

SPECIES DIVERSITY AND DISTRIBUTION OF AMPHIBIANS AND REPTILES IN TRAM CHIM NATIONAL PARK – DONG THAP PROVINCE

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Abstract

This survey recorded 40 amphibian and reptile species belonging to 32 genera, 16 families and 3 orders distributing in Tram Chim National Park. The diverse families were Dicroglossidae (3 genera, 4 species) and Homalopsidae (3 genera 8 species). Two amphibian and 17 reptile species were added to Tram Chim National Park checklist. There were six rare and endangered species listed in Vietnam's Red Book, IUCN Red List, Decree 06 of the Government, and CITES. Three species including *Occidozyga lima*, *Hylarana erythraea* and *Enhydris enhydris* distributed widely throughout the survey region. The obtained data can be used to evaluate biodiversity level in Tram Chim National Park adapting climate change.

Keywords: Amphibian and reptile, diversity of species, distribution, Tram Chim National Park - Dong Thap province.

ĐA DẠNG THÀNH PHẦN LOÀI VÀ ĐẶC ĐIỂM PHÂN BỐ CỦA LŨNG CƯ BÒ SÁT Ở VƯỜN QUỐC GIA TRÀM CHIM – ĐỒNG THÁP

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Tóm tắt

Khảo sát đã ghi nhận 40 loài lưỡng cư bò sát thuộc 32 giống, 16 họ và 3 bộ phân bố ở Vườn Quốc gia Tràm Chim. Hai họ có thành phần giống loài đa dạng gồm Dicroglossidae (3 giống, 04 loài) và Homalopsidae (3 giống, 08 loài). Đề tài đã bổ sung 02 loài lưỡng cư và 17 loài bò sát cho khu vực nghiên cứu. Có 06 loài lưỡng cư bò sát quý hiếm bị đe dọa ở các mức độ khác nhau theo Sách Đỏ Việt Nam, Danh lục Đỏ Thế giới, Nghị định 06 của Chính phủ và Công ước CITES. Loài *Occidozyga lima*, *Hylarana erythraea* và *Enhydris enhydris* phân bố ở hầu hết các sinh cảnh trong khu vực nghiên cứu. Kết quả đề tài góp phần đánh giá độ đa dạng sinh học Vườn Quốc gia Tràm Chim trong sự thích ứng với biến đổi khí hậu.

Từ khóa: Đa dạng loài, đặc điểm phân bố, lưỡng cư và bò sát, quý hiếm, Vườn Quốc gia Tràm Chim.

1. Introduction

Tram Chim National Park (7,588 hectares), which is a flat area and at an altitude of one meter, is considered one of the remaining wetland ecosystems of Dong Thap Muoi (Buckton *et al.*, 1999). In addition to diversity and seasonally inundated grassland as *Eleocharis dulcis*, *Oryza rufipogon*, *Ischaemum spp*, *Cyperus malaccensis*, *Nelumbo nucifera*, *Nymphaea spp* and *Melaleuca* forest, there were 231 species of birds belonging to 48 families and 15 orders were recorded in the main habitats of Tram Chim National Park. Especially, the population of Sarus Crane, *Grus antigone*, which migrates to the park during the dry season (Buckton *et al.*, 1999). The reptile and amphibia groups of Tram Chim had been studied by Krohn (2009); Ngô Đắc Chứng và Hoàng Thị Nghiệp (2014), which recorded 64 species belonging to 43 genera, 20 families and 4 orders.

The evolution of climate change such as storms, inundated floods, the average increase in temperature, rising sea level and salt water intrusion has strongly impacted biodiversity in natural ecosystems in general and wetland ecosystems of Tram Chim National Park in particular. Lê Thị Hồng Hạnh và Trương Văn Tuấn (2014) said that wetland ecosystems were quite sensitive to weather fluctuations as well as water quality and these were also the habitat of many amphibians and reptiles.

2. Materials and methods

2.1. Location and study time

The samples of amphibians and reptiles were collected on 10 sampling routes passing 06 habitats: canals in gardens, canals outside gardens, *Lotus* swamps, *Melaleuca* forests, *Eleocharis* grasslands and dikes around the garden. Sampling was carried out during rainy season (10/2018) and dry season (03/2019) with a total time of 30 days. Diagram of sampling routes is shown in Figure 1.



Figure 1. Diagram of amphibians and reptiles sampling routes in Tram Chim National Park

2.2. Research methods

The survey methods followed Chanhom (2004) and Veith *et al.* (2007). Specimens were collected directly by hand, stick, noose or fishing rod with lures all day and night. After fixing with 10% formaldehyde solution (from 24 to 48 hours), the specimens were stored in 70% alcohol. In addition, the study also used trapping methods along the sampling routes and interviewed the Tram Chim National Park's staffs for recording the presence of amphibians and reptiles.

Identification and analysis were carried out in animal laboratory, Department of Biology Education, School of Education, Can Tho University in Can Tho City. The classification criteria were measured and determined based on the documents by Đào Văn Tiên (1981), Das (2015), etc.

3. Results and discussion

3.1. Species composition

This survey recorded 40 amphibian and reptile species belonging to 32 genera, 16 families and 3 orders distributing in Tram Chim National Park. The list of species (Table 1) based on field specimens (31 species), specimen observed (01 species) and samples recorded from interviews (08 species).

Table 1. List of amphibian and reptile species recorded in Tram Chim National Park

	Scientific name	Vietnamese name	Specimen
	Amphibia	Lớp Lưỡng cư	
	Anura	Bộ Không đuôi	
	1. Bufonidae Gray, 1825	Họ Cóc	
1.	<i>Duttaphrynus melanostictus</i> (Schneider, 1799)*	Cóc nhà	F
	2. Microhylidae Günther, 1858	Họ Cóc miệng nhỏ	
2.	<i>Kaloula pulchra</i> Gray, 1831	Ếnh ương thường	F
	3. Dicroglossidae Anderson, 1871	Họ Ếch nhái chính thức	
3.	<i>Fejervarya limnocharis</i> (Gravenhorst, 1829)*	Ngóe	F
4.	<i>Fejervarya cancrivora</i> (Gravenhorst, 1829)	Ếch cua	F, I
5.	<i>Hoplobatrachus rugulosus</i> (Wiegmann, 1834)*	Ếch đồng	F
6.	<i>Occidozyga lima</i> (Gravenhorst, 1829)*	Cóc nước sần	F
	4. Ranidae Rafinesque, 1814	Họ Ếch nhái	
7.	<i>Hylarana erythraea</i> (Schlegel, 1837)*	Chàng xanh	F
	Reptilia	Lớp Bò sát	
	Squamata	Bộ Có vảy	
	5. Agamidae Gray, 1827	Họ Nhông	
8.	<i>Calotes versicolor</i> (Daudin, 1802)*	Nhông xanh	F
	6. Gekkonidae Gray, 1825	Họ Tắc kè	
9.	<i>Gekko gecko</i> (Linnaeus, 1758)	Tắc kè	I
10.	<i>Gehyra multilata</i> (Weigmann, 1835)	Thạch sùng cụt thường	F
11.	<i>Hemidactylus platyurus</i> (Schneider, 1792)*	Thạch sùng đuôi rềm	F
12.	<i>Hemidactylus frenatus</i> Schlegel, 1836*	Thạch sùng đuôi sần	F
	7. Scincidae Opell, 1811	Họ Thằn lằn bóng	
13.	<i>Eutropis multifasciata</i> (Kuhl, 1820)*	Thằn lằn bóng hoa	F
14.	<i>Lygosoma quadrupes</i> (Linnaeus, 1766)	Thằn lằn chân ngắn thường	I
	8. Typhlopidae Gray, 1825	Họ Rắn giun	
15.	<i>Ramphotyphlops braminus</i> (Daudin, 1803)*	Rắn giun thường	F
	9. Cyndrophidae Fitzinger, 1826	Họ Rắn hai đầu	
16.	<i>Cylindrophis ruffus</i> (Laurenti, 1768)*	Rắn hai đầu	F
	10. Pythonidae Fitzinger, 1826	Họ Trăn	
17.	<i>Python bivittatus</i> (Kuhl, 1820)*	Trăn đất	O
	11. Xenopeltidae Bonaparte, 1845	Họ Rắn mồng	
18.	<i>Xenopeltis unicolor</i> Reinwardt, 1827*	Rắn mồng	F
	12. Colubridae Opperl, 1811	Họ Rắn nước	
19.	<i>Ahaetulla nasuta</i> (Lacépède, 1789)	Rắn roi mõm nhọn	F
20.	<i>Chrysopelea ornata</i> (Shaw, 1802)	Rắn cườm	F

21.	<i>Coelognathus radiatus</i> (Boie, 1827)*	Rắn sọc dưa	F
22.	<i>Dendrelaphis* pictus</i> (Gmelin, 1789)	Rắn leo cây	F
23.	<i>Oligodon taeniatus</i> (Gunther, 1861)	Rắn khiếm vạch	F
24.	<i>Ptyas korros</i> (Schlegel, 1837)*	Rắn ráo thường	F
25.	<i>Ptyas mucosa</i> (Linnaeus, 1758)	Rắn ráo trâu	F
26.	<i>Xenochrophis flavipunctatus</i> (Hallowell, 1861)*	Rắn nước	F
	13. Homalopsidae Bonaparte, 1845	Họ Rắn bông	
27.	<i>Enhydris bocourti</i> (Jan, 1865)*	Rắn bông voi	F
28.	<i>Enhydris enhydris</i> (Schneider, 1799)*	Rắn bông súng	F
29.	<i>Enhydris innominata</i> (Morice, 1875)*	Rắn bông không tên	F
30.	<i>Enhydris subtaeniata</i> (Bourret, 1934)	Rắn bông mê kông	F
31.	<i>Enhydris</i> sp1		F
32.	<i>Enhydris</i> sp2		F
33.	<i>Erpeton tentaculatum</i> (Lacépède, 1800)*	Rắn râu	F
34.	<i>Homalopsis buccata</i> (Linnaeus, 1758)*	Rắn ri cá	F
	14. Elapidae Boie, 1827	Họ Rắn hổ	
35.	<i>Bungarus fasciatus</i> (Schneider, 1801)	Rắn cạp nong	I
	Testudines	Bộ Rùa	
	15. Geoemydidae Theobald, 1868	Họ Rùa đầm	
36.	<i>Cuora amboinensis</i> (Daudin, 1801)	Rùa hộp lưng đen	I
37.	<i>Heosemys grandis</i> (Gray, 1860)	Rùa đất lớn	I
38.	<i>Malayemys subtrijuga</i> (Schlegel & S.muller, 1844)	Rùa ba gờ	I
	16. Trionychidae Fitzinger, 1826	Họ Ba ba	
39.	<i>Amyda cartilaginea</i> (Boddaert, 1770)	Ba ba nam bộ	I
40.	<i>Pelodiscus sinensis</i> (Wiegmann, 1835)	Ba ba trơn	I

Note: F (Field specimens); O (Observed specimens); I (Interview specimens); *: The taxon announced by Krohn's research (2009).

3.2. Species composition structure

In the amphibian class, the study recorded 04 families, 06 genera and 07 species belonging to Anura. Dicroglossidae had the most diverse species composition, including 03 genera and 04 species (*Fejervarya limnocharis*, *F. cancrivora*, *Hoplobatrachus rugulosus*, *Occidozyga lima*). Bufonidae, Microhylidae and Ranidae were less diverse with only one genus and one species in each family.

With the same scope of study, the research not only recorded all five amphibian species announced by Krohn (2009) but also presented

two new amphibian species (*Kaloula pulchra* and *Fejervarya cancrivora*) to the Tram Chim National Park.

In the reptile group, the survey obtained 25 species and 10 families belonging to Squamata. Colubridae had the most species composition (07 genera and 08 species). Homalopsidae had a very high diversity of species (08 species) belonging to genera *Enhydris*, *Erpeton* and *Homalopsis*. Among them, *Enhydris* had the highest proportion (75%). Survey results recorded 16 species announced by Krohn (2009) except *Takydromus sexlineatus*.

Table 2. Species composition structure of amphibians and reptiles in Tram Chim National Park

	CLASS	ORDER	FAMILY	GENUS	SPECIES
1	Amphibia	Anura	Bufo	1	1
2			Microhylidae	1	1
3			Dicroglossidae	3	4
4			Ranidae	1	1
5	Reptilia	Squamata	Agamidae	1	1
6			Gekkonidae	3	4
7			Scincidae	2	2
8			Typhlopidae	1	1
9			Cylindrophiiidae	1	1
10			Pythonidae	1	1
11			Xenopeltidae	1	1
12			Colubridae	7	8
13			Homalopsidae	3	8
14			Elapidae	1	1
15		Testudines	Geoemydidae	3	3
16			Trionychidae	2	2
Total		03	16	32	40

According to Arnold (1997) and Chan-Ard *et al.* (2015), *Takydromus sexlineatus* is a common species in grasslands. High water level in the study area during the sampling period may cause limited active area and reduced chances of encountering this species. Besides, the study also recorded the new appearance of 17 reptile species in this area, of which, there was one species of *Dendrelaphis* genus that was previously announced by Krohn (2009).

Among the amphibians and reptiles recorded in Tram Chim National Park, there were six rare species threatened at different levels that listed in the Vietnam Red Data Book (2007), the IUCN Red List (2019), the Decree 06/2019 observation of Convention Trade in Endangered Species of Wild Fauna and Flora and the CITES convention (2006). The list of rare species is presented in Table 3.

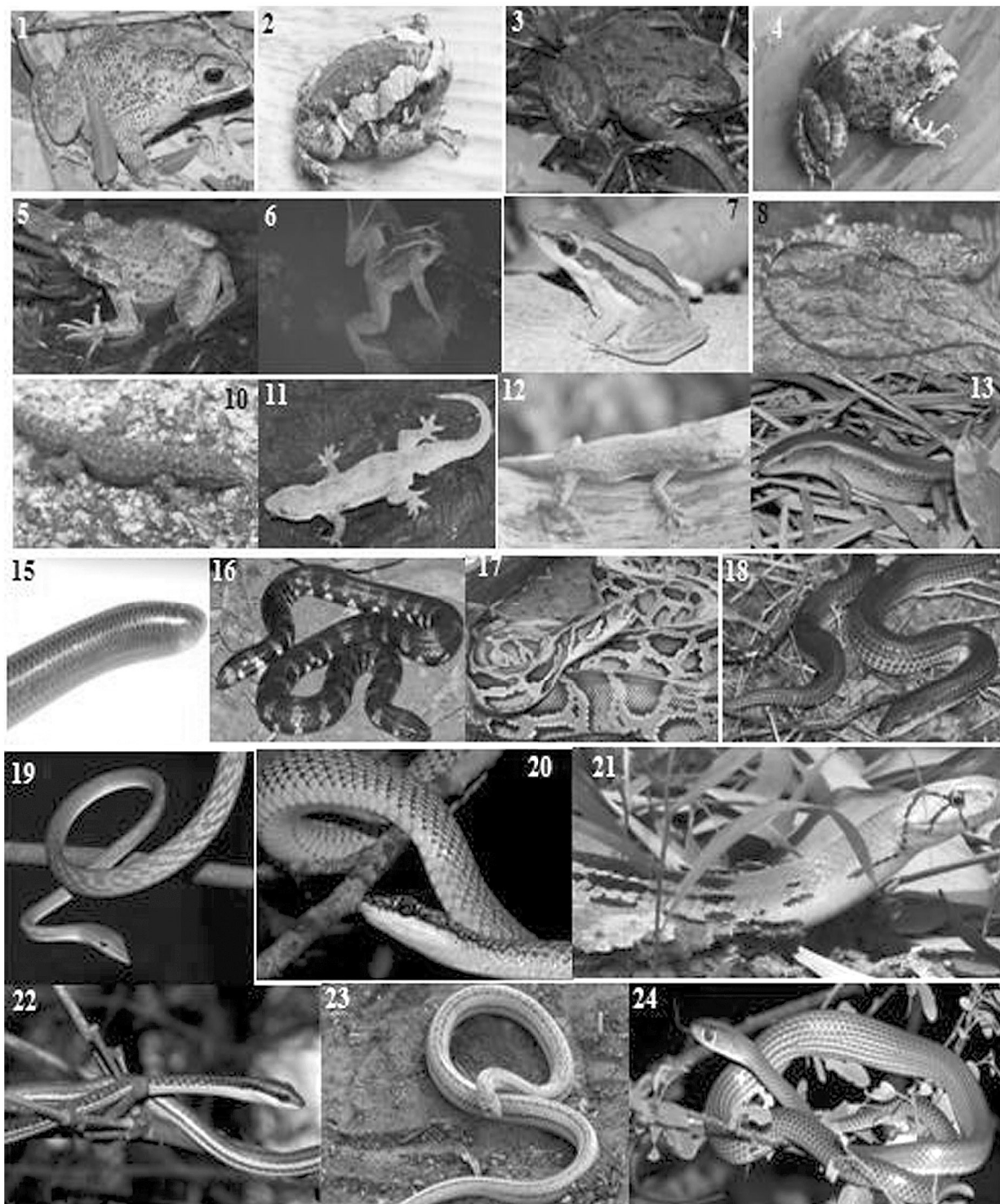


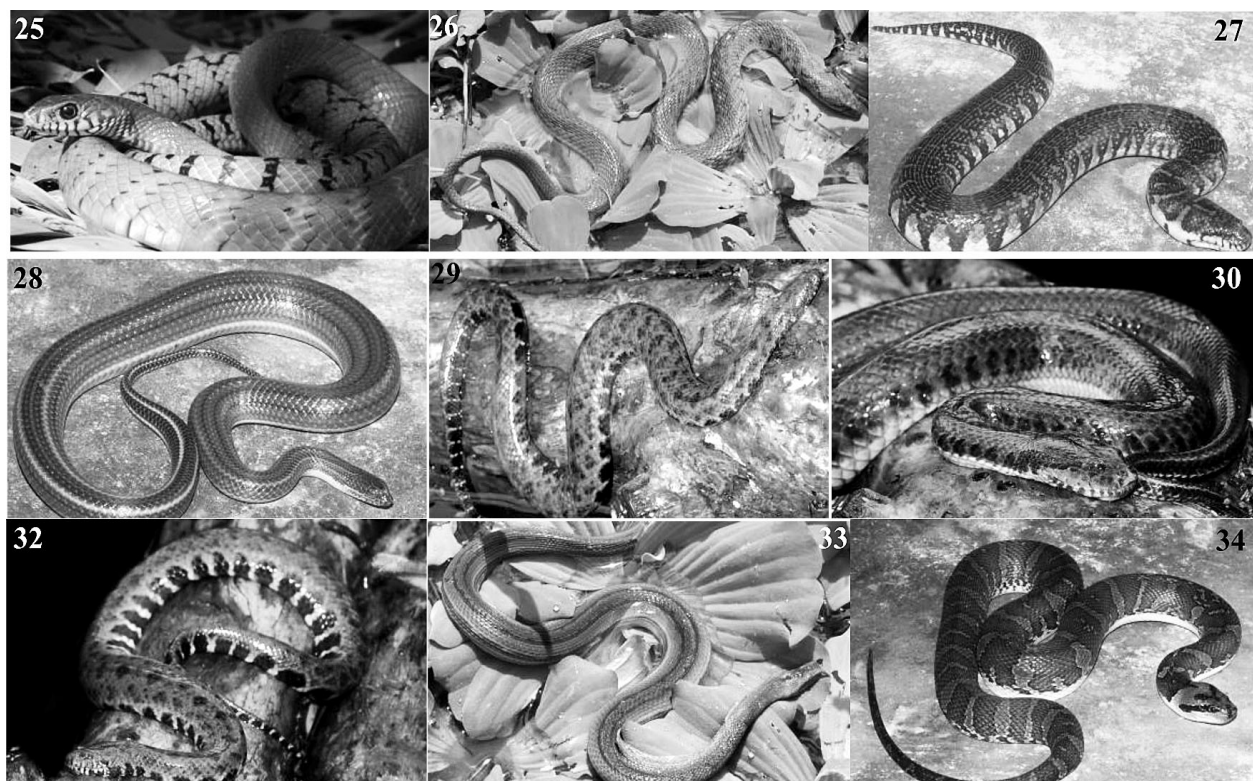
Figure 2. Amphibian and reptile species in Tram Chim National Park

(The ordinal numbers shown in the figure correspond to the order of species off the list in Table 1)

Table 3. Rere amphibian and reptile have been recorded in Tram Chim National Park

	Scientific Name	Vietnamese Name	RBVN (2007)	IUCN (2019)	Decree 06 (2019)	CITES (2006)
1	<i>Python bivittatus</i> (Kuhl, 1820)	Trăn đất	CR	VU	IIB	I
2	<i>Ptyas mucosa</i> (Linnaeus, 1758)	Rắn ráo trâu	EN		IIB	II
3	<i>Cuora amboinensis</i> (Daudin, 1801)	Rùa hộp lưng đen	VU	VU	IIB	
4	<i>Heosemys grandis</i> (Gray, 1860)	Rùa đất lớn	VU	VU	IIB	II
5	<i>Malayemys subtrijuga</i> (Schlegel & S.muller, 1844)	Rùa ba gờ	VU	VU	IIB	II
6	<i>Amyda cartilaginea</i> (Boddaert, 1770)	Ba ba nam bộ	VU	VU	IIB	II

Notes: RBVN = Vietnam Red Data Book (2007): CR = Critical; EN = Endangered; VU = Vulnerable; IUCN = IUCN Red List of Threatened Species (2019): VU = Vulnerable; Decree 06 = Decree 06/2019 observation of Convention Trade in Endangered Species of Wild Fauna and Flora: IIB = Group forest animals; CITES = the Convention on International Trade in Endangered Species of Wild Fauna and Flora: I = Appendix I; II = Appendix II.

**Figure 3. Amphibian and reptile species in Tram Chim National Park (cont.)**

3.3. Distribution characteristics of amphibians and reptiles in Tram Chim National Park

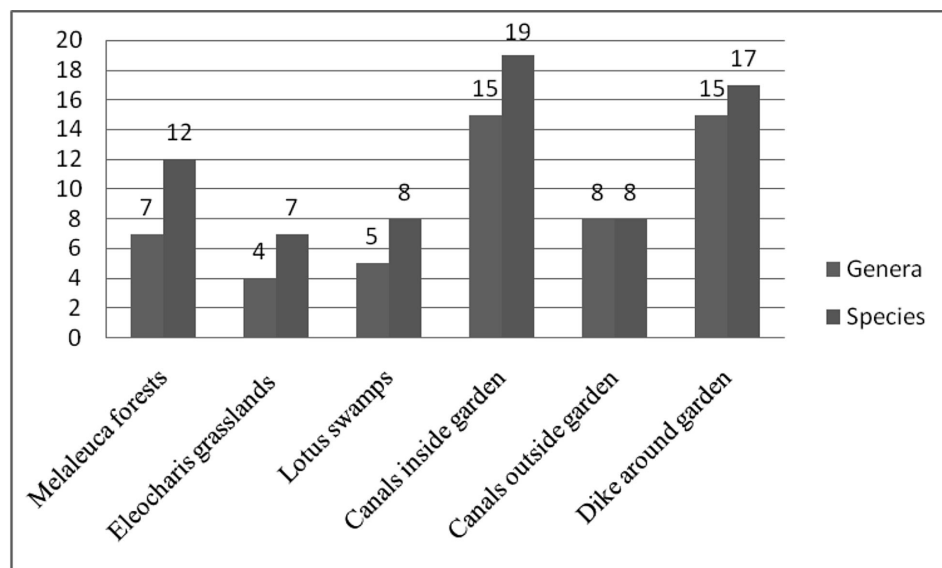


Figure 4. Distribution of amphibians and reptiles in Tram Chim National Park

Figure 4 showed that the group of habitats, including canals in the garden, dike around the garden and *Melaleuca* forest had a more diverse species composition than the rest of the habitats. Most snake species were recorded in the habitat of canal inside the garden due to the diverse flora from large woody species such as *Melaleuca* sp., Eucalyptuses, bamboo, etc. to shrubs, vines, reeds, *Mimosa* sp. and other types of hyacinths, duckweeds, grasses filling the canal bed, of which, Colubridae and Homalopsidae account for between 75% and 87,5% of all reptile species. The dike habitat surrounding the park was the main distribution of lizards collected in Tram Chim National Park due to its all year dry characteristic and the diversity of the flora such as *Melaleuca* sp., Eucalyptuses, bamboo, bushes and viens. The number of amphibians and reptiles recorded in *Melaleuca* forests, *Eleocharis* grasslands and *Lotus* swamps was quite low because of the all year high water level, their monotonous and homogeneous flora.

In the amphibian class, *Occidozyga lima*

and *Hylarana erythraea* had the widest range of distribution because they appeared in most of the habitat in the survey area. *Enhydris* genus was the most prevalent in these habitats, accounting for 50% of the total number of species recorded in each habitat. There was no difference in species composition of amphibians between canals inside garden and canals outside garden.

In the reptile group, Homalopsidae had a quite wide

range of distribution from its presence in four habitats: *Melaleuca* forests, canals inside garden, *Eleocharis* grasslands and *Lotus* swamps. In particular, the species composition of the Homalopsidae family was highest in two habitats: *Melaleuca* forests and canals inside garden. *Enhydris enhydris* was a common reptile species in the habitats of Tram Chim National Park.

4. Conclusion

A list of 40 amphibian and reptile species belonging to 32 genera, 16 families and 03 orders distributing in Tram Chim National Park had been established. Dicroglossidae (03 genera, 04 species) and Homalopsidae (03 genera, 08 species) were diversified families in composition. Two amphibian and 17 reptile species were added to Tram Chim National Park checklist.

There were six rare and endangered species listed in the Vietnam Red Data Book (2007), IUCN Red List (2019), Decree 06 of the Government (2019) and Convention CITES (2006).

The group of habitats, including canal inside garden, dike around the garden and *Melaleuca*

forests, was more diverse in species composition than the rest. Amphibians and lizards mainly distributed in dike habitat surrounding the garden. The diversity of snake species belonging to Colubridae and Homalopsidae was found in habitats of canals inside garden.

Three species of *Occidozyga lima*, *Hylarana erythraea* and *Enhydryis enhydryis* distributed widely throughout the survey area.

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