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Ichthyofauna in the Phong Nha – Ke Bang National Park from Vietnam

Tuan HA*

Department of Biology, Vinh University, Nghe An Province, Vietnam

Abstract

Ichthyofauna in the phong Nha – Ke bang national Park is typically characterised by tectonic limestone structure with 300 caves, underground rivers and valuably rare flora and fauna in the Vietnam Red Book and World Red Book. Total length of cave system in this area is estimated about 80 km but joint team of Vietnamese and English explorers only discovered 20 km, in which 17 km in Phong Nha area and 3 km in Ke Bang area. Due to naturally special block Karst Phong Nha-Ke Bang, phenomenon of underground water flowing is widespread. In this region, some small streams flow into the Rao Thuong channel with some opening punctuated segments and into cave system as underground river and then gathered into Chay River and Trooc river and creat a lagest tributary of the Gianh River.

Keywords: Cave; Underground rivers; Species; Chay river

Introduction

The Phong Nha – Ke Bang National Park locates in the range of coordinates from 17°21' to 17°39' north latitude and from 105°57' to 106°24' east longitude. This National Park is typically characterised by tectonic limestone structure with 300 caves, underground rivers and valuably rare flora and fauna in the Vietnam Red Book and World Red Book. Total length of cave system in this area is estimated about 80 km but joint team of Vietnamese and English explorers only discovered 20 km, in which 17 km in Phong Nha area and 3 km in Ke Bang area. Due to naturally special block Karst Phong Nha - Ke Bang, phenomenon of underground water flowing is widespread. In this region, some small streams flow into the Rao Thuong channel with some opening punctuated segments and into cave system as underground river and then gathered into Chay River and Trooc river and creat a lagest tributary of the Gianh River.

Species composition of fish fauna in the Phong Nha – Ke Bang National Park were documented by Tu et al. [1]. In these researches, 72 fish species were indentified, but 12 species were still unknown. In the period of 1998 to 2001, researchers of Institute of Ecology and Biological Resources indentified 75 fish species, but 8 species were unknown [2]. In addition, 162 species were indentified by Nguyen Thai Tu and Ho Anh Tuan [3], however there were 54 species are still not named. In the same year, Ngo Sy Van and Tran Anh Tuan also reported 121 species in this area but 23 species not identified [2]. These studies indicate the problem of fish composition in the Phong Nha – Ke Bang National Park still under estimation, not the same classification and getting dificulty to named many species. This study aim to solve these dificulties with the title "Ichthyofauna in the Phong Nha - Ke Bang National Park from Vietnam".

Material and Methods

Fish specimens were collected mainly from fishing men in these survey regions. Fishing tools are fishnets, rackets, casting – net, multi size fishing – rods and also professional tools of fish men such as: fishing basket, fishing traps, etc. Some other specimens was bought from local people. All samples were given full information in field trip diary, sampling notes, taking pictures and fixed with formaline 8-10% and reserving with formaline 5% in Animal Laboratory of Department of Biology, Vinh University (Figure 1).

We use the following materials to Identification species: Chen Yiyu [4]; Chu Xinluo and Chen Yinrui [5]; Chu Xinluo [6]; Freyhof and Serov [7]; Freyhof and Herder [8]; Carpenter KE and Niem VH [9]; Imamura et al. [10]; Chen, Weng [11]; Knapp and Platycephalidae [12]; Kottelat [13]; Yen [14]; Menon [15]; Nakabo [16]; Phung [17]; Huong [18]; Thi [19,20]; Hao [21]; Luc [22]; Prokofiev [23]; Walter [24]; William [25]; Yokogawa KH [26]; Yue P [27].

List of classes, orders, families and subfamilies is sorted by William [25]. Genera of subfamilies and species of genera is sorted by a to z [28-30].

Results and Discussion

We conducted 12 field surveys in 2003–2011 at 17 study sites and collected 2349 specimens. Over time of analysis, we have identified 119 fish species belong to 89 genera, 35 families of 12 orders distributed in ichthyofauna of the Phong Nha - Ke Bang National Park from Vietnam (Table 1).

Notes: (1) Number the order; (2) Scientific name; (3) RB: Species in the Vietnam Red Book 2007; (4) IUCN: Species in the IUCN Red List of Threatened Species; (5) EV: Species with precious economic values; (6) Species distribute inside cave habitat; Not Evaluated (NE); Data Deficient (DD); Least Concern (LC); Near Threatened (NT); Vulnerable (VU); Endangered (En); Critically Endangered (CR); Add: Supplemental species in ichthyofauna of the Phong Nha - Ke Bang National Park from Vietnam [31].

According to Vietnam Red Book 2007 [32], there were 5 species identified in ichthyofauna of the Phong Nha - Ke Bang National Park belonging to conservation list such as: *Anguilla marmorata, Konosirus punctatus; Hypsibarbus annamensis* (Level VU), *Clupanodon thrissa* (Level EN) and *Bostrychus sinensis* (Level CR). In which, 2 species: *Anguilla marmorata* and *Clupanodon thrissa*, were all found many time in high quantity. Some species such as *Hypsibarbus annamensis, Clupanodon thrissa* and *Bostrychus sinensis* were found only 1 time with low quantity.

List of distributive fish species in ichthyofauna of the Phong Nha - Ke Bang National Park in the Table 1 is recorded in the IUCN Red List of Threaten Species as below [33-38]: Not Evaluated (NE): 29 species; Data Deficient (DD): 25 species; Least Concern (LC): 58 species; Near

***Corresponding author:** Tuan HA, Department of Biology Vinh University, Nghe An Province, Vietnam, Tel: 0903 492 899; E-mail: hoanhtuan18@gmail.com

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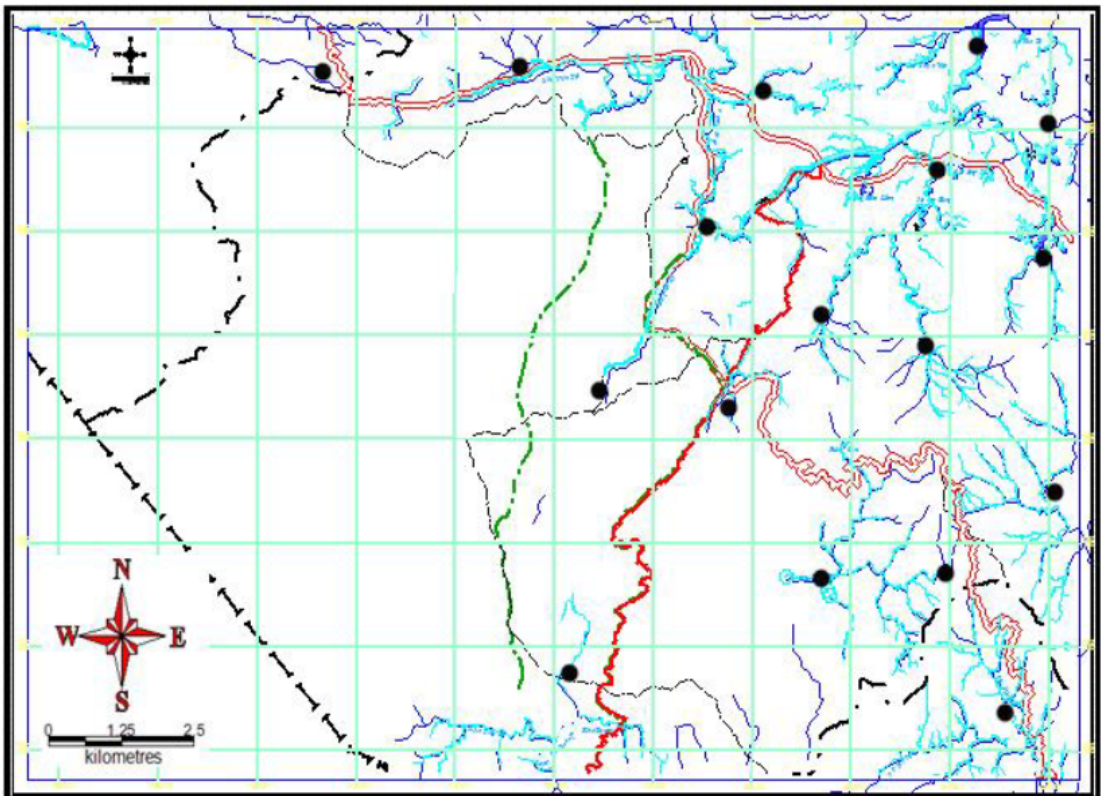

Figure 1: Map study fish in Phong Nha – Ke Bang.

N⁰	Scientific name	RB	IUCN	EV	Cave
I.	**Order osteoglossiformes**				
(1).	**Family notopteridae**				
	Notopterus notopterus (Pallas, 1769)		LC	*	
II.	**Order Anguilliformes**				
(2).	**Family Anguillidae**				
	Anguilla marmorata Quoy and Gaimard, 1824	VU	LC	*	+
III.	**Order Clupeiformes**				
(3).	**Family Clupeidae**				
	Clupanodon thrissa (Linnaeus, 1758)	EN	NE	*	
	Konosirus punctatus (Tem. and Sch., 1846)	VU	NE	*	
IV.	**Order Cypriniformes**				
(4).	**Family Cyprinidae**				
1	**Subfamily Acheilognathinae**				
	Acheilognathus lamus Tu, 1983		NE		
	Acheilognathus tonkinensis (Vailant, 1892)		DD		+
	Rhodeus kyphus (Yen, 1978)		NE		
	Rhodeus ocellatus (Kener, 1867)		DD		+
	Rhodeus spinalis Oshima, 1926		LC		
2	**Subfamily Cultrinae**				
	Hemiculter leucisculus (Basilewsky, 1855)		LC	*	
3	**Subfamily Cyprininae**				
	Carassioides acuminatus (Richardson, 1846)		LC	*	
	Carassioides phongnhaensis Tu and Tuan, 2003		DD		
	Carassius auratus (Linnaeus, 1785)		LC	*	
	Cyprinus carpio Linnaeus, 1758		VU	*	
	Cyprinus hieni Tu and Tuan, 2003		DD		
	Cyprinus quidatensis Tu, 1999		DD		
4	**Subfamily Barbinae**				
	Puntius brevis (Bleeker, 1849)		LC		

N⁰	Scientific name	RB	IUCN	EV	Cave
	Puntius semifasciolatus (Günther, 1868)		LC		
5	**Subfamily Labeoninae**				
	Cirrhinus molitorella (Valenciennes, 1844)		NT	*	
	Garra imberba Garman, 1912		DD	*	+
	Osteochilus lini Fowler, 1935		LC		
	Osteochilus salsburyi Nichols and Pope, 1927		LC	*	
6	**Subfamily Squaliobarbinae**				
	Ctenopharyngodon idella (Val., 1844)		NE	*	
	Squaliobarbus curriculus (Richardson, 1846)		DD	*	
7	**Subfamily Xenocypridinae (Xenocyprinae)**				
	Hypophthalmichthys molitrix (Valenciennes, 1844)		NT	*	
8	**Subfamily Gobioninae**				
	Hemibarbus umbrifer (Lin, 1931)		LC	*	
	Microphysogobio kachekensis (Oshima, 1926)		LC	*	
	Sarcocheilichthys parvus Nichols, 1930		LC		
	Squalidus argentatus (Sau. and Dab. Thi., 1874)		DD		
9	**Subfamily Danioninae**				
	Devario fangfangae (Kottelat, 2000) Add		LC		
	Devario gibber (Kottelat, 2000) Add		LC		
	Esomus metallicus Ahl, 1923 Add		LC		
	Esomus longimanus (Lunel, 1881) Add		DD		
	Rasbora steineri Nichols and Pope, 1927		LC		+
10	**Incertae sedis Subfamily**				
	Hypsibarbus annamensis (Pel. and Che., 1936)	VU	DD	*	
	Hypsibarbus macrosquamatus (Mai, 1978)		DD	*	
	Nicholsicypris dorsohorizontalis Ng. & Do., 1969		NE	*	+
	Neolissochilus benasi (Pellegrin and Chevey, 1936)		DD	*	+
	Onychostoma gerlachi (Peters, 1881)		NT	*	
	Opsariichthys bidens Günther, 1873		LC	*	+
	Paraspinibarbus macracanthus (Pel. and Che., 1936)		DD	*	
	Poropuntius solitus Kottelat, 2000 Add		EN	*	+
	Spinibarbus denticulatus (Oshima, 1926)		LC	*	+
	Spinibarbus hollandi Oshima, 1919		DD	*	
11	**Subfamily Alburninae**				
	Metzia lineata (Pellegrin, 1907)		LC		
(5).	**Family Cobitidae**				
12	**Subfamily Cobitinae**				
	Cobitis laoensis (Sauvage, 1878)		LC	*	+
	Misgurnus anguillicaulatus (Cantor, 1842)		NE	*	+
	Misgurnus mizolepis Günther, 1888		NE	*	+
(6).	**Family Balitoridae**				
	Annamia normani (Hora, 1931)		LC		
	Sewellia lineolata (Valenciennes, 1836)		VU		
(7).	**Family Nemacheilidae**				
	Schistura finis Kottelat, 2000 Add		DD		
	Schistura hingi (Herre, 1934)		LC	*	
	Schistura pervagata Kottelat, 1998		LC	*	
	Schistura kottelati Tuan et al. Add		NE		
	Traccatichthys taeniatus (Pel. and Che., 1936)		NE	*	
V.	**Order Siluriformes**				
(8).	**Family Bagridae**				
	Mystus gulio (Hamilton, 1822)		LC		
	Hemibagrus centralus Mai, 1978		DD	*	
	Tachysurus virgatus (Oshima, 1926)		DD	*	
(9).	**Family Siluridae**				
	Silurus asotus Linnaeus, 1758		LC	*	+
	Pterocryptis cochinchinensis (Val., 1840)		LC	*	+
(10).	**Family Sisoridae**				
13	**Subfamily Glyptosterninae**				
	Glyptothorax laosensis Fowler, 1934 Add		LC		

N⁰	Scientific name	RB	IUCN	EV	Cave
	Glyptothorax interspinalus (Mai, 1978) Add		**NT**		
	Glyptothorax quadriocellatus (Mai, 1978)		**DD**		
	Glyptothorax zanaensis Wu, He and Chu, 1981 Add		**NE**		+
(11).	**Family Clariida**e				
	Clarias fuscus (Linnaeus, 1758)		**LC**	*	
VI.	**Order Aulopiforme**s				
(12).	**Family Synodontida**e				
14	**Subfamily Harpadontina**e				
	Saurida elongata (Tem. and Sch., 1846)		**NE**	*	
VII.	**Order Beloniforme**s				
(13).	**Family Hemiramphida**e				
	Hyporhamphus sinensis (Günther 1866)		**LC**		
VIII.	**Order Synbranchiforme**s				
(14).	**Family Synbranchida**e				
	Monopterus albus (Zuiew, 1793)		**LC**	*	+
(15).	**Family Mastacembelida**e				
	Mastacembelus armatus (Lacepède, 1800)		**LC**	*	+
	Sinobdella sinensis (Bleeker, 1870)		**LC**	*	+
IX.	**Order Scorpaeniforme**s				
(16).	**Family Platycephalida**e				
	Platycephalus indicus (Linnaeus, 1758)		**DD**	*	
X.	**Order Perciforme**s				
(17).	**Family Ambassida**e				
	Ambassis ambassis (Lacepède, 1802)		**LC**		
(18).	**Family Percichthyida**e				
	Coreoperca whiteheadi Boulenger, 1900		**LC**	*	
(19).	**Family Latida**e				
	Lates calcarifer (Bloch, 1790)		**NE**	*	
(20).	**Family Terapontida**e				
	Terapon jarbua (Forsskål, 1775)		**LC**	*	
	Pelates sexlineatus (Quoy and Gaimard, 1825)		**LC**	*	
(21).	**Family Leiognathida**e				
	Leiognathus equulus (Forsskål, 1775)		**LC**		
(22).	**Family Gerreida**e				
	Gerres limbatus Cuvier, 1830		**LC**	*	
	Gerres decacanthus (Bleeker, 1864)		**NE**		
	Gerres filamentosus Cuvier, 1829		**LC**	*	
(23).	**Family Monodactylida**e				
	Monodactylus argenteus (Linnaeus, 1758)		**NE**		
(24).	**Family Mugilida**e				
	Liza affinis (Günther, 1861)		**NE**	*	
(25).	**Family Cichlida**e				
15	**Subfamily Pseudocrenilabrina**e				
	Oreochromis niloticus (Linnaeus, 1758)		**NE**	*	
(26).	**Family Odontobutida**e				
	Sineleotris chalmersi Nichols and Pope, 1927		**LC**	*	
	Sineleotris namxamensis Chen and Kottelat, 2004		**DD**	*	
(27).	**Family Eleotrida**e				
16	**Subfamily Butina**e				
	Bostrychus sinensis Lacepède, 1801	**CR**	**LC**	*	
	Butis butis (Hamilton, 1822)		**LC**		
	Butis koilomatodon (Bleek, 1849)		**NE**		
17	**Subfamily Eleotrina**e				
	Eleotris fusca (Forster, 1801)		**LC**		
	Eleotris melanosoma Bleeker, 1853		**LC**		
(28).	**Family Gobiida**e				
18	**Subfamily Gobionellina**e				
	Oligolepis acutipennis (Valenciennes, 1837)		**DD**		
	Oxyurichthys microlepis (Bleek, 1849)		**NE**		
	Oxyurichthys tentacularis (Valenciennes, 1837)		**NE**	*	

N⁰	Scientific name	RB	IUCN	EV	Cave
	Rhinogobius giurinus (Rutter, 1897)		**LC**		
	Rhinogobius leavelli (Herre, 1935)		**LC**	*	
	Tridentiger trigonocephalus (Gill, 1859)		**NE**	*	
	Papuligobius uniporus Chen and Kottelat, 2003		**DD**	*	
19	**Subfamily Oxudercina**e				
	Pseudapocryptes elongatus (Cuvier, 1816)		**LC**	*	
20	**Subfamily Gobiina**e				
	Acentrogobius nebulosus (Forsskål, 1775)		**NE**		
	Favonigobius aliciae (Herre, 1936)		**NE**		
	Glossogobius giuris (Hamilton, 1822)		**LC**	*	+
	Glossogobius olivaceus (Tem. and Sch., 1845)		**LC**		
	Paragobiodon echinocephalus (Ruppell, 1828)		**NE**		
	Psammogobius biocellatus (Valenciennes, 1837)		**LC**		
	Yongeichthys criniger (Valenciennes, 1837)		**NE**		
(29).	**Family Scatophagidae**				
	Scatophagus argus (Linnaeus, 1766)		**LC**	*	
(30).	**Family Anabantida**e				
	Anabas testudineus (Bloch, 1792)		**DD**	*	
(31).	**Family Osphronemida**e				
21	**Subfamily Macropodusina**e				
	Macropodus opercularis (Linneaeus, 1758)		**LC**		
	Macropodus spechti Schreitmüller, 1936 Add		**DD**		
	Macropodus erythropterus Frey. and Her., 2002 Add		**DD**		
	Trichopsis vittata (Cuvier, 1831) Add		**LC**		
22	**Subfamily Luciocephalina**e				
	Trichopodus trichopterus (Pallas, 1770)		**LC**		
(32).	**Family Channida**e				
	Channa striata (Bloch, 1793)		**LC**	*	
	Channa gachua (Hamilton, 1822)		**LC**	*	+
XI.	**Order Pleuronectiforme**s				
(33).	**Family Paralichthyida**e				
	Paralichthys olivaceus (Tem. and Sch., 1846) Add		**NE**		
(34).	**Family Soleida**e				
	Aseraggodes xenicus (Matsubara and Ochiai, 1963) Add		**NE**	*	
	Heteromycteris japonicus (Tem. and Sch., 1846) Add		**NE**		
	Solea ovata Richardson, 1846		**NE**	*	
XII.	**Order Tetraodontiforme**s				
(35).	**Family Tetraodontida**e				
	Lagocephalus sceleratus (Gmelin, 1789) Add		**LC**		
	Total	**5**	**119**	**65**	**21**

*Species with precious economic value
+Species distribute inside cave habitat

Table 1: Composition of fish species in ichthyofauna Phong Nha – Ke Bang national Park.

Threatened (NT): 4 species; Vulnerable (VU): 2 species; Endangered (En): 1 species.

In our observation, there were 65 species providing quite high yield in in ichthyofauna of the Phong Nha - Ke Bang National Park tributary. These species are also precious marketing and local people consume them every day. Therefore, these species were considered as economic development for local fish – men in this ichthyofauna. Having 21 species distributed in caves, add the distribution area for 17 species in ichthyofauna of the Phong Nha - Ke Bang National Park.

Conclusion

Twelfth survey on the fish species compostion of in ichthyofauna of the Phong Nha - Ke Bang National Park from Vietnam were carried out from 2003 to 2011. 119 fish species belong to 89 genera, 35 families of 12 orders are recorded, 5 rare species recorded in the Red Book of Vietnam [32], 65 species having economic value, species is recorded in the IUCN Red List of Threaten Species as below: Not Evaluated (NE): 29 species; Data Deficient (DD): 25 species; Least Concern (LC): 58 species; Near Threatened (NT): 4 species; Vulnerable (VU): 2 species; Endangered (En): 1 species. 21 species distributed in caves add the distribution area for 17 species in ichthyofauna of the Phong Nha - Ke Bang National Park.

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