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INLAND ICHTHYOFAUNA IN SOUTHEAST HA TINH PROVINCE, VIETNAM*Nguyen Van TUONG**, *Nguyen Thi Thao NGUYEN***, *Nguyen Thi THOA***, *Ho Anh TUAN**** *Le Quang Chi Hingh School, Vietnam*** *Vinh University, Vietnam*

We conducted 18 field surveys in 2017 - 2018 at 9 study sites and collected 602 specimens. Over time of analysis, we have classified and identified 183 fish species belonging to 138 genera, 67 families of 22 orders distributed in Southeast Ha Tinh province. Inside 86 species was supplemented in the study area. There are 5 fish species were recorded in the Red Book to be protected; 77 species are level NE; 14 are level species DD; 83 species are level LC; 8 species are level NT; 1 species are level VU in the IUCN Red List of Threaten Species.

Keywords: *Inland, Ichthyofauna; Ha Vang river, Rac river, Tri river, Sot estuary, Nhuong estuary, Khau estuary, Ha Tinh, Vietnam.*

IHTIOFAUNA INTERIOARĂ ÎN PROVINCIA HA TINH DE SUD-EST A VIETNAMULUI

Noi am efectuat 18 cercetări de teren în perioada anilor 2017 - 2018 la 9 grupe de studiu și am colectat 602 specii. În timpul analizei, am clasificat și am identificat 183 de specii de pește care aparțin la 138 de genuri, 67 de familii ale 22 de ordine distribuite în provincia Ha Tinh de Sud-Est. În interiorul ariei de studiu au fost completate 86 de specii. Există 5 specii de pește, care au fost înregistrate în Cartea Roșie, fiind protejate; 77 de specii sunt la nivelul NE; 14 specii sunt la nivelul DD; 83 de specii sunt la nivelul LC; 8 specii sunt la nivelul NT; 1 specie este la nivelul VU în Cartea Roșie a speciilor amenințate IUCN.

Cuvinte-cheie: *interior, ihtiofaună, râul Ha Vang, râul Rac, râul Tri, estuarul Sot, estuarul Nhuong, estuarul Khau, Ha Tinh, Vietnam.*

Introduction

Ha Tinh is a northern central province of Vietnam that includes: 1 city; 2 towns; 10 districts. The area is about 6.055,6 km². Southeast Ha Tinh province consists of: Loc Ha; Thach Ha; Can Loc; Cam Xuyen; Ky Anh districts; town Ky Anh and Ha Tinh city. The remarkable thing about the study of fish in in southeast Ha Tinh province. There is only one study of Vo Van Phu and Ho Thi Hong published 97 species of fish distributing in Sot estuary [1]. Therefore we conducted the research: "Inland ichthyofauna in southeast Ha Tinh province".

1. 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 fishermen such as: fishing basket, fishing traps, etc. Some other specimens were 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.

Species are classified by monographs: Chen Yiyu et al. (1998) [2]; Chu Xinluo et al. (1999) [3]; Do Thi Nhu Nhung (2007) [4]; Kottelat, M. (2001) [5]; Mai Dinh Yen (1978) [6]; Nguyen Huu Phung (2001) [7]; Nguyen Khac Huong (1991, 2001, 2007) [8, 9, 10]; Nguyen Nhat Thi (1991, 2001) [11, 12]; Nguyen Van Hao, Ngo Sy Van (2001) [13]; Nguyen Van Hao (Vol. 2, Vol. 3) [14]; Nguyen Van Luc (2007) [15]; Rainboth, W.J. (1996) [16]; Tetsji Nakabo (2002) [17]; Yue Peiqi et al (2000) [18].

We have carried out samplings (602 specimens) at 9 locations in southeast Ha Tinh province, North Central of Vietnam, each sampling point is from 0.5 km to 1 km.

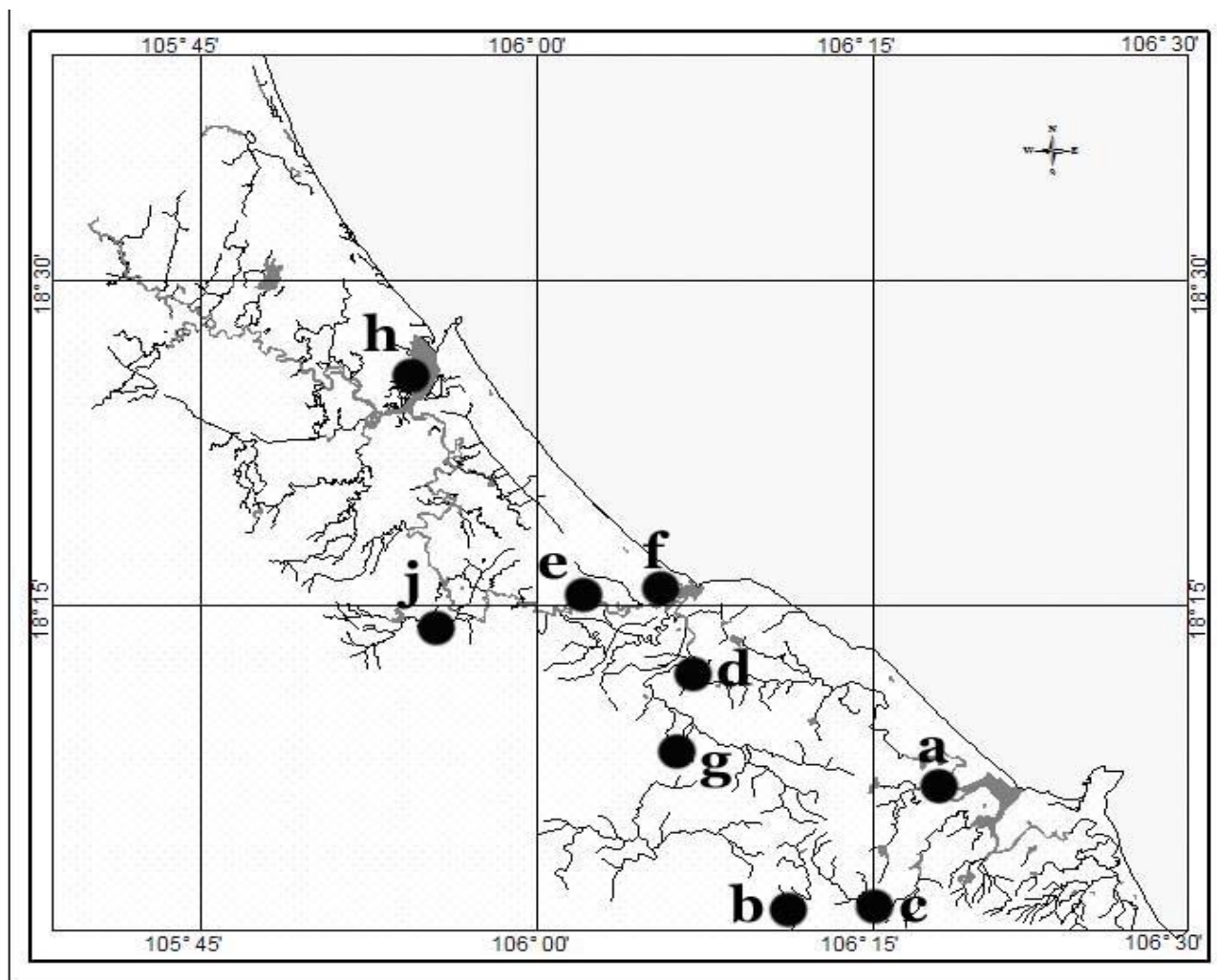


Fig.1. Map study fish in southeast Ha Tinh province.

Note: (a): Ky Hai Ward; (b): Ky Son Ward; (c): Ky Tan Ward; (d): Cam Lac Ward; (e): Cam Thang Ward; (f): Cam Phuc Ward; (g): Rac river; (h): Sot estuary; (j): Ke Go lake.

List of inland ichthyofauna in southeast Ha Tinh province was created by William N. Eschmeyer and Jon David Fong 2018 and Fishbase version 6/2018 [19, 20].

2. Results and discussion

We conducted 18 field surveys in 2017 - 2018 at 9 study sites and collected 602 specimens. Over time of analysis, we have classified and combined with the study of Vo Van Phu, Ho Thi Hong [1], have identified 183 fish species belonging to 138 genera, 67 families of 22 orders distributed in Southeast Ha Tinh province.

Table 1

Composition of fish species in Southeast Ha Tinh province

1	2	3	4	5	6	7	8	9	10
N ^o	Scientific name	IUCN	Study location	Distribution of topography			Distribution of watershed		
A	ELASMOBRANCHII								
I	Myliobatiformes								
(1)	Dasyatidae								
1.	<i>Hemitrygon sinensis</i> (Steindachner, 1892)	NE	a, h						+

1	2	3	4	5	6	7	8	9	10
B	ACTINOPTERI								
II	Elopiformes								
(2)	Elopidae								
2.	<i>Elops saurus</i> Linnaeus, 1766	LC	a, f						
III	Albuliformes								
(3)	Albulidae								
3.	<i>Albula vulpes</i> (Linnaeus, 1758)*	NT	h						+
IV	Anguilliformes								
(4)	Muraenesocidae								
4.	<i>Muraenesox cinereus</i> (Forsskål, 1775)*	NE	h						+
(5)	Muraenidae								
5.	<i>Echidna polyzona</i> (Richardson, 1845)*	NE	a, h						+
(6)	Ophichthidae								
6.	<i>Pisodonophis boro</i> (Hamilton, 1822)	LC	a						
7.	<i>Ophichthus apicalis</i> (Bennett, 1830)*	NE	h						+
(7)	Anguillidae								
8.	<i>Anguilla marmorata</i> Quo. & Gaimard, 1824	LC	b, j			+	+		
V	Osteoglossiformes								
(8)	Notopteridae								
9.	<i>Notopterus notopterus</i> (Pallas, 1769)	LC	a, b, g			+	+	+	
VI	Clupeiformes								
(9)	Clupeidae								
10.	<i>Clupanodon thrissa</i> (Linnaeus, 1758)	NE	a, h			+			+
11.	<i>Sardinella melanura</i> (Cuvier, 1829)	NE	a, e, g			+			+
12.	<i>Anodontostoma thailandiae</i> Won., 1983	LC	d			+			+
13.	<i>Konosirus punctatus</i> (Tem. & Sch., 1846)*	NE	a, f, h			+			+
14.	<i>Nematalosa nasus</i> (Bloch, 1795)	LC	d			+			+
(10)	Engraulidae								
15.	<i>Stolephorus commersonii</i> Lacepède, 1803*	NE	a, h			+			+
16.	<i>Stolephorus tri</i> (Bleeker, 1852)*	NE	a, g, h			+			+
17.	<i>Coilia grayii</i> Richardson, 1845	LC	h			+			+
18.	<i>Thryssa dussumieri</i> (Valenciennes, 1848)*	NE	h			+			+
19.	<i>Thryssa hamiltonii</i> Gray, 1835*	NE	h			+			+
20.	<i>Setipinna taty</i> (Valenciennes, 1848)*	NE	h						+
VII	Cypriniformes								
(11)	Cobitidae								
21.	<i>Cobitis laoensis</i> (Sauvage, 1878)	LC	a, b, g, j		+	+	+	+	
22.	<i>Misgurnus anguillicaudatus</i> (Cantor, 1842)	LC	a, b, g, j	+	+	+	+	+	
(12)	Nemacheilidae								
23.	<i>Tracacichthys pulcher</i> (Nic. & Pope, 1927)	LC	a, b			+	+		
24.	<i>Schistura fasciolata</i> (Nichols & Pope, 1927)	DD	b			+	+		
(13)	Cyprinidae								
25.	<i>Cyprinus carpio</i> Linnaeus, 1758	VU	a → j	+	+	+	+	+	+
26.	<i>Carassius auratus</i> (Linnaeus, 1758)	LC	a → j	+	+	+	+	+	+
27.	<i>Carassioides acuminatus</i> (Ric., 1846)	LC	b			+	+		
28.	<i>Acheilognathus barbatulus</i> Günther, 1873	LC	b			+	+		
29.	<i>Rhodeus ocellatus</i> (Kner, 1866)	DD	b, j		+	+	+		
30.	<i>Metzia lineata</i> (Pellegrin, 1907)	LC	a, b, j		+	+	+	+	
31.	<i>Rasbora steineri</i> Nichols & Pope, 1927	LC	j		+	+			

1	2	3	4	5	6	7	8	9	10
32.	<i>Chanodichthys erythropterus</i> (Bas., 1855)	LC	d, j		+	+		+	
33.	<i>Hemiculter leucisculus</i> (Basilewsky, 1855)*	LC	a → j		+	+	+	+	+
34.	<i>Ancherythroculter wangi</i> (Tchang, 1932)	NE	a, b, j		+	+	+	+	
35.	<i>Opsariichthys bidens</i> Günther, 1873	LC	a, c, j		+	+	+		
36.	<i>Aphyocypris dorsohorizontalis</i> (N. & D., 1969)	NE	b, d			+	+		
37.	<i>Toxabramis swinhonis</i> Günther, 1873	NE	j		+	+			
38.	<i>Hemibarbus umbrifer</i> (Lin, 1931)	LC	a, b			+	+		
39.	<i>Microphysogobio kachekensis</i> (Osh., 1926)	LC	j		+	+			
40.	<i>Osteochilus salsburyi</i> Nichols & Pope, 1927	LC	j		+	+			
41.	<i>Cirrhinus molitorella</i> (Valenciennes, 1844)	NT	a, g, j		+	+			
42.	<i>Barbodes semifasciolatus</i> (Günther, 1868)*	LC	a → j	+	+	+	+	+	+
43.	<i>Puntius brevis</i> (Bleeker, 1849)	LC	a, b, g, j		+	+	+		
44.	<i>Squaliobarbus curriculus</i> (Richardson, 1846)	DD	j		+	+			
45.	<i>Onychostoma gerlachi</i> (Peters, 1881)	NT	b			+	+		
46.	<i>Ctenopharyngodon idella</i> (Val., 1844)*	NE	a → j	+	+	+	+	+	+
47.	<i>Hypophthalmichthys molitrix</i> (Val., 1844)*	NT	a → j	+	+	+	+	+	+
48.	<i>Hypophthalmichthys nobilis</i> (Ric, 1845)	DD	j		+	+			
VIII	Siluriformes								
(14)	Plotosidae								
49.	<i>Plotosus lineatus</i> (Thunberg, 1787)*	NE	a, h			+			+
(15)	Bagridae								
50.	<i>Tachysurus argentivittatus</i> (Regan, 1905)	LC	a, b, e, f		+	+	+	+	
51.	<i>Tachysurus fulvidraco</i> (Richardson, 1846)	LC	j		+	+			
52.	<i>Tachysurus sinensis</i> Lacepède, 1803*	NE	a, h			+			+
53.	<i>Hemibagrus centralus</i> Mai, 1978	DD	b			+	+		
(16)	Sisoridae								
54.	<i>Glyptothorax laosensis</i> Fowler, 1934	NE	b			+	+		
(17)	Siluridae								
55.	<i>Silurus asotus</i> Linnaeus, 1758	LC	b, j		+	+	+		
56.	<i>Pterocryptis cochinchinensis</i> (Val., 1840)	LC	a, b, j		+	+	+		
(18)	Clariidae								
57.	<i>Clarias fuscus</i> (Lacepède, 1803)	LC	a → g	+	+	+	+	+	
(19)	Ariidae								
58.	<i>Arius arius</i> (Hamilton, 1822)*	LC	a, c → j		+	+			+
IX	Aulopiformes								
(20)	Synodontidae								
59.	<i>Saurida elongata</i> (Tem. & Schlegel, 1846)*	NE	h			+			+
60.	<i>Saurida tumbil</i> (Bloch, 1795)*	LC	h			+			+
X	Scombriformes								
(21)	Stromateidae								
61.	<i>Pampus argenteus</i> (Euphrasen, 1788)*	NE	a, h			+			+
XI	Syngnathiformes								
(22)	Syngnathidae								
62.	<i>Syngnathus pelagicus</i> Linnaeus, 1758*	LC	h			+			+
XII	Gobiiformes								
(23)	Odontobutidae								
63.	<i>Odontobutis potamophila</i> (Günther, 1861)	DD	c			+	+		
64.	<i>Neodontobutis tonkinensis</i> (Mai, 1978)	DD	a, c, j		+	+	+		
(24)	Eleotridae								

1	2	3	4	5	6	7	8	9	10
65.	<i>Eleotris fusca</i> (Forster, 1801)*	LC	d, h, j		+	+			+
66.	<i>Butis butis</i> (Hamilton, 1822)*	LC	b, e, h			+		+	+
67.	<i>Butis koilomatodon</i> (Bleeker, 1849)	NE	b, h			+		+	+
(25)	Gobiidae								
68.	<i>Acanthogobius lactipes</i> (Hilgendorf, 1879)*	NE	a, h			+			+
69.	<i>Awaous grammepomus</i> (Bleeker, 1849)*	LC	h			+			+
70.	<i>Amoya gracilis</i> (Bleeker, 1875)*	NE	h			+			+
71.	<i>Bathygobius fuscus</i> (Rüppell, 1830)*	LC	h			+			+
72.	<i>Ctenotrypauchen chinensis</i> Ste., 1867*	NE	a, h			+			+
73.	<i>Glossogobius giuris</i> (Hamilton, 1822)	LC	a			+	+		
74.	<i>Glossogobius olivaceus</i> (Tem. & Sch., 1845)	LC	a, f			+		+	+
75.	<i>Odontamblyopus rubicundus</i> (Ham., 1822)	NE	a, e			+		+	+
76.	<i>Oligolepis acutipennis</i> (Valenciennes, 1837)	DD	d			+		+	+
77.	<i>Oplopomus caninoides</i> (Bleeker, 1852)*	NE	a, h			+		+	+
78.	<i>Oxyurichthys ophthalmonema</i> (Ble., 1856)*	LC	h			+		+	+
79.	<i>Oxyurichthys microlepis</i> (Bleeker, 1849)*	LC	a, h			+		+	+
80.	<i>Oxyurichthys tentacularis</i> (Val., 1837)*	DD	a, h			+		+	+
81.	<i>Psammogobius biocellatus</i> (Val., 1837)	LC	a			+		+	+
82.	<i>Rhinogobius giurinus</i> (Rutter, 1897)	LC	j		+	+		+	+
XIII	Synbranchiformes								
(26)	Mastacembelidae								
83.	<i>Mastacembelus armatus</i> (Lacepède, 1800)	LC	a, b			+	+	+	
(27)	Synbranchidae								
84.	<i>Monopterus albus</i> (Zuiew, 1793)	LC	b → g, j	+	+	+	+	+	
XIV	Anabantiformes								
(28)	Anabantidae								
85.	<i>Anabas testudineus</i> (Bloch, 1792)	DD	a → j	+	+	+	+	+	+
(29)	Osphronemidae								
86.	<i>Trichopodus trichopterus</i> (Pallas, 1770)	LC	a → j	+	+	+	+	+	+
87.	<i>Macropodus opercularis</i> (Linnaeus, 1758)	LC	a → j	+	+	+	+	+	+
(30)	Channidae								
88.	<i>Channa striata</i> (Bloch, 1793)	LC	a → j	+	+	+	+	+	+
89.	<i>Channa gachua</i> (Hamilton, 1822)	LC	b			+	+		
XV	Pleuronectiformes								
(31)	Paralichthyidae								
90.	<i>Pseudorhombus arsius</i> (Hamilton, 1822)*	NE	h						+
91.	<i>Pseudorhombus cinnamoneus</i> (T. & S., 1846)*	NE	h						+
92.	<i>Pseudorhombus malayanus</i> Bleeker, 1865	NE	a, d, h			+			+
93.	<i>Tephrinectes sinensis</i> (Lacepède, 1802)	NE	a			+			+
(32)	Soleidae								
94.	<i>Aseraggodes xenicus</i> (Mat. & Ochiai, 1963)	LC	a			+			+
95.	<i>Brachirus orientalis</i> (Bloch & Sch., 1801)*	NE	h						+
96.	<i>Solea ovata</i> Richardson, 1846*	NE	a, h			+			+
(33)	Cynoglossidae								
97.	<i>Cynoglossus cynoglossus</i> (Hamilton, 1822)	NE	a			+			+
98.	<i>Cynoglossus lingua</i> Hamilton, 1822	NE	a, g			+			+
XVI	Cichliformes								
(34)	Cichlidae								
99.	<i>Oreochromis aureus</i> (Steindachner, 1864)	NE	f			+		+	

1	2	3	4	5	6	7	8	9	10
100.	<i>Oreochromis mossambicus</i> (Peters, 1852)	NT	j		+	+			
101.	<i>Oreochromis niloticus</i> (Linnaeus, 1758)	NE	a → j	+	+	+	+	+	+
XVII	Atheriniformes								
(35)	Atherinidae								
102.	<i>Hypoatherina valenciennesi</i> (Bleeker, 1854)*	NE	h			+			+
XVIII	Beloniformes								
(36)	Belonidae								
103.	<i>Strongylura anastomella</i> (Val., 1846)*	NE	h			+			+
104.	<i>Strongylura strongylura</i> (Hasselt, 1823)	NE	a, g			+			+
(37)	Hemiramphidae								
105.	<i>Hyporhamphus erythrorinchus</i> (Les., 1821)*	NE	h						+
106.	<i>Hyporhamphus limbatus</i> (Val., 1847)*	LC	a, g, h			+			+
(38)	Zenarchopteridae								
107.	<i>Dermogenys pusilla</i> Kuhl & van Has., 1823	NE	a, h						+
XIX	Mugiliformes								
(39)	Mugilidae								
108.	<i>Mugil cephalus</i> Linnaeus, 1758*	LC	a, g, h			+			+
109.	<i>Liza carinata</i> (Valenciennes, 1836)	NE	a, h			+			+
110.	<i>Ellochelon vaigiensis</i> (Quoy & Gai., 1825)*	LC	h						+
111.	<i>Planiliza macrolepis</i> (Smith, 1846)*	LC	f, h			+			+
112.	<i>Planiliza subviridis</i> (Valenciennes, 1836)	NE	a			+			+
113.	<i>Paramugil parmatus</i> (Cantor, 1849)	NE	a, h			+			+
114.	<i>Osteomugil cunnesius</i> (Valenciennes, 1836)*	NE	h						+
115.	<i>Valamugil speigleri</i> (Bleeker, 1858)	NE	e			+			+
XX	Tetraodontiformes								
(40)	Triacanthidae								
116.	<i>Triacanthus biaculeatus</i> (Bloch, 1786)*	NE	h						+
(41)	Tetraodontidae								
117.	<i>Arothron immaculatus</i> (Bloch & Sch., 1801)*	LC	h						+
118.	<i>Arothron stellatus</i> (Anonymous, 1798)*	LC	h						+
119.	<i>Chelonodon patoca</i> (Hamilton, 1822)*	LC	h						+
120.	<i>Takifugu ocellatus</i> (Linnaeus, 1758)*	NT	h						+
XXI	Scorpaeniformes								
(42)	Synanceiidae								
121.	<i>Minous pusillus</i> Temminck & Schlegel, 1843	NE	a			+			+
(43)	Platycephalidae								
122.	<i>Platycephalus indicus</i> (Linnaeus, 1758)*	DD	a, h			+			+
123.	<i>Grammoplites scaber</i> (Linnaeus, 1758)*	NE	h						+
124.	<i>Rogadius serratus</i> (Cuvier, 1829)	LC	a, h			+			+
XXII	Perciformes								
(44)	Ambassidae								
125.	<i>Ambassis gymnocephalus</i> (Lacepède, 1802)*	LC	a, e → h			+			+
126.	<i>Ambassis kopsii</i> Bleeker, 1858*	NE	a, g, h			+			+
(45)	Percichthyidae								
127.	<i>Coreoperca whiteheadi</i> Boulenger, 1900	LC	b, d, j		+	+	+		
(46)	Latidae								
128.	<i>Lates calcarifer</i> (Bloch, 1790)*	NE	h			+			+
129.	<i>Psammoperca waigiensis</i> (Cuvier, 1828)*	NE	h						+

1	2	3	4	5	6	7	8	9	10
(47)	Serranidae								
130.	<i>Epinephelus awoara</i> (Tem. & Sch., 1842)*	DD	a, h			+			+
131.	<i>Epinephelus epistictus</i> (Tem. & Sch., 1842)*	DD	h						+
132.	<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)*	NT	h						+
133.	<i>Epinephelus maculatus</i> (Bloch, 1790)*	LC	h						+
134.	<i>Epinephelus malabaricus</i> (B. & Sch., 1801)*	NT	h						+
(48)	Terapontidae								
135.	<i>Terapon jarbua</i> (Forsskål, 1775)*	LC	a, g, h			+		+	+
136.	<i>Helotes sexlineatus</i> (Quo. & Gaimard, 1825)*	NE	h						+
137.	<i>Pelates quadrilineatus</i> (Bloch, 1790)*	NE	a, d, e, f, h			+		+	+
138.	<i>Rhynchopelates oxyrhynchus</i> (T. & S., 1842)	NE	a, d, e, f			+		+	+
(49)	Apogonidae								
139.	<i>Ostorhinchus moluccensis</i> (Val., 1832)*	NE	h						+
(50)	Sillaginidae								
140.	<i>Sillago japonica</i> Temminck & Schlegel, 1843	LC	a			+			+
141.	<i>Sillago maculata</i> Quoy & Gaimard, 1824*	NE	f, h			+			+
142.	<i>Sillago sihama</i> (Forsskål, 1775)*	LC	h						+
(51)	Carangidae								
143.	<i>Alepes djedaba</i> (Forsskål, 1775)*	LC	h						+
144.	<i>Alepes melanoptera</i> (Swainson, 1839)*	NE	a, f, h			+			+
145.	<i>Seriola lalandi</i> Valenciennes, 1833*	LC	h						+
(52)	Leiognathidae								
146.	<i>Equulites rivulatus</i> (Tem. & Schlegel, 1845)*	NE	a, h			+			+
147.	<i>Karalla daura</i> (Cuvier, 1829)	NE	a, f			+			+
148.	<i>Leiognathus equulus</i> (Forsskål, 1775)*	LC	a, e, h			+			+
149.	<i>Leiognathus brevirostris</i> (Val., 1835)*	NE	a, d, h			+			+
150.	<i>Leiognathus berbis</i> (Valenciennes, 1835)	NE	a, d			+			+
151.	<i>Secutor ruconius</i> (Hamilton, 1822)*	NE	a, h			+			+
(53)	Bramidae								
152.	<i>Megalobrama terminalis</i> (Ric., 1846)	NE	a						+
(54)	Lutjanidae								
153.	<i>Lutjanus argentimaculatus</i> (Forsskål, 1775)*	LC	a, e, h			+		+	+
154.	<i>Lutjanus fulvus</i> (Forster, 1801)*	LC	a, d, h			+		+	+
155.	<i>Lutjanus jordani</i> (Gilbert, 1898)*	LC	h						+
156.	<i>Lutjanus fulviflamma</i> (Forsskål, 1775)*	LC	a, h			+			+
(55)	Gerreidae								
157.	<i>Gerres filamentosus</i> Cuvier, 1829*	LC	a, f, h			+		+	+
158.	<i>Gerres japonicus</i> Bleeker, 1854*	NE	h						+
159.	<i>Gerres limbatus</i> Cuvier, 1830*	LC	a, f, h			+		+	+
160.	<i>Gerres oblongus</i> Cuvier, 1830	LC	a, d			+			+
161.	<i>Gerres oyena</i> (Forsskål, 1775)*	LC	h						+
(56)	Haemulidae								
162.	<i>Pomadasys argenteus</i> (Forsskål, 1775)*	LC	a, h			+			+
163.	<i>Pomadasys maculatus</i> (Bloch, 1793)*	LC	h						+
(57)	Sparidae								
164.	<i>Acanthopagrus berda</i> (Forsskål, 1775)	LC	a						+
165.	<i>Acanthopagrus latus</i> (Houttuyn, 1782)*	DD	a, d, h			+		+	+
166.	<i>Acanthopagrus schlegelii</i> (Bleeker, 1854)*	LC	h						+
167.	<i>Rhabdosargus sarba</i> (Forsskål, 1775)*	LC	h						+

1	2	3	4	5	6	7	8	9	10
(58)	Sciaenidae								
168.	<i>Nibea albiflora</i> (Richardson, 1846)*	NE	h						+
169.	<i>Pennahia argentata</i> (Houttuyn, 1782)*	NE	a, h			+			+
170.	<i>Pennahia pawak</i> (Lin, 1940)	NE	a						+
(59)	Polynemidae								
171.	<i>Eleutheronema tetradactylum</i> (Shaw, 1804)*	NE	h						+
(60)	Drepaneidae								
172.	<i>Drepane punctata</i> (Linnaeus, 1758)*	NE	a, h			+			+
(61)	Monodactylidae								
173.	<i>Monodactylus argenteus</i> (Linnaeus, 1758)	NE	a, h			+			+
(62)	Pomacentridae								
174.	<i>Stegastes nigricans</i> (Lacepède, 1802)	NE	a						+
(63)	Callionymidae								
175.	<i>Callionymus curvicornis</i> Valenciennes, 1837	NE	a, h			+			+
176.	<i>Callionymus pleurostictus</i> Fricke, 1982	NE	a, h			+			+
(64)	Ephippidae								
177.	<i>Platax teira</i> (Forsskål, 1775)*	NE	h						+
(65)	Scatophagidae								
178.	<i>Scatophagus argus</i> (Linnaeus, 1766)*	LC	a, d, e, f, h			+		+	+
(66)	Siganidae								
179.	<i>Siganus argenteus</i> (Quoy & Gaimard, 1825)*	LC	h						+
180.	<i>Siganus fuscescens</i> (Houttuyn, 1782)*	LC	a, h			+			+
181.	<i>Siganus guttatus</i> (Bloch, 1787)*	LC	a, h			+			+
182.	<i>Siganus canaliculatus</i> (Park, 1797)*	LC	a, h			+			+
(67)	Sphyraenidae								
183.	<i>Sphyraena obtusata</i> Cuvier, 1829*	NE	h						+

Note: Column 1: Number of classes, orders, families and species; Column 2. Scientific name, * by Vo Van Phu and Ho Thi Hong [20]; Column 3. The IUCN Red List of Threatened Species; Column 4. Research location: (a): Ky Hai Ward; (b): Ky Son Ward; (c): Ky Tan Ward; (d): Cam Lac Ward; (e): Cam Thang Ward; (f): Cam Phuc Ward; (g): Rac river; (h): Sot estuary; (j): Ke Go lake.

Distribution of topography: Column 5: Species in rice farm; Column 6: Species in ponds, lakes, reservoirs; Column 7: River and Stream; Distribution of watershed: Column 8: Species found in upper stream; Column 9: Species found in middle; Column 10: Species found in downstream.

The distribution of fish species in Southeast Ha Tinh province: 13 species in in rice farm; 38 species in ponds, lakes, reservoirs; 137 species in river and stream; 40 species in upper stream; 42 species in middle and 141 species in downstream.

According to Vietnam Red Animals (2007) [21] and based on species composition table (Table 1), we determined that in Southeast Ha Tinh province there are 5 fish species which were recorded in the Red Book to be protected. (*Elops saurus*; *Anguilla marmorata*; *Konosirus punctatus*; *Nematalosa nasus* is level VU and *Clupanodon thrissa* is level EN).

The list of distributive fish species of Southeast Ha Tinh province in the table 1 is recorded in the IUCN Red List of Threaten Species as below: 77 species are level Not Evaluated (NE); 14 are level species Data Deficient (DD); 83 species are level Least Concern (LC); 8 species are level Near Threatened (NT); 1 species is level Vulnerable (VU) [22].

Conclusion

We have identified 183 fish species belonging to 138 genera, 67 families of 22 orders distributed in Southeast Ha Tinh province. Inside 86 species were supplemented in the study area. There are 5 fish species recorded in the Red Book to be protected; 77 species are level NE; 14 are level species DD; 83 species are level LC; 8 species are level NT; 1 species is level VU in the IUCN Red List of Threaten Species.

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References:

1. VO, Van Phu, Ho Thi Hong. *Biodiversity on species composition of the ichthyofauna*. Sot estuary, Ha Tinh province. Council for Natural Science. Section of Life Sciences. Problems of basic reseach in life sciences. Proceedings the 3rd National conference in life science. Thai Nguyen September 23, 2004. Hanoi: Science and Technics Publishing House, 2004, p.849-852 (In Vietnamese)
2. CHEN, Yiyu et al. *Fauna Sinica Osteichthyes Cypriniformes II*. Fresh Beijing China, 1998, p.532. (In Chinese)
3. CHU, Xinluo et al. *Fauna Sinica, Osteichthys Siluriformes*. Science pres Beijing, China, 1999, p.345. (In Chinese)
4. DO, Thi Nhu Nhung. *Fauna of Vietnam. Sea fish*. Order Perciformes. Sciene and Technics Fublishing House, 2007, Vol.17, p.228. (In Vietnamese)
5. KOTTELAT, M. *Freshwater fishes of northern Vietnam*. A preliminary check-list of the fishes known or expected to occur in northern Vietnam with comments on systematics and nomenclature. The World Bank, 2001, p.123.
6. MAI, Dinh Yen. Identification of freshwater fishes of northern Vietnam. Science & Technics Publishing House, Ha Noi, 1978, p.339. (In Vietnamese)
7. NGUYEN, Huu Phung. *Fauna of Vietnam. Marine fish*. Hanoi: Sciene and Technics Fublishing House, 2001, vol.12, p.135. (In Vietnamese)
8. NGUYEN, Khac Huong. *Sea fish in Vietnam*. Hanoi: Science and Technics Publishing House, 1991, vol.II, no1, no2, no3, p.823 (In Vietnamese)
9. NGUYEN, Khac Huong. *Fauna of Vietnam*. Hanoi: Sciene and Technics Fublishing House, 2001, vol.10. p.194. (In Vietnamese)
10. NGUYEN, Khac Huong. *Fauna of Vietnam. Sea fish*. Hanoi: Sciene and Technics Fublishing House, 2007, vol.20, p.159. (In Vietnamese)
11. NGUYEN, Nhat Thi. *Sea fish in Vietnam - Osteichthyes in Gulf of Tonkin*. Hanoi: Science and Technics Publishing House, 1991, p.321. (In Vietnamese)
12. NGUYEN, Nhat Thi. *Fauna of Vietnam. Suborder Gobioidei*. Hanoi: Science and Technics Publishing House, 2001, p.219. (In Vietnamese)
13. NGUYEN, Van Hao, NGO, Sy Van. *Freshwater fishes of Vietnam. Family Cyprinidae*. Hanoi: Agriculture Publishing House, 2001, vol.1, p.622. (In Vietnamese)
14. NGUYEN, Van Hao. *Freshwater fishes of Vietnam*. Hanoi: Agriculture Publishing House, 2005, vol.2, vol.3. p.1517. (In Vietnamese)
15. NGUYEN, Van Luc et al. *Fauna of Vietnam. Sea fish. Order Perciformes*. Hanoi: Sciene and Technics Fublishing House, 2007, vol.19. p.237. (In Vietnamese)
16. RAINBOTH, J. Walter. *Fishes of the Cambodian Mekong*. USA: University of Wisconsin Oshkosh, 1996, p.265.
17. TETSJI, Nakabo. *Fishes of Japan*. Printed in Japan. 2002, 1749 p.
18. YUE, Peiqi et al. *Fauna Sinica Osteichthyes Cypriniformes II*. Beijing: Science Press (Chinese), 2000, 661 p. (In Chinese)
19. <http://www.fishbase.org/search.php>. (6/2018)
20. <http://researcharchive.calacademy.org/research/ichthyology/catalog/SpeciesByFamily.asp>. (6/2018)
21. Ministry of Science and Technology. *Vietnam Red Book (Part Animals)*. Sciene and Technics Publishing House. 2007, p.277-372. (In Vietnamese)
22. <http://www.iucnredlist.org>. (6/2018)

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