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A preliminary checklist of the freshwater fishes of the River Dong Nai, South Vietnam

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Abstract. 107 species of fish are recorded based on two surveys of the catchment area of the River Dong Nai (South Vietnam). Seven localities were visited in 1990 and another two in 1999. The ichthyofauna of the River Dong Nai is similar to that of the lower Mekong. No endemic species could be found in the Dong Nai up to now. *Glyptothorax laosensis*, *Glyptothorax* cf. *zainaiensis*, *Hemimyzon papilio*, *Homaloptera smithi* and *Tetraodon barbatus* are recorded for the first time from Vietnam.

Key words. Ichthyofauna, Asia, Indochina, biodiversity.

Introduction

Large areas of mainland Southeast Asia are still not surveyed and our knowledge of fish distribution is still very incomplete (see Kottelat & Whitten 1996 for review). Vietnam is one of these areas, which was sampled only occasionally for most groups of freshwater fish. The river Dong Nai in southern Vietnam has its sources in the mountains of Da Lat and is the most important catchment in southern Vietnam beside the Mekong. With this major Southeast Asian River, the Dong Nai forms one deltaic area. Fishes from the Dong Nai were first studied by Sauvage (1880), who described *Hypsibarbus pierrei* and *Bangana pierrei* from the rapids in the Bien-Hoa Province. Later, Tirant (1884) examined a number of fish species from the surroundings of Saigon and described few of them as new (see Kottelat 1986 for discussion). The ichthyofauna of the Dong Nai was studied more intensively by Mai et al. (1992), who reported 130 species of fresh and brackish water fishes. However, Mai et al. (1992) lacked comparative material and, therefore, many identifications are questionable. During two surveys on the fish fauna of Vietnam, material of 107 species was obtained. The major part of the collection is stored in the Vietnamese-Russian Science and Technological Tropical Center, Ho Chi Minh City. Voucher specimens of all species were deposited in the collections of the Zoologisches Forschungsinstitut und Museum Alexander Koenig (ZFMK). The aim of this paper is to make this material available for further biodiversity studies.

Study area

During the years 1990 and 1999 nine different areas in the catchment of the River Dong Nai have been visited. The time and intensity of sampling was very heterogeneous and in all sampling stations, a number of different habitats and nearby localities were lumped together. Therefore, a correlation of fish species to habitats and ecological conditions is not possible. The stations sampled are:

1. Nature Reserve Xuen Moc, small streams and estuaries, Dong Nai Province at 10° 33' N; 107° 25' E; D. V. Serov; May 1990.

2. Sai Gon River near Thu Duc, large lowland river, Dong Nai Province at 10° 49' N; 106° 45' E; D. V. Serov; February–April 1990, July–October 1990.
3. Vam Co Dong River near Chau Thanh village, medium sized lowland river, Tay Ninh Province at 11E 18' N; 106E 00' E; D. V. Serov; December 1990, March 1991.
4. Dau Tieng Dam Lake at Sai Gon River, very shallow reservoir about 25 x 5 km, Tay Ninh Province at 11° 29' N; 106° 14' E; September–October 1990, D. V. Serov; December 1990.
5. Tri An Dam Lake at Dong Nai River, shallow reservoir about 20 x 18 km, Dong Nai Province at 11° 10' N; 107° 09' E; D. V. Serov; November 1990.
6. Ma Da River near Rang Rang Village, small lowland river, Dong Nai Province at 11° 23' N; 107° 32' E; D. V. Serov; February–March 1990, August 1990.
7. Dong Nai River at Nam Cat Tien Nature Reserve, large lowland river, Dong Nai Province at 11° 34' N; 107° 20' E; D. V. Serov; March–April 1990, December 1990.
8. Da Dung River, small mountain streams, Lam Dong Province at 11° 45' N; 108° 24' E; J. Freyhof & D. V. Serov; January 1999.
9. Dai Tan River, small mountain streams, Lam Dong Province at 11° 47' N; 108° 19' E; J. Freyhof & D. V. Serov; January 1999.

Methods

Fish were caught by beach seines, gill nets, lift-nets, dip-nets and the portable electroshocker DEKA 3000 and fixed directly in 5% formaldehyde. Because of the different structure of habitats and the heterogeneous availability of sampling equipment, the catch efforts were very heterogeneous. Determination follows in most cases Rainboth (1996) and Smith (1945). Nomenclature of most species names follows Kottelat (1998) or Eschmeyer (1998).

Results

The following 107 species out of 30 families are recorded:

Notopteridae

Notopterus notopterus (Pallas, 1769). – Records from localities 2, 3, 5, 6, 7; not preserved.

Engraulidae

Lycothrissa crocodilus (Bleeker, 1851). – Records from localities 2, 3; ZFMK 194357.

Cyprinidae

Barbonymus gonionotus (Bleeker, 1850). – Records from localities 2, 7; ZFMK 18884.

Barbonymus schwanenfeldii (Bleeker, 1853). – Records from locality 7; ZFMK 18964–18967.

Barilius koratensis (Smith, 1931). – Records from localities 6, 7; ZFMK 18926, 18927, 18939–18942.

Brachydanio albolineatus (Blyth, 1860). – Records from localities 1, 6, 7; not preserved.

Chela laubuca (Hamilton, 1822). – Records from localities 6, 7; ZFMK 18866–18880.

Cirrhinus molitorella (Valenciennes in Cuv. & Val., 1844). – Records from localities 5, 7; ZFMK 18856, 18857. The determination follows Roberts (1997).

Cosmochilus harmandi Sauvage, 1878. – Records from localities 5, 7; ZFMK 19256.

Crossocheilus reticulatus Fowler, 1934. – Records from locality 7; ZFMK 18881–18883.

Cyclocheilichthys apogon (Valenciennes, 1842). – Records from localities 3, 4, 7; ZFMK 19266–19275.

Cyclocheilichthys armatus (Valenciennes, 1842). – Records from locality 5; ZFMK 18918.

Esomus metallicus Ahl, 1924. – Records from localities 2, 4, 5, 6, 7; ZFMK 18904–18917.

Garra cambodgiensis (Tirant, 1884). – Records from localities 7, 8, 9; ZFMK 19252–19264, 21406, 21451.

Garra cf. *orientalis* Nichols, 1925. – Records from locality 9; ZFMK 21452–21454. This species could not be identified. The state of taxonomy in Indochinese *Garra* seems to be far from settled. Our *Garra* sp. belongs to the *Garra orientalis*-group and will be studied in the near future.

Hampala macrolepidota van Hasselt, 1823. – Records from localities 2, 3, 4, 5, 6, 7; ZFMK 18983–18990.

- Hypsibarbus pierrei* (Sauvage, 1880). – Records from locality 7; ZFMK 19069–19072.
Hypsibarbus malcolmi (Smith, 1945). – Records from locality 7; ZFMK 19420–19426.
Labiobarbus leptocheila (Valenciennes in Cuv. & Val., 1842). – Records from locality 7; ZFMK 18975, 18976.
Labiobarbus spilopleura Smith, 1934. – Records from localities 3, 4; ZFMK 18968–18974. The taxonomy of *Labiobarbus* follows Roberts (1993).
Lobocheilos melanotaenia (Fowler, 1935). – Records from locality 7; ZFMK 18977.
Lobocheilos rhabdoura (Fowler, 1934). – Records from locality 7; ZFMK 18895.
Morulius chrysophekadion (Bleeker, 1850). – Records from localities 5, 7; ZFMK 19283–19285.
Mystacoleucus marginatus (Valenciennes, 1842). – Records from localities 6, 8; ZFMK 19286–19293.
Osteochilus hasselti (Valenciennes, 1842). – Records from localities 2, 3, 4, 5, 6, 7; ZFMK 18833–18843.
Osteochilus lini Fowler, 1935. – Records from locality 5; not preserved.
Osteochilus melanopleurus (Bleeker, 1852). – Records from localities 3, 4; ZFMK 18858, 18859.
Osteochilus waandersi (Bleeker, 1852). – Records from locality 7; ZFMK 18890–18894.
Paralaubuca typus Bleeker, 1865. – Records from locality 3; ZFMK 19437, 19438.
Poropuntius sp. 1. – Records from localities 5, 6, 7; ZFMK 18924, 18925.
Poropuntius sp. 2. – Records from localities 8, 9; ZFMK 21455–21504. The taxonomy of Indochinese *Poropuntius* is confusing; Roberts (1998c), without examining the types, identified one species as *Poropuntius deauratus* but Kottelat (1998) identified the same species as *Poropuntius laoensis*. Our *Poropuntius* sp. 1 represents this species. Following Roberts (1998c), *Poropuntius* sp. 2 should be considered conspecific with *Poropuntius kontumensis*, described from the Bien Lake north of Pleiku. The original material from Bien Lake is lost. Considering the description of *Poropuntius kontumensis*, it seems unlikely, that it is conspecific with the species from the headwaters of the Dong Nai. Fresh material is needed to clarify this problem.
Puntioplites proctozystron (Bleeker, 1865). – Records from localities 3, 7; ZFMK 18952–18956.
Puntius aurotaeniatus (Tirant, 1885). – Records from locality 5; ZFMK 18919–18923.
Puntius rhombeus Kottelat, 2000. – Records from localities 1, 2, 4, 5, 6, 7, 8, 9; ZFMK 18844–18855, 21505–21510.
Puntius brevis (Bleeker, 1850). – Records from localities 1, 2, 4, 5, 6, 7; ZFMK 18860–18865.
Puntius jacobusboehlkei (Fowler, 1858). – Records from locality 7; ZFMK 18978. Taxonomy of this species follows Kottelat (1998).
Puntius partipentazona (Fowler, 1934). – Records from locality 4; ZFMK 19414, 19415.
Rasbora aurotaenia Tirant, 1885. – Records from localities 2, 6, 7; ZFMK 18896–18903.
Rasbora borapetensis Smith, 1934. – Records from locality 4; ZFMK 19350–19378.
Rasbora daniconius (Hamilton, 1822). – Records from locality 7; ZFMK 18928–18938.
Rasbora daniei Tirant, 1885. – Records from localities 1, 2, 3, 4, 5, 6, 7, 8, 9; ZFMK 18885–18889, 19308–19315, 21511–21544.

Gyrinocheilidae

- Gyrinocheilus aymonieri* (Tirant, 1884). – Records from locality 7; not preserved.

Balitoridae

- Annamia normani* (Hora, 1931). – Records from localities 8, 9; ZFMK 21544–21666.
Hemimyzon papilio Kottelat, 1998. – Records from locality 9; ZFMK 21667–21702.
Homaloptera smithi Hora, 1932. – Records from locality 9; ZFMK 21703–21712.
Nemacheilus platiceps Kottelat, 1990. – Records from localities 1, 7; ZFMK 19175–19210.
Nemacheilus pallidus Kottelat, 1990. – Records from locality 7; ZFMK 19396, 19397.
Schistura sp. 1. – Records from localities 8, 9; ZFMK 23641–23652.
Schistura sp. 2. – Records from localities 8, 9; ZFMK 23580–23640. The material of *Schistura* is under study.

Cobitidae

Botia beanforti Smith, 1931. – Records from locality 7; ZFMK 19233–19240.

Botia eos Taki, 1972. – Records from locality 7; ZFMK 19419.

Botia morleti Tirant, 1885. – Records from locality 7; ZFMK 19241–19247.

Lepidocephalichthys hasselti (Valenciennes, 1846). – Records from localities 5, 6, 7; ZFMK 19140–19171.

Misgurnus anguillicaudatus (Cantor, 1842). – Records from locality 9; ZFMK 21713.

Bagridae

Mystus gulio (Hamilton, 1822). – Records from locality 6; ZFMK 19106–19108.

Mystus mysticemus Roberts, 1992. – Records from locality 7; ZFMK 19385–19386.

Mystus singaringan (Bleeker, 1846). – Records from localities 3, 4, 5, 7; ZFMK 19093–19099.

Pseudomystus siamensis Regan, 1913. – Records from localities 4, 7; ZFMK 19405, 19406.

Siluridae

Kryptopterus cheveyi Durand, 1940. – Records from localities 3, 5; ZFMK 19100–19105.

Micronema bleekeri (Günther, 1864). – Records from locality 7; ZFMK 19092.

Ompok bimaculatus (Bloch, 1794). – Records from localities 2, 4, 5, 6, 7; ZFMK 19085–19091.

Wallago attu (Bloch & Schneider, 1801). – Records from locality 4; ZFMK 19416, 19417.

Schilbeidae

Laides hexanema (Bleeker, 1852). – Records from locality 7; ZFMK 19067, 19068.

Pangasiidae

Pangasius pleurotaenia Sauvage, 1878. – Records from locality 7; ZFMK 19073–19075.

Sisoridae

Bagarius bagarius (Hamilton, 1822). – Records from localities 5, 7; ZFMK 19066.

Glyptothorax laosensis Fowler, 1934. – Records from localities 8, 9; ZFMK 21714–21755.

Glyptothorax cf. *zainiensis* Wu, He & Chu, 1981. – Records from localities 8, 9; ZFMK 21756–21776.

Clariidae

Clarias batrachus (Linnaeus, 1758). – Records from localities 2, 5, 6, 7; ZFMK 19349.

Clarias macrocephalus Guenther, 1864. – Records from localities 2, 4, 5; not preserved.

Adrianichthyidae

Oryzias haugiangensis Roberts, 1998. – Records from localities 1, 2; ZFMK 19137–19138.

Determination follows Roberts (1998b).

Poeciliidae

Gambusia holbrooki (Girard 1859). – Records from locality 9; ZFMK 21785–21788.

Poecilia reticulata Peters, 1860. – Records from locality 9; ZFMK 21784.

Belonidae

Xenentodon cancila (Hamilton, 1822). – Records from localities 3, 4; ZFMK 19344–19348.

Hemiramphidae

Dermogenys siamensis Fowler, 1934. – Records from localities 1, 2, 5, 6; ZFMK 19121–19125.

Zenarchopterus sp. – Records from localities 3, 7; ZFMK 19418.

Aplocheilidae

Aplocheilichthys panchax (Hamilton, 1822). – Records from localities 1, 2; ZFMK 19117–19120.

Syngnathidae

Doryichthys boaja (Bleeker, 1851). – Records from localities 3, 4; ZFMK 19321–19329.

Synbranchidae

Monopterus albus (Zuiew, 1787). – Records from localities 2, 5, 6, 8; ZFMK 19330.

Mastacembelidae

Macrogathus semiocellatus Roberts, 1986. – Records from locality 5; ZFMK 19398. Taxonomy follows Kottelat (1998).

Macrogathus siamensis (Günther, 1861). – Records from localities 4, 5; ZFMK 19316 – 19320.

Chandidae

Ambassis cf. *buruensis* Bleeker, 1856. – Records from locality 4; ZFMK 19172–19174.

Parambassis wolffii (Bleeker, 1851). – Records from locality 3; ZFMK 18991–18997.

Parambassis siamensis (Fowler, 1937). – Records from localities 2, 4, 5, 6, 7; ZFMK 19031–19065. The determination and nomenclature follows Roberts (1994).

Datnoidae

Datnoides pulcher (Kottelat, 1998). – Records from locality 3; ZFMK 19135.

Nandidae

Nandus oxyrhynchus Ng, Vidthayanon & Ng, 1996. – Records from locality 3; not preserved. This nandine perch could not be determined, because the material got lost. Following the distribution data given by Ng et al. (1996), it should be this species.

Pristolepididae

Pristolepis fasciata (Bleeker, 1851). – Records from localities 2, 4, 5, 6, 7; ZFMK 19004–19012.

Gobiidae

Brachygobius sua (Smith, 1931). – Records from locality 2; ZFMK 19213–19218.

Eleotris fusca (Schneider & Forster, 1801). – Records from locality 2; ZFMK 19342, 19343.

Glossogobius giuris (Hamilton, 1822). – Records from localities 1, 2, 3; ZFMK 19013, 19014.

Gobiopertus chuno (Hamilton, 1822). – Records from locality 2; ZFMK 19227, 19228.

Oxyeleotris marmorata (Bleeker, 1852). – Records from localities 2, 5; ZFMK 19407, 19408.

Oxyeleotris siamensis (Günther, 1861). – Records from localities 2, 5; ZFMK 19387–19395.

Periophthalmodon schlosseri (Pallas, 1770). – Records from localities 1, 2; ZFMK 19427–19434.

Rhinogobius ocellatus (Fowler, 1937). – Records from localities 1, 2, 7; ZFMK 19132–19134.

Anabantidae

Anabas testudineus (Bloch, 1792). – Records from localities 1, 2, 4, 5, 7, 9; ZFMK 19002, 19003, 21777.

Helostomatidae

Helostoma temminckii Cuvier, 1831. – Records from locality 2; ZFMK 18998.

Osphronemidae

Macropodus opercularis (Linnaeus, 1758). – Records from locality 9; ZFMK 21780.

Trichogaster microlepis (Günther, 1861). – Records from locality 3; ZFMK 19000, 19001.

Trichogaster pectoralis (Regan, 1910). – Records from locality 2; ZFMK 18999.

Trichogaster trichopterus (Pallas, 1770). – Records from localities 1, 2, 4, 5, 6, 7, 8; ZFMK 19015–19025, 21781.

Trichopsis vittata (Cuvier, 1831). – Records from localities 2, 4, 5, 6; ZFMK 19126–19131.

Channidae

Channa gachua Hamilton, 1822. – Records from localities 1, 2, 4, 5, 6, 7, 9; ZFMK 19026–19030, 21782–21783.

Channa micropeltes (Cuvier, 1831). – Records from localities 2, 4, 7; ZFMK 19112–19116.

Channa striata (Bloch, 1793). – Records from localities 2, 5; ZFMK 19534.

Tetraodontidae

Tetraodon barbatus Roberts, 1998. – Records from localities 1, 5; ZFMK 19340, 19341.

Tetraodon fangi Pellegrin & Chevey, 1940. – Records from locality 5; ZFMK 19436.

Tetraodon cambodginensis Chabanaud, 1923. – Records from locality 5; ZFMK 19136. Nomenclature and identification of pufferfishes follows Dekkers (1975). The specimen keying out as *T. leiurus* Bleeker, 1851 correspond to *T. barbatus* described by Roberts (1998a).

Discussion

Because of the lack of comparison material and taxonomic problems in the study published by Mai et al. (1992), it is difficult to give a complete list of the fish species known from the Dong Nai. The following examination of the species number of the Dong Nai has therefore to be considered as preliminary. Mai et al. (1992) reported 130 species, from which about 18 were typical estuarine (Ariidae, Cynoglossidae, Sparidae, Synbranchidae, Polynemidae, Plotosidae, Tetraodontidae). Because of the choice of sampling localities, in this study, only two estuarine species (*Lycothrissa crocodilus*, *Periophthalmodon schlosseri*) were obtained. From the 112 freshwater species recorded by Mai et al. (1992), 54 (48.2 %) were not found during the recent study. From the 105 pure freshwater species found in this study, 47 (44.8 %) were not recorded from the Dong Nai by Mai et al. (1992). This difference might originate from different methods used in different habitats, or from poor identifications. Including the estuarine species, the new study adds 47 freshwater and 2 estuarine species to the ichthyofauna of the Dong Nai and therefore 179 species are recorded. Concerning the high amount of first records from the Dong Nai, it seems very likely that this river is inhabited by more than 200 different species. During this study, some species could be recorded the first time for Vietnam (*Glyptothorax laosensis*, *Glyptothorax* cf. *zainaensis*, *Hemimyzon papilio*, *Homaloptera smithi*, *Tetraodon barbatus*) or their known range could be expanded notably to the south (*Macropodus opercularis*, *Misgurnus anguillicaudatus*). It could not be ruled out, that *Macropodus opercularis*, *Misgurnus anguillicaudatus* are introduced into the Dong Nai. The Dong Nai ichthyofauna is obviously less diverse but related to the fauna of the lower Mekong with which the Dong Nai has many connections in the delta area. Workman (1975) postulated, that the River Dong Nai was a tributary of the lower Mekong during glacial times. Even in this study, no species could be found to be endemic to the Dong Nai.

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Zusammenfassung

Während zweier Untersuchungen in den Jahren 1990 und 1999 wurden an zusammen neun Probestellen im Flussgebiet des Dong Nai in Süd-Vietnam insgesamt 107 verschiedene Fischarten nachgewiesen. Die Fauna des Dong Nai ist der des unteren Mekong sehr ähnlich; endemische Arten konnten im Dong Nai bisher nicht gefunden werden. *Glyptothorax laosensis*, *Glyptothorax* cf. *zainaensis*, *Hemimyzon papilio*, *Homaloptera smithi* und *Tetraodon barbatus* werden erstmals für Vietnam gemeldet.

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