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## New discoveries of amphibians and reptiles from Vietnam

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**Abstract.** We provide a list of 21 new amphibian and reptilian species and subspecies discoveries from Vietnam, including one new snake genus, published after the comprehensive overview by Nguyen et al. (2009). The new herpetofauna representatives are introduced inclusive of the original description, type locality, English and Vietnamese names, as well as current distribution.

Key words. Vietnam, herpetofauna, new species.

### INTRODUCTION

Although Vietnam has one of the world's richest amphibian and reptilian fauna, as revealed particularly through surveys by Vietnamese scientists and their international collaborators during the past quarter century, the study of its herpetofauna was long overshadowed by research in India, China, and the East Indies (Adler 2009). The first significant summary of the Vietnamese herpetofauna was written by Morice (1875), in which 13 amphibians and 114 species of reptiles including the marine species were listed. Ten years later, Tirant (1885) published a 104-pages book containing 166 species of herpetofauna from Vietnam and Cambodia. Subsequently, the following staff members or associates of the Muséum d'Histoire Naturelle, Paris, published specific studies of Vietnamese amphibians and reptiles: Léon Vaillant (1834-1914), François Mocquard (1834–1917), Jacques Pellegrin (1873–1944), Chabanaud (1876–1959), Fernand Angel (1881-1950), and René Bourret (1884-1957), who was the only one of the afore mentioned zoologists who ever set foot in Vietnam (Adler 2009).

It was René Bourret, originally a geologist, who became the leading authority on Vietnamese herpetofauna. From 1927 until 1947 he published a series of papers and books of Indochinese and specifically on Vietnamese herpetology. Besides the publication of several identification manuals, he is most famous for a substantial series of monographs of Indochinese herpetology, which are to date the most important background on the subject (Bourret 1936a, b, 1941, 1942). In total, René Bourret reported of 177 lizard taxa (i.e., species and subspecies), 245 snake taxa, 45 turtle taxa and 171 amphibian taxa for the Indochinese region (Nguyen 2006).

Because of the French Indochina War, no remarkable herpetological studies were undertaken in the period from 1946 to 1954. In 1954, when northern Vietnam attained independence from France, Vietnamese herpetologists began to conduct herpetological field surveys predominantly in northern Vietnam, and the first lists and keys to the species of Vietnamese amphibians and reptiles were compiled by Dao (e.g., 1977, 1978, 1979, 1981, 1982), including 363 species in total, but with inaccuracies. Another noteworthy key to snakes of southern Vietnam was written during the Second Indochina War, better known in the West as Vietnam War, by Campden-Main (1970), who had served several years as a medic with American forces stationed in Vietnam.

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The end of the Vietnam War in 1975 marked the beginning of another period of biodiversity research in Vietnam (Sterling et al. 2006). Thereafter, an increasing engagement in herpetological field work mainly by Russian institutions was observable, which is still persistent. Eventually, in the last 30 years many international herpetological cooperations emerged, which led to an enormous increase in new records and species descriptions from Vietnam (see overview in Nguyen 2006). As a consequence, the updated checklist by Nguyen et al. (2005) comprised 458 species, viz., 162 species of amphibians and 296 species of reptiles, which included more than 100 additional species compared with the previous checklist of the herpetofauna of Vietnam by Nguyen & Ho (1996). Furthermore, the most actual list (Nguyen et al. 2009) covers 12 additional species of amphibians and 64 additional species of reptiles compared with Nguyen et al. (2005).

On the occasion of this Proceedings Volume addicted to Professor Dr. Wolfgang Böhme, Vice Director, Head of the Vertebrate Department and Curator of Herpetology at the Zoological Research Museum Alexander Koenig, Bonn, Germany, we provide a list of new amphibian and reptilian discoveries from Vietnam that were published subsequent to the comprehensive overview provided by Nguyen et al. (2009). We would like to dedicate this paper to Wolfgang Böhme, who supervised the PhD theses of both authors (T. Ziegler: 1997–2000; T.Q. Nguyen 2007–2011) and thus decisively brought forward herpetodiversity research in Vietnam.

### MATERIAL AND METHODS

We herein compiled species' descriptions that were formally published after the appearance of Nguyen et al. (2009). We therefore followed the style and taxonomic arrangement provided by the latter authors.

Abbreviations are as follows: AMNH = American Museum of Natural History, New York, USA; AMS = Australian Museum, Sydney, Australia; IEBR = Institute of Ecology and Biological Resources, Hanoi, Vietnam; ITBCZ = Institute of Tropical Biology, Collection of Zoology, Ho Chi Minh City, Vietnam; LSUHC = La Sierra University, Herpetological Collection, La Sierra University, Riverside, California, USA; UNS = Zoological Collection of the University of Natural Sciences, Ho Chi Minh City, Vietnam; VNMN = Vietnam National Museum of Nature, Hanoi, Vietnam; ZFMK = Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany; ZISP = Zoological Institute, St. Petersburg, Russia; a.s.l. = above sea level.

# LIST OF NEW SPECIES AND SUBSPECIES SINCE NGUYEN ET AL. (2009)

### **Amphibia**

Anura

### Megophryidae

### Leptolalax applebyi Rowley & Cao, 2009

Leptolalax applebyi J.J.L. Rowley & T.T. Cao, 2009, Zootaxa 2198: 52.

Holotype: AMS R171703.

Type locality: Song Thanh Proposed Nature Reserve, Phouc Son (Phuoc Son) District, Quang Nam Province, Vietnam, 1,402 m a.s.l.

English name: Appleby's Asian Toad.

Vietnamese name: Coc may ap-li-bai.

Distribution: This species is currently known only from the type locality.

### Ranidae

## Odorrana geminata Bain, Stuart, Nguyen, Che & Rao, 2009

Odorrana geminata R.H. Bain, B.L. Stuart, T.Q. Nguyen, J. Che & D.-Q. Rao, 2009, Copeia 2: 355.

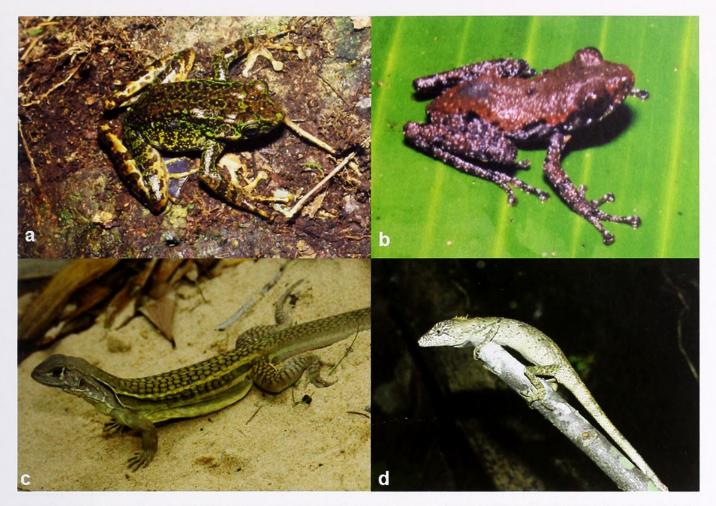
Holotype: AMNH 163782.

Type locality: Mount Tay Con Linh II, Cao Bo Commune, Vi Xuyen District, Ha Giang Province, Vietnam, 1,420 m a.s.l.

English name: Geminated Cascade Frog.

Vietnamese name: Ech bam da hoa.

Distribution: This species (Fig. 1a) is currently known only from montane areas in northeastern Vietnam (Ha Giang and Cao Bang provinces) and southeastern Yunnan Province, China.



**Fig. 1.** a) *Odorrana geminata* from Ha Giang Province, Photo T.Q. Nguyen; b) *Theloderma lateriticum* from Lao Cai Province, Photo T.Q. Nguyen; c) *Leiolepis ngovantrii* from Ba Ria–Vung Tau Province, Photo L.L. Grismer; and d) *Pseudocalotes ziegleri* from Kon Tum Province, Photo C.T. Ho.

### Rhacophoridae

### Theloderma lateriticum Bain, Nguyen & Doan, 2009

Theloderma lateriticum R.H. Bain, T.Q. Nguyen & K.V. Doan, 2009, Zootaxa 2191: 60.

Holotype: AMNH 168757/IEBR A. 0860.

Type locality: Nam Tha Commune, Van Ban District, Lao Cai Province, Vietnam, 1,300–1,400 m a.s.l.

English name: Brick-red Bug-eyed Frog.

Vietnamese name: Ech cay san do.

Distribution: This species (Fig. 1b) is currently known only from the type locality.

### Reptilia

Squamata

Sauria

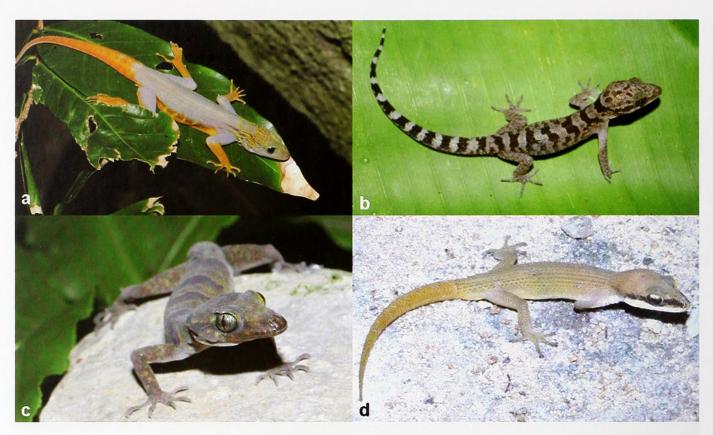
## Agamidae

### Leiolepis ngovantrii Grismer & Grismer, 2010

*Leiolepis ngovantrii* J.L. Grismer & L.L. Grismer, 2010, Zootaxa 2433: 52.

Holotype: LSUHC 9234.

Type locality: Binh Chau-Phuoc Buu Nature Reserve, Xuyen Moc District, Ba Ria-Vung Tau Province, Vietnam, 30 m a.s.l.



**Fig. 2.** a) Cnemaspis psychedelica from Ca Mau Province, Photo L.L. Grismer; b) Cyrtodactylus cattienensis from Dong Nai Province, Photo P. Geissler; c) Cyrtodactylus roesleri from Quang Binh Province, Photo T. Ziegler; and d) Dixonius aaronbaueri from Ninh Thuan Province, Photo T.V. Ngo.

English name: Ngovantri's Butterfly Lizard.

Vietnamese name: Nhong cat ngo van tri.

Distribution: This species (Fig. 1c) is currently known only from Vietnam (Ba Ria–Vung Tau Province).

# Pseudocalotes ziegleri Hallermann, Nguyen, Orlov & Ananjeva, 2010

*Pseudocalotes ziegleri* J. Hallermann, T.Q. Nguyen, N. Orlov & N. Ananjeva, 2010, Russ. J. Herpetol. 17(1): 32.

Holotype: IEBR 330.

Type locality: Nuoc Ka forest, near Mang Canh, Kon Plong District, Kon Tum Province, Vietnam, ca. 1,200 m a.s.l.

English name: Ziegler's Tree Lizard.

Vietnamese name: Nhong zig-lo.

Distribution: This species (Fig. 1d) is currently known only from Vietnam (Kon Tum Province).

Remarks: Specimens identified as *Pseudocalotes floweri* from Kon Tum Province (Bain et al. 2007) were subsequently re-identified as *P. ziegleri* by Hallermann et al. (2010).

### Gekkonidae

### Cnemaspis psychedelica Grismer, Ngo & Grismer, 2010

Cnemaspis psychedelica L.L. Grismer, T.V. Ngo & J.L. Grismer, 2010, Zootaxa 2352: 48.

Holotype: UNS 0444.

Type locality: Hon Khoai Island, Ngoc Hien District, Ca Mau Province, Vietnam.

English name: Psychedelic Gecko.

Vietnamese name: Tac ke duoi vang.

Distribution: This species (Fig. 2a) is currently known only from the type locality.

# Cyrtodactylus cattienensis Geissler, Nazarov, Orlov, Böhme, Phung, Nguyen & Ziegler, 2009

*Cyrtodactylus cattienensis* P. Geissler, R. Nazarov, N.L. Orlov, W. Böhme, T.M. Phung, T.Q. Nguyen & T. Ziegler, 2009, Zootaxa 2161, 21.

Holotype: IEBR A.0856.

Type locality: Cat Tien National Park, Dong Nai Province, Vietnam, 120 m a.s.l.

English name: Cattien Bent-toed Gecko.

Vietnamese name: Thach sung ngon cat tien.

Distribution: This species (Fig. 2b) is currently known only from Vietnam (Ba Ria-Vung Tau and Dong Nai provinces).

# Cyrtodactylus roesleri Ziegler, Nazarov, Orlov, Nguyen, Vu, Dang, Dinh & Schmitz, 2010

Cyrtodactylus roesleri T. Ziegler, R. Nazarov, N. Orlov, T.Q. Nguyen, T.N. Vu, K.N. Dang, T.H. Dinh & A. Schmitz, 2010, Zootaxa, 2413: 24.

Holotype: ZFMK 89377.

Type locality: Phong Nha–Ke Bang National Park, Minh Hoa District, Quang Binh Province, Vietnam.

English name: Roesler's Bent-toed Gecko.

Vietnamese name: Thach sung ngon ro-x-lo.

Distribution: This species (Fig. 2c) is currently known only from the type locality.

### Cyrtodactylus yangbayensis Ngo & Chan, 2010

Cyrtodactylus yangbayensis T.V. Ngo & K.O. Chan, Zootaxa, 2504: 48.

Holotype: UNS 0476.

Type locality: Yang Bay Waterfall, Dien Khanh District, Khanh Hoa Province, southern Vietnam, 500–600 m a.s.l.

English name: Yangbay Bent-toed Gecko.

Vietnamese name: Than lan chan ngon yang bay.

Distribution: This species is currently known only from the type locality in Khanh Hoa Province.

### Dixonius aaronbaueri Ngo & Ziegler, 2009

Dixonius aaronbaueri T.V. Ngo & T. Ziegler, 2009, Zoosyst. Evol., 85(1): 119.

Holotype: UNS 0284.

Type locality: Binh Tien Forest Station, Ninh Hai District, Nui Chua National Park, Ninh Thuan Province, southern Vietnam, 4–5 m a.s.l.

English name: Aaron Bauer's Leaf-toed Gecko.

Vietnamese name: Than lan chan la a-ron-bau-o.

Distribution: This species (Fig. 2d) is currently known only from the type locality.

# Gekko canhi Rösler, Nguyen, Doan, Ho, Nguyen & Ziegler, 2010

*Gekko canhi* H. Rösler, T.Q. Nguyen, K.V. Doan, C.T. Ho, T.T. Nguyen & T. Ziegler, 2009, Zootaxa 2329: 57.

Holotype: IEBR A.0910.

Type locality: Huu Lien, Huu Lung, Lang Son Province, North Vietnam.

English name: Canh's Gecko.

Vietnamese name: Tac ke canh.

Distribution: This species (Fig. 3a) is currently known only from northern Vietnam (Lang Son and Lao Cai provinces).

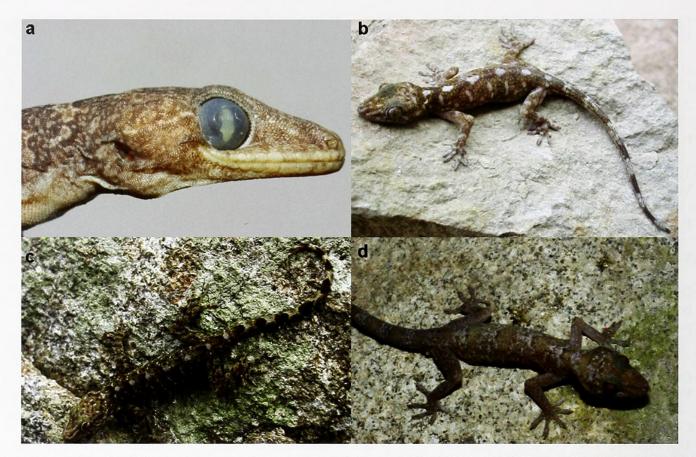
### Gekko russelltraini Ngo, Bauer, Wood & Grismer, 2009

Gekko russelltraini T.V. Ngo, A.M. Bauer, P.L. Jr. Wood & J.L. Grismer, 2009, Zootaxa 2238: 34.

Holotype: UNS 0293.

Type locality: Chua Chan Mountain, Suoi Cat Commune, Xuan Loc District, Dong Nai Province, Vietnam, ca. 100 m a.s.l.

English name: Russell Train's Marble Gecko.



**Fig. 3.** a) Portrait of preserved *Gekko canhi* from Lang Son Province, Photo T. Ziegler; b) *Gekko russelltraini* from Dong Nai Province, Photo T.V. Ngo; c) *Gekko takouensis* from Binh Thuan Province, Photo S.N. Nguyen; and d) *Gekko vietnamensis* from An Giang Province, Photo S.N. Nguyen.

Vietnamese name: Than lan da ru-xen-tren.

Distribution: This species (Fig. 3b) is currently known only from Vietnam (Dong Nai Province).

### Gekko takouensis Ngo & Gamble, 2010

Gekko takouensis T.V. Ngo & T. Gamble, 2010, Zootaxa 2346: 18.

Holotype: UNS 0491.

Type locality: Ta Kou Mountain, Ham Thuan Nam District, Binh Thuan Province, Vietnam, 425 m a.s.l.

English name: Takou Marbled Gecko.

Vietnamese name: Than lan da ta kou.

Distribution: This species (Fig. 3c) is currently known only from the type locality.

### Gekko vietnamensis Nguyen, 2010

Gekko vietnamensis S.N. Nguyen, 2010, Zootaxa 2501: 55.

Holotype: ITBCZ 667.

Type locality: Tuc Dup Hill, An Giang Province, southern Vietnam, 43 m a.s.l.

English name: Vietnam Gecko

Vietnamese name: Tac ke viet nam.

Distribution: This species (Fig. 3d) is currently known only from the type locality.

### Scincidae

Scincella apraefrontalis Nguyen, Nguyen, Böhme & Ziegler 2010

Scincella apraefrontalis T.Q. Nguyen, S.V. Nguyen, W. Böhme & T. Ziegler, 2010, Folia. Zool., 59(2): 116.

Holotype: IEBR A.0832.

Type locality: Huu Lien Nature Reserve, Huu Lung District, Lang Son Province, Vietnam, ca. 200 m a.s.l.

English name: Huulien Ground Skink.

Vietnamese name: Than lan co huu lien.

Distribution: This species is only known from Lang Son Province, northeastern Vietnam.

# Tropidophorus boehmei Nguyen, Nguyen, Schmitz, Orlov & Ziegler, 2010

*Tropidophorus boehmei* T.Q. Nguyen, T.T. Nguyen, A. Schmitz, N.L. Orlov & T. Ziegler, 2010, Zootaxa 2439: 57.

Holotype: VNMN 822.

Type locality: Hoang Lien Mountain, near Ban Khoang, Sa Pa District, Lao Cai Province, northern Vietnam, 1,200–1,300 m a.s.l.

English name: Boehme's Water Skink

Vietnamese name: Than lan tai boe-me

Distribution: This species (Fig. 4a) is currently known only from Hoang Lien Mountain in Sa Pa and Van Ban districts, Lao Cai Province, Vietnam.

### Serpentes

### Colubridae

### Calamaria gialaiensis Ziegler, Nguyen & Nguyen, 2008

Calamaria gialaiensis T. Ziegler, S.V. Nguyen & T.Q. Nguyen, 2008, Current Herpetol., 27(2): 72.

Holotype: IEBR A.0714.

Type locality: Kon Ka Kinh, K Bang District, Gia Lai Province, Vietnam, 1300 m a.s.l.

English name: Gialai Reed Snake.

Vietnamese name: Ran mai gam gia lai.

Distribution: This species (Fig. 4b) is currently known only from Gia Lai Province, Vietnam.

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## Calamaria sangi Nguyen, Koch & Ziegler, 2010 (2009)

Calamaria sangi T.Q. Nguyen, A. Koch & T. Ziegler, 2010 "2009", Hamadryad 34(1): 2.

Holotype: IEBR 360.

Type locality: Mang Canh Commune, Kon Plong District, Kon Tum Province, Vietnam, 1,200 m a.s.l.

English name: Sang's Reed Snake.

Vietnamese name: Ran mai gam sang.

Distribution: This species is currently known only from Vietnam.

# Colubroelaps nguyenvansangi Orlov, Kharin, Ananjeva, Nguyen & Nguyen, 2009

Colubroelaps nguyenvansangi N.L. Orlov, V.E. Kharin, N.B. Ananjeva, T.T. Nguyen & T.Q. Nguyen, 2009, Russ. J- Herpetol. 16(3): 235.

Holotype: ZISP/IEBR 25682.

Type locality: Loc Bac Forest Enterprise, Lam Dong Province, Vietnam, ca. 720 m a.s.l.

English name: Nguyenvansang's Snake.

Vietnamese name: Ran nguyen van sang.

Distribution: The second record of this species was reported by N. Poyarkov from Bu Gia Map National Park, Binh Phuoc Province (Fig. 5). Therefore *Colubroelaps nguyenvansangi* is currently known from Lam Dong and Binh Phuoc provinces, Vietnam.

# Lycodon ruhstrati abditus Vogel, David, Pauwels, Sumontha, Norval, Hendrix, Vu & Ziegler, 2009

Lycodon ruhstrati abditus G. Vogel, P. David, O.S.G. Pauwels, M. Sumontha, G. Norval, R. Hendrix, T.N. Vu & T. Ziegler, 2009, Tropical Zoology 22(2): 144.

Holotype: ZFMK 86451.

Type locality: U Bo region, Phong Nha – Ke Bang National Park, Quang Binh Province, Vietnam.

English name: Hidden Mountain Wolf Snake.

Vietnamese name: Ran khuyet an.



**Fig. 4.** a) *Tropidophorus boehmei* from Lao Cai Province, Photo T.T. Nguyen; b) Portrait of preserved *Calamaria gialaiensis* from Gia Lai Province, Photo T. Ziegler; and c) *Protobothrops trungkhanhensis* from Cao Bang Province, Photo T.T. Nguyen.



Fig. 5. Colubroelaps nguyenvansangi from Binh Phuoc Province, Photo N. Poyarkov.

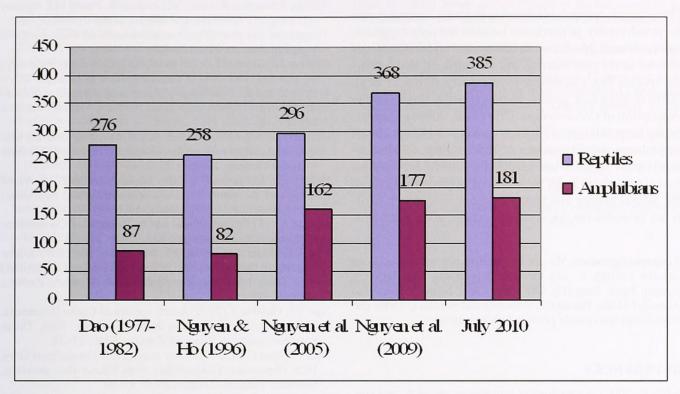


Fig. 6. Species diversity of the herpetofauna of Vietnam.

Distribution: This subspecies is currently known from Quang Binh and Vinh Phuc provinces in Vietnam, and from Fujian, Anhui, Zhejiang, Guangdong, Yunnan, Sichuan and Gansu provinces in China. Because it has often been confused with other taxa, its range is probably much wider, both in northern Vietnam and China (probably also present in Guangxi Province).

## Viperidae

# Protobothrops trungkhanhensis Orlov, Ryabov & Nguyen, 2009

Protobothrops trungkhanhensis N.L. Orlov, S.A. Ryabov & T.T. Nguyen, 2009, Russ. J. Herpetol. 16(1): 71.

Holotype: ZISP 25351.

Type locality: Trung Khanh Nature Reserve, Trung Khanh District, Cao Bang Province, Vietnam, 600 m a.s.l.

English name: Trungkhanh Pitviper.

Vietnamese name: Ran luc trung khanh.

Distribution: This species (Fig. 4c) is currently known only from the type locality.

### **DISCUSSION**

After the publication of the "Herpetofauna of Vietnam" by Nguyen et al. (2009) 20 new amphibian and reptilian species, one new subspecies, and a new snake genus have been described from Vietnam by June 2010. Among them there were three new amphibians (1 Megophryidae, 1 Ranidae, 1 Rhacophoridae) and 18 new reptilian taxa (2 Agamidae, 9 Gekkonidae, 2 Scincidae, 4 Colubridae, and 1 Viperidae). In contrast, two species which were listed as valid and occurring in Vietnam in Nguyen et al. (2009) were synonymized meanwhile: Gekko ulikovskii Darevsky & Orlov, 1994 was regarded as a junior synonym of Gekko badenii Szczerbak & Nekrasova, 1994 by Nguyen et al. (2010d) and the specimen previously identified as Pseudocalotes floweri from Kon Tum Province was reidentified as P. ziegleri by Hallermann et al. (2010). Most of the recent species' discoveries affected lizards, with geckos clearly being the predominant group. In addition to these new species descriptions, three new country records were published after the book of Nguyen et al. (2009): one amphibian species, the megophryid anuran Leptobrachium promustache, the scincid lizard Scincella monticola, and the colubrid snake Amphiesmoides ornaticeps (Bain et al. 2009b, Nguyen et al. 2010a, b).

The results of this paper clearly exemplify that even after the comprehensive book provided by Nguyen et al.

(2009) much research is needed to describe Vietnam's rich herpetodiversity. In particular because not only cryptic or inconspicuous species were discovered and formally described in the past months, but also striking and colourful species like *Cnemaspis psychedelica* (Grismer et al. 2010) or even new genera, as was recently shown by the description of *Colubroelaps* (Orlov et al. 2009a). Currently, the herpetofauna of Vietnam comprises 181 species of amphibians and 385 species of reptiles (Fig. 6). However, diversity research and species inventories are only the first steps, which must be followed by investigations of the natural history and specific adaptations, which finally are prerequisites for adequate conservation measures.

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