

Первый этап создания модели земноводных и пресмыкающихся в университете Хонгдык (Вьетнам)

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Аннотация

В данной статье представлены результаты построения наборов амфибий и рептилий в Университете Хонгдык. Мы создали модель земноводных и пресмыкающихся в университете Хонгдык, в том числе 1381 образцов со 114 классами, относящихся к 68 родам, 20 семействам и 3 отрядам. Модель способствует улучшению качества преподавания и исследований в области земноводных и пресмыкающихся в Университете Хонгдык.

Ключевые слова: Университет Хонгдык, земноводные, пресмыкающиеся, модель, исследования, преподавание.

Initial building the sample sets of amphibians and reptiles in the Hong Duc University (Viet Nam)

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Abstract

This article presents the results of the amphibian and reptile set building at Hong Duc University. We have built the amphibian and reptile specimens at Hong Duc University with 1381 specimens of 114 species belonging to 68 genus, 20 families and 3 orders. The model contributes to improving the quality of teaching and research in the field of amphibians and reptiles at Hong Duc University.

Keywords: Hong Duc University, amphibians, reptiles, specimen, researching, teaching.

Introduction

Vietnam, which is located in the East of the Indochinese peninsular in the tropical monsoon region, is diverse in terrain, landscape and different climate difference, thus creating a variety of ecosystem types. This characteristics is a favorable condition for the formation and development of diverse species of animals, plants in general and amphibians and reptiles in particular Vietnam. The amphibians and reptiles are a group of animals with high economic value. They are used as food, medicine, leather industry, etc... In addition, in nature they are the enemies of many species of insects which destroy crops, including the harmful rodents. At the same time, they are the important chain of food chains and webs in the nature, so they bring great value to human life and agricultural production. In recent years, the basic research on amphibians and reptiles in Vietnam has been carried out carefully by scientists in both domestic and foreign. Studies have shown the diversity of this group of animals. So far there are 737 species which have been discovered in Vietnam, including 265 species of amphibians and 472 species of reptiles (Frost 2018, Uetz & Hosek 2018) [9; 18], not to mention many new species have been discovered, recently. However, with significant changes in the recent environment such as climate change, environmental pollution, deforestation, over-exploitation and many other causes that can decline in the number of reptiles and amphibians - one of the most susceptible to environmental factors are the alarming, many species are at the risk of extinction. Therefore, in addition to implementing conservation measures for species in the wild, the construction of reptile amphibious specimens is required to meet the needs of training and scientific research in University. This is also one of the works currently underway at many museums of the Institute and Universities in Vietnam.

Materials and Methods

Materials: The amphibian and reptile samples donated by Assoc. Prof. Le Nguyen Ngat and others were collected during the surveys. Specimens were analyzed from July 2017 to May 2018 at the zoological laboratory, Department of Natural Sciences, Hong Duc University.

Research methods: Identifying the scientific name of reptiles and amphibians based on the identifications of amphibians and reptiles of Dao Van Tien (1977, 1979, 1981, 1982) [5; 6; 7; 8], Bourret (1936, 1942, 1943) [1; 2; 3] Campden-Main (1970) [4]. Identification of reptiles and amphibians by the documents of Nguyen Van Sang, Ho Thu Cuc, Nguyen Quang Truong, Nguyen Vu Khoi (2005) [14], Hoang Xuan Quang et al. (2008) [10], Hoang Xuan Quang, Hoang Ngoc Thao, Ngo Dac Chung (2012) [11] and some related documents by Ohler & Delorme (2006) [16], Orlov et al. (2006) [17], McLeod (2010) [13]. The species classification of Nguyen et al. (2009) [15] and further reference of Uetz P., Hošek J. (2018) [18] and Frost D.R. (2018) [9]. Classification of species conservation levels according to the IUCN Red List (2018) [12].

After identifying the species, amphibians and reptiles, its have been put into suitable plastic or glass containers in such a way that the animals have been in a natural shape. The next steps was have been to pour 70⁰ alcohol to flood the sample so that it will have been not damaged during the long-term display and to close the lid tightly. The plastic containers have been labeled outside with the information such as sample symbol, scientific name, Vietnamese name, number of samples, the sampling location, sample collector, and sampling date. Then they have been arranged in the glass cabinets for display.

Results and discussion

Based on the results of the analysis of the specimens collected, we have identified the amphibian reptile specimens at the University Hong Duc with 114 species of reptiles and amphibians belonging to 68 genera, 20 families and 3 orders. The reptile and amphibian specimens in Hong Duc University were collected in 21 provinces in Vietnam as shown in Table 1.

Table 1 – List of amphibian and reptile species in the specimens at Hong Duc University

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
(1)	(2)	(3)	(4)	(5)
	AMPHIBIA			
	Gymnophiona			
	1. Ichthyophiidae			
1.	<i>Ichthyophis bannanicus</i> (Yang, 1984)	8	5, 18, 19	LC
	Anura			
	2. Bufonidae			
2.	<i>Duttaphrynus melanostictus</i> (Schneider, 1799)	54	5, 7, 9, 18, 16	LC
	3. Megophryidae			
3.	<i>Megophrys feae</i> (Boulenger, 1887)	5	?	LC
4.	<i>Leptobrachella nahangensis</i>	5	9	LC

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
	(Lathrop, Murphy, Orlov và Ho, 1998)			
5.	<i>Leptobranchella sungi</i> (Lathrop, Murphy, Orlov và Ho, 1998)	5	5	LC
6.	<i>Megophrys major</i> (Boulenger, 1908)	33	4, 5, 15	LC
	4. Microhylidae			
7.	<i>Glyphoglossus guttulatus</i> (Blyth, 1856)	1	15	LC
8.	<i>Kaloula pulchra</i> (Gray, 1831)	21	7, 15, 18	LC
9.	<i>Microhyla berdmorei</i> (Blyth, 1856)	2	2	LC
10.	<i>Microhyla fissipes</i> (Boulenger, 1884)	18	2, 9, 11, 17	LC
11.	<i>Microhyla heymonsi</i> (Vogt, 1911)	31	9, 17, 18	LC
12.	<i>Microhyla pulchra</i> (Hallowell, 1861)	33	5, 7, 9, 11, 15	LC
	5. Dicroglossidae			
13.	<i>Fejervarya limnocharis</i> (Gravenhorst, 1829)	99	2, 3, 5, 7, 8, 9, 11, 17, 18, 19	LC
14.	<i>Hoplobatrachus rugulosus</i> (Wiegmann, 1834)	88	1, 2, 5, 7, 8, 11, 18, 19	LC
15.	<i>Limnonectes bannaensi</i> (Ye, Fei & Jiang, 2007)	56	5, 7, 8, 9, 11	LC
16.	<i>Limnonectes poilani</i> (Bourret, 1942)	16	5	LC
17.	<i>Occidozyga lima</i> (Gravenhorst, 1829)	17	1, 5, 9, 11, 18	LC
18.	<i>Occidozyga martensii</i> (Peters, 1867)	30	5, 9, 11, 17, 18, 20	LC
	6. Ranidae			
19.	<i>Amolops cremnobatus</i> (Inger and Kottelat, 1998)	7	?	LC
20.	<i>Amolops cucae</i> (Bain, Stuart and Orlov, 2006)	2	?	EN
21.	<i>Amolops ricketti</i> (Boulenger, 1899)	8	?	LC
22.	<i>Babina chapaensis</i> (Bourret, 1937)	2	9	LC
23.	<i>Nanorana aenea</i> (Smith, 1922)	1	9	LC
24.	<i>Hylarana attigua</i> (Inger, Orlov, and Darevsky, 1999)	1	?	LC
25.	<i>Hylarana erythraea</i> (Schlegel, 1837)	28	17, 18	LC

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
26.	<i>Hylarana guentheri</i> (Boulenger, 1882)	33	5, 8, 11	LC
27.	<i>Hylarana macrodactyla</i> (Günther, 1858)	5	9, 14	LC
28.	<i>Hylarana maosonensis</i> (Bourret, 1937)	38	5, 7, 9	LC
29.	<i>Hylarana milleti</i> (Smith, 1921)	4	11, 13	LC
30.	<i>Hylarana taipehensis</i> (Van Denburgh, 1909)	12	5, 9, 15	LC
31.	<i>Limnonectes dabanus</i> (Smith, 1922)	1	?	LC
32.	<i>Odorrana andersonii</i> (Boulenger, 1882)	15	2, 5, 9, 15	LC
33.	<i>Odorrana bacboensis</i> (Bain, Lathrop, Murphy, Orlov & Ho, 2003)	7	9, 10	LC
34.	<i>Odorrana livida</i> (Blyth, 1856)	15	9	DD
35.	<i>Odorrana nasica</i> (Boulenger, 1903)	6	9	LC
36.	<i>Quasipaa delacouri</i> (Angel, 1928)	1	?	LC
37.	<i>Quasipaa verrucospinosa</i> (Bourret, 1937)	21	13, 15	NT
38.	<i>Rana johnsi</i> (Smith, 1921)	1	9	LC
39.	<i>Sylvirana nigrovittata</i> (Blyth, 1856)	28	9	LC
	7. Rhacophoridae			
40.	<i>Kurixalus banaensis</i> (Bourret, 1939)	24	9, 14	DD
41.	<i>Polypedates mutus</i> (Smith, 1940)	113	2, 5, 7, 9, 11, 17, 18	LC
42.	<i>Rhacophorus annamensis</i> (Smith, 1924)	12	?	LC
43.	<i>Rhacophorus calcaneus</i> (Smith, 1924)	1	?	EN
44.	<i>Rhacophorus dennysi</i> (Blanford, 1881)	3	5	LC
45.	<i>Rhacophorus feae</i> (Boulenger, 1893)	2	?	LC
46.	<i>Rhacophorus kio</i> (Ohler and Delorme, 2006)	11	9	LC
47.	<i>Rhacophorus smaragdinus</i> (Blyth, 1852)	4	9	LC
48.	<i>Theloderma albopunctatum</i> (Liu and Hu, 1962)	1	11	DD
49.	<i>Theloderma corticale</i> (Boulenger, 1903)	1	?	LC

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
	REPTILIA			
	Squamata			
	Sauria			
	1. Agamidae			
50.	<i>Acanthosaura lepidogaster</i> (Cuvier, 1829)	11	5, 7, 9, 15	
51.	<i>Acanthosaura nataliae</i> (Orlov, Truong & Sang 2006)	3	13, 20	LC
52.	<i>Bronchocela vietnamensis</i> (Hallermann & Orlov, 2005)	1	15	VU
53.	<i>Calotes mystaceus</i> (Duméril & Bibron, 1837)	6	2, 15	
54.	<i>Calotes emma</i> (Gray, 1845)	1	?	
55.	<i>Calotes versicolor</i> (Daudin, 1802)	46	2, 3, 11, 13, 15, 18, 19, 20	
56.	<i>Draco maculatus</i> (Gray, 1845)	3	4	LC
57.	<i>Pseudocalotes microlepis</i> (Boulenger, 1888)	4	5, 15	
58.	<i>Physignathus cocincinus</i> (Cuvier, 1829)	17	2, 3, 5, 9, 15, 17	
59.	<i>Leiolepis guentherpetersi</i> (Darevsky & Kupriyanova, 1993)	3	11	EN
60.	<i>Leiolepis reevesii</i> (Gray, 1831)	13	11, 20	
	2. Gekkonidea			
61.	<i>Gekko gecko</i> (Linnaeus, 1758)	16	5, 15, 9, 17, 19	
62.	<i>Hemidactylus platyurus</i> (Schneider, 1797)	19	9, 11, 19, 20	
	3. Varanidae			
63.	<i>Varanus salvator</i> (Laurenti, 1768)	1	?	LC
	4. Lacertidae			
64.	<i>Takydromus sexlineatus</i> (Daudin, 1802)	12	2, 5, 15	LC
65.	<i>Takydromus wolteri</i> (Fischer, 1885)	8	7, 12, 19	
	5. Scincidae			
66.	<i>Dasia olivacea</i> (Gray, 1839)	1	15	LC
67.	<i>Eutropis multifasciata</i> (Kuhl, 1820)	34	15	LC
68.	<i>Lygosoma bowringii</i> (Günther, 1864)	4		

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
69.	<i>Lygosoma quadrupes</i> (Linnaeus, 1766)	3	2, 19	
70.	<i>Plestiodon elegans</i> (Boulenger, 1887)	1	?	
71.	<i>Tropidophorus cocincinensis</i> (Duméril & Bibron, 1839)	1	?	LC
	6. Anguidae			
72.	<i>Dopasia harti</i> (Boulenger, 1899)	1	14	
	7. Typhlopidae			
73.	<i>Typhlops braminus</i> (Daudin, 1803)	7	19	
	Serpentes			
	8. Cyndrophiiidae			
74.	<i>Cylindrophis ruffus</i> (Laurenti, 1768)	9	15, 19	LC
	9. Pythonidae			
75.	<i>Python molurus</i> (Linnaeus, 1758)	1	21	VU
	10. Colubridae			
76.	<i>Calamaria pavementata</i> (Duméril, Bibron & Duméril, 1854)	3	?	LC
77.	<i>Ahaetulla nasuta</i> (Lacépède, 1789)	3	1	
78.	<i>Ahaetulla prasina</i> (Boie, 1827)	3	?	LC
79.	<i>Boiga guangxiensis</i> (Wen, 1998)	1	9	LC
80.	<i>Boiga jaspidea</i> (Duméril, Bibron & Duméril, 1854)	2	5	LC
81.	<i>Boiga multomaculata</i> (Boie, 1827)	2	?	
82.	<i>Coelognathus radiatus</i> (Boie, 1827)	5	1, 17	LC
83.	<i>Cyclophiops multinctus</i> (Roux, 1907)	4	5	LC
84.	<i>Dendrelaphis ngansonensis</i> (Bourret, 1935)	1	5	LC
85.	<i>Dendrelaphis pictus</i> (Gmelin, 1789)	5	9, 19	
86.	<i>Lycodon laoensis</i> (Günther, 1864)	2	5	LC
87.	<i>Oligodon chinensis</i> (Günther, 1888)	4	9	LC
88.	<i>Oligodon eberhardti</i> (Pellegrin, 1910)	4	5	LC
89.	<i>Oligodon fasciolatus</i> (Günther, 1864)	1	19	LC
90.	<i>Oligodon mouhoti</i> (Boulenger, 1914)	2	19	LC

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
91.	<i>Ptyas korros</i> (Schlegel, 1837)	19	1, 5, 9, 17, 19	
92.	<i>Ptyas mucosa</i> (Linnaeus, 1758)	1	?	
93.	<i>Rhynchophis boulengeri</i> (Mocquardt, 1897)	2	9	LC
94.	<i>Enhydris enhydris</i> (Schneider, 1799)	6	19, 21	LC
95.	<i>Enhydris bocourti</i> (Jan, 1865)	6	1, 17, 18, 19, 21	LC
96.	<i>Enhydris chinensis</i> (Gray, 1842)	7	5, 19	LC
97.	<i>Enhydris plumbea</i> (Boie, 1827)	12	5, 7, 9, 19	LC
98.	<i>Enhydris subtaeniata</i> (Bourret, 1934)	9	8, 9, 11	LC
99.	<i>Homalopsis buccata</i> (Linnaeus, 1758)	3	1, 19	LC
100.	<i>Amphiesma khasiense</i> (Boulenger, 1890)	4	5	
101.	<i>Amphiesma stolatum</i> (Linnaeus, 1758)	15	7, 9	
102.	<i>Psammodynastes pulverulentus</i> (Boie, 1827)	2	5	
103.	<i>Rhabdophis subminiatus</i> (Schlegel, 1837)	21	1, 11, 17	LC
104.	<i>Sinonatrix aequifasciata</i> (Barbour, 1908)	7	3, 5, 9	LC
105.	<i>Sinonatrix percarinata</i> (Boulenger, 1899)	24	5, 9	LC
106.	<i>Xenochrophis flavipunctatus</i> (Hallowell, 1860)	18	1, 9, 17	LC
	11. Xenopeltidae			
107.	<i>Xenopeltis unicolor</i> (Reinwardt, 1827)	12	9, 17	LC
	12. Elapidae			
108.	<i>Bungarus candidus</i> (Linnaeus, 1758)	1	?	LC
109.	<i>Bungarus fasciatus</i> (Schneider, 1801)	6	9, 17	LC
110.	<i>Bungarus multicinctus</i> (Blyth, 1861)	2	?	LC
111.	<i>Naja kaouthia</i> (Lesson, 1831)	1	?	LC
112.	<i>Sinomicrourus maclellandi</i> (Reinhardt, 1844)	1	?	
	13. Viperidae			

No.	Scientific name	Number of sample	Sampling location	Conservation status according to IUCN
113.	<i>Ovophis monticola</i> (Günther, 1864)	1	?	LC
114.	<i>Protobothrops mucrosquamatus</i> (Cantor, 1839)	3	5, 7, 19	LC

Note: (4) Sampling location: 1. Ha Giang; 2. Dien Bien; 3. Son La; 4. Thai Nguyen; 5. Vinh Phuc; 6. Bac Giang; 7. Hai Duong; 8. Nam Dinh; 9. Thanh Hoa; 10. Nghe An; 11. Thua Thien Hue; 12. Quang Nam; 13. Da Nang; 14. Kon Tum; 15. Dak Nong; 16. Long An; 17. Vinh Long; 18. Can Tho; 19. Hau Giang; 20. Kien Giang; 21. Ca Mau; ?. Data deficient.

(5) Red List IUCN (2018): CR = Critically endangered; EN = Endangered; VU= Vulnerable; NT = Near threatened; LC = Least Concern; DD = Data deficient.

From the detailed list of amphibians and reptiles in the sample sets of the Hong Duc University in Table 1, we have some following findings on the characteristics and properties of reptile and amphibian samples. The amphibian is divided into two groups which are the Gymnophion and the Anura. The Gymnophiona has one family (account for 5% of the total family), one genus (account for 1,47% of the total genera), and one species (account for 0,88% of the total species). The Anura has six families (account for 30% of the total families), twenty-four genera (account for 35,29% of the total genera), and forty-eight species (account for 42,11% of total species). The reptile has one group, which is Squamata with thirteen families (account for 65% of the total families), forty-three genera (account for 63,24% of the total genera), and sixty-five species (account for 57,01% of the total species). In general, the Squamata is the most diverse order in quantity of families, genera, and species; followed by The Anura and the Gymnophiona respectively shown in Figure 1.

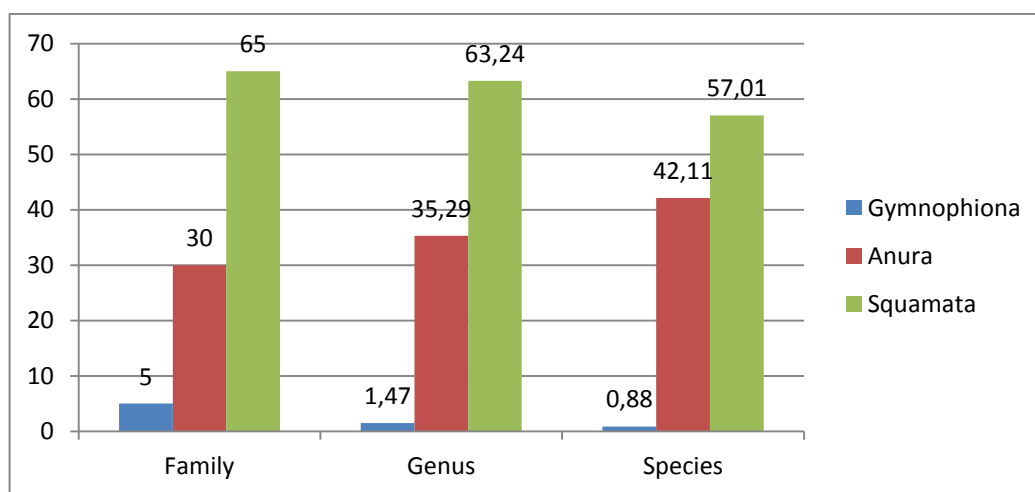


Figure 1 - Percentage chart of families, genus, species in amphibians and reptiles in the specimens of Hong Duc University

Based on the IUCN Red List (2018) [12] we recorded six rare species of amphibians and reptiles in the Hong Duc University specimens, There are two species of *Bronchocela vietnamensis* and *Python molurus* at the VU level (vulnerable), *Quasipaa verrucospinosa* at the NT level (near threatened) and three species of *Amolops cucae*, *Rhacophorus calcaneus* and *Leiolepis guentherpetersi* at EN level (endangered) shown in Table 1.

After analyzing and classifying, we have constructed a collection of reptile and amphibian specimens at Hong Duc University. The specimen information are as follows:

- Number of specimens: 1381 specimens.
- Number of species: 114 species of amphibians and reptile with 68 genera, 20 families and 3 orders. In which, the amphibian class has 49 species, 25 genera, 7 families, 2 orders and reptiles class has of 65 species, 43 genus, 13 families and 1 order.
- Preservation of specimens: Preserved specimens of alcohol solution 70⁰ in plastic or glass bins with labels bearing the specimen's information, and specimens of species also being photographed the photos of specimens for searching easily.
- These plastic and glass vases are housed in glass cabinets for display, for study, research and teaching in the field of zoology of students, faculty and researchers.

The database of amphibian and reptile specimens: The reptile amphibian data is stored on the Excel software for 1381 samples of 114 reptile species. The database information of each specimen includes: sample symbol, scientific name, Vietnamese name, number of specimens, sampling location, sample collector and date of collection.

The amphibian and reptile specimens at Hong Duc University is a tool for teaching and displaying. For university-level training, the specimens serve directly for the teaching of subjects such as zoology, biodiversity. For post-graduate training for teaching subjects such as Biodiversity and Conservation of Animals, Principles of Animal Taxonomy, Amphibian Studies. The use of specimens in teaching will contribute to raising awareness and attracting the attention of the community and the managers for the conservation of nature.

Nowadays, the biodiversity is severely impaired because of climate change, natural habitat degradation and illogical exploitation of humans. The area of important natural ecosystems is narrowed down. Many species of amphibians and reptiles are completely degraded in numbers or threatened with extinction. In that situation, the specimen is not only evidence of the evolution and survival of the species (in case this species will be extinct) but also the object to study and propose appropriate conservation measures. For example, they help to define the reproduction method (giving birth or spawning), feed requirements, habitat requirements of the species, optimal conditions for reproduction and development for the little one. It is necessary to preserve the species in natural habitat or to carry out captive breeding.

Conclusion

We have built a collection of reptile and amphibian specimens in Hong Duc University has 1381 specimens of 114 species of reptiles and amphibians belonging to 68 genus, 20 families and 3 orders. The amphibian class has 49 species, 25 genera, 7 families, 2 orders and reptiles class has of 65 species, 43 genera, 13 families and 1 order. The specimens were collected in 21 provinces of Vietnam. Confirmation that there are 6 species of rare and valuable amphibians and reptiles in the IUCN Red List (2018). The amphibian and reptile samples contributed to improving the quality of undergraduate and postgraduate education at Hong Duc University. Raise awareness of the protection of rare amphibians and reptiles. The collection of amphibians and reptiles is important in preserving valuable resources for Vietnam's laboratory and museum systems.

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