

AN UPDATED LIST OF VIETNAM RODENTS (RODENTIA) WITH TAXONOMIC REVIEW AND RECENTLY DISCOVERED SPECIES

Nguyen Xuan Dang, Nguyen Tien Dat, Nguyen Xuan Nghia
and Vu Dinh Thong

*Institute of Ecology and Biological Resources,
Vietnam Academy of Science and Technology*

Abstract. This study was carried out in 2021-2022. By referencing published scientific documents and reviewing museum specimens stored at the Institute of Ecology and Biological Resources, we have established the List of Vietnam Rodents updated to 2022 including 71 species and 22 subspecies of 34 genera and seven families. Compared with the previous lists before 2010, this List has five species excluded because they were misidentified; 13 species have their taxonomic position or scientific name changed by recent reviews; six species, three genera, and one family related to recently discovered species. We recommend that the museum specimens of Vietnam mammals need to be reviewed to adjust their classification position and make scientific names consistent with this updated list. Future studies also need to use this updated List to build a list of rodent species for the study area. This will ensure the up-to-date taxonomic position of the taxa and the using the same taxonomic system that will be convenient for users, especially those who are not specialized in rodent taxonomy.

Keywords: Rodents, Update, Vietnam, Checklist.

1. Introduction

Rodentia is the largest order in the class Mammalia and plays a substantial role in natural ecosystems as well as in human life. Accordingly, the order Rodentia has received a lot of research attention worldwide. Due to the complexity of their genetic relationships and phylogenetic relationships, as well as, the high similarity in external morphological features between species, classifying rodents can be difficult. Consequently, rodent taxonomy is ever-changing, with frequent disagreements among scientists about the taxonomic position of certain taxa. Thanks to the recent development of both molecular genetic analysis and computer analysis technology, a myriad of problems in rodent taxonomy and systematics have since been elucidated.

Received November 11, 2022. Revised June 14, 2023. Accepted June 28, 2023.

Contact Nguyen Xuan Dang, e-mail address: dangcerrec@gmail.com

Many species have been moved from one genus/family to another and even some species have been divided into two or more different species. In contrast, some species have been combined into one and their scientific name has ceased to be valid. Additionally, many new species or genera have been recently discovered and described for science. According to the current rodent classification system and the list should undergo major changes compared to the pre-2010 lists.

The rodent fauna of Vietnam is very diverse and has been studied by scientists since the early 18th century [1]. Due to different research times and conditions, the Vietnam rodent lists often have significant differences in species composition, taxonomic positions, and scientific names of the taxa, causing much difficulty for users. According to the latest comprehensive checklist by Dang Ngoc Can et al. (2008) [2], the mammal fauna of Vietnam consists of 295 species, including 69 rodents belonging to 30 genera and six families. Since 2008, a lot of new data on small mammals have been published indicating that the current knowledge of richness, taxonomy, and distribution of Vietnamese rodent species is still incomplete. This study aims to provide the most up-to-date Vietnam rodent list by reviewing the taxonomic positions of the known rodent species and adding recently discovered species.

2. Content

2.1. Time and research methods

During 2001-2022, we collected and consulted scientific documents published recently to aid in updating the taxonomic position and species composition of the rodent species known to Vietnam. We still follow the mammal classification system of Wilson and Reeder (2005) [3], which is commonly used worldwide. The three main documents we used to review and update the taxonomic position of rodents in Vietnam are [4, 5, 6]. These documents have compiled and synthesized the most complete information on the taxonomy of rodent species in the world and thus we mostly follow the opinion of these authors. In addition, we also consulted other documents related to updating taxonomic positions, phylogenetic positions, karyological data, discovering, and describing new rodent species from Vietnam such as [7-15].

To verify the updated taxonomic position information in the references, we studied rodent specimens stored in the Department of Zoological Museum and Department of Vertebrate Zoology, at the Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology (Hanoi). In total, we have examined 939 skin specimens and 515 skull specimens from 42 rodent species to compare with the publications recently. Detailed data on this will be presented in our future publication.

2.2. Results and Discussion

2.2.1. Changes in the classification system of Vietnam rodents

Our research results show that the Vietnam rodent lists published before 2010 [2, 16,17] should undergo the following major changes: the removal of five species because they are not distributed in Vietnam but were included due to misidentification; the changing of the taxonomic position and scientific name of 13 species, and adding six

recently discovered species, which present in three genera and one order. The five species that should be excluded from previous lists are:

Ratufa affinis Raffles, 1822: Dang Huy Huynh et al. (1994) [16] and Dang Huy Huynh et al. (2008) [17] reported *R. affinis* has been recorded in Ho Chi Minh City. However, according to Corbet G. B. and Hill J. E., 1992 [18], this species is not distributed in Vietnam at all. The above-mentioned sightings may be due to confusion with the subspecies *Ratufa bicolor smithi* whose external morphology is similar to that of *R. affinis*. Wilson et al. (2016) [4] and Francis (2019) [6] also suggested that *R. affinis* not distributed in Vietnam. One of the authors of this paper (Nguyen Xuan Dang) has examined a hunted specimen of this species in a collection from Bu Gia Map National Park (Binh Phuoc Province) and identified it as *Ratufa bicolor smithi*.

Callosciurus nigrovittatus (Horsfield, 1823): Dang Huy Huynh et al. (1994) [16] reported a sighting of this species in Saigon, but so far, no specimen has ever been collected and no further records have been made. Corbet and Hill (1992) [18] suggested that this species is not distributed north of Cape Kra (10°30'N) so it would be impossible to find in Vietnam. Wilson et al. (2016) [4] and Francis (2019) [19] also agree with this view. We follow this opinion and remove this species from our updated 2022 Vietnam Rodent list.

Callosciurus nonatus (Boddaert, 1785): This species has been reported to be recorded in Saigon [16], but so far, there have been no further records. According to Lunde et al. (2001) [19], Wilson et al. (2016) [4], and Francis (2019) [6], this species is not distributed north of Cape Kra (10°30'N), therefore, it cannot be found in Vietnam. We follow this opinion and remove this species from the updated 2022 Vietnam Rodent list.

Niviventer niviventer (Hodgson, 1836): Dang Huy Huynh et al. (1994) [16] and Dang Huy Huynh et al. (2008) [17] reported the *N. niviventer* were found in Vietnam. However, a few studies [5, 19, 20, 21] show that *N. niviventer* is only found in Northeastern Pakistan, Nepal, and India, not Vietnam. We follow this opinion and remove this species from the updated 2022 Vietnam Rodent list.

Niviventer cremoriventer Miller, 1900: Dang Huy Huynh et al. (2008) [17] reported that this species has been recorded in some provinces of Vietnam. However, recent studies show that *Niviventer cremoriventer* Miller, 1900 is only distributed in Southern Myanmar, Thailand, the Malay Peninsula, Sumatra, Java, and Borneo, not in Vietnam [5]. Specimens previously classified as *Niviventer cremoriventer* Miller, 1900 should be re-examined and reclassified as either *Chiromyscus chyropus* (Thomas, 1891) or *Chiromyscus langbianis* (Robinson at Kloss, 1922). We follow this opinion and remove this species from the 2022 Vietnam Rodent list.

Based on the taxonomic system in [4, 5], we found that the following 13 species of Vietnam rodents should have their taxonomic position and scientific name changed (Table 1).

Table 1. Species changed taxonomic position or scientific name

Old taxonomic position and name	New taxonomic position and name	The authors changed the name
<i>Hylopetes lepidus</i> (Horsfield, 1822)	<i>Hylopetes platyurus</i> (Jentink, 1890)	Lunde et al. (2001)
<i>Petaurista petaurista</i> (Pallas, 1766)	<i>Petaurista phillipensis</i> Elliot, 1839	Corbet & Hill (1992), Thorington & Hoffman (2005), Đặng Ngọc Cần và cs. (2008), Oshida et al. (2013);
<i>Callosciurus flavimanus</i> (Geofroy, 1831)	<i>Callosciurus erythraeus flavimanus</i> Geoffroy Saint-Hilaire,1831	Corbet & Hill (1992), Lunde et al. (2001), Oshida et al.(2013), Wilson et al.(2016),
<i>Typhlomys cinereus</i> Milne-Edwards, 1877	<i>Typhlomyschapensis</i> (Osgood,1932)	Lunde et al. (2001), Abramov et al. (2014), He et al. (2017) Wilson et al. (2017),
<i>Eothenomys melanogaster</i> (Milne-Edwards, 1871)	<i>Eothenomys miletus</i> (Thomas 1914)	Wilson et al. (2017)
<i>Leopoldamys sabanus</i> (Thomas, 1887)	<i>Leopoldamys herberti</i> (Kloss 1916)	Balakirev et al. 2013, Wilson et al.(2017)
<i>Micromys minutus</i> (Pallas, 1771)	<i>Micromys erythrotis</i> Blyth, 1856	Abramov et al. (2009)
<i>Rattus koratensis</i> Kloss 1919	<i>Rattus andamanensis</i> (Blyth, 1860)	Dang Ngoc Can et al. (2008)
<i>Rattus flavipectus</i> (Milne- Edwards, 1871)	<i>Rattus tanezumi</i> Temminck, 1844	Musser and Carleton (1993), Lunde et al. (2008)
<i>Rattus molliculus</i> Robbinson et Kloss, 1922	<i>Rattus tanezumi</i> Temminck, 1844	Musser and Carleton (1993), Lunde et al. (2008)
<i>Rattus germani</i> Milne- Edwards,1872	<i>Rattus tanezumi</i> Temminck, 1844	Musser and Carleton (1993), Lunde et al. (2008)
<i>Hystrix subcristrata</i> Swinhoe, 1870	<i>Hystrix brachyura</i> <i>subcristrata</i> Swinhoe, 1870	Woods & Kilpatrik (2005), Dang Ngoc Can (2008):
<i>Hystrix klossi</i> Thomas, 1916	<i>Hystrix brachyura</i> Linnaeus, 1758	Wilson et al. (2016)

According to Wilson et al. (2016), there are many subspecies of *Callosciurus erythraeus*, some of which may be distinct at the species level, however, more research needs to be done to resolve this issue. Currently, there are about 26 recognized subspecies, some of which are grouped by Corbet & Hill (1992) into the following 4 groups: (1) Group *C. e. erythraeus* distributed in North Vietnam, Thailand, Malaysia, 186

Myanmar, India, Vietnam has 1 subspecies: *C. e. erythraeus*; (2) Group *C. e. flavimanus* distributed in South Vietnam, Laos, Cambodia. Vietnam has 1 subspecies: *C. e. flavimanus* Geoffroy Saint-Hilaire, 1831; (3) Group *C. e. sladeni* distributed in Myanmar; (4) Group *C. e. styani* distributed in East China. There are 11 other subspecies not grouped by Corbet & Hill (1992), including 2 in Vietnam: *C. e. griseimanus* Milne-Edwards, 1867 (near Saigon) and *C. e. hendeei* Osgood, 1932 (South Vietnam).

Six species added to the updated list include:

Laonastes aenigmamus Jenkins, Kilpatrick, Robinson & Timmins, 2005: This species was first discovered in Laos in 2005 [22] and first discovered in Vietnam (in Phong Nha – Ke Bang National Park) in 2012 [7].

Saxatilomys paulinae Musser, Smith, Robinson, Lunde, 2005: This species was first discovered in Laos in 2005 [23] and first discovered in Vietnam (in Phong Nha – Ke Bang National Park) in 2014 [14].

Callosciurus honkhoaiensis Nguyen et al, 2018: This species was first discovered in Vietnam (in Hon Khoai Island, Ca Mau province) and to science in 2018 [15].

Chiromyscus thomasi Balakirev et al., 2014: For a long time *Chiromyscus chiropus* was characterized as having a "mask" (large black ring around the eyes) until Balakirev et al. (2014) [9] determined that the holotype of *C. chiropus* had no "mask". As such, the "masked" specimens were another species, which Balakirev et al. (2014) [9] gave the name *C. thomasi*. The species *C. chiropus* has also been mistakenly classified as *Niviventer cremoriventer*. Due to this taxonomic change, specimens from areas formerly thought to have *C. chiropus* need to be re-identified to one of the following species: *C. chiropus*, *C. thomasi*, or *C. langbianis*[5].

Hapalomys suntsovi Abramov et al. 2017: The species was recorded by [11] in Bu Gia Map National Park, Binh Phuoc Province. It was previously considered to belong to *H. delacouri*[5], which is found in many provinces of Vietnam [2, 17]. However, recent chromosomal studies of populations in South Vietnam and Northern Thailand show that *H. delacouri* is multiple species and Abramov et al. (2017) [11] then further isolated them to *H. suntsovi*. Thus, the species *Hapalomys delacouri* Thomas, 1927 has now been separated into two independent species: *Hapalomys delacouri* Thomas, 1927 and *Hapalomys suntsovi* Abramov et al. 2017. Both species are distributed throughout Vietnam. Museum specimens in Vietnam were previously classified as *Hapalomys delacouri* Thomas, 1927, now need to be reclassified to find out whether they belong to *Hapalomys delacouri* Thomas, 1927 or *Hapalomys suntsovi* Abramov et al. 2017.

Niviventer huang (Bonhote, 1905): Dang Huy Huynh et al. (2008) [1], considered *Niviventer huang* as the synonym of *Niviventer bukit*. Bonhote, 1903, recorded the species in some provinces of Vietnam. Dang Ngoc Can et al. (2008) [2], considered *Niviventer huang* (Bonhote, 1905) as a synonym of *N. fulvescens*, recorded in many provinces of Vietnam. However, recent morphological and evolutionary genetic analyses separated *N. fulvescens* into three independent species: *N. fulvescens*, *N. huang*, and *N. bukit* [5]. All these species are found in Vietnam: *N. fulvescens* distributed in South Vietnam, *N. huang* distributed throughout Vietnam (including Con Dao island) and *N. bukit* distributed in South Vietnam.

Along with the recently discovered species, there are 2 new genera (*Laonastes*, *Saxatilomys*) and one new family (Laonastidae) added to the updated list of Vietnam rodents.

2.2.2. The list of Vietnam rodents updated to 2022

From the research results, we have established a 2022 updated List of Vietnam Rodents including, 71 species and 22 subspecies of 34 genera and seven families. We follow the classification system of Wilson et al (2005) [3]. The English names and Vietnamese names of the taxa are listed inside the square mark.

Table 2. A 2022 updated list of Vietnam rodent species

Taxon	English name	Vietnamese name
I. Family Sciuridae Fischer de Waldheim, 1817	Squirrels	Họ Sóc
1.1. Subfamily Ratufinae Moore, 1959	Giant Squirrels	Phân họ Sóc đen
1. <i>Ratufa bicolor</i> (Sparman, 1778) Subspecies: <i>R. b. condorensis</i> Kloss, 1921, <i>R. b. gigantea</i> McClelland, 1839 and <i>R. b. smithi</i> Robinson & Kloss, 1922	Black Giant Squirrel	Sóc đen
1.2. Subfamily Sciurinae Fischer de Waldheim, 1817	Flying Squirrels;	Phân họ Sóc bay
2. <i>Belomys pearsonii</i> (Gray, 1842) Subspecies: <i>B. p. blandus</i> Osgood, 1932	Hairy-footed Flying Squirrel	Sóc bay long chân
3. <i>Hylopetes alboniger</i> (Hodgson, 1836) Subspecies: <i>H. a. alboniger</i> Hodgson, 1836	Particolored Flying Squirrel	Sóc bay đen trắng
4. <i>Hylopetes lepidus</i> (Horsfield, 1822) / <i>Hylopetes platyurus</i> (Jentink, 1890) Subspecies: <i>H. a. alboniger</i> Hodgson, 1836	Particolored Flying Squirrel	Sóc bay đen trắng
5. <i>Hylopetes phayrei</i> (Blyth, 1859) Subspecies: <i>H. p. phayrei</i> Blyth, 1859	Indochinese Flying Squirrel	Sóc bay xám
6. <i>Hylopetes spadiceus</i> (Blyth, 1847) Subspecies: <i>H. s. spadiceus</i> (Müller, 1840, 1836)	Red-cheeked Flying Squirrel	Sóc bay bé, Sóc bay sao
7. <i>Petaurista elegans</i> (Temminck, 1836) Subspecies: <i>P. e. marica</i> Thomas 1912	Spotted Giant Flying Squirrel	Sóc bay sao
8. <i>Petaurista phillipensis</i> (Elliot, 1839) Subspecies: <i>P. p. annamensis</i> Thomas, 1914; <i>P. p. lylei</i> Bonhote, 1990; and <i>P. p. miloni</i> (Bourret, 1942)	Indian Giant Flying Squirrel	Sóc bay trâu
1.3. Subfamily Callosciurinae Pocock, 1923	Tree Squirrels	Phân họ Sóc cây

9. <i>Callosciurus erythraeus</i> (Pallas, 1779) Subspecies: <i>C.e. erythraeus</i> Pallas, 1779; <i>C. e. flavimanus</i> Geoffroy Saint-Hilaire, 1831; <i>C. e. griseimanus</i> Milne-Edwards, 1867; and <i>C. e. hendeei</i> Osgood, 1932	Pallas's Squirrel	Sóc bụng đỏ
10. <i>Callosciurus finlaysonii</i> (Horsfiels, 1823) Subspecies: <i>C. f. annellatus</i> Thomas, 1929; <i>C. f. germaini</i> Milne-Edwards, 1867; and <i>C. f. harnamdi</i> Milne-Edwards, 1877	Finlayson's Squirrel	Sóc đỏ
11. <i>Callosciurus inornatus</i> (Gray, 1867)	Inornate Squirrel	Sóc bụng xám
12. <i>Callosciurus honkhoaiensis</i> Nguyen et al., 2018	Hon Khoai squirrel	Sóc hòn khoai
13. <i>Dremomys gularis</i> Osgood, 1932	Red-throated Squirrel	Sóc họng đỏ
14. <i>Dremomys pernyi</i> (Milne-Edwards, 1867); Subspecies: <i>D. p. flavior</i> Allen, 1912; and <i>D. p. pernyi</i> Milne-Edwards, 1867	Perny's Long-nosed Squirrel	Sóc má vàng
15. <i>Dremomys rufigenis</i> (Blanford, 1878) Subspecies: <i>D. r. rufigenis</i> Blanford, 1878; <i>D. r. fuscus</i> Bonhote, 1907	Asian Red-cheeked Squirrel	Sóc mõm hung
16. <i>Menetes berdmorei</i> (Blyth, 1849) Subspecies: <i>M. b. pyrocephalus</i> Milne-Edwards, 1867; and <i>M. b. moerescens</i> Thomas, 1914	Indochinese Ground Squirrel	Sóc vằn lưng
17. <i>Sundasciurus hippurus</i> (Geoffroy, 1831); Subspecies: <i>S. h. ornatus</i> Dao Van Tien & Cao Van Sung, 1990	Horse-tailed Squirrel	Sóc đuôi ngựa
18. <i>Tamiops maccllellandi</i> (Horsfield, 1840) Subspecies: <i>T. m. inconstans</i> Thomas, 1920	Himalayan Striped Squirrel	Sóc chuột nhỏ
19. <i>Tamiops maritimus</i> (Bonhote, 1900) Subspecies: <i>T. m. hainanus</i> Allen, 1906; and <i>T. m. moi</i> Robinson & Kloss, 1922	Maritime Striped Squirrel	Sóc chuột hải nam
20. <i>Tamiops rodolphii</i> (Milne-Edwards, 1867); Subspecies: <i>T. r. rodolphii</i> Milne-Edwards, 1867	Cambodian Striped Squirrel	Sóc chuột nhỏ
21. <i>Tamiops swinhoi</i> (Milne-Edwards, 1874); Subspecies: <i>T. s. olivaceus</i> Osgood, 1932	Swinhoe's Striped Squirrel	Sóc chuột lớn

II. Family Platacanthomyidae Alston, 1876	Dormouses	Họ Chuột mù
22. <i>Typhlomys chapensis</i> (Osgood,1932)	Soft-furred Pyg my Dormouse	Chuột mù
III. Family Spalacidae Gray, 1821	Bamboo Rats	Họ Dúi
3.1. Subfamily Rhizomyinae Winge, 1887	Bamboo Rats	Phân họ Dúi
23. <i>Cannomys badius</i> (Hodgson, 1841)	Lesser Bamboo Rat	Dúi nâu
24. <i>Rhizomys pruinosus</i> Blyth, 1851 Subspecies: <i>R. p. pannosus</i> Thomas 1915	Hoary Bamboo Rat	Dúi mốc lớn
25. <i>Rhizomys sinensis</i> Gray, 1831 Subspecies: <i>R. s. reductus</i> Dao Van Tien & Cao Van Sung 1990	Chinese Bamboo Rat	Dúi mốc nhỏ
26. <i>Rhizomys sumatrensis</i> (Raffles, 1821) Subspecies: <i>R. s. cinereus</i> McClelland, 1841	Indomalayan Bamboo Rat	Dúi mốc lớn má vàng
IV. Family Cricetidae Fischer, 1817	Voles	Họ Chuột cộc
4.1. Subfamily Arvicolinae Gray, 1821	Voles	Phân họ Chuột cộc
27. <i>Eothenomys miletus</i> (Thomas 1914)	Pere David's Vole	Chuột cộc
V. Family Muridae Illiger, 1811	Rats, Mouses	Họ Chuột
5.1. Murinae Illiger, 1815	Rats, Mouses	Phân họ Chuột
28. <i>Bandicota indica</i> (Bechstein, 1800) Subspecies: <i>B. i. jabouillei</i> Thomas 1892, <i>B. i. sonlaensis</i> Dao, 1972; <i>B. i. nemorivagus</i> Hodgson 1836; and <i>B. i. setifer</i> Horsfield, 1824	Greater Bandicoot Rat	Chuột đất lớn
29. <i>Bandicota savilei</i> Thomas, 1916 Subspecies: <i>B. s. hichensis</i> Dao, 1961; and <i>B. s. gialainesis</i> Dao et Cao, 1990	Savile's Bandicoot Rat	Chuột đất bé
30. <i>Berylmys berdmorei</i> (Blyth, 1851)	Berdmore's Rat	Chuột mốc bé
31. <i>Berylmys bowersii</i> (Anderson, 1879) Subspecies: <i>B. b. bowersii</i> Anderson 1887; and <i>B. b. tolipes</i> Dao, 1966	Bower's Rat	Chuột mốc lớn
32. <i>Berylmys mackenziei</i> (Thomas, 1916)	Mackenzie's Rat	Chuột mốc mackenzi
33. <i>Chiromyscus chiropus</i> (Thomas, 1891)	Fea's Tree Rat	Chuột cây
34. <i>Chiromyscus thomasi</i> Balakirev et al., 2014	Thomas' Tree Rat	Chuột cây thomas

35. <i>Chiromyscus langbianis</i> (Robinson et Kloss, 1922)	Langbian Tree Rat	Chuột cây langbian
36. <i>Chiropodomys gliroides</i> (Blyth, 1856)	Indomalayan Pencil-tailed Tree-mouse	Chuột nhắt cây
37. <i>Dacnomys millardi</i> Thomas, 1916	Millard Giant Rat	Chuột răng to
38. <i>Hapalomys delacouri</i> Thomas, 1927	Lesser Marmoset Rat	Chuột vàng
39. <i>Hapalomys suntsovi</i> Abromov et al. 2017	Sunsov's Marmoset Rat	Chuột vàng sun-sốp
40. <i>Leopoldamys edwardsi</i> (Thomas, 1882)	Edward's Giant Rat	Chuột hươu lớn
41. <i>Leopoldamys milleti</i> (Robinson, Kloss, 1922)	Millet's Giant Rat	Chuột núi mi-lét
42. <i>Leopoldamys neilli</i> (Marshall, 1976)	Neill's Rat	Chuột núi đông bắc; Chuột núi neill
43. <i>Leopoldamys herberti</i> (Kloss 1916)	Long-tailed Giant Rat	Chuột núi đuôi dài
44. <i>Maxomys moi</i> (Robinson et Kloss, 1922)	Indochinese Maxomys	Chuột su-ri lông mềm
45. <i>Maxomys surifer</i> (Miller, 1900) Subspecies: <i>M. s. finis</i> Kloss, 1916; and <i>M. s. tonkinensis</i> Balakirev, 2017	Red Spiny Maxomys	Chuột su-ri
46. <i>Micromys erythrotis</i> Blyth, 1856	Harvest Mouse	Chuột choắt tai đỏ
47. <i>Mus caroli</i> Bonhote, 1902	Ricefield Mouse	Chuột nhắt đồng
48. <i>Mus cervicolor</i> Hodgson, 1845	Fawn-coloured Mouse	Chuột nhắt hoẵng
49. <i>Mus cookii</i> Ryley, 1914	Cook's Mouse	Chuột cúc
50. <i>Mus musculus</i> Linnaeus, 1758 Subspecies: <i>M. m. castaneus</i> Waterhouse, 1843	Asian House Mouse	Chuột nhắt nhà
51. <i>Mus pahari</i> Thomas, 1916	Indochinese Shrewlike Mouse	Chuột nhắt nương
52. <i>Mus shortridgei</i> (Thomas, 1914)	Shortridge's Mouse	Chuột nhắt mũi ngắn
53. <i>Niviventer confucianus</i> (Milne-Edwards, 1871)	Confucian Niviventer	Chuột khổng tử

54. <i>Niviventer fulvescens</i> (Gray, 1847)	Indomalayan Niviventer	Chuột hươu bé
55. <i>Niviventer huang</i> (Bonhote, 1905)	Huang Niviventer	Chuột hoàng
56. <i>Niviventer bukit</i> Bonhote, 1903	Bukit Niviventer	Chuột bukit
57. <i>Niviventer tenaster</i> (Thomas, 1916)	Indochinese Mountain Niviventer	Chuột núi đông dương
58. <i>Rattus andamanensis</i> (Blyth, 1860)	Indochinese Forest Rat	Chuột rừng đông dương
59. <i>Rattus argentiventer</i> (Robinson, Kloss, 1916)	Ricefield Rat	Chuột bụng bạc
60. <i>Rattus exulans</i> (Peale, 1848)	Pacific Rat	Chuột lắt
61. <i>Rattus losea</i> (Swinhoe, 1871)	Lesser Ricefield Rat	Chuột đồng bé
62. <i>Rattus nitidus</i> (Hodgson, 1845)	White-footed Indochines Rat	Chuột bóng
63. <i>Rattus norvegicus</i> (Berkenhout, 1769)	Norway Rat	Chuột cống
64. <i>Rattus osgoodi</i> Musser, Newcomb, 1985	Osgood's Rat	Chuột đồng núi cao
65. <i>Rattus rattus</i> (Linnaeus, 1758)	House Rat, Roof Rat	Chuột thường
66. <i>Rattus tanezumi</i> Temminck, 1844	Oriental House Rat	Chuột nhà
67. <i>Saxatilomys paulinae</i> Musser, Smith, Robinson, Lunde, 2005	Lao Limestone Rat	Chuột paunlina
68. <i>Tonkinomys daovantieni</i> Musser, Lunde, Son, 2006	Tonkin Limestone Rat	Chuột núi đá đông bắc
69. <i>Vandeleuria oleracea</i> (Bennett, 1832) Subspecies: <i>V. o. scandens</i> Osgood, 1932	Long-tailed Climbing Mouse	Chuột nhắt cây đuôi dài
VI. Family Hystricidae G. Fischer, 1817	Porcupines	Họ Nhím
70. <i>Atherurus macrourus</i> (Linnaeus, 1758)	Brush-tailed Porcupine	Đon
71. <i>Hystrix brachyura</i> Linnaeus, 1758 Subspecies: <i>H. b. subcristrata</i> Swinhoe, 1870; and <i>H. b. brachyura</i> Linnaeus, 1758	Malayan Porcupine	Nhím đuôi ngắn
VII. Family Diatomyidae	Rock Rat	họ Chuột đá
72. <i>Laonastes aenigmamus</i> Jenkins, Kilpatrick, Robinson & Timmins, 2005	Laotian Rock Rat;	Chuột đá trường sơn

3. Conclusions

This study has established a new Vietnam Rodent List updated to 2022, which includes, 72 species and 22 subspecies comprising 34 genera and seven families. The updated List differs from previous versions in the following ways: exclusion of five species, taxonomic position and/or scientific name changes of 13 species, and an addition of six species, belonging to three genera and one order. We recommend any new research should use this updated List when developing a list of rodent species composition of a study area, to ensure an up-to-date taxonomic position of the taxa and to unify the same system of classification for the convenience of users, especially those who are not specialized in rodent taxonomy.

Acknowledgments. The authors would like to express their sincere thanks to the Institute of Ecology and Biological Resources for funding this study, and to all members of the Department of Zoological Museum and Department of Vertebrate Zoology for providing us with favorable conditions to implement this study.

REFERENCES

- [1] Dang Huy Huynh, Cao Van Sung, Le Xuan Canh, Pham Trong Anh, Nguyen Xuan Dang, Hoang Minh Khien, Nguyen Minh Tam 2008. *Fauna of Vietnam*. Vol. 25 Mammals - Mammalia, Publishing House for Science and Technology, Hanoi, Vietnam: 362 pp.
- [2] Dang Ngoc Can, H. Endo, Nguyen Truong Son, T. Oshida, Le Xuan Canh, Dang Huy Phuong, D. P. Lunde, S. Kawada, A. Hayashida, M. Sasaki, 2008. *Checklist of Vietnam wild mammals*. Published by Kyoto University, Japan, and Institute of Ecology and Biological Resources, Hanoi, Vietnam.
- [3] Wilson, D. E. and Reeder, D. M. (eds.), 2005. *Mammal species of the world: a taxonomic and geographic reference*. 3rd edition, Vol. 1&2, Baltimore: Johns Hopkins University Press, 2141p.
- [4] Wilson D. E., Lacher T. E., and Mittermeier R. A. (eds.), 2016. *Handbook of the Mammals of the World. Vol. 6 Lagomorphs and Rodents I*, Lynx Editions, Barcelona, 987 pp.
- [5] Wilson D. E., Lacher, T. E., and Mittermeier R. A. (eds.), 2017. *Handbook of the Mammals of the World. Vol. 7 Rodents II*, Lynx Editions, Barcelona, 987 pp.
- [6] Francis C., 2019. *A guide to mammals of Southeast Asia*. Second edition, Bloomsbury Wildlife Publishing Plc, UK, 416 pp.
- [7] Nguyen Xuan Dang, Nguyen Xuan Nghia, Nguyen Manh Ha, Le Duc Minh, Nguyen Duy Luong, Dinh Huy Tri, 2012. Discovered rodent 'living fossil' *Laonastes aenigmamus* in Phong Nha - Ke Bang, Vietnam. *Journal of Biology*, Vol. 34, No. 1, pp. 40-47 (in Vietnamese with English abstract).

- [8] Nguyen Xuan Nghia, Nguyen Xuan Dang, Nguyen Duy Luong, 2013. Survey results Rodentia in Phong Nha - Ke Bang National Park, Quang Binh province. *Journal of Biology*, Vol. 35, No. 2, pp. 185-192 (in Vietnamese with English abstract).
- [9] Balakirev A.E., Abramov A.V., Rozhnov V.V., 2014. Phylogenetic relationships in the *Niviventer-Chiromyscus* complex (Rodentia, Muridae) inferred from molecular data, with description of a new species. *ZooKeys*, Vol. 451, pp. 109-136. doi: 10.3897/zookeys.451.7210.
- [10] Balakirev A.E., Rozhnov V.V., 2012. Contribution to the species composition and taxonomic status of some *Rattus* inhabiting Southern Vietnam and Sundaland. *Russian J. of Theriology*, Vol. 11, No. 1, pp. 33-45.
- [11] Abramov A.V., Balakirev A.E. and Rozhnov V.V., 2017. New insights into the taxonomy of the marmoset rats *Hapalomys* (Rodentia: Muridae). *Raffles Bulletin of Zoology*, Vol. 65, pp. 20-28, <http://zoobank.org/urn:lsid:zoobank.org:pub:EB7E8FFC-B119-4EAC-810F-FD3D8520D2BB>.
- [12] Oshida T., Dang C. N., Nguyen S. T., Nguyen N. X., Endo H., Kimura J., Sasaki M., Hayashida A., Takano A., Yasuda, M. and Hayashi, Y. 2011. Phylogenetic relationships between *Callosciurus caniceps* and *C. inornatus* (Rodentia, Sciuridae): Implication for zoogeographical isolation by the Mekong River. *Italian Journal of Zoology*, Vol. 78, pp. 328-335.
- [13] Oshida T., Can N. D., Son T. N., Nghia X.N., Endo H., Kimura J., Sasaki M., Akiko Hayashida A., Ai Takano A., Koyabu D. and Hayashi Y. 2013. Phylogenetic position of *Callosciurus erythraeus griseimanus* from Vietnam in the genus *Callosciurus*. *Mammal Study*, Vol. 38, pp. 41-47.
- [14] Nghia Xuan Nguyen, Dang Xuan Nguyen, Tuong Xuan Ngo, Duy Dinh Nguyen, 2015. New data on recently described rodent species Paulina's Limestone Rat *Saxatilomys paulinae* Musser, Smith, Robinson & Lunde, 2005 (Mammalia: Rodentia). *Biodiversity Data Journal*, Vol. 3, e4961. doi: 10.3897/BDJ.3.e4961.
- [15] Son Truong Nguyen, Oshida T., Phuong Huy Dang, Hai Tuan Bui and Motokawa M., 2018. A new species of squirrel (Sciuridae: *Callosciurus*) from an isolated island off the Indochina Peninsula in Southern Vietnam. *Journal of Mammalogy*, Vol. 99, No. 4, pp. 813-825. DOI:10.1093/jmammal/gyy0611.
- [16] Dang Huy Huynh, Dao Van Tien, Cao Van Sung, Pham Trong Anh, Hoang Minh Khien, 1994. *Checklist of mammals (Mammalia) in Vietnam*. Publ. House Science and Technology, Hanoi, p. 168 (in Vietnamese).
- [17] Dang Huy Huynh, Cao Van Sung, Le Xuan Canh, Pham Trong Anh, Nguyen Xuan Dang, Hoang Minh Khien, Nguyen Minh Tam, 2008. *The Fauna of Vietnam, Volume 25, class Mammalia*. Publ. House Science and Technology, Hanoi, p. 262 (in Vietnamese).
- [18] Corbet G. B. and Hill J. E., 1992. *The mammals of the Indomalayan Region: A systematic review*. Oxford University Press, New York, p. 117-156.

- [19] Lunde D. P. and N. T. Son., 2001. *An Identification Guide to the Rodent of Vietnam*. American Museum of Natural History, New York, 80pp.
- [20] Musser G.G., 1981. Results of the Archbold expeditions. No. 105. Notes on the systematics of the Indo-Malayan Murid Rodents, and D of New Genera and species from Ceylon, Sulawesi, and the Philippines. *Bulletin of the American Museum of Natural History*, Vol. 168, No. 3, pp. 225-334.
- [21] Musser G.G., and Carleton M.D., 1993. Family Muridae. In D.E. Wilson and D.M. Reeder (eds.), *Mammal species of the world. A taxonomic and geographic reference*, 2nd ed., p. 501-755. Washington D.C.: Smithsonian Inst. Press.
- [22] Jenkins P. D., Kilpatrick C. W., Robinson M. F., Timmins R. J., 2005. Morphological and molecular investigations of a new family, genus, and species of rodent (Mammalia: Rodentia: Hystricognatha) from Lao PDR. *Systematics and Biodiversity*, Vol. 2, No. 4, pp. 419-454.
- [23] Musser G. G., Angela L., Smith A. L., Robinson M.F., and Lunde D.P., 2005. Description of a New Genus and Species of Rodent (Murinae, Muridae, Rodentia) from the Khammouan Limestone National Biodiversity Conservation Area in Lao PDR. *Novitates*, 3497, 31 pp.