

The Biodiversity of Freshwater Fishes and Different Measures Applied for Its Conservation in Vietnam

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INTRODUCTION

During the last three decades, I have opportunities to carry out many surveys on the biodiversity of freshwater fishes of almost important ecosystems distributed all over the country of Vietnam (Fig.1). Many papers have been reported [1], [2], [3], [4].

METHODS

For surveys on the biodiversity of freshwater fishes, I used the book of T. Bagenal, 1978 [5]. For ichthyogeographical analysis, I applied the methods used in zoogeographical analysis. For identification of fish species, I used the books dealing on systematic of freshwater fishes at the Oriental Region (China, India, Thailand, Vietnam).

RESULTS AND DISCUSSION

1. Freshwater Fish Species Composition

There are 471 freshwater fish species living in different types of freshwater ecosystems including streams, rivers, lakes, ponds, ricefields, wetlands, ground water streams, dam reservoirs and brackish lagoons.

They belonging to 217 genera and 48 families. Some of largest fish families are: Cyprinidae - 204 species, Cobitidae - 26, Bagridae - 22, Homalopteridae - 18, Gobiidae - 16, Siluridae - 15, Schilbeidae - 13, Ariidae - 12, Eleotridae - 11, Cynoglossidae - 11. (Table 1).

Among them, there are more than 50 endemic species. Many are described as new species recently, I would like remember particularly here that there is one new specie described by The Japanese Prince (now is The King) **Akihito** : *Glossogobius sparsipapillus* [6].

Comparing with medium-sized countries as Vietnam with 33 x 10⁶ ha surface area, Vietnam is considered as a country with high biodiversity in freshwater fishes

2. Freshwater Ichthyogeographical Zones

Vietnam could be divided into 10 ichthyogeographical units in the level of Ichthyogeographical district belonging to the two major subregions of the Oriental Region namely South China subregion and Indochinese subregion (Fig. 2).

The South China subregion has 203 fish species belonging to 114 genera and 27 families. The Indochinese subregion has 255 fish species belonging to 130 genera and 43 families.

The two subregions has only 11 species in common. The 6 districts have mountainous fish fauna and the 3 districts have deltaic fish fauna.

3. Inland fisheries and freshwater aquaculture

Inland fisheries and freshwater aquaculture are good developed in Vietnam. Vietnam's surface water resources are provided by 15 major rivers distributed all over in the country.

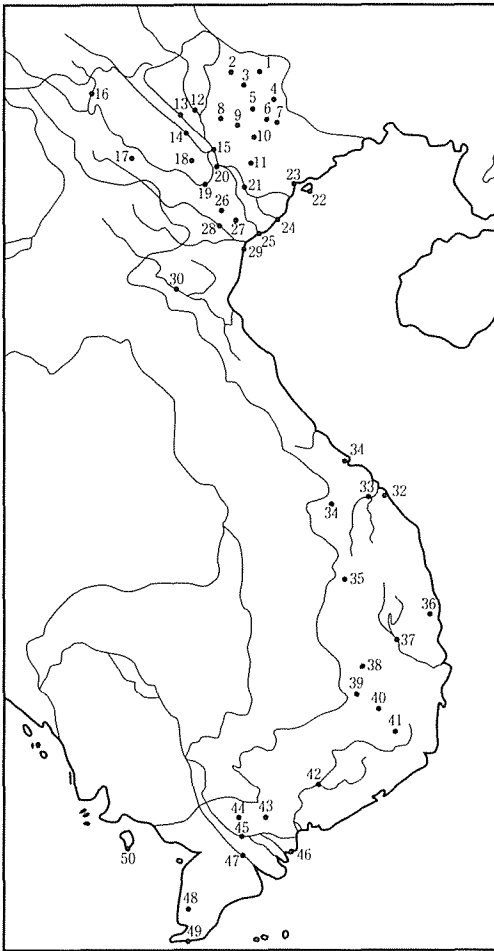


Fig. 1: (Left)
 Map showing 50 waterbodies
 of Vietnam which have been
 examined for their fish fauna.

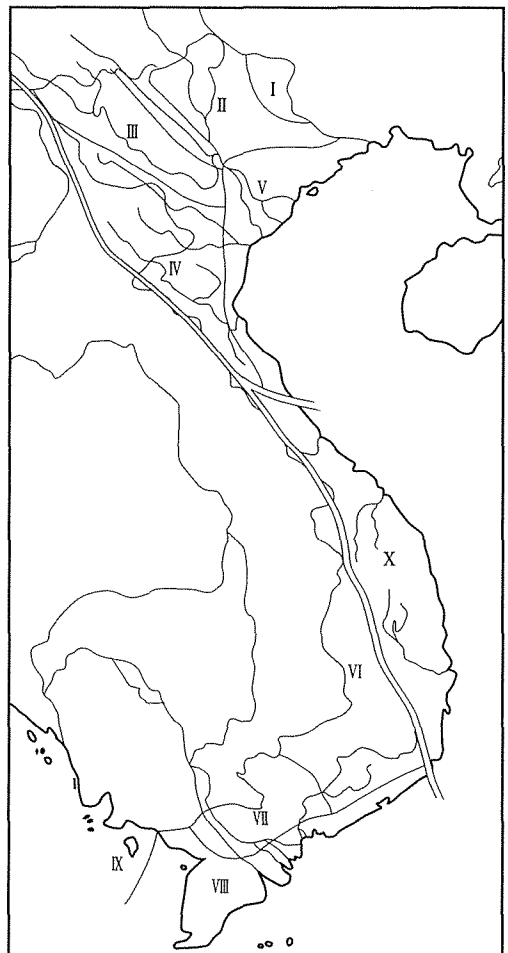


Fig. 2: (Right)
 Map showing zoogeographical
 zones for the freshwater fishes
 of Vietnam:
 I, II, III, IV, V: South China Subregion
 VI, VII, VIII, IX: Indochinese Subregion
 X: Overlapping district

Table 1: List of families with number of genera and species of freshwater fishes of Vietnam.

No	Name of family	Number of genera	Number of species	No	Name of family	Number of genera	Number of species
1.	Elopidae	1	1	25.	Anguillidae	1	2
2.	Clupeidae	6	9	26.	Psettodidae	1	1
3.	Engraulidae	5	8	27.	Bothidae	1	1
4.	Notopteridae	1	2	28.	Soleidae	2	8
5.	Mastacembelidae	1	4	29.	Cynoglossidae	2	11
6.	Salangidae	3	3	30.	Syngnathidae	1	1
7.	Cyprinidae	87	204	31.	Ophiocephalidae	2	7
8.	Ophichthyidae	1	1	32.	Polynemidae	2	3
9.	Flutidae	1	1	33.	Anabantidae	5	9
10.	Symbranchidae	2	2	34.	Centropomidae	2	5
11.	Homalopteridae	4	18	35.	Toxotidae	1	1
12.	Gyrinocheilidae	1	2	36.	Sparidae	1	1
13.	Cobitidae	9	26	37.	Serranidae	2	3
14.	Siluridae	8	15	38.	Lobotidae	1	2
15.	Clariidae	1	3	39.	Scatophagidae	1	1
16.	Plotosidae	1	1	40.	Nandidae	2	2
17.	Bagrgridae	8	22	41.	Sciaenidae	1	1
18.	Sisoridae	4	8	42.	Eleotridae	6	11
19.	Ariidae	3	12	43.	Gobiidae	11	16
20.	Schilbeidae	5	13	44.	Periophthalmidae	1	1
21.	Cyprinodontidae	2	3	45.	Apocrypteidae	3	3
22.	Poecilidae	1	1	46.	Gobioididae	2	3
23.	Belonidae	4	6	47.	Lagocephalidae	2	2
24.	Hemirhamphidae	2	4	48.	Tetrodontidae	3	7

Total of 48 families with 217 genera and 471 species.

Table 2: List of 50 economical freshwater fish species living in natural waterbodies of Vietnam.

1. <i>Clupanodon thrissa</i>	2. <i>Hilsa reevesii</i>
3. <i>Coilia grayi</i>	4. <i>Notopterus notopterus</i>
5. <i>Cyprinus centralus</i>	6. <i>Catlocarpio siamensis</i>
7. <i>Puntius altus</i>	8. <i>Lissochilus krempfi</i>
9. <i>Altigena lemassoni</i>	10. <i>Megalobrama terminalis</i>
11. <i>Spinibarbichthys denticulatus</i>	12. <i>Semilabeo notabilis</i>
13. <i>Cirrhinus microlepis</i>	14. <i>Puntioplites proctozysron</i>
15. <i>Hampala macrolepidota</i>	16. <i>Morulus chrysophekadion</i>
17. <i>Cyclocheilichthys enoplos</i>	18. <i>Hemiculter leucisculus</i>
19. <i>Thynnichthys thynnoides</i>	20. <i>Elopichthys bambusa</i>
21. <i>Rasbora lateristriata</i>	22. <i>Onychostoma gerlarchi</i>
23. <i>Squaliobarbus curriculus</i>	24. <i>Leptobarbus hoeveni</i>
25. <i>Misgurnus fossilis</i>	26. <i>Clarias fuscus</i>
27. <i>Clarias macrocephalus</i>	28. <i>Hemibagrus elongatus</i>
29. <i>Wallago attu</i>	30. <i>Bagarius bagarius</i>
31. <i>Cranoglanis sinensis</i>	32. <i>Fluta alba</i>
33. <i>Anguilla bicolor pacifica</i>	34. <i>Anabas testudineus</i>
35. <i>Ophiocephalus striatus</i>	36. <i>Ophiocephalus micropeltes</i>
37. <i>Mastacembelus armatus</i>	38. <i>Oxyeleotris marmorata</i>
39. <i>Anguilla marmorata</i>	40. <i>Mugil cephalus</i>
41. <i>Cyprinus carpio</i>	42. <i>Carassius auratus</i>
43. <i>Cirrhina molitorella</i>	44. <i>Hypophthalmichthys molitrix</i>
45. <i>Mylopharyngodon piceus</i>	46. <i>Osteochilus hasselti</i>
47. <i>Puntius gonionotus</i>	48. <i>Pangasius micronemus</i>
49. <i>Trichogaster pectoralis</i>	50. <i>Osphronemus gorami</i>

Table 3: List of freshwater cultured fish species in Vietnam.

1. <i>Chanos chanos</i>	2. <i>Cyprinus carpio</i>
3. <i>Carassius auratus</i>	4. <i>Osteochilus hasselti</i>
5. <i>Puntius javanicus</i>	6. <i>Cirrhina molitorella</i>
7. <i>Mypharyngodon piceus</i>	8. <i>Ctenopharyngodon idellus</i>
9. <i>Hypophthalmichthys molitrix Harmandi</i>	10. <i>Aristichthys nobilis</i>
11. <i>Clarias lazera</i>	12. <i>Pangasius micronemus</i>
13. <i>Mugil cephalus</i>	14. <i>Helostoma Temmincki</i>
15. <i>Trichogaster pectoralis</i>	16. <i>Osphronemus gorami</i>
17. <i>Oreochromis mossambicus</i>	18. <i>Oreochromis niloticus</i>
19. <i>Labeo rohita</i>	20. <i>Cirrhinus mrigala</i>
21. <i>Catla catla</i>	22. <i>Clarias fuscus</i>
23. <i>Clarias macrocephalus</i>	24. <i>Spinibarbichthys denticulatus</i>

**Table 4: List of freshwater fish species rare and endangered in Vietnam
(enregistered in the Red Data Book of Vietnam)**

1. <i>Chanos chanos</i>	2. <i>Hilsa reevesii</i>
3. <i>Hilsa toli</i>	4. <i>Clupanodon thrissa</i>
5. <i>Clupanodon punctatus</i>	6. <i>Notopterus chitala</i>
7. <i>Anguilla japonica</i>	8. <i>Anguilla macrorata</i>
9. <i>Procypris merus</i>	10. <i>Cyprinus multitaenniata</i>
11. <i>Catlocarpio siamensis</i>	12. <i>Onychostoma laticeps</i>
13. <i>Semilabeo notabilis</i>	14. <i>Altigena Lemassoni</i>
15. <i>Labeo tonkinensis</i>	16. <i>Labeo Graffeuilli</i>
17. <i>Spinibarbus caldwelli</i>	18. <i>Spinibarbichthys denticulatus</i>
19. <i>Cyclocheilichthys enoplos</i>	20. <i>Cirrhinus macrolepis</i>
21. <i>Morulus chrysophekadion</i>	22. <i>Tor brevifilis</i>
23. <i>Tor tambroides</i>	24. <i>Mylopharyngodon piceus</i>
25. <i>Luciocyprinus langsoni</i>	26. <i>Megalobrama terminalis</i>
27. <i>Gyrinocheilus Aymoneri</i>	28. <i>Sinogastromyzon tonkinensis</i>
29. <i>Clarias macrocephalus</i>	30. <i>Clarias batrachus</i>
31. <i>Pangasius Larnaudi</i>	32. <i>Pangasianodon gigas</i>
33. <i>Hemibagrus elongatus</i>	34. <i>Cranoglanis sinensis</i>
35. <i>Bagarius bagarius</i>	36. <i>Datnioides quadrifasciatus</i>
37. <i>Nandus nandus</i>	38. <i>Toxotes chatareus</i>
39. <i>Ophiocephalus micropeltes</i>	40. <i>Trichogaster pectoralis</i>

REFERENCES

1. Mai Dinh Yen , 1982. Contribution to the study of freshwater ichthyofauna of the Southern Vietnam. *Biology Review* Vol. 4, No 4: 8-12 (in Vietnamese).
2. Mai Dinh Yen , 1985. Species composition and distribution of the freshwater fish fauna of the Northern Vietnam. *Hydrobiologia* 121: 281-286.
3. Mai Dinh Yen , Nguyen Van Trong, 1988. Species composition and distribution of the freshwater fish fauna of the Southern Vietnam. *Hydrobiologia*, 160: 45-51
4. Mai Dinh Yen, Nguyen Huu Duc, 1991. Species composition and distribution of the freshwater fish fauna of the Southern coastal provinces of Centre of Vietnam. *Sciences Journal , University of Hanoi* No 3: 47-54 (in Vietnamese)
5. Bagenal T., 1978. *Methods for Assessment of Fish Production in Freshwater*. IBP Handbook No 3 . Blackwell Scientific Publications. Oxford. 3rd ed.
6. Prince Akihito, Katsusuke Meguro, 1976 . *Glossogobius sparsipapillus*, a new species of goby from Vietnam .*Japanese Journal of Ichthyology*. Vol . 23 No I : 9 - II .
7. Mai Dinh Yen , 1983. The economical freshwater fish species of Vietnam. *Sciences and Technics Publishing House*. Hanoi : 1-124 (in Vietnamese)
8. Ministry of Science, Technology and Environment , 1992 . *Red Data Books of Vietnam* Vol . 1: Animals. *Sciences and Technics Publishing House* (in Vietnamese) .
9. Anonymous, 1994 . *Law on Environmental Protection in Vietnam*. Document have been signed by the President of the Parliament .
10. Committee of Ministers, 1990. Decision No 195 HDBT of June 2, 1990 on the Protection and Development of Aquatic Resources.