aquaculture**: Commercial [Ref. 012108]
- **Used as bait**: Never/rarely
- **Aquarium fish**: Commercial, based mainly on breeding [Ref. 001672]
- **Game fish**: No
- **Dangerous fish**: Potential pest
- **Electrobiology**: No special ability

**Size and age**
- **Maximum length (cm) (male/unsexed)**: 25 TL [Ref. 006028]
- **Common length (cm) (male/unsexed)**: 15 TL [Ref. 002686]
- **Maximum weight (g) (male/unsexed)**: 500.00 [Ref. 006028]

---

**Remarks:**

> Found in shallow sluggish or standing-water habitats with a lot of aquatic vegetation. Occurs in flooded forests of the Lower Mekong and gradually moves back to rivers and the Tonle Sap Lake as floodwaters recede (Ref. 12693). Generally feeds on aquatic plants. Can breathe air directly, as well as absorb oxygen from water through its gills (Ref. 9987). The flesh is of good quality; may be grilled or used for fish soup. In Thailand there is a trade of dried pla salid for the benefit of people in areas where it is not caught (Ref 2686). Cultured both for food and for export as aquarium fish (Ref. 9987). Marketed fresh (Ref. 12693).

---

7.4. Synonyms, misidentifications, etc. used for *Trichogaster pectoralis*

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Author</th>
<th>Status</th>
<th>Ref.</th>
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<tbody>
<tr>
<td><em>Trichopodus pectoralis</em></td>
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<td>original combination</td>
<td>004792</td>
</tr>
<tr>
<td><em>Trichogaster pectoralis</em></td>
<td>Regan, 1910</td>
<td>new combination</td>
<td>012693</td>
</tr>
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</table>
7.5. Common names for *Trichogaster pectoralis*

<table>
<thead>
<tr>
<th>Name</th>
<th>Language</th>
<th>Country</th>
<th>Ref.</th>
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</thead>
<tbody>
<tr>
<td>Siamese gourami</td>
<td>English</td>
<td>Bangladesh</td>
<td>044085</td>
</tr>
<tr>
<td>Kanthor</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036651</td>
</tr>
<tr>
<td>Trey kantho</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>002686</td>
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<tr>
<td>Trey kanthor</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Trey kawnthor</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
</tr>
<tr>
<td>Sepat siam</td>
<td>Malay</td>
<td>Indonesia</td>
<td>002686</td>
</tr>
<tr>
<td>Sepat siem, Siem</td>
<td>Malay</td>
<td>Indonesia</td>
<td>006107</td>
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<tr>
<td>Pa sa lit</td>
<td>Laotian</td>
<td>Lao People’s Dem. Rep.</td>
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</tr>
<tr>
<td>Snakeskin gouramy</td>
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<td>004789</td>
</tr>
<tr>
<td>Sepat siam</td>
<td>Malay</td>
<td>Malaysia</td>
<td>002686</td>
</tr>
<tr>
<td>Bubble nest builder</td>
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<td>Myanmar</td>
<td>005736</td>
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<td>Snakeskin gourami</td>
<td>English</td>
<td>USA (contiguous states)</td>
<td>004537</td>
</tr>
<tr>
<td>Cá sac ran</td>
<td>Vietnamese</td>
<td>Viet Nam</td>
<td>036625</td>
</tr>
<tr>
<td>Cá sat rang</td>
<td>Vietnamese</td>
<td>Viet Nam</td>
<td>002686</td>
</tr>
</tbody>
</table>

7.6. Distribution of *Trichogaster pectoralis*

**Asia:** Mekong Basin in Laos, Thailand, Cambodia and Viet Nam; also Chao Phraya Basin (Ref. 43281). Introduced elsewhere and at least one country reports adverse ecological impact after introduction (Ref. 1739).

MainRef.: 043281

Latitudinal range: 20° N - 22° S    Temperature range: 23 - 28 °C  Ref.: 1672

Status of threat: NL.

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>native</td>
<td>012693</td>
</tr>
<tr>
<td>Naturally occurring in the Mekong Basin (Ref. 12693). Found around the Tonle Sap Lake and River (Ref. 36651) and Stung Sen (Ref. 36654). Known from the flooded forests of the Lower Mekong and gradually moves back to rivers and the Tonle Sap Lake as floodwaters recede (Ref. 12693, 36686). Also Ref. 3902, 33813, 37772, 43281.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>introduced</td>
<td>001739</td>
</tr>
<tr>
<td>Introduced to Sumatra, Borneo, Java and Sulawesi (Ref. 7050). See also Ref. 8984 for nominal catches. Also Ref. 1739, 9987, 2847.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>introduced</td>
<td>007050</td>
</tr>
<tr>
<td>Malaysia</td>
<td>reintroduced</td>
<td>001739</td>
</tr>
<tr>
<td>Formed an important fishery in the country (Ref. 1739 and 6095).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td>native</td>
<td>005736</td>
</tr>
<tr>
<td>This species is native to the Chao Phraya in Thailand and Mekong Basin in Laos, Thailand, Cambodia and Viet Nam and has been introduced elsewhere (Ref. 43281). Thus, status of occurrence in Myanmar needs confirmation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New Caledonia introduced 001739
Papua New Guinea introduced 002847
Introduced to the Western Highlands, Central and Gulf Districts. Also Ref. 1739.
Philippines introduced 006096
Common in Lake Bombon (=Taal) (Ref. 12165). Known from Lake Mainit, Mindanao (Ref. 4867). A fine food fish found in Laguna de Bay. Museum specimens collected in 1983 from the east bay, LRS-83129 and from various localities in 1984, LRS-84126 (Ref. 13460). Also introduced to Lake Buluan (Ref. 13492). Used in the aquarium trade (Ref. 12157). Also Ref. 1739.
Singapore introduced 006299
Sri Lanka introduced 006028
Found throughout Sri Lanka, particularly in the dry zone tanks, but not in the central hills. Also Ref. 4833.
Thailand native 043281
Naturally found in Mekong and Chao Phraya Basins (Ref. 43281). Recorded from Maeklong and Southeast Thailand river systems (Ref. 26336). Naturally absent from Peninsular, Northern, and Western Thailand. Flesh of good quality; usually prepared by air drying. Reared in captivity for the ornamental fish trade (Ref. 6459). Also Ref. 2686, 7306, 9648, 9987, 36654.
Viet Nam native 036625
Naturally found in the Mekong Basin (Ref. 43281). Also Ref. 36654.

7.7. Introductions of *Trichogaster pectoralis*

**Asia:** Mekong Basin in Laos, Thailand, Cambodia and Viet Nam; also Chao Phraya Basin (Ref. 43281). Introduced elsewhere and at least one country reports adverse ecological impact after introduction (Ref. 1739).

<table>
<thead>
<tr>
<th>Year</th>
<th>Established</th>
<th>Reason</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952</td>
<td>unknown</td>
<td>to Bangladesh from Singapore</td>
<td>044085</td>
</tr>
<tr>
<td>1951</td>
<td>yes</td>
<td>to Sri Lanka from Malaysia</td>
<td>013686</td>
</tr>
<tr>
<td>unknown</td>
<td>no</td>
<td>to Colombia from Unknown</td>
<td>001739</td>
</tr>
<tr>
<td>1934</td>
<td>yes</td>
<td>to Indonesia from Malaysia</td>
<td>001739</td>
</tr>
</tbody>
</table>

Comments: Introduced by the Inland Fisheries Department which later became widely cultured in ponds and is established in open waters in Java, Borneo and Celebes. Present in the Ajamaru Lakes, Irian Jaya in the 1950s, but its current status is uncertain (Ref. 2847). Also Ref. 13364.
Year: unknown  Established: no  Ref. 001739
Introduced: to Japan from Unknown
Reason: aquaculture
Comments: Assumed to be introduced for aquaculture. Also Ref. 13364.

Year: 1921  Established: yes  Ref. 001739
Introduced: to Malaysia from Thailand
Reason: aquaculture
Comments: Introduced in the Krian rice-bowl area, northwestern Peninsular Malaysia. Has colonized swamps, canals and rice paddies where it yields 94-202 kg/ha but has been badly affected by double cropping of rice and wide use of pesticides. Has also displaced to some extent the native T. trichopterus.

Year: unknown  Established: yes  Ref. 001739
Introduced: to New Caledonia from Unknown
Reason: aquaculture
Comments: Assumed to be introduced for aquaculture. Species became established. Also Ref. 13364.

Year: 1957  Established: no  Ref. 013686
Introduced: to Pakistan from Malaysia
Reason: aquaculture
Comments: It is not cultured any longer.

Year: 1957  Established: yes  Ref. 001739
Introduced: to Papua New Guinea from Malaysia
Reason: aquaculture
Comments: Distribution is very limited in the Central and Gulf provinces. Presently of no value although the species has potential in sewage ponds (Ref. 6367). Also Ref.13364.

Year: 1938  Established: yes  Ref. 006096
Introduced: to Philippines from Thailand
Reason: aquaculture
Comments: Has populated rivers and reservoirs and is regarded as a useful addition to the fauna of swampy areas. Introduced by Dr. Eduardo Quisumbing (Ref. 4735). Used in the aquarium trade elsewhere and at least one country reports adverse ecological impact after introduction (Ref. 1739).

Year: 1938  Established: yes  Ref. 006096
Introduced: to Philippines from Thailand
Reason: ornamental
Comments: Also Ref. 13364 and 38466.

7.8. Summary information (no. of records) available for *Trichogaster pectoralis*

<table>
<thead>
<tr>
<th>Level: species in general</th>
<th>StockCode: 043281</th>
<th>MainRef.: 043281</th>
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</thead>
<tbody>
<tr>
<td>Asia: Mekong Basin in Laos, Thailand, Cambodia and Viet Nam; also Chao Phraya Basin (Ref. 43281). Introduced elsewhere and at least one country reports adverse ecological impact after introduction (Ref. 1739).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ecology</th>
<th>Max. sizes</th>
<th>Strains</th>
<th>Food items</th>
<th>FAO catches</th>
<th>Diseases</th>
<th>Genetics</th>
<th>Ciguatera</th>
<th>Diet composition</th>
<th>Allele frequency</th>
<th>Ecotoxicology</th>
<th>Ration</th>
<th>Heritability</th>
<th>Metabolism</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15502</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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</tr>
</tbody>
</table>
7.9. Morphology of *Trichogaster pectoralis*

**Meristic Characters**

**Lateral Lines**
- Interrupted: no
- Scales on lateral line: 52-57
- Scales in lateral series: 55-63
- Barbels: 0
- Gill rakers on lower limb: total 66-70
- Vertebrae preanal: -

**Dorsal fins**
- Dorsal attributes: other
- Number of fins: -
- Spines total: 78
- Soft-rays total: 10-11
- Adipose fin: absent
- Finlets dorsal: 0
- Finlets ventral: 0

**Caudal fin**
- Shape of fin: more or less truncate
- Attributes: more or less normal

**Anal fin**
- Number of fins: -
- Spines total: 912
- Soft-rays total: 3338

**Paired fins**
- Pectoral attributes: more or less normal
- Spines: 910
- Soft-rays:

**Pelvics attributes:** other (see diagnosis)

7.10. Genetic information for *Trichogaster pectoralis*

**MainRef.: 034370**

**Locality:**
- Chromosome number (haploid): 23
- Chromosome number (diploid): 46
- Genetic marker(s) present: No
- Chromosome arm no: 46

Ref: 034766

Monograph on *Trichogaster pectoralis*
7.11. FAO aquaculture production data for *Trichogaster pectoralis*

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</thead>
<tbody>
<tr>
<td>Indonesia (4)</td>
<td>(t)</td>
<td>1,281</td>
<td>1,410</td>
<td>1,410</td>
<td>1,410</td>
<td>2,000</td>
<td>2,000</td>
<td>2,464</td>
<td>(US$'000)</td>
<td>1,922</td>
<td>2,115</td>
<td>2,115</td>
<td>3,503</td>
<td>4,000</td>
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<tr>
<td>(t)</td>
<td>2,039</td>
<td>2,760</td>
<td>1,821</td>
<td>2,626</td>
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<td>(US$'000)</td>
<td>4,282</td>
<td>5,796</td>
<td>4,006</td>
<td>5,777</td>
<td>7,134</td>
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<td>(t)</td>
<td>3,211</td>
<td>3,762</td>
<td>3,478</td>
<td>2,808</td>
<td></td>
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<td></td>
<td></td>
<td>(US$'000)</td>
<td>6,743</td>
<td>7,900</td>
<td>7,304</td>
<td>5,897</td>
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<tr>
<td>Malaysia (4)</td>
<td>(t)</td>
<td>6</td>
<td>13</td>
<td>107</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>(US$'000)</td>
<td>4</td>
<td>10</td>
<td>131</td>
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<td>(US$'000)</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>Thailand (4)</td>
<td>(t)</td>
<td>11,780</td>
<td>16,578</td>
<td>16,578</td>
<td>14,269</td>
<td>14,901</td>
<td>13,196</td>
<td>12,800</td>
<td>(US$'000)</td>
<td>6,080</td>
<td>8,091</td>
<td>9,252</td>
<td>8,362</td>
<td>8,091</td>
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<tr>
<td>(t)</td>
<td>13,300</td>
<td>12,958</td>
<td>15,449</td>
<td>16,993</td>
<td>16,714</td>
<td>14,200</td>
<td>17,230</td>
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<td>(US$'000)</td>
<td>10,946</td>
<td>11,443</td>
<td>17,463</td>
<td>19,339</td>
<td>24,621</td>
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<tr>
<td>(t)</td>
<td>17,214</td>
<td>21,989</td>
<td>21,577</td>
<td>19,690</td>
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<td>(US$'000)</td>
<td>15,878</td>
<td>28,962</td>
<td>28,755</td>
<td>26,385</td>
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<tr>
<td>(mt)</td>
<td>13,067</td>
<td>18,001</td>
<td>17,651</td>
<td>16,215</td>
<td>16,901</td>
<td>15,196</td>
<td>15,264</td>
<td></td>
<td>(US$'000)</td>
<td>8,006</td>
<td>10,216</td>
<td>11,505</td>
<td>12,807</td>
<td>11,943</td>
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<tr>
<td>(mt)</td>
<td>15,339</td>
<td>18,011</td>
<td>17,651</td>
<td>16,215</td>
<td>16,901</td>
<td>15,196</td>
<td>15,264</td>
<td></td>
<td>(US$'000)</td>
<td>15,228</td>
<td>17,239</td>
<td>21,469</td>
<td>25,116</td>
<td>31,755</td>
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<tr>
<td>(mt)</td>
<td>20,425</td>
<td>25,751</td>
<td>25,055</td>
<td>22,498</td>
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<td>(US$'000)</td>
<td>22,621</td>
<td>36,862</td>
<td>36,059</td>
<td>32,281</td>
<td></td>
</tr>
</tbody>
</table>

7.12. General information on the reproduction of *Trichogaster pectoralis*

**Level:** species in general  
**StockCode:** 000515  
**MainRef.:** 006459

**Mode and Type of Reproduction**
- **Mode:** dioecism
- **Fertilization:** external
- **Batch spawner:** no
- **Reproductive guild:** guarders, nesters

Male creates a bubble-nest at the surface. After fertilization, the male, with the use of its mouth, collects the eggs and pushes them up into the bubble-nest (Ref. 6459). Male guards the eggs until hatching (Ref. 9987); both parents care for the young (Ref. 6028).

**Spawning Information for Trichogaster pectoralis**

**Locality:** Thailand  
**Stockcode:** 000515

| Season (% of mature females; 111 = presence of mature females) |
|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 |
| 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 | 111 |

**Fecundity:**  
- **min:** 1,000 (n)  
- **max:** 10,000 (n)  

**Female size:**  
- **min:** 0.00 (g) (cm)  
- **max:** 200 (g) (cm)  

Ref. 006459
7.13. Ecology of *Trichogaster pectoralis*

<table>
<thead>
<tr>
<th>Level: species in general</th>
<th>StockCode: 000515, 000499</th>
<th>Main Ref.: 013497</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat: Streams: No</td>
<td>Lake: Yes</td>
<td>Cave: No</td>
</tr>
<tr>
<td>Estuaries/lagoons/brackish seas: No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intertidal: No</td>
<td>Soft: No</td>
<td>Rocky: No</td>
</tr>
<tr>
<td>Marine: No</td>
<td>Oceanic: No</td>
<td>Neritic: No</td>
</tr>
<tr>
<td>Tropical:soft bottom: No</td>
<td>Hard bottom: No</td>
<td>Seagrass beds: No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Macrophyte: No</td>
</tr>
</tbody>
</table>

**Feeding**

- Feeding Type: plants/detritus+animals (troph. 2.8 and up) [Ref: 033813]
- Feeding Habil: selective plankton feeding

**Trophic level(s):**

- Original sample: 3.2 0.36
- Unfished population: 3.1 0.29 troph of adults [Ref: 013497]

**Remarks**

Additional remarks:

- Feeds mainly on planktonic invertebrates (Ref. 13497).

7.14. Diet composition of *Trichogaster pectoralis*

**StockCode: 000515**

**Locality:** Bukit Merah Reservoir, between September 1979 and August 1980

**Stage of fish sampled:** adults  Number: 28

**Food group (%)**

- 52.0 n.a./other plank. Crustaceans, Copepoda, Cladocera, Decapoda, juv./adults
- 28.0 insects, both aquatic and terrestrial forms of Diptera, Odonata, etc., adults
- 20.0 n.a./other plank. Invertebrates, Paramecium, Rotifera, parasitic Nematoda, juv./adults

100.0 Total

**Remarks**

- 52.0 n.a./other plank. Crustaceans
- 28.0 insects
- 20.0 n.a./other plank. Invertebrates
7.15. Diseases reported for *Trichogaster pectoralis*

**StockCode: 000515**  
Parasitic infestations (protozoa, worms, etc.), Trichodinosis  
*Trichodinella sp.* Trichodina infestation

Causative agent: *Trichodina sp.*  
Occurrence: Luzon, Philippines, 1981  
Prevalence: common

**Remarks:** Infestation occurs most commonly in the gills and skin. Besides 1981 (Guerrero and Paycana), the infestation also occurred in 1982 (by the same author).

Bacterial diseases  
Bacterial infections (general)  
Causative agent: N.A.  
Occurrence: not specified  
Remarks: Parasitic infestations (protozoa, worms, etc.), *Dactylogyrus* gill flukes disease

Helminthoses (gills)  
Causative agent: *Dactylogyrus sp.*  
Occurrence: not specified

Parasitic infestations (protozoa, worms, etc.), Costia disease  
Causative agent: *Dactylogyrus sp.*  
Occurrence: not specified

7.16. FAO annual catch data (in tonnes) for *Trichogaster pectoralis*

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<tbody>
<tr>
<td>Indonesia</td>
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| Total: 2    | 10,036 | 10,217 | 11,498 | 13,389 | 12,568 | 14,357 | 16,545 | 17,922 | 14,698 | 19,773 |
|             | 19,387 | 21,651 | 22,723 | 21,264 | 23,334 | 23,013 | 27,688 | 28,956 | 25,271 | 24,785 |
|             | 25,697 | 25,458 | 25,337 | 22,298 | 23,811 | 21,419 | 29,440 | 26,715 | 22,460 | 30,630 |
|             | 30,407 | 28,647 | 27,120 | 35,842 | 31,737 | 29,660 | 27,346 | 28,892 | 27,211 | 25,036 |
|             | 26,259 | 23,899 | 25,212 | 27,662 | 23,787 | 25,090 | 30,793 | 21,728 | 22,422 | 23,776 |
|             | 21,575 | 21,990 |     |     |     |     |     |     |     |     |

92  *Monograph on Trichogaster pectoralis*
7.17. References used for *Trichogaster pectoralis*

Anon. 1999. Fish collection database of the Natural History Museum, London (formerly British Museum of Natural History (BMNH)). Natural History Museum, London (formerly British Museum of Natural History (BMNH)).


Lamberts, D and T. Sarath. 1997. Base line information on the ecology of the fish and the habitats of the flood area of the Tonlé Sap Lake in SiemReap province, Cambodia. GCP/CMB/002/BEL.


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


Anon. 2002. Fish collection of the University of the Philippines in the Visayas Museum. UPV Museum.


ANABAS TESTUDINEUS
(Bloch, 1792)
Climbing perch
រឿងតូចម្រង់
8.1. Summary information on the family Anabantidae

Family : Anabantidae (Climbing gouramies)
Order : Perciformes                    MainRef.: 007463
Class : Actinopterygii (Ray-finned fishes)      FamCode : 426
Number of genera : 3
Number of species : 30
Occurs in  O Marine
ØBrackish
ØFreshwater
Aquarium fishes : some

Species currently in FishBase: Genera: 5 Species: 37 (Including subspecies)  Complete: Yes

Distribution: Africa and India to Philippines. Rarely brackish. Fixed conical teeth on jaws, prevomer, and parasphenoid. Relatively large mouth. Upper jaw slightly protractile. The genus Sandelia has only cycloid scales, few gill rakers, and generally a carnivorous diet.
Etymology: Greek, anabas = aoristo of anabainein = to climb (Ref. 45335).

8.2. Information on the genus Anabas and its synonyms

After Eschmeyer, March 2003 (Ref. 46206)

Anabas Status : valid Gender : masculine
Cloquet (ex Cuvier), 1816, p. 35, CAS Ref: 12560
Type by monotypy.
Type species : Perca scandens Daldorff, 1797
Current genus : Anabas

Coius Status : valid Gender : masculine
Hamilton, 1822, p. 85, 369, CAS Ref: 2031
Type by subsequent designation.
Type species : Coius coboius Hamilton, 1822
Current genus : Anabas

8.3. General information on Anabas testudineus

Classification
Class : Actinopterygii (Ray-finned fishes) MainRef. 004833
Order : Perciformes
Family : Anabantidae (Climbing gouramies)
Species : Anabas testudineus
Author : (Bloch, 1792)
Date Eschmeyer, pers. comm.

Environment
Freshwater : Yes Habitat : Demersal
Brackish : Yes
Saltwater : No Depth range : 0

Distribution: Africa and India to Philippines. Rarely brackish. Fixed conical teeth on jaws, prevomer, and parasphenoid. Relatively large mouth. Upper jaw slightly protractile. The genus Sandelia has only cycloid scales, few gill rakers, and generally a carnivorous diet.
Etymology: Greek, anabas = aoristo of anabainein = to climb (Ref. 45335).
8.4. Synonyms, misidentifications, etc. used for *Anabas testudineus*

<table>
<thead>
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<th>Synonym</th>
<th>Author</th>
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<td>001672</td>
</tr>
<tr>
<td><em>Anabas macrocephalus</em></td>
<td>Bleeker, 1854</td>
<td>junior synonym</td>
<td>002073</td>
</tr>
<tr>
<td><em>Anabas microcephalus</em></td>
<td>Bleeker, 1857</td>
<td>junior synonym</td>
<td>001672</td>
</tr>
<tr>
<td><em>Perca scandens</em></td>
<td>Daldorff, 1797</td>
<td>junior synonym</td>
<td>002091</td>
</tr>
<tr>
<td><em>Lutjanus scandens</em></td>
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<td>junior synonym</td>
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</tr>
<tr>
<td><em>Sparus scandens</em></td>
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<td>junior synonym</td>
<td>001672</td>
</tr>
<tr>
<td><em>Anabas scandens</em></td>
<td>Daldorff, 1797</td>
<td>junior synonym</td>
<td>002091</td>
</tr>
<tr>
<td><em>Amphiprion scensor</em></td>
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<td>junior synonym</td>
<td>001672</td>
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<tr>
<td><em>Anabas spinosus</em></td>
<td>Gray, 1834</td>
<td>junior synonym</td>
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</tr>
<tr>
<td><em>Anabas testudinens</em></td>
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<td>misspelling</td>
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<tr>
<td><em>Amphiprion testudineus</em></td>
<td>Bloch, 1792</td>
<td>new combination</td>
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<td><em>Anthias testudineus</em></td>
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<td><em>Anabas testudineus</em></td>
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<td><em>Sparus testudineus</em></td>
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<td><em>Anabas testudineus ricei</em></td>
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<td><em>Anabas testudineus riveri</em></td>
<td>Das, 1966</td>
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<td>004833</td>
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</tbody>
</table>

*Found mostly in canals, lakes, ponds, swamps and estuaries (Ref. 41236).* Occurs in medium to large rivers, brooks, flooded fields and stagnant water bodies including sluggish flowing canals (Ref. 12975). Often found in areas with dense vegetation (Ref. 12693). Can tolerate extremely unfavorable water conditions and is associated mainly with turbid, stagnant waters (Ref. 6028). Remains buried under the mud during dry season (Ref. 1479). Feeds on macrophytic vegetation, shrimps and fish fry (Ref. 6028). Reported to undertake lateral migration from the Mekong mainstream, or other permanent water bodies, to flooded areas during the flood season and return to the permanent water bodies at the onset of the dry season (Ref. 37770). During the dry season, it stays in pools associated with submerged woods and shrubs (Ref. 37770). Possesses an accessory air-breathing organ (Ref. 2847). Able to survive for several days or weeks out of water if the air breathing organs can be kept moist (Ref. 1479). Fish famous for its ability to walk; important food fish in Southeast Asia, considered a tasty food fish (Ref. 6565) but not of the finest quality since it is bony (Ref. 2686). Usually sold live in markets where it is kept alive for several days by keeping it moist (Ref. 12693).
8.5. Common names for *Anabas testudineus*

<table>
<thead>
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<th>Language</th>
<th>Country</th>
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<td>Khmer</td>
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<td>Khmer</td>
<td>Cambodia</td>
<td>002686</td>
</tr>
<tr>
<td>Trey kranh srai</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
</tr>
<tr>
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<td>Assamese</td>
<td>India</td>
<td>047932</td>
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<td>Koi</td>
<td>Bengali</td>
<td>India</td>
<td>047932</td>
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<tr>
<td>Climbing perch</td>
<td>English</td>
<td>India</td>
<td>004833</td>
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<tr>
<td>Khakoi</td>
<td>Khasi</td>
<td>India</td>
<td>047932</td>
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<td>India</td>
<td>043640</td>
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8.6. Distribution of *Anabas testudineus*

*Asia:* India to Wallace line including China. May have been distributed in more areas than were commonly reported.

Latitudinal range: 28° N - 10° S

Temperature range: 22 - 30 °C

Status of threat: NL.

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
<th>Ref.</th>
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<td>Bangladesh</td>
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<td></td>
<td>Also Ref. 4833, 39989, 41236, 43638.</td>
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<tr>
<td>Cambodia</td>
<td>native</td>
<td>012693</td>
</tr>
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</table>

Occurs in the Mekong Basin (Ref. 27732). Found around the Tonle Sap Great Lake and River (Ref. 36651). Known from Réam, Stung Sen, Angkor (Ref. 36654) and Sangke River,
Battambang province (Ref. 41486). Occurs in sluggish or still standing waters (Ref. 36686). Also Ref. 3902, 33813, 36662, 41236, 45353.

China native 027732
Occurs in the Mekong Basin in Yunnan (Ref. 27732). Also Ref. 1739, 36654, 41236.

India native 004833
Known throughout India (Ref. 43640). Recorded from Western Ghats Rivers, Maharashatra (Ref. 43634) and Chilka Lake (Ref. 29108). Also Ref. 36654, 41236, 45255.

Indonesia native 007050
Known from Sulawesi (Ref. 2847) and Lake Tundai, South Borneo (Ref. 42107). Translocated to Irian Jaya, possibly in the Merauke area (Ref. 2847). Also Ref. 27732.

Lao People's Dem. Rep. native 043281
Occurs in the Mekong Basin. Found in the Lower and Middle Xe Bangfai, and the Middle Nam Theun (Ref. 27732) and Ban Hang Khone, a village on an island in the middle of the mainstream Mekong River just below the Great Khone Waterfalls in Khong District, Champasak Province (Ref. 37767). Also Ref. 4792, 30857.

Malaysia native 004835

Maldives native 001739

Myanmar native 005736
Also Ref. 4833, 41236, 43638.

Nepal native 009496
Found in Terai region at 76-135 m altitude. Also Ref. 41236, 43638.

Pakistan native 004833

Papua New Guinea introduced 002847
Established in Sepik area (Ref. 6993) and in the extreme southwest corner of the country (Ref. 50786). Also Ref. 9420.

Philippines native 000280
Status to be confirmed. Recorded as introduced (Ref. 6565). May be a native fish due to museum records dating back to 1901 (USNM, 00126367) (Ref. 38732). Found in slow streams, ditches, ponds, and lakes, but not in the mountains (Ref. 2854). Reported from Laguna de Bay; museum specimens collected in 1984 from the south bay, LRS-84128 (Ref. 13460) and Sta. Maria River, in Laguna; Lake Buhi, Camarines Sur; Lake Naujan, Mindoro; San Fernando, La Union; Rosales, La Union; Tacloban, Leyte; Lake Buluan and the rivers of Cotabato (Rio Grande and Fort Pikit) (Ref. 00280). A specimen was caught in 1989 with hook and line from Lake Manguao, Palawan (Ref. 13489). Known from Lake Buluan (Ref. 13492) and Lake Lanao (Ref. 13446). Considered a tasty but bony food fish (Ref. 6565). Used in the aquarium trade (Ref. 12157). Also Ref. 4835, 4833, 7050, 12744, 43638.

Singapore native 004833

Sri Lanka native 006028
Widespread throughout the country except in the central hills. Also Ref.4833, 27732, 41236, 43281, 43638.

Taiwan native 027732
Also Ref. 7050, 43281.

Thailand native 026336
Found in Mekong, Chao Phraya, Maeklong, Peninsular and Southeast Thailand river systems (Ref. 26336). Also Ref. 1632, 7306, 9648, 27732, 41236.

USA (contiguous states ) introduced 003814
Formerly established in Florida, but has since disappeared.

Viet Nam native 044416
Found in Hanoi, Northern Viet Nam (Ref. 44416). Occurs in the Mekong Basin (Ref. 27732). Also Ref. 2682, 36625, 37770.

8.7. Introductions of Anabas testudineus

Asia: India to Wallace line including China. May have been distributed in more areas than were commonly reported.
8.8. Summary information (no. of records) available for *Anabas testudineus*

<table>
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<tr>
<th>Ecology</th>
<th>Max. sizes</th>
<th>Strains</th>
<th>Food items</th>
<th>FAO catches</th>
<th>Diseases</th>
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<table>
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<th>Allele frequency</th>
<th>Ecotoxicology</th>
<th>Ration</th>
<th>Heritability</th>
<th>Metabolism</th>
<th>Swimming type</th>
<th>Swimming speed</th>
<th>Eggs</th>
<th>Vision</th>
<th>Larvae</th>
<th>Brains</th>
<th>Larval dynamics</th>
<th>Introductions</th>
<th>Aquaculture</th>
<th>Occurrence</th>
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<td>3</td>
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</tbody>
</table>

8.9. Morphology of *Anabas testudineus*

**Diagnostic Characters**
Color in life dark to pale greenish, very pale below, back dusky to olive; head with longitudinal stripes ventrally; posterior margin of opercle with a dark spot; iris golden reddish. Body form variable, affected by age and amount of food consumed. Scaled head with 4-5 rows between eye & rear margin of pre-operculum. Scales large & regularly arranged, ciliate.

**Descriptive Characters**

<table>
<thead>
<tr>
<th>Striking features</th>
<th>Cross section: compressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body shape lateral</td>
<td>short and / or deep</td>
</tr>
<tr>
<td>Operculum present</td>
<td>Yes</td>
</tr>
<tr>
<td>Type of eyes</td>
<td>more or less normal</td>
</tr>
<tr>
<td>Position/type of mouth</td>
<td>terminal more or less normal</td>
</tr>
</tbody>
</table>
**Teeth Presence**

- Lower jaw: present, conical
- Upper jaw: present, conical
- Vomerine: present, conical
- Palatine: absent

Comment: Teeth small and fixed.

**Pigmentation on trunk and tail**

- Horizontal stripes: absent, dorsal and ventral ending before ventral contour
- Vertical stripes: absent
- Diagonal stripes: absent
- Curved stripes: absent
- Spots: one spot only lateral mainly on tail
- Dorsal fin (D1): more than one spot or stripe, no colored margin
- Caudal fin: no spots or stripes, no colored margin
- Anal fin (A1): no spots or stripes, no colored margin

**Meristic Characters**

- Lateral Lines: 1
- Interrupted: yes
- Scales on lateral line: 26-32
- Scales in lateral series: 21-29
- Scale rows above lateral line: 3-4
- Scale rows below lateral line: 811
- Scales around caudal peduncle: -
- Barbels: 0

**Dorsal fins**

- Dorsal attributes: extending over most of the back length
- Number of fins: -
- Spines total: 1620-
- Soft-rays total: 710
- Adipose fin: absent
- Finlets dorsal: -0000
- Finlets ventral: 0-0

**Caudal fin**

- Shape of fin: more or less truncate

**Anal fin**

- Number of fins: -
- Spines total: -911
- Soft-rays total: 811

**Paired fins**

- Pectoral attributes: more or less normal
- Spines: 0
- Soft-rays: 1416
- Pelvics attributes: more or less normal
- Position: thoracic behind origin of D1
- Spines: 1
- Soft-rays: 55

**Body proportions (based on picture)**

- Standard length (SL) (cm)
- Preorbital length (% HL): Maximum depth (% SL): 30.8
8.10. Genetic information for *Anabas testudineus*

**Locality**: Unspecified
*Chromosome number (haploid)*: 23
*Chromosome number (diploid)*: 46
*Genetic marker(s) present*: No
*Chromosome arm no.*: 50

**Locality**: Kalyani, Western Bengal, India
*Chromosome number (haploid)*: 23
*Chromosome number (diploid)*: 46
*Genetic marker(s) present*: No

**Sex-determining mechanism**: 46

**Remarks**: *Sex chromosomes not distinguishable. No banding technique used. CF= 4st+2t+22T (2n=28) (calculated from Ref. 028174)*

**Locality**: Unspecified
*Chromosome number (haploid)*: 24
*Chromosome number (diploid)*: 48
*Genetic marker(s) present*: No
*Chromosome arm no.*: 48

**Locality**: Porto Novo, India
*Chromosome number (haploid)*: 23
*Chromosome number (diploid)*: 46
*Genetic marker(s) present*: No
*Chromosome arm no.*: 50

**Remarks**: *CF = 4st + 20A + 22t.*
### 8.11. FAO aquaculture production data for *Anabas testudineus*

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</thead>
<tbody>
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<td></td>
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<tr>
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<td>35,000</td>
<td>35,000</td>
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<td>79,632</td>
<td>84,315</td>
<td>81,468</td>
<td>75,392</td>
<td>76,545</td>
</tr>
<tr>
<td>(US$'000)</td>
<td>64,000</td>
<td>76,545</td>
<td>79,632</td>
<td>84,315</td>
<td>81,468</td>
<td>75,392</td>
<td>76,545</td>
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<tr>
<td>(t)</td>
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<td>50,000</td>
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<td>57,970</td>
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<tr>
<td>(US$'000)</td>
<td>66,513</td>
<td>65,883</td>
<td>541</td>
<td>828</td>
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<td>1,189</td>
<td>910</td>
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<tr>
<td>(US$'000)</td>
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<td>883</td>
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<td>828</td>
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<td>77,318</td>
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<td>(t)</td>
<td>65,763</td>
<td>65,760</td>
<td>470</td>
<td>720</td>
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<td>541</td>
<td>828</td>
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</tr>
</tbody>
</table>

### 8.12. General information on the reproduction of *Anabas testudineus*

**Level**: species in general  
**StockCode**: 000511  
**MainRef**: 007471

**Mode and Type of Reproduction**

- **Mode**: dioecism
- **Fertilization**: external
- **Spawning frequency**: Batch spawner: no
- **Reproductive guild**: guarders, clutch tenders
  - Guards eggs at the surface of hypoxic water (Ref.: 7471)

**Spawning Information for Anabas testudineus**

**Locality**: Mekong Mainstream  
**Stockcode**: 000511  
**Main Ref.**: 037770

Season (% of mature females; 111= presence of mature females):

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
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<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
</tr>
</tbody>
</table>

Comment: Eggs occur during March to October.

**Locality**: Bangladesh  
**Stockcode**: 000511  
**MainRef**: 001479

Season (% of mature females; 111= presence of mature females):

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>111</td>
<td>111</td>
<td></td>
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</tbody>
</table>

**Monograph on Anabas testudineus**
Fecundity: min 39,687 (n) Female size: (g) 11.00 (cm)
max 86,108 (n) (g) 27.90 (cm)
Comment: Hatching takes place in 18 hours at a temperature of 28.5°C. Egg diameter 0.7 mm.

Locality: Viet Nam, Mekong Mainstream at Dong Thap province
Stockcode: 000511
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111
Comment: Spawning takes place in irrigated ricefields.

Locality: Thailand, Mekong Mainstream at Chiang Khong province
Stockcode: 000511
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111
Comment: Spawning takes place in rain fed paddy.

8.13. Available information on eggs of *Anabas testudineus*

**Level**: species in general
**StockCode**: 00511

Water parameters with reported egg occurrences
Main Ref.: 041595

**Descriptive characters**
Place of development: buoyant (pelagic)
Shape of egg: spherical
Attributes: smooth

**Meristic and metric (mm) characters**

<table>
<thead>
<tr>
<th>Character</th>
<th>max</th>
<th>Ref.</th>
<th>mod</th>
<th>Ref.</th>
<th>mod</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil globules</td>
<td>1</td>
<td>041595</td>
<td>1</td>
<td>041595</td>
<td>1</td>
<td>041595</td>
</tr>
<tr>
<td>Oil diameter (mm)</td>
<td></td>
<td></td>
<td>1</td>
<td>041595</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egg diameter (mm)</td>
<td>1</td>
<td>041595</td>
<td>1</td>
<td>041595</td>
<td></td>
<td></td>
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<tr>
<td>Reference diameter (RD)</td>
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<td></td>
<td>1</td>
<td>041595</td>
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<td></td>
</tr>
</tbody>
</table>

8.14. Ecology of *Anabas testudineus*

**Level**: species in general
**StockCode**: 000511, 000495
**Main Ref.**: 012693

**Habitats**
Ref.: 012693
Streams: Yes Lakes: No Caves: No (Exclusively: No)
Estuaries/lagoons/brackish seas: No
Intertidal: No Soft: No Rocky: No Mangroves/marshes/swamps: No
Marine: No Oceanic: No Neritic: No Coral reefs: No
Tropical soft bottom: No Hard bottom: No Seagrass beds: No Macrophyte: No

**Feeding**
Feeding Type: mainly animals (troph. 2.8 and up) Ref. 012693
Feeding Habit: hunting macrofauna (predator) Ref. 012975

**Trophic level(s)**
Original sample Unfished population Remarks
Estimation method Troph s.e. Troph s.e.
From diet composition
From indiv. food items 2.6 0.28 - -
### 8.15. Food items for *Anabas testudineus*

**Level:** species in general  
**StockCode:** 000511

<table>
<thead>
<tr>
<th>Food item</th>
<th>Food item</th>
<th>Unidentified</th>
<th>Unidentified</th>
<th>StockCode</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>nekton</strong></td>
<td>finfish bony fish</td>
<td>unidentified</td>
<td>unidentified</td>
<td>012693</td>
</tr>
<tr>
<td><strong>plants</strong></td>
<td>other plants benthic algae/weeds</td>
<td>unidentified</td>
<td>unidentified</td>
<td>006028</td>
</tr>
<tr>
<td></td>
<td>phytoplankton blue-green algae</td>
<td>Characeae Charasp.</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Desmidiaceae Closteriu</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oscillatoriae Lyngbyaspi</td>
<td>048780</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Oscillatoriae Oscillatoriasspi</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Zygnemataceae Spirogyrasp.</td>
<td>048780</td>
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<tr>
<td></td>
<td></td>
<td>Zygnemataceae Zygnemasp.</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>diatoms Euglenaceae Euglenasp.</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hookeriaceae Chaetophorasp.</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oedogoniaceae Oedogonium</td>
<td>048780</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ulotrichaceae Ulothrixsp.</td>
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<tr>
<td></td>
<td></td>
<td>Volvocaceae Volvoxsp.</td>
<td>048780</td>
<td></td>
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<tr>
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<td>006028</td>
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<td>unidentified</td>
<td>048780</td>
</tr>
<tr>
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<td>unidentified mollusks</td>
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</tr>
<tr>
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<td>unidentified</td>
<td>006028</td>
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<tr>
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<tr>
<td></td>
<td></td>
<td>Daphniidae Daphniasspi</td>
<td>048780</td>
<td></td>
</tr>
</tbody>
</table>

### 8.16. Maximum weight/length/age of *Anabas testudineus*

**Locality:** India, Tamil Nadu  
**StockCode:** 000511  
**Ref.:** 043637  
**Max length (cm):** 10.5  
**Max age (yrs):** No  
**Sex:** unsexed

**Locality:** Nepal, None specified  
**StockCode:** 000511  
**Ref.:** 009496  
**Max length (cm):** 12.5  
**Max age (yrs):** No  
**Sex:** unsexed

### 8.17. Diseases reported for *Anabas testudineus*

**StockCode:** 000511  
**Main Ref.:** 042533

- **Parasitic infestations (protozoa, worms, etc.):** Tripartiella disease  
  **Causative agent:** *Tripartiella* sp.  
  **Occurrence:** Chittagong, Bangladesh, 1993  
  **Remarks:** *Location of infestation not specified. Infection of Tripartiella sp. is doubtful, G. Asmat (pers.comm. 07/03).*

- **Parasitic infestations (protozoa, worms, etc.):** Dactylogyrus gill flukes disease  
  **Causative agent:** *Dactylogyrus* sp.  
  **Occurrence:** Chittagong and Raj Shani, Bangladesh, 1993
Remarks: *Infestation commonly occurs in the gills and skin.*

Parasitic infestations (protozoa, worms, etc.): Contracaecum disease  
Nematode  
Causative agent: *Contracaecum sp.*  
Occurrence: Dhaka, Bangladesh, 1997

Remarks: *Infestation commonly occurs in the intestine, stomach, pyloric caeca, body cavity and viscera.*

Parasitic infestations (protozoa, worms, etc.): Paragendria infestation  
Causative agent: *Paragendria wallagonia*  
Occurrence: Dhaka, Bangladesh, 1997

Remarks: *Infestation commonly occurs in the intestine.*

Parasitic infestations (protozoa, worms, etc.): Gnathostoma infestation  
Causative agent: *Gnathostoma spinigerum*  
Occurrence: Dhaka, Bangladesh, 1997

Remarks: *Infestation commonly occurs in the intestine.*

Parasitic infestations (protozoa, worms, etc.): Gnathostoma infestation  
Causative agent: *Gnathostoma spinigerum*  
Occurrence: Dhaka, Bangladesh, 1997

Remarks: *Infestation commonly occurs in the intestine.*

Parasitic infestations (protozoa, worms, etc.): Allocreadium infestation  
Causative agent: *Allocreadium minutum*  
Occurrence: Dhaka, Bangladesh, 1993

Remarks: *Infestation commonly occurs in the intestine.*

Parasitic infestations (protozoa, worms, etc.): Allocreadium infestation  
Causative agent: *Allocreadium minutum*  
Occurrence: Dhaka, Bangladesh, 1993

Remarks: *Infestation commonly occurs in the stomach, stomach wall, intestine and intestinal wall.*

Parasitic infestations (protozoa, worms, etc.): Camallanus infestation  
Causative agent: *Camallanus anabantis*  
Occurrence: Dhaka and/or Sylhet, Bangladesh, 1973


Parasitic infestations (protozoa, worms, etc.): Camallanus infestation  
Causative agent: *Camallanus pearsei*  
Occurrence: Dhaka and/or Sylhet, Bangladesh, 1973


Parasitic infestations (protozoa, worms, etc.): Stellantchasmus infestation  
Causative agent: *Stellantchasmus falcatus*  
Occurrence: Luzon, Philippines, 1939

Remarks: *Infestation occurs most commonly in the musculature and body cavity.*
Parasitic infestations (protozoa, worms, etc.): Camallanus infestation 1
Causative agent: Camallanus anabantis
Occurrence: Luzon, Philippines, 1966
Remarks: Infestation occurs most commonly in the intestine. Besides 1966 (Velasquez), the infestation also occurred in 1980 by the same author.

Parasitic infestations (protozoa, worms, etc.): Centrocestus infestation 2
Causative agent: Centrocestus caninus
Occurrence: Luzon, Philippines, 1939
Remarks: Infestation occurs most commonly in the gills.

Parasitic infestations (protozoa, worms, etc.): Procerovum infestation 2
Causative agent: Procerovum varium
Occurrence: Luzon, Philippines, 1966
Remarks: Infestation occurs most commonly in the musculature and base of fins.

Parasitic infestations (protozoa, worms, etc.): Gnathostoma infestation
Causative agent: Gnathostoma spinigerum
Occurrence: Luzon, Philippines, 1938
Remarks: Infestation occurs most commonly in the musculature and visceral linings. Besides 1938 (Refuerzo and Garcia), the infestation was also reported in 1974 (Velasquez). Refuerzo and Garcia experimentally exposed host fish to infected copepods. But they are uncertain whether infections of these larvae were the result of natural or experimental infection.

Parasitic infestations (protozoa, worms, etc.): Procerovum infestation 1
Causative agent: Procerovum calderoni
Occurrence: Luzon, Philippines, 1939
Remarks: Common infestation (Vazquez-Colet and Africa). The infestation was also reported in 1940 (Vazquez-Colet and Africa), 1966 (Velasquez) in Luzon, and in 1973 (Velasquez) in Luzon and Mindanao

Parasitic infestations (protozoa, worms, etc.): Lernaea infestation
Causative agent: Lernaea lophiara
Occurrence: Luzon, Philippines, 1988
Remarks: The head of the parasite is embedded in the musculature with the body protruding externally. This report involves an experimental infection.

Parasitic infestations (protozoa, worms, etc.): Anchor worm disease
Causative agent: Lernaea cyprinacea
Occurrence: Luzon (Laguna de Bay), Philippines, 1988
Remarks: The parasite's head is commonly embedded in the eye or nostril of a host with the body protruding externally.

8.18. Ecotoxicology of Anabas testudineus

<table>
<thead>
<tr>
<th>Chemical</th>
<th>LC50 (mg/l)</th>
<th>Exposure Stage (h)</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malathion</td>
<td>28</td>
<td>28</td>
<td>008721</td>
</tr>
<tr>
<td>Malathion</td>
<td>11.8</td>
<td>96</td>
<td>008721</td>
</tr>
</tbody>
</table>
8.19. References used for *Anabas testudineus*


001632 Suvatti, C. 1981. Fishes of Thailand. Royal Institute of Thailand, Bangkok. 379 p. [not seen]


009648 Sidthimunka, A. 1970. A report on the fisheries survey of the Mekong River in the vicinity of the Pa Mong Dam site. Inland Fisheries Division, Department of Fisheries, Bangkok, Thailand. 75 p.


Lamberts, D and T. Sarath. 1997. Base line information on the ecology of the fish and the habitats of the flood area of the Tonlé Sap Lake in Siem Reap province, Cambodia. GCP/CMB/002/BEL.


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


Anon. 2002. Fish collection of the University of the Philippines in the Visayas Museum. UPV Museum.


<table>
<thead>
<tr>
<th>Entry</th>
<th>Reference</th>
</tr>
</thead>
</table>
BOESEMANIA MICROLEPIS
(Bleeker, 1858)
Boeseman croaker
រំហាក់រម្លាប់
### 9.1. Summary information on the family Sciaenidae

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Sciaenidae (Drums or croakers)</td>
</tr>
<tr>
<td>Order</td>
<td>Perciformes</td>
</tr>
<tr>
<td>Class</td>
<td>Actinopterygii (Ray-finned fishes)</td>
</tr>
<tr>
<td>Number of genera</td>
<td>70</td>
</tr>
<tr>
<td>Number of species</td>
<td>270</td>
</tr>
<tr>
<td>Occurs in</td>
<td>✏️ Marine ✏️ Brackish ✏️ Freshwater</td>
</tr>
<tr>
<td>Aquarium fishes</td>
<td>some</td>
</tr>
</tbody>
</table>

Species currently in FishBase: Genera: 71 Species: 275 (Including subspecies) Complete: No

#### Remarks:
Drums or croakers are distributed in the Atlantic, Indian and Pacific oceans. Dorsal fin long, having a deep notch between the spinous and soft-rayed parts, but the parts rarely separate. Spinous part with 6-13 spines; the soft-rayed part with 1 spine and usually 20-35 soft rays. Anal fin having 1 or 2 usually weak spines; soft rays 6-13. Lateral line reaching end of caudal fin. Slightly emarginate to rounded caudal fin. Opercle with the upper bony edge forked. Gill opening with a bony flap above it. Some species with 1 barbel or a patch of small barbels on chin. Large cavernous canals in head. Snout and lower jaw with conspicuous pores. Vomer and palatine toothless. Swim bladder usually having many branches and used as a resonating chamber. Exceptionally large otoliths. Vertebrae 24-29. Bottom dwelling carnivores, feeding on benthic invertebrates and small fishes. Juveniles are popular aquarium fishes, but difficult to maintain.

Etymology: Greek, skiaina = a kind of fish (Ref. 45335).

### 9.2. Information on the genus *Boesemania* and its synonyms

After Eschmeyer, March 2003 (Ref. 46206)

**Boesemania**

<table>
<thead>
<tr>
<th>Status</th>
<th>feminine</th>
</tr>
</thead>
</table>

Trewavas, 1977, p. 309, CAS Ref: 4459

Type by original designation (also monotypic).

Type species: *Johnius microlepis* Bleeker, 1859

Current genus: *Boesemania*

### 9.3. General information on *Boesemania microlepis*

#### Classification

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>Actinopterygii (Ray-finned fishes)</td>
</tr>
<tr>
<td>Order</td>
<td>Perciformes</td>
</tr>
<tr>
<td>Family</td>
<td>Sciaenidae (Drums or croakers)</td>
</tr>
<tr>
<td>Species</td>
<td><em>Boesemania microlepis</em></td>
</tr>
<tr>
<td>Author</td>
<td>(Bleeker, 1858)</td>
</tr>
</tbody>
</table>

#### Environment

<table>
<thead>
<tr>
<th>Environment</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater</td>
<td>Yes</td>
</tr>
<tr>
<td>Brackish</td>
<td>Yes</td>
</tr>
<tr>
<td>Saltwater</td>
<td>No</td>
</tr>
</tbody>
</table>

Habitat: Benthopelagic

Monograph on *Boesemania microlepis* 119
Importance
Importance to fisheries: Highly commercial
Ref. 043946
Main catching method: Gillnets
Other methods:
- Seines
- Gillnets
- Castnets
- Traps
- Spears
- Trawls
- Dredges
- Liftnets
- Hooks + Lines
- Other
Used for aquaculture: Never/rarely
Used as bait: Never/rarely
Aquarium fish: Never/rarely
Game fish: No
Dangerous fish: Harmless
Electrobiology: No special ability

Size and age
Maximum length (cm) (male/unsexed): 100 SL (female):
Common length (cm) (male/unsexed): 20 SL (female):
Maximum weight (g) (male/unsexed): 7,000.00 (female):

Occurs in flowing waters of large rivers. Found in the deep-water pools of the Mekong River even during the dry-season (Ref. 43946). Appears to be sedentary with no clear-cut migratory habits (Ref. 43946). Feeds on crustaceans and small fishes (Ref. 12693). Loud continuous croaking was observed during the dry season in the deep water areas of the Mekong River which could be linked with spawning behavior (Ref. 43946). Marketed fresh (Ref. 12693). Most desirable and highly priced food fishes in the Mekong region (Ref. 43946).

9.4. Synonyms, misidentifications, etc. used for *Boesemania microlepis*

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Author</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otolithoides aeneocorpus</td>
<td>Fowler, 1935</td>
<td>junior synonym</td>
<td>005369</td>
</tr>
<tr>
<td>Pseudosciaena microlepis</td>
<td>Bleeker, 1858</td>
<td>new combination</td>
<td>007050</td>
</tr>
<tr>
<td>Johnius microlepis</td>
<td>Bleeker, 1858</td>
<td>original combination</td>
<td>026282</td>
</tr>
<tr>
<td>Boesemania microlepis</td>
<td>Bleeker, 1858</td>
<td>new combination</td>
<td>009772</td>
</tr>
<tr>
<td>Nibea soldado</td>
<td>nonLacepède, 1802</td>
<td>misidentification</td>
<td>009772</td>
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</tbody>
</table>

Total = 5

9.5. Common names for *Boesemania microlepis*

<table>
<thead>
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<th>Name</th>
<th>Language</th>
<th>Country</th>
<th>Ref.</th>
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<tbody>
<tr>
<td>Prama</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036651</td>
</tr>
<tr>
<td>Trey pama</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>036654</td>
</tr>
<tr>
<td>Trey promah</td>
<td>Khmer</td>
<td>Cambodia</td>
<td>012693</td>
</tr>
<tr>
<td>Terusan</td>
<td>Malay</td>
<td>Indonesia</td>
<td>006107</td>
</tr>
<tr>
<td>Pa gooawng</td>
<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>009497</td>
</tr>
<tr>
<td>Pa kouang</td>
<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>037767</td>
</tr>
<tr>
<td>Pba gooawng</td>
<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>012369</td>
</tr>
<tr>
<td>Pla hang kew</td>
<td>Thai</td>
<td>Thailand</td>
<td>043946</td>
</tr>
<tr>
<td>Pla ma</td>
<td>Thai</td>
<td>Thailand</td>
<td>043946</td>
</tr>
<tr>
<td>Boeseman croaker</td>
<td>English</td>
<td>United Kingdom</td>
<td>009772</td>
</tr>
<tr>
<td>Smallscale croaker</td>
<td>English</td>
<td>United Kingdom</td>
<td>012693</td>
</tr>
<tr>
<td>Ca suu</td>
<td>Vietnamese</td>
<td>Viet Nam</td>
<td>043946</td>
</tr>
</tbody>
</table>
9.6. Distribution of *Boesemania microlepis*

**Asia:** Thailand to Viet Nam and Sumatra.  
Main Ref.: 009772  
Latitudinal range: °-°  
Temperature range: - °C  
Status of threat: NL.

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>native</td>
<td>009772</td>
</tr>
<tr>
<td></td>
<td>Known from the Mekong Basin (Ref. 37772). Found around the Tonle Sap River and the Great Lake (Ref.36651), Sékong at Stung Treng (Ref. 36654). Occurs in flowing waters (Ref. 36686). Also Ref. 37772.</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>native</td>
<td>007050</td>
</tr>
<tr>
<td></td>
<td>Known from Sumatra (Ref. 7050, 36654).</td>
<td></td>
</tr>
<tr>
<td>Lao People's Dem. Rep.</td>
<td>native</td>
<td>043281</td>
</tr>
<tr>
<td></td>
<td>Known from the Mekong Basin (Ref. 43281). Occurs in the Khone Falls (Ref. 37772) and Ban Hang Khone at Don Khone, 3 km below the fall line of the great waterfalls of the Mekong Basin at Lee Pee. Reported to migrate upstream during the dry season in January/March in Southern Laos (Ref. 37769). Regarded by Ban Hang Khone fishermen as non-migratory. The present catch in Ban Hang Khone is reportedly only about 10% of what it was in 1970 (Ref. 9497). Becoming locally rare (Ref. 43281). Museum: Mekong at Ban Hang Khone, just below Khone Falls, CAS 94880 (Ref. 5515). Also Ref. 12369, 36654, 37767.</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>native</td>
<td>043946</td>
</tr>
<tr>
<td></td>
<td>Found in river tributaries of peninsular Malaysia (Ref. 43946).</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>native</td>
<td>026336</td>
</tr>
<tr>
<td></td>
<td>Known from the Mekong, Chao Phraya, Maeklong Basins (Ref. 26336); Nan, Tachin and Bang Pakong Rivers (Ref. 43946). Museum: Mekong River mainstream at Bung Kla, ca. 140 km nw of Nakhon Phanom, CAS 95034 (Ref. 5515). Also Ref. 9772.</td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td>native</td>
<td>009772</td>
</tr>
<tr>
<td></td>
<td>Known from the Mekong Basin (Ref. 43281). Also Ref. 36654.</td>
<td></td>
</tr>
</tbody>
</table>

9.7. Summary information (no. of records) available for *Boesemania microlepis*

**Asia:** Thailand to Viet Nam and Sumatra.

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology</td>
<td>1</td>
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<tr>
<td>Food items</td>
<td>4</td>
</tr>
<tr>
<td>Food consumption</td>
<td>0</td>
</tr>
<tr>
<td>Diet composition</td>
<td>0</td>
</tr>
<tr>
<td>Ration</td>
<td>0</td>
</tr>
<tr>
<td>Predators</td>
<td>0</td>
</tr>
<tr>
<td>Morphology</td>
<td>0</td>
</tr>
<tr>
<td>Processing</td>
<td>0</td>
</tr>
<tr>
<td>Growth/mortality</td>
<td>0</td>
</tr>
<tr>
<td>Maturity</td>
<td>0</td>
</tr>
<tr>
<td>Recruitment</td>
<td>0</td>
</tr>
<tr>
<td>L/W relat.</td>
<td>1</td>
</tr>
<tr>
<td>Max. sizes</td>
<td>0</td>
</tr>
<tr>
<td>FAO catches</td>
<td>15502</td>
</tr>
<tr>
<td>Genetics</td>
<td>0</td>
</tr>
<tr>
<td>Allele frequency</td>
<td>0</td>
</tr>
<tr>
<td>Heritability</td>
<td>0</td>
</tr>
<tr>
<td>Reproduction</td>
<td>0</td>
</tr>
<tr>
<td>Spawning</td>
<td>7</td>
</tr>
<tr>
<td>Eggs</td>
<td>0</td>
</tr>
<tr>
<td>Egg dev't.</td>
<td>0</td>
</tr>
<tr>
<td>Larvae</td>
<td>0</td>
</tr>
<tr>
<td>Larval dynamics</td>
<td>0</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>0</td>
</tr>
<tr>
<td>Strains</td>
<td>0</td>
</tr>
<tr>
<td>Diseases</td>
<td>0</td>
</tr>
<tr>
<td>Ciguatera</td>
<td>0</td>
</tr>
<tr>
<td>Ecotoxicology</td>
<td>0</td>
</tr>
<tr>
<td>Metabolism</td>
<td>0</td>
</tr>
<tr>
<td>Gill area</td>
<td>0</td>
</tr>
<tr>
<td>Swimming type</td>
<td>0</td>
</tr>
<tr>
<td>Swimming speed</td>
<td>0</td>
</tr>
<tr>
<td>Vision</td>
<td>0</td>
</tr>
<tr>
<td>Brains</td>
<td>0</td>
</tr>
<tr>
<td>Occurrence</td>
<td>22</td>
</tr>
</tbody>
</table>

Total = 1
9.8. General Information on the Reproduction of Boesemania microlepis

Locality: Laos, Veun Tholathi
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111
Comment: This vast spawning ground is included in the areas being protected within the Fish Conservation Zones (FCZ) since 1994 and has since benefited from this scheme (Ref. 43946).

Locality: Laos, Veun Te/Veun Va
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111

Locality: Laos, Veun Phou That
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111

Locality: Laos, Veun Louk
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111

Locality: Laos, Veun Hat Phou
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111

Locality: Laos, Khoum Pa Tong/Peo Ta
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111 111
Comment: Also included in the Fish Conservation Zone scheme in 1995 but not successful enough like the other areas that have been protected (Ref. : 43946)

Locality: Laos, Ban Hang Khone
Season (% of mature females; 111= presence of mature females):
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
111 111
Comment: Large fish in spawning condition were caught in February and March and were thought to spawn in Boong Pba Gooawng and Boong Pba Jook, just in front of Ban Hang Khone. Fish vocalized at mid-afternoon every day in February-March, producing a deep "oot-oot" sound.

9.9. Ecology of Boesemania microlepis

Habitats:
Stream: Yes  Caves: No (Exclusively: No)
Estuaries /logoons /brackish seas: No
Intertidal: No  Soft: No  Rocky: No  Mangoves/marshes/swamps: No
Marine: No  Oceanic: No  Neritic: No  Coral reefs: No
Tropical soft bottom: No  Hard bottom: No  Seagrass beds: No  Macrophyte: No

Monograph on Boesemania microlepis
Feeding
Feeding type: mainly animals (troph. 2.8 and up)                       Ref.: 033813
Feeding habitat: hunting macrofaun (predator)

<table>
<thead>
<tr>
<th>Trophic level(s):</th>
<th>Original sample</th>
<th>Unfished population</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation method</td>
<td>Troph s.e.</td>
<td>Troph s.e.</td>
<td></td>
</tr>
<tr>
<td>From diet composition:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From indiv. food item:</td>
<td>3.7 0.59</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

9.10. Food items for *Boesemania microlepis*

**Level: species in general**

<table>
<thead>
<tr>
<th>Food item</th>
<th>Nekton</th>
<th>StockCode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nekton</td>
<td></td>
<td>StockCode</td>
</tr>
<tr>
<td>Finfish</td>
<td>bonyfish</td>
<td>033813</td>
</tr>
</tbody>
</table>

**Zoobenthos**

<table>
<thead>
<tr>
<th>benth. crust</th>
<th>n.a/other benth</th>
<th>unidentified</th>
<th>033813</th>
</tr>
</thead>
<tbody>
<tr>
<td>crustaceans</td>
<td>shrimps/prawns</td>
<td>unidentified shrimp</td>
<td>043946</td>
</tr>
<tr>
<td>insect</td>
<td>insect</td>
<td>unidentified</td>
<td>043946</td>
</tr>
</tbody>
</table>
9.11. References used for *Boesemania microlepis*


038732  Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


OXYELEOTRIS MARMORATA
(Bleeker, 1852)
Marble goby

Picture by FAO

Picture by Warren, T.

Map showing the distribution of Oxyeleotris marmorata.
10.1. Summary information on the family Eleotridae

Family: Eleotridae (Sleepers)
Order: Perciformes
Class: Actinopterygii (Ray-finned fishes)
Number of genera: 35
Number of species: 150
Occurs in: Marine, Brackish, Freshwater
Aquarium fishes: some

Species currently in FishBase: Genera: 39 Species: 158 (Including subspecies) Complete: No

Remarks:
Distribution: most tropical and subtropical areas; rare in temperate areas. Separate pelvic fins, or fused to various extents. Mouth never subterminal. Cycloid or ctenoid scales. Dorsal fin 2-8 flexible spines. Vertebræ 25-28. Branchiostegal rays 6. Maximum length about 60 cm (reported for Dormitator maculatus)
Etymology: Greek, eleotris = the name of a Nile fish

10.2. Information on the genus Oxyeleotris and its synonyms

After Eschmeyer March 2003 (Ref. 46206)

Gigantogobius
Fowler, 1905, p. 511, CAS Ref: 1370
Type by original designation (also monotypic).
Type species: Gigantogobius jordani Fowler, 1905
Current genus: Oxyeleotris

Oxyeleotris
Bleeker, 1874, p. 302, CAS Ref: 437
Type by original designation (also monotypic).
Type species: Eleotris marmorata Bleeker, 1852
Current genus: Oxyeleotris

10.3. General information on Oxyeleotris marmorata

Classification
Class: Actinopterygii (Ray-finned fishes)
Order: Perciformes
Family: Eleotridae (Sleepers)
Species: Oxyeleotris marmorata
Author: (Bleeker, 1852) Date Eschmeyer, pers. comm.

Environment
Freshwater: Yes Habitat: Demersal
Brackish: Yes
Saltwater: No Depth range: 10

Importance
Importance to fisheries: Commercial
Other methods: Seines Gillnets Castnets Traps Spear Trawls Dredges Liftnets Hooks+Lines Other

Monograph on Oxyeleotris marmorata 129
10.4. Synonyms, misidentifications, etc. used for *Oxyeleotris marmorata*

<table>
<thead>
<tr>
<th>Synonym</th>
<th>Author</th>
<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigantogobius jordani</td>
<td>Fowler, 1905</td>
<td>questionable</td>
<td>003178</td>
</tr>
<tr>
<td><em>Oxyeleotris marmorata</em></td>
<td>Bleeker, 1852</td>
<td>new combination</td>
<td>007050</td>
</tr>
<tr>
<td><em>Eleotris marmorata</em></td>
<td>Bleeker, 1852</td>
<td>original combination</td>
<td>003178</td>
</tr>
<tr>
<td><em>Oxyeleotris marmoratus</em></td>
<td>Bleeker, 1852</td>
<td>misspelling</td>
<td>007050</td>
</tr>
<tr>
<td><em>Bostrichthys marmoratus</em></td>
<td>Bleeker, 1852</td>
<td>new combination</td>
<td>005193</td>
</tr>
<tr>
<td><em>Callieleotris platycephalus</em></td>
<td>Fowler, 1934</td>
<td>junior synonym</td>
<td>003178</td>
</tr>
</tbody>
</table>

10.5. Common names for *Oxyeleotris marmorata*

<table>
<thead>
<tr>
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<th>Country</th>
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<tbody>
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</tr>
<tr>
<td>Bakutut</td>
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<td>Indonesia</td>
<td>006107</td>
</tr>
<tr>
<td>Ikan bakut</td>
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<td>Indonesia</td>
<td>009217</td>
</tr>
<tr>
<td>Ikan belutu</td>
<td>Malay</td>
<td>Indonesia</td>
<td>009217</td>
</tr>
<tr>
<td>Pa boo</td>
<td>Laotian</td>
<td>Lao People's Dem. Rep.</td>
<td>009497</td>
</tr>
<tr>
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<tr>
<td>Goby</td>
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<td>Malaysia</td>
<td>004789</td>
</tr>
<tr>
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<td>Malaysia</td>
<td>009217</td>
</tr>
<tr>
<td>Soon hock</td>
<td>Cantonese</td>
<td>Singapore</td>
<td>009222</td>
</tr>
<tr>
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<td>English</td>
<td>Singapore</td>
<td>009217</td>
</tr>
<tr>
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<td>009217</td>
</tr>
<tr>
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<td>040297</td>
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<td>Thai</td>
<td>Thailand</td>
<td>042982</td>
</tr>
<tr>
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</tr>
<tr>
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<td>003691</td>
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<tr>
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<td>United Kingdom</td>
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<tr>
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<td>003178</td>
</tr>
<tr>
<td>Bong tuong</td>
<td>Vietnamese</td>
<td>Viet Nam</td>
<td>036625</td>
</tr>
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</table>
10.6. Distribution of *Oxyeleotris marmorata*

Asia: Mekong and Chao Phraya Basins, Malay Peninsula, Indochina, Philippines and Indonesia. Record from Fiji needs confirmation. 
Latitudinal range: 23° N - 18° S  
Temperature range: 22 - 28 °C  
MainRef.: 043281  
Ref.: 13371

Status of threat: NL.

<table>
<thead>
<tr>
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<th>Status</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
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<td>007050</td>
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<td>Cambodia</td>
<td>native</td>
<td>012693</td>
</tr>
<tr>
<td>Fiji Islands</td>
<td>questionable</td>
<td>003178</td>
</tr>
<tr>
<td>Indonesia</td>
<td>native</td>
<td>007050</td>
</tr>
<tr>
<td>Lao People's Dem. Rep.</td>
<td>native</td>
<td>043281</td>
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<td>Malaysia</td>
<td>native</td>
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</tr>
<tr>
<td>Philippines</td>
<td>native</td>
<td>000280</td>
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<tr>
<td>Singapore</td>
<td>native</td>
<td>003178</td>
</tr>
<tr>
<td>Taiwan</td>
<td>introduced</td>
<td>005193</td>
</tr>
<tr>
<td>Thailand</td>
<td>native</td>
<td>026336</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>native</td>
<td>036625</td>
</tr>
</tbody>
</table>

10.7. Introductions of *Oxyeleotris marmorata*

Asia: Mekong and Chao Phraya Basins, Malay Peninsula, Indochina, Philippines and Indonesia. Record from Fiji needs confirmation.

Year: 1975  
Established: unknown  
Ref.005193

Introduced: to Taiwan from Cambodia  
Reason: aquaculture  
Comments: Total = 01  
Established: yes = 0  
probably yes = 0

10.8. Summary information (no. of records) available for *Oxyeleotris marmorata*

Level: species in general  
StockCode: 043281  
MainRef. 043281

Asia: Mekong and Chao Phraya Basins, Malay Peninsula, Indochina, Philippines and Indonesia. Record from Fiji needs confirmation.
10.9. Morphology of *Oxyeleotris marmorata*

**Level**: species in general

**StockCode**: 005633

**Main Ref.**: 004792

**Diagnostic Characters**
With 60-65 predorsal scales without ocellus on caudal peduncle (Ref. 43281).

**Descriptive Characters**

- **Striking features**: none
- **Body shape lateral**: elongated
- **Dorsal head profile**: more or less straight
- **Operculum present**: yes
- **Type of eyes**: more or less normal
- **Position/type of mouth**: terminal more or less normal

**Teeth Presence**

- **lower jaw**: present
- **upper jaw**: present

**Pigmentation on trunk and tail**

- **Horizontal stripes**: absent
- **Vertical stripes**: absent
- **Diagonal stripes**: absent
- **Curved stripes**: absent
- **Spots**: more than one spot dorsal and ventral on trunk and tail
- **Dorsal fin (D1)**: more than one spot or stripe no colored margin
- **Caudal fin**: more than one spot or stripe no colored margin
- **Anal fin (A1)**: more than one spot or stripe no colored margin

**Meristic Characters**

Lateral lines: interrupted: no

- **Scales on lateral line**: 80-90

**Barbels**: 0

- **Gill rakers on lower limb total**: 12-12

**Dorsal fins**

- **Dorsal attributes**: no striking attributes

- **Number of fins**: -
  - spines total: 77- soft-rays total: 99
- **Adipose fin**: absent
  - finlets dorsal: 0-0
  - finlets ventral: 0-0

**Caudal fin**

- **Shape of fin**: more or less truncate

**Anal fin**

- **Shape of fin**: more or less normal

**Paired fins**

- **Number of fins**: -
  - spines total: -11 soft-rays total: 88
Pectoral attributes: more or less normal
Pelvics attributes: more or less normal
Position: abdominal before origin of D1

Body proportions
(Based on picture)

10.10. Genetic information for *Oxyeleotris marmorata*

Locality: Unspecified
Chromosome number (haploid): 23
Chromosome number (diploid): 46
Genetic marker(s) present: No
Chromosome arm no.: 50

Remarks: AN = 50 (Ref. 8973). No heteromorphic pairs could be referred to as sex chromosomes. Also Ref. 9217 and 9218.

Locality: Thailand
Chromosome number (haploid): 23
Chromosome number (diploid): 46
Genetic marker(s) present: No
Chromosome arm no.: 50

Chromosome number of (2a) *Oxyeleotris marmorata*

10.11. FAO aquaculture production data for *Oxyeleotris marmorata*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>0</td>
<td>0</td>
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<td>(US$'000)</td>
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<td>0</td>
<td>0</td>
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<td>115</td>
<td>37</td>
<td>25</td>
<td>33</td>
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<td>39</td>
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<td>(US$'000)</td>
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<td>1,023</td>
<td>305</td>
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<td>336</td>
<td>342</td>
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<tr>
<td>(t)</td>
<td>125</td>
<td>203</td>
<td>180</td>
<td>129</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(US$'000)</td>
<td>1,077</td>
<td>1,888</td>
<td>1,669</td>
<td>1,360</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.12. General information on the reproduction of *Oxyeleotris marmorata*

**Spawning Information for *Oxyeleotris marmorata***

**Locality:** Thailand, aquaculture ponds  
**Stockcode:** 005633  
**Main Ref.:** 009223

**Season (% of mature females; 111= presence of mature females):**

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tr>
<td>111</td>
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<td>111</td>
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<td>111</td>
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<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
</tr>
</tbody>
</table>

**Tem.: 28-35° C**

**Fecundity:**

- **min 2,000 (n)**
- **max 30,000 (n)**

**Comment:** 3.3-4.4 nests/female/year. Absence of spawning in Nov. -Dec. may have been due to low water temperature below 24°C.

**Locality:** Thailand  
**Stockcode:** 005633  
**Main Ref.:** 006459

**Season (% of mature females; 111= presence of mature females):**

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tr>
<td>111</td>
<td>111</td>
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<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
<td>111</td>
</tr>
</tbody>
</table>

**Tem.: 28° C**

**Fecundity:**

- **min 10,000 (n)**
- **max 90,000 (n)**

**Female size:**

- **(g) 15.000(cm)**
- **(g) 36.000(cm)**

**Ref. 006459**

**Comment:** Eggs hatch out within 16-30 hours at 20° - 30° C.

10.13. Ecology of *Oxyeleotris marmorata*

**Level :** species in general  
**StockCode:** 005633, 005376  
**Main Ref.:** 009497

**Habitats**

- Streams: Yes  
- Lakes: Yes  
- Caves: No  
- Estuaries/lagoons/brackish seas: No  
- Intertidal: No  
- Soft: No  
- Rocky: No  
- Mangroves/marshes/swamps: No  
- Marine: No  
- Oceanic: No  
- Neritic: No  
- Coral reefs: No  
- Tropical soft bottom: No  
- Hard bottom: No  
- Seagrass beds: No  
- Macrophyte: No

**Ref.: 013497**

**Feeding**

- **Feeding Type:** mainly animals (troph. 2.8 and up)  
- **Feeding Habit:** hunting macrofauna (predator)  

**Ref.: 009497**
### 10.14. Food items for *Oxyeleotris marmorata*

**Level:** species in general  
**StockCode:** 005633

<table>
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<tr>
<th>Food item</th>
<th>Food item</th>
<th>Ref.</th>
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<tr>
<td>nekton</td>
<td>finfish</td>
<td>unidentified</td>
</tr>
<tr>
<td>zoobenthos</td>
<td>bony fish</td>
<td>009497</td>
</tr>
<tr>
<td></td>
<td>crabs</td>
<td>unidentified</td>
</tr>
<tr>
<td></td>
<td>shrimps/prawns</td>
<td>unidentified</td>
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<tr>
<td>insects</td>
<td>insects</td>
<td>006459</td>
</tr>
<tr>
<td></td>
<td>n.a./other mollusks</td>
<td>unidentified</td>
</tr>
</tbody>
</table>

### 10.15. Maximum weight/length/age of *Oxyeleotris marmorata*

**Locality:** Indonesia, Cirata Reservoir, Cianjur, West Java  
**StockCode:** 005633

<table>
<thead>
<tr>
<th>Max weight (g)</th>
<th>102.19</th>
<th>total weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max length (cm):</td>
<td>19.47 TL</td>
<td>Same specimen for WL: Yes</td>
</tr>
<tr>
<td>Same specimen for LT: Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Locality:** Indonesia, Parung Ponds, Bogor, West Java  
**StockCode:** 005633

<table>
<thead>
<tr>
<th>Max weight (g)</th>
<th>204.5</th>
<th>total weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max length (cm):</td>
<td>23.69 TL</td>
<td>Same specimen for WL: Yes</td>
</tr>
<tr>
<td>Same specimen for LT: Yes</td>
<td></td>
<td></td>
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</tbody>
</table>

### 10.16. Length-Weight relationships of *Oxyeleotris marmorata*

\( W = a \times L^b \) with Length in cm and Weight in g  
**StockCode:** 005633

<table>
<thead>
<tr>
<th>Length range</th>
<th>19.47 - 23.69 TL</th>
<th>Sample size:</th>
<th>Main Ref.: 009217</th>
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<tbody>
<tr>
<td>a</td>
<td>0.0146</td>
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<td></td>
</tr>
<tr>
<td>Correlation coefficient</td>
<td>b : 3</td>
<td>Sex: unsexed</td>
<td></td>
</tr>
<tr>
<td>Sex: unsexed</td>
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<td></td>
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</tbody>
</table>

**Comment:** Estimated using data in Ref.

### 10.17. Diseases reported for *Oxyeleotris marmorata*

**StockCode:** 005633  
**MainRef.:** 048850

- Bacterial diseases, Edwardsiellosis  
  Ref.: 000193
- Emphysematous Putrefactive Disease of Catfish (EPDC): *Edwardsiella septicaemia*  
  Causative agent: *Edwardsiella tarda*  
  Occurrence: Not specified, 1988
  - O eggs  
  - O fry  
  - O females  
  - O larvae  
  - O juveniles  
  - O males  
  - ☐ in the wild  
  - ☐ in culture

**Remarks:** *The disease was reported by Supamataya (1998).*

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*Monograph on Oxyeleotris marmorata* 135
10.18. References used for *Oxyeleotris marmorata*


Anon. 2001. Fish collection database of the National Museum of Natural History (Smithsonian Institution). Smithsonian Institution - Division of Fishes.


Acknowledgments

The persons acknowledged below provided, entered or checked information on at least one of the species detailed in this document

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The Inland Fisheries Research and Development Institute (IFReDI) was established in October 2002 by virtue of Declaration No. 357 of the Ministry of Agriculture, Forestry and Fisheries as a research and development institute under the supervision of the Department of Fisheries (DoF).

Vision
Sustainable development of Cambodia’s inland aquatic resources for the country’s food, security, and economic prosperity.

Mission
To provide scientific information and technical support for the sustainable development and management of inland living aquatic resources in Cambodia, based on biological and socioeconomic research.

Goals
- Scientific research collection, analysis and dissemination of biological and socioeconomic data;
- Development and upgrading of national capacity for the rational management of inland fisheries;
- Maximization of the income of fishermen and farmers;
- Sustainable utilization of the fishery resources.

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This document is a review of all the information published worldwide about ten fish species that contribute significantly to Cambodian fishery resources.

Catfishes  
Pangasius larnaudii;  
Clarias batrachus;  

Cyprinids  
Cirrhinus microlepis;  
Leptobarbus hoevenii;  
Thynnichthys thynnoides;  
Trichogaster microlepis;  
Trichogaster pectoralis;  

Gouramis  
Trichogaster microlepis;  
Trichogaster pectoralis;  

Perch  
Anabas testudineus;  

Croaker  
Boesemania microlepis;  

Goby  
Oxyeleotris marmorata.

These ten reviews result from the extraction and the editing by the authors of the information available in FishBase 2004, a biological database on fishes developed by the WorldFish Center in collaboration with the FAO. www.fishbase.org

In each review summary information is given on the family, the genus and the species. For each species are detailed synonyms, common names and misidentifications; morphology; maximum weight/length/age; distribution and ecology. Whenever available, introductions, diseases and FAO production data are also detailed as well as the biological features of the species (length-weight relationships, growth and mortality, diet, reproduction, genetic information). Each review is concluded by a comprehensive list of bibliographic references.