

SPECIES COMPOSITION OF REPTILES IN DA HUOAI DISTRICT, DI LINH PLATEAU, LAM DONG PROVINCE

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SUMMARY

Lam Dong province is home to a highly diverse reptilian fauna that is under increasing threat by ongoing habitat loss and modification. Since 2011, there have been seven new reptilian species discovered in Lam Dong province indicating that the knowledge of reptilian diversity in the area is still incomplete. In July and August 2020, we conducted two short field trips to survey reptiles in Da Huoai district, Di Linh plateau, Southern Lam Dong province. According to morphological comparisons, we firstly reported the list of 14 reptile species from this area including five lizard species and nine snake species. Two species *Coelognathus flavolineatus* and *Pareas temporalis* are reported from Lam Dong province for the first time. Among recorded reptile species, there are one endemic species to Vietnam (*Pareas temporalis*) and two vulnerable species (*Physignathus cocincinus* and *Trimeresurus rubeus*) according to the IUCN Red List (2022). Our new records bring the total number of reptilian species in Lam Dong province to 99 species with four turtle species, 57 snake species, and 38 lizard species. Due to the reptile faunal differences and the expansion of cash crops, the construction of roads, houses, and associated infrastructure, further surveys for the possible existence of other reptilian species in the Di Linh plateau are suggested.

Keywords: Di Linh plateau, new records, reptiles, Vietnam.

1. INTRODUCTION

Lam Dong province is the Southernmost tip of Truong Son mountain. It contains two plateaus: the Langbian plateau (800 – 2.400 m elevation) with a humid climate in the north and the Di Linh plateau (300 – 1.500 m elevation) with a drier and more seasonal climate in the southwest (Sterling et al., 2006; Bain & Hurley, 2011). The herpetofauna of Lam Dong province belongs to the Southern Annamites subregion within Indochina (Bain & Hurley, 2011). In the checklist of the herpetofauna of Vietnam, Nguyen et al. (2009) listed 78 species of reptiles in Lam Dong province. Nguyen & Kuznetsov (2011) recorded 79 reptile species for Lam Dong province with 63 species in Langbian plateau and 40 species in Di Linh plateau. Geissler et al. (2011) firstly recorded *Boiga multomaculata* in Lam Dong province. In the last decade, several new species have been discovered in Lam Dong province, mostly in the

Langbian plateau, including *Trimeresurus rubeus* (Malhotra et al., 2011), *Cyrtodactylus*

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bidoupimontis (Nazarov et al., 2012), *Calotes bachae* (Hartmann et al., 2013), *Calamaria strigiventris* (Poyarkov et al., 2019), *Oligodon rostralis* (Nguyen et al., 2020) and *Hemiphyllodactylus dalatensis* (Do et al., 2021). In the Di Linh plateau, a new species was recently described as *Pareas temporalis* (Le et al., 2021) which brings the number of reptile species in Lam Dong province up to 98 species. These above findings on reptiles in Lam Dong province prove that the reptile fauna of the province still has not been fully explored, especially in Di Linh plateau. Therefore, our study was conducted to learn more about the species composition of reptiles in this area.

2. RESEARCH METHODOLOGY

Two surveys were conducted by Le Thi Thuy Duong and Tran Gia Thinh from 25 – 27, July 2020 and from 26 – 28, August 2020 in Da Huoai district, Lam Dong province (Figure 1). Specimens were caught by hand or snake tongs between 18:00 and 23:00. Collected specimens were fixed in 70% ethanol for 10 hours then preserved in 70% ethanol in jars for permanent

storage. Specimens were deposited at the Lab of Zoology, University of Science, Vietnam

National University Ho Chi Minh City.

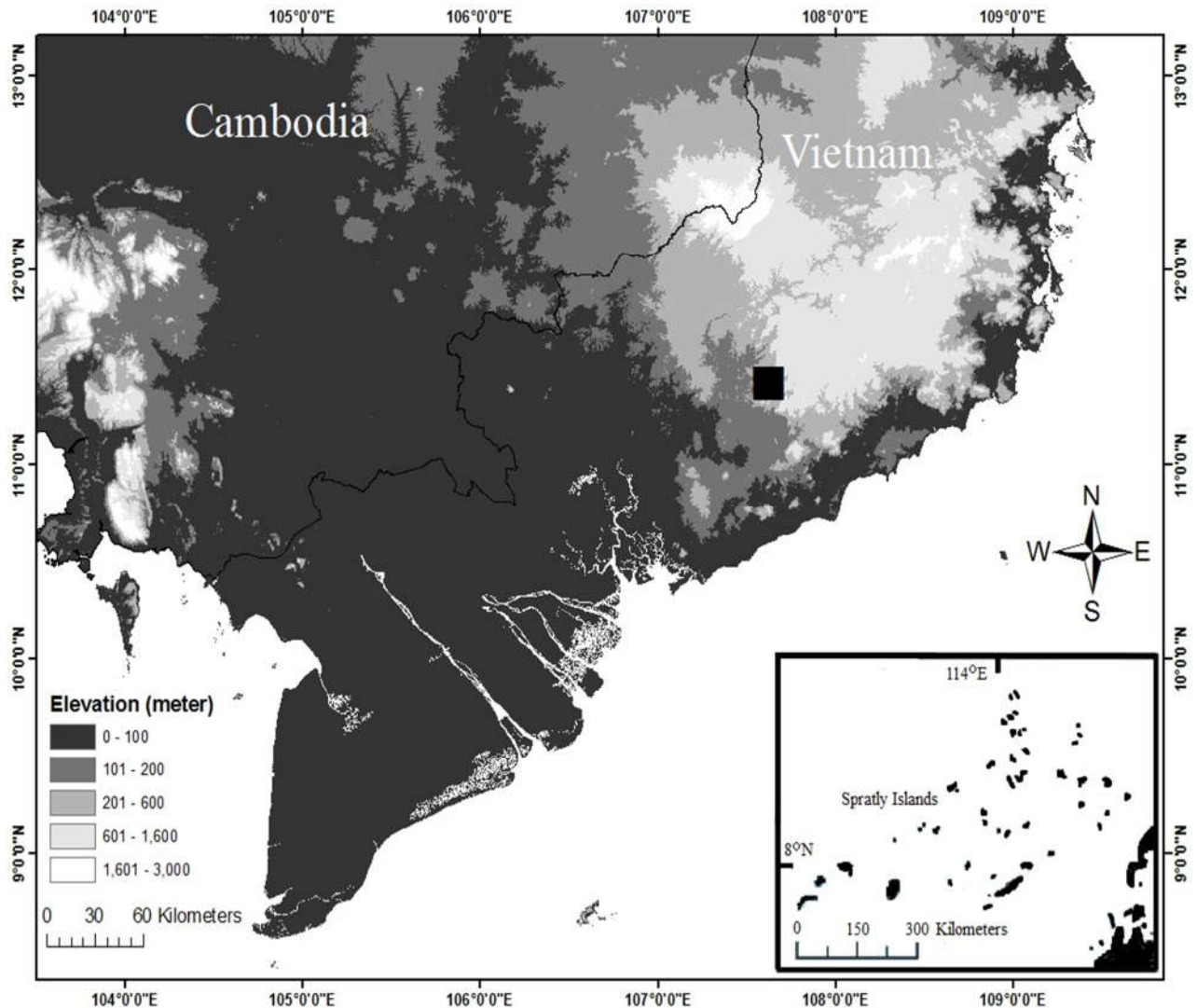


Figure 1. Map showing the location of Da Huoai district in Lam Dong province, southern Vietnam (■: Black square)

Measurements were taken to the nearest 0.1 mm with dial calipers including snout-vent length (SVL), from tip of snout to vent; tail length (TaL), from vent to tip of tail. Paired meristic characters are given as left/right. Measurements and meristic counts were taken following Smith (1935, 1943), Zug et al. (2006), Das (2010), Nguyen et al. (2010), Ziegler et al. (2010), Rösler et al. (2011), Malhotra et al. (2011), Pyron & Wallach (2014), Vassilieva et al. (2016), Amarasinghe et al. (2018), Vogel et

al. (2020), David & Vogel (2021) and Le et al. (2021). Systematics followed Vassilieva et al. (2016), Li et al. (2020), Gowande et al. (2021), and David & Vogel (2021).

Conservation status followed Vietnam Red Data Book (2007) and IUCN Red List (2022).

3. RESULTS AND DISCUSSION

Based on morphological examinations, we reported 14 species of reptiles with 9 families, and 13 genera in Da Huoai district, Lam Dong province (Table 1).

Table 1. List of reptile species recorded in Da Huoai district, Lam Dong province

No.	Species name	Specimens	IUCN (2022)	VNRB (2007)
Squamata				
Agamidae Gray, 1827				
1	<i>Physignathus cocincinus</i> Cuvier, 1829	1	VU	VU
2	<i>Calotes irawadi</i> Zug, Brown, Schulte & Vindum 2006	1		
Gekkonidae Gray, 1825				
3	<i>Gekko gekko</i> (Linnaeus, 1758)	1		VU
Scincidae Gray, 1825				
4	<i>Eutropis multifasciata</i> (Kuhl, 1820)	1		
5	<i>Tropidophorus microlepis</i> Günther, 1861	1		
Typhlopidae Gray, 1825				
6	<i>Indotyphlops braminus</i> (Daudin, 1803)	1		
Colubridae Opperl, 1811				
7	<i>Ahaetulla prasina</i> (Boie, 1827)	2		
8	<i>Boiga jaspidea</i> (Duméril, Bibron & Duméril, 1854)	1		
9	<i>Coelognathus flavolineatus</i> (Schlegel, 1837)*	1		
Natricidae Bornaparte, 1838				
10	<i>Rhabdophis cf. siamensis</i> (Mell, 1931)	1		
Pareatidae Romer, 1956				
11	<i>Pareas margaritophorus</i> (Jan, 1866)	1		
12	<i>Pareas temporalis</i> Le, Tran, Hoang & Stuart, 2021*	1		
Lamprophiidae Fitzinger, 1843				
13	<i>Psammodynastes pulverulentus</i> (Boie, 1827)	1		
Viperidae Opperl, 1811				
14	<i>Trimeresurus rubeus</i> (Malhotra, Thorpe, Mrinalini & Stuart, 2011)	3	VU	

Note: *New record for Lam Dong province; IUCN (2022): IUCN Red List of Threatened Species (2022); VNRB (2007): Vietnam Red Data Book (2007); VU: Vulnerable

New records in Lam Dong province

***Coelognathus flavolineatus* (Schlegel, 1837) (Figure 2a)**

Specimen examined: One adult female LD23727.

Description: Morphological characteristics of the specimen match with the descriptions of Smith (1943), Vassilieva (2016), and Geissler (2011). SVL: 1362.6 mm; TaL: 383.9 mm. Body long, slender, cylindrical; head oblong, slightly distinct from neck; eye contacting 1/1 preocular, 1/1 supraocular, 2/2 postoculars, 5th-6th/4th-5th supralabials; 1/1 loreal with loreal pit absent; 9/8 supralabials; 2/2 anterior temporals; 2/2 posterior temporals; 10/10 infralabials with mental groove; the first chin shield contacting 1st-5th/1st-5th infralabials; dorsal scale rows 21 – 19 – 17, with keeled rows, increase posteriorly; 217 ventrals, strongly angulated laterally; 104

subcaudals, all divided; undivided anal scale.

Color in life: Body brown and blackish, darkening posteriorly; a yellow vertebral stripe between two black lines in the anterior of the body; bands on flanks with alternating white and black streaks; each side of the eye with 3 black stripes: 2 stripes radiating from eye (touching eye) to supralabial, 1 stripe downwardly radiating from the temporal area (not touching eye) to the nuchal area; ventrals yellow with lateral black at the end of dorsal bands, darkening posteriorly; iris golden.

Natural history notes: This individual was found about 20:00 in rocks near the stream.

Distribution: Vietnam: This species was reported in Gia Lai, Dak Lak, Dak Nong, Dong Nai, and Binh Phuoc provinces. This is the first report of the species in Da Hoai district as well as in Lam Dong province. Elsewhere: India,

Myanmar, Thailand, Malaysia, Singapore, Brunei Darussalam, and Indonesia (Nguyen et al., 2009; Vassilieva et al., 2016).

***Pareas temporalis* Le, Tran, Hoang & Stuart, 2021 (Figure 2b)**

We described this species as a new species in 2021 (see more details in Le et al., 2021).

Notes: This species was only known in Lam Dong province (Le et al., 2021; Poyarkov et al., 2022).



Figure 2. New species records in Lam Dong province
a) *Coelognathus flavolineatus* (LD23727), b) *Pareas temporalis* (UNS 09992)

Morphological characteristics of two species in complex in Da Huoai district, Lam Dong province

***Calotes irawadi* Zug, Brown, Schulte & Vindum 2006 (Figure 3a)**

Specimen examined: One adult female LD26711.

Description: Morphological characteristics of the specimen match the descriptions of Zug et al. (2006) and Liu et al. (2021). SVL 76 mm; TaL: 189 mm. Head is triangular and distinct from neck; postorbital spine absent; 2 spines in supratympanic area: anterior one dorsolaterally directly above anterior half of tympanum, posterior one lower and above the posterior edge of tympanum; 6 scales on line transversally between left and right nasal scales; 8/8 elongate scales along dorsolateral snout ridge from the above posterodorsal corner of nasal scale to and including posterior-most supraciliary scale; 11/11 supralabials; 10/10 infralabials; 57 middorsal scales which beginning with first enlarged spine-like scale on the nape to above vent; 50 scale rows around the trunk at midbody, all trunk scales are keeled; ventral scales strongly keeled; Limbs have modest to large scales, all keeled; 19/20 lamellae on the fourth finger and 24/24 lamellae

on the fourth toe. This species differs from *Calotes versicolor* by more dorsal crest scales (57 vs 31 – 51 in *C. versicolor*) and more midbody scales (50 vs 36 – 46 in *C.versicolor*).

Color in life: dorsal coloration olive with dark-brown bars; dorsally head dark-brown and laterally head with 4 dark streaks radiating from the eye; ventral lighter with some black stripes.

Ecological note: This specimen was found about 22:00 – 23:00 on a tree branch about 0.5 m above the ground in disturbed mixed broadleaf and bamboo forest.

Distribution: This species occurs in northeast India and southeast Asia, including Vietnam (Gowande et al. 2021).

Notes: Previously, the population of *Calotes versicolor* complex in Vietnam was identified as *Calotes versicolor*. Until 2021, by morphology and molecular phylogenetics evidence, Gowande et al. reported *Calotes irawadi* in southern Vietnam through two localities 75 and 76 (see in Gowande et al. 2021). However, the distribution of *Calotes irawadi* throughout Vietnam is unclear. Further analyzing the morphology and genetics is necessary to make sure the population of *Calotes versicolor* in all of Vietnam is *Calotes irawadi*.

***Rhabdophis cf. siamensis* (Mell, 1931)
(Figure 3b)**

Specimen examined: One juvenile LD23724.

Description: Morphological characteristics of the specimen match with *Rhabdophis siamensis* descriptions of David & Vogel (2021). SVL: 197.5 mm; TaL: 58.7 mm. Body slender, cylindrical; head elongate, distinct from neck; nostril in divided nasal; eye contacting 1/1 preocular, 1/1 supraocular, 3/3 postoculars, and 3rd-5th/3rd-5th supralabials; 1/1 loreal, loreal pit absent; 8/8 supralabials; 2/2 anterior temporals; 3/3 posterior temporals; 10/10 infralabials with mental groove; the first chin shield contacting 1st-5th/1st-5th infralabials; no nuchal groove and no enlarged nuchal scales; dorsal scale in 17 – 19 – 17 keeled with 1st dorsal scale row smooth; the position of the dorsal scale rows reduction expressed in ventral 78th; 149 ventrals, all smooth; 76 subcaudals, all divided; divided nasal scale.

Color in life: Body brown with more pronounced white, brown, black reticulated

pattern caused by colored interstitial skin; head coloration gray with a black oblique subocular stripe from eye to supralabial; a wide black collar edged with yellow at neck and rear neck and anteriorly part of body red; ventral cream with dark dots on the tips of ventrals on the anterior part of the body.

Natural history notes: This individual was collected about 22:00 – 23:00 on a branch of a tree about 1 m above the ground in the broadleaf forest.

Distribution: Vietnam: This species was reported from Thanh Hoa Southwards to Kien Giang provinces. Elsewhere: China, Laos, Cambodia, Thailand, Myanmar, and Malaysia (David & Vogel, 2021).

Notes: Since the examined specimen is a juvenile, it lacks some characteristics presented in adult specimens such as no nuchal groove (vs present); no enlarged nuchal scales (vs 3 – 8 paired enlarged scales). Therefore, more specimens are required for identification, especially adult individuals.



Figure 3. Renamed species in Da Huoai district, Lam Dong province

a) *Calotes irawadi* (LD26711), b) *Rhabdophis cf. siamensis* (LD23724)

4. CONCLUSION

In this study, 14 species of reptiles were recorded in Da Huoai district, Lam Dong province. A new species *Pareas temporalis* was described in 2021. The back copper rat snake, *Coelognathus flavolineatus* is reported from Lam Dong province for the first time. Our records increase the number of reptiles in Lam Dong province to 99 species including four turtle species, 57 snake species, and 38 lizard

species. Among reported species, two species (*Physignathus cocincinus* and *Trimeresurus rubeus*) are listed as Vulnerable in the IUCN Red List (2022) and two species (*Physignathus cocincinus* and *Gekko gekko*) are listed as Vulnerable in the Vietnam Red Data Book (2007). Our new findings on reptiles in the Di Linh plateau imply for local and national conservation strategies. Due to the stark reptile faunal differences, conservation attention for

the reptiles in the Di Linh plateau is warranted. Additional surveys are required to obtain further data on the actual biodiversity of this area.

REFERENCES

1. Amarasinghe A.A.T., Thammachoti P., Campbell P.D., Hallermann J., Henkanaththege S.M., Karunarathna D.M.S.S., Riyanto A., Smith E.N. & Ineich I. (2018). Systematic composition of the *Eutropis multifasciata* (Kuhl, 1820) species complex (Squamata: Scincidae) and designation of a neotype. *Herpetologica*, 74 (4), 342 - 354.
2. Bain R.H. & Hurley M.M. (2011). *A biogeographic synthesis of the Amphibians and Reptiles of Indochina*. Bulletin of the American Museum of Natural History.
3. Das I. (2010). *A Field Guide to the Reptiles of South-East Asia*. New Holland Publishers.
4. David P. & Vogel G. (2021). Taxonomic composition of the *Rhabdophis subminiatus* (Schlegel, 1837) species complex (Reptilia: Natricidae) with the description of a new species from China. *Taprobanica*, 10, 89 - 120.
5. Do Q.H., Nguyen K.V., Le M.D., Ziegler T., & Nguyen T. Q. (2021). A new species of *Hemiphyllodactylus* Bleeker, 1860 (Squamata: Gekkonidae) from Da Lat Plateau, Vietnam. *Zootaxa*, 5023 (1), 93 - 106.
6. Geissler P., Nguyen T.Q., Poyarkov N.A., Böhme W. (2011). New records of snakes from Cat Tien National Park, Dong Nai and Lam Dong provinces, Southern Vietnam. *Bonn Zoological Bulletin*, 60 (1), 9 - 16.
7. Gowande G., Pal S., Jablonski D., Masroor R., Phansalkar P.U., Dsouza P., Jayarajan A., Shanker K. (2021). Molecular phylogenetics and taxonomic reassessment of the widespread agamid lizard *Calotes versicolor* (Daudin, 1802) (Squamata, Agamidae) across South Asia. *Vertebrate Zoology*, 71, 669 - 696.
8. Hartmann T., Geissler P., Poyarkov N.A. J., Ihlow F., Galoyan E.A., Rödder D. & Böhme W. (2013). A new species of the genus *Calotes* Cuvier, 1817 (Squamata: Agamidae) from Southern Vietnam. *Zootaxa*, 3599 (3), 246 - 260.
9. IUCN., 2021. The IUCN Red List of Threatened Species. Version 2021-3. <https://www.iucnredlist.org>. Accessed on 2022 - 5 - 31.
10. Le M.V., Nguyen L.T., Vo B.D., Murphy R.W., Nguyen V.D.H., Nguyen S.N. (2020). A review of the genus *Sphenomorphus* Fitzinger, 1843 (Squamata: Scincidae) in Southern Vietnam, with additional data on *S. sheai* and *S. tridigitus*. *Science & Technology Development Journal*, 23 (1), 470 - 478.
11. Le D.T.T., Tran T.G., Hoang H.D. & Stuart B.L. (2021). A new species of *Pareas* (Squamata, Pareidae) from Southern Vietnam. *Vertebrate Zoology*, 71 (4), 439 - 451.
12. Li J.-N., Liang D., Wang Y.-Y., Guo P., Huang S. and Zhang P. (2020). A large-scale systematic framework of Chinese snakes based on a unified multilocus marker system. *Molecular Phylogenetics and Evolution*, 148 (106807). 17.
13. Liu S., Zou C. & Rao D. (2021). Distribution extension of *Calotes irawadi* Zug, Brown, Schulte & Vindum, 2006, previously confused with *C. versicolor* (Daudin, 1802): first record from China. *Herpetozoa*, 34, 83 - 88.
14. Malhotra A., Thorpe R.S., Mrinalini & Stuart B.L. (2011). Two new species of pitviper of the genus *Cryptelytrops* Cope 1860 (Squamata: Viperidae: Crotalinae) from Southeast Asia. *Zootaxa*, 2757, 1 - 23.
15. Nazarov R., Poyarkov N.A., Orlov N.L., Phung T.M., Nguyen T.T., Hoang D.M. & Ziegler T. (2012). Two new cryptic species of the *Cyrtodactylus irregularis* complex (Squamata: Gekkonidae) from Southern Vietnam. *Zootaxa*, 3302, 1 - 24.
16. Nguyen S.V., Ho C.T. & Nguyen T.Q. (2009). *Herpetofauna of Vietnam*. Frankfurt am Main.
17. Nguyen H.D. & Kuznetsov A.N. (2011). *Biodiversity and ecological characteristics of Bidoup - Nui Ba National Park (in Vietnamese)*. Vietnam Academy of Science and Technology.
18. Nguyen Q.T., Nguyen V.S., Orlov N., Hoang N.T., Böhme W. & Ziegler T. (2010). A review of the genus *Tropidophorus* (Squamata, Scincidae) from Vietnam with new species records and additional data on natural history. *Zoosystematics and Evolution*, 86, 5 - 19.
19. Poyarkov N.A.J., Nguyen V.T., Orlov N.L. & Vogel G. (2019). A new species of the genus *Calamaria* Boie, 1827 from the highlands of the Langbian Plateau, Southern Vietnam (Squamata: Colubridae). *Russ J Herpeto*, 26 (6), 335 - 348.
20. Poyarkov N.A., Nguyen T.V., Pawangkhanant P., Yushchenko P.V., Brakels P., Nguyen L.H., Nguyen H.N., Suwannapoom C., Orlov N. & Vogel G. (2022). An integrative taxonomic revision of slug-eating snakes (Squamata: Pareidae: Pareinae) reveals unprecedented diversity in Indochina. *PeerJ*, 10:e12713.
21. Pyron R.A. & Wallach V. (2014). Systematics of the blindsnakes (Serpentes: Scolecophidia: Typhlopoidea) based on molecular and morphological evidence. *Zootaxa*, 3829 (1), 1 - 81.
22. Rösler H., Bauer A.M., Heinicke M.P., Greenbaum E., Jackman T., Nguyen T.Q. & Ziegler T. (2011). Phylogeny, taxonomy, and zoogeography of the genus *Gekko* Laurenti, 1768 with the revalidation of *G. reevesii* Gray, 1831 (Sauria: Gekkonidae). *Zootaxa*, 2989, 1 - 50.
23. Smith M.A. (1935). *The fauna of British India, including Ceylon and Burma. Reptiles and Amphibia, Vol. II. Sauria*. Taylor and Francis.
24. Smith M.A. (1943). *The Fauna of British India, Ceylon and Burma, including the whole of the Indo-*

chinese subregion. *Reptilia and Amphibia, Vol. III. Serpentes*. Taylor and Francis.

25. Sterling E.J., Hurley M.M. & Minh L.D. (2006). *Vietnam: A Natural History*. Yale University Press.

26. Vassilieva A.B., Galoyan E.A., Poyarkov N.A. & Geissler P. (2016). *A photographic Field Guide to the Amphibians and Reptiles of the Lowland Monsoon Forests of Southern Vietnam*. Frankfurt am Main.

27. Vogel G., Nguyen T. V., Lalremsanga H. T., Biakzuala L., Hrima V. & Poyarkov N. A. (2020). Taxonomic reassessment of the *Pareas margaritophorus-macularius* species complex (Squamata, Pareidae). *Vertebrate Zoology*, 70 (4), 547 - 569.

28. Ziegler T., Orlov N.L., Giang T.T., Nguyen T.Q., Nguyen T.T., Le Q.K., Nguyen K.V. & Vu T.N. (2010). New records of catsnakes, *Boiga Fitzinger*, 1826 (Squamata, Serpentes, Colubridae), from Vietnam, inclusive of an extended diagnosis of *Boiga bourreti* Tillack, Le, and Ziegler, 2004. *Zoosystematics and Evolution*, 86 (2), 263 - 274.

29. Zug G. R., Brown H. H. K., Schulte J. A. II & Vindum J. V. (2006). Systematics of the Garden Lizards, *Calotes versicolor* Group (Reptilia, Squamata, Agamidae), in Myanmar: Central Dry Zone Populations. *Proceedings of the California Academy of Sciences*, 57 (2), 35 - 68.

BƯỚC ĐẦU GHI NHẬN THÀNH PHẦN LOÀI BÒ SÁT Ở HUYỆN ĐẠ HUOAI, CAO NGUYÊN DI LINH, TỈNH LÂM ĐỒNG

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TÓM TẮT

Tỉnh Lâm Đồng là nơi có khu hệ bò sát đa dạng và đang bị đe dọa do mất và thay đổi môi trường sống tự nhiên. Từ năm 2011 đến nay, bảy loài bò sát mới đã được phát hiện tại đây. Điều này cho thấy thông tin về khu hệ bò sát của Lâm Đồng vẫn chưa thực sự đầy đủ. Vào tháng 7 và tháng 8 năm 2020, chúng tôi đã thực hiện hai chuyến thực địa ngắn để khảo sát thành phần loài bò sát tại huyện Đạ Huoai, cao nguyên Di Linh, tỉnh Lâm Đồng. Dựa vào việc so sánh hình thái, chúng tôi bước đầu ghi nhận 14 loài bò sát cho khu vực gồm năm loài thằn lằn và chín loài rắn. Hai loài rắn mới được ghi nhận lần đầu cho tỉnh Lâm Đồng là rắn sọc vàng *Coelognathus flavolineatus* và rắn hổ mây Di Linh *Pareas temporalis*. Trong số các loài bò sát được ghi nhận có một loài (*Pareas temporalis*) là đặc hữu của Việt Nam và hai loài (*Physignathus cocincinus* và *Trimeresurus rubeus*) thuộc bậc sắp nguy cấp trong Danh lục Đỏ IUCN (2022). Những ghi nhận của chúng tôi nâng tổng số các loài bò sát của tỉnh Lâm Đồng lên 99 loài với 4 loài rùa, 57 loài rắn và 38 loài thằn lằn. Do có sự đặc trưng về khu hệ bò sát cùng với việc gia tăng diện tích đất nông nghiệp, xây dựng đường giao thông, nhà cửa và các công trình cơ sở hạ tầng khác, những điều tra quy mô hơn về khả năng tồn tại của các loài bò sát khác tại cao nguyên Di Linh cần được thực hiện.

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