NEW RECORD OF *Cyrtodactylus cattienensis* Geissler, Nazarov, Orlov, Bohme, Phung, Nguyen & Ziegler, 2009 (Squamata: Sauria: Gekkonidae) IN NUI ONG NATURE RESERVE, BINH THUAN PROVINCE, VIETNAM

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SUMMARY

Cyrtodactylus cattienensis was discovered in Dong Nai and Ba Ria - Vung Tau provinces by Geissler et al. (2009). Some other locations of this species were also discovered in later studies. We provide a new record for this species from Binh Thuan province based on three specimens collected in Nui Ong Nature Reserve. Data on the morphological of the collected specimens are also provided. Specimens include combination characters: tubercles present on the head, body, limbs and tails; 28 - 47 interorbital scale rows; 19 tubercules rows belonging at midbody; 35 - 38 ventral scales smooth, medial scales three times larger than the dorsal granules, lateral folds absent; males with 6 - 7 precloacal pores in angular continuous series, males and female with 17 - 18 (including precloacal pores scales) enlarged scales in the precloacal region, 5 - 7 enlarged femoral scales on each side, femoral pores absent; subcaudal scales are small, not transversely enlarged; there are 15 - 16 lamellas under the fourth finger and 17 - 20 lamellas under the fourth toe. Results of the research also show that the distribution characteristic of *Cyrtodactylus cattienensis* is larger than most species of the *Cyrtodactylus* genus, which species nearly discovered in Vietnam. The new record also extends the distribution of this species about 60 km (from Cat Tien National Park to Nui Ong Nature Reserve).

Keywords: *Cyrtodactylus cattienensis,* distribution, new records, Nui Ong nature reserve.

1. INTRODUCTION

Genus *Cyrtodactylus* Gray, 1827 comprises 335 species that have been recorded (Uetz et al., 2022). In Vietnam, the number of this genus includes 49 species (Uetz et al., 2022). Among them, after the publication of Nguyen et al. (2009), new species discovered are 31 species. Most new species were discovered outside of the original distribution area, there are very few species were found in other distribution areas. This demonstrates the limited distribution of species in *Cyrtodactylus* in Vietnam. Therefore, the discovery of a new distribution area of these species anywhere outside of the original distribution area is important for determining the feature of the distribution as well as contributing to the conservation of species.

In 2009, Geissler et al. published new species *Cyrtodactylus cattienensis* based on the specimens collected in Cat Tien National Park, Vinh Cuu Nature Reserve (Dong Nai province), and Nui Dinh (Ba Ria-Vung Tau province). In 2018, we were collected some specimens of *Cyrtodactylus* in Nui Ong Nature Reserve, Binh Thuan province, our results showed that these specimens belong to *C. cattienensis*. It suggests that the distribution of *C. cattienensis* is broader than many other species of the genus *Cyrtodactylus* in Vietnam.

2. RESEARCH METHODOLOGY

The field survey was conducted in Nui Ong Nature Reserve, Duc Binh commune, Tanh Linh district, Binh Thuan province in December 2018. The specimens were preserved in 70% ethanol, and kept at the

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Morphological characters. The following measurements were taken with a digital vernier caliper, interpolated to the nearest 0.1 mm: Snout-vent length (SVL, from tip of snout to vent); tail length (TL, from vent to tip of tail); distance from snout to eye (SE, from tip of snout to anteriormost point of eye including ciliaria); distance from eye to ear (EE, from posterior corner of eye to anterior margin of ear including ciliaria); maximum head width (HW); maximum head height (HH); head length (HL, from tip of snout to posterior margin of jaw); maximum ear diameter (EAD); horizontal eye diameter (ED); distance between nares (IND); distance from axilla to groin (AG); forearm length (FL, from base of palm to elbow); femur length (FEL, from posterior edge of hindlimb insertion to knee).

Scale counts were taken as follows: Supralabials (SPL); infralabials (IL); granular scales behind upper labials to angle of mouth (GBUL); granular scales behind lower labials to angle of mouth (GBLL); internasals (IN); postmentals (PM); scales between fifth supralabials (S5S); interorbitals (IO); dorsal tubercle rows (DTR, longitudinal rows of enlarged tubercles on the middle of dorsum and flanks); ventral scales in longitudinal rows at midbody (V); subdigital lamellae under the fourth finger (LF4) and under the fourth toe (LT4); precloacal pores in males (PP); postcloacal tubercles (PAT); enlarged precloacal scales (EPS); enlarged femoral scales (EFS); femoral pores (FP); granules surrounding dorsal tubercles (GST).

3. RESULTS AND DISCUSSION

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

Specimens examined: three specimens, including HDU.3262 (adult male, field number NO124; the latitude and longitude coordinates is 11.077832°N, 107.741943°E, at an elevation of 825 m a.s.l.); HDU.3263 (adult male, field number NO125; the latitude and longitude coordinates is 11.076810°N, 107.745634°E, at an elevation of 837 m a.s.l.), and HDU.3264 (adult female, field number NO126; the latitude and longitude coordinates is 11.075397°N, 107.747963°E, at an elevation of 817 m a.s.l.). Specimens were collected on 18 December 2018 by Dinh Duc Hanh, from the forest of Nui Ong Nature Reserve, Duc Binh commune, Tanh Linh district, Binh Thuan province.

Measurements (min-max): SVL 52.9 - 71.2 mm; TL 63.4 - 78; SE 6.7 - 8.9 mm; EE 4.8 - 6.1 mm; HW 10.8 - 14.2 mm; HH 6.7 - 9.4 mm; HL 15.2 - 20.5 mm; EAD 0.8 - 1.0 mm; ED 3.6 - 4.9 mm; IND 1.8 - 2.6; AG 23.1 - 29.3; FL 7.1 - 8.4; FEL 10.2 - 13.5.

Proportions: HL/SVL 0.29; HW/HL 0.69 - 0.72; HH/HL 0.42 - 0.46; EE/SE 0.67 - 0.72; EAD/ED 0.16 - 0.24; ED/SE 0.54 - 0.58.

Measurements and counts of specimens are shown in Table 1.

Description: Morphological characters of the specimens from Nui Ong NR conformed with the descriptions of *Cyrtodactylus cattienensis* in Geissler et al. (2009): The rostral is a rectangle, mean 1.6 times wider than height, with an inverse Y-shaped median suture. There are 11 supralabials and 8 - 9 infralabials on each side and continues by 4 - 7 granular scales behind upper labials and 4 - 5 granular scales behind lower labials to the angle of mouth. Nares is large, bordered by the rostral, the supranasal, three post-nasals, and the first supralabial. One supranasal on each side is two times larger than the intersupranasal. Supranasals are separated from each other by an intersupranasal. The mental is nearly triangular, wide as long as; one pair of posmentals, longer than wide, in contact with each other at the back of the mental, bordered by the mental, the first

infralabial, posteriorly touched by two larger scales. Gular pairs from second to sixth or seventh separated from infralabials by a row of scales.

The head scales are granular and small, 1.5 times larger than median snout scales; 28 - 47 interorbital scale rows. The dorsal of the head and temporal region with rounded, smooth tubercles, which are three times larger than the surrounding scales. The back with granular scales, the size is similar to the snout scales. Dorsal tubercles round, conical, slightly keeled; surrounded by 10 (sometime 9) granular scales; 19 tubercules rows belonging at midbody; 35 - 38 ventral scales smooth, medial scales three times larger than the dorsal granules, lateral folds absent. Upper and lower arm covered with granular scales, larking tubercles; upper hind limb covered with granular scales and conical tubercles similar to the back. Fingers and toes lacking webbing, lamellae of basally wider than distally. There are 15 - 16 lamellas under the fourth finger and 17 - 20 lamellas under the fourth toe. Males with 6 - 7 precloacal pores in angular continuous series; males and female with 17 - 18 (including precloacal pores scales) enlarged scales in the precloacal region, 5 - 7 enlarged femoral scales on each side, femoral pores absent. Subcaudal scales are small, not transversely enlarged.

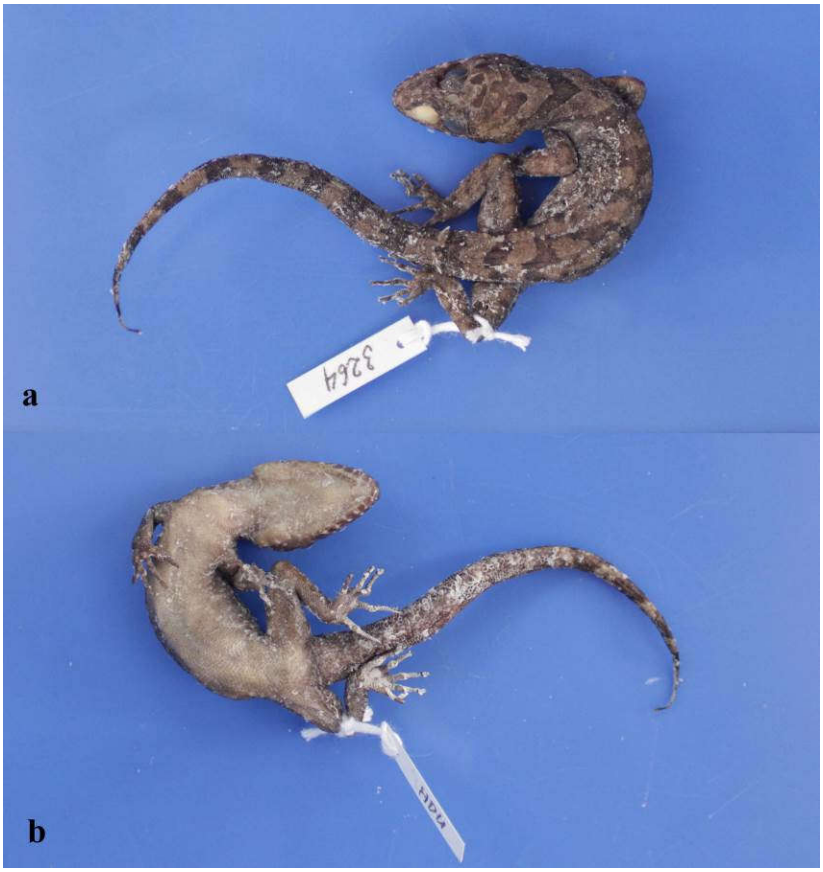

Figure 1. Dorsal (a) and ventral (b) view of *Cyrtodactylus cattienensis* (HDU.3264) from Nui Ong Nature Reserve, Binh Thuan province

(Photo by Hoang Ngoc Thao)

Coloration in preserved: Head dorsally brownish grey with dark brown spots; the band of nuchal broadened, extends to the posterior border of the eye. Dorsal with dark brown transverse bands, bands without white margins; the first band on the shoulder is X-shaped. The next bands are zigzag shapes (Figure 1).

Table 1. Measurements and scale counts of specimens of *Cyrtodactylus cattienensis* in Nui Ong Nature Reserve

Specimen	HDU.3262	HDU.3263	HDU.3264	min	max
Sex	male	male	female		
SVL	55.2	52.9	71.2	52.9	71.2
TL	42.3 (broken)	63.4	78	63.4	78
SE	7.2	6.7	8.9	6.7	8.9
EE	4.8	4.8	6.1	4.8	6.1
HW	11.6	10.8	14.2	10.8	14.2
HH	6.8	6.7	9.4	6.7	9.4
HL	16.1	15.2	20.5	15.2	20.5
EAD	1	0.8	0.8	0.8	1
ED	4.2	3.6	4.9	3.6	4.9
IND	1.8	1.9	2.6	1.8	2.6
AG	23.8	23.1	29.3	23.1	29.3
FL	7.1	7.4	8.4	7.1	8.4
FEL	10.3	10.2	13.5	10.2	13.5
SPL	11	11	11	11	11
IL	8	9	9	8	9
GBUL	7	4	7	4	7
GBLL	4	5	5	4	5
IN	3	3	3	3	3
PM	1	1	1	1	1
S5S	42	44	-	42	44
IO	36	28	47	28	47
DTR	19	19	19	19	19
V	38	35	38	35	38
LF4	15	15	16	15	16
LT4	17	19	20	17	20
PP	7	6	0	6 ♂	7♂
FP	0	0	0	0	0
PAT	1 + 1	2 + 2	2+2	1	2
EPS	18	17	18	17	18
EFS	5+5	7+7	7+7	5	7
GST	10	9-10	9-10	9	10

Ecological notes: Not information.

Distribution: *Cyrtodactylus cattienensis* was discovered in 2009 in Cat Tien National Park, Vinh Cuu Nature Reserve (Dong Nai province), and Nui Dinh (Ba Ria - Vung Tau province) by Geissler et al. (2009). In the survey in 2013, Nguyen et al. analyzed specimens of *Cyrtodactylus cattienensis* from Cat Tien NP and Ma Da (Dong Nai province), Binh Chau NR (Ba Ria - Vung Tau province) (according to Nguyen et al., 2013). The survey of Nguyen et al. (2017) also used specimens of *C. cattienensis* from Ba Ra Mountain (Binh Phuoc province), Cat Tien NP, Ma Da and Tan Phu (Dong Nai province) (Nguyen et al., 2017). The population of *C. cattienensis* in Binh Chau - Phuoc Buu was also confirmed by Pauwels et at. in 2018 (Pauwels et al., 2018). Until now, *C. cattienensis* were recorded in Cat Tien National Park, Tan Phu district, Vinh Cuu Nature Reserve, Ma Da belonging to Dong Nai province; Nui Dinh, Binh Chau - Phuoc Buu Nature Reserve belonging to Ba Ria - Vung Tau province; Ba Ra Mountain, Binh Phuoc province, and Nui Ong Nature Reserve, Binh Thuan province (Figure 2).

Figure 2. Locality records of *Cyrtodactylus cattienensis*
Cat Tien National Park, Tan Phu district (1); Vinh Cuu Nature Reserve, Ma Da (2); Nui Dinh (3); Binh Chau - Phuoc Buu Nature Reserve (4); Ba Ra Mountain (5), and Nui Ong Nature Reserve (6)

In the species of *Cyrtodactylus* nearly discovered in Vietnam, especially in the same geographic distribution area in southern Vietnam, most species are only known in type locality, such as *C. caovansungi* (2007) in Ninh Thuan province; *C. takouensis* (2008) from Ta Kou Nature Reserve, Binh Thuan province; *C. huynhi* (2008) from Chua Chan Mountain, Dong Nai province; *C. cucdongensis* (2014) from Khanh Hoa province; *C. gialaiensis* (2017) from Gia Lai province, *C. sangi* (2018) from Nui Chua National Park. Only some species were found outside of the original distribution area: *C. bugiamapensis* (2012) from Bu Gia Map National Park, Binh Phuoc province, and Tuy Duc district (Dak Nong province); *C. bidoupimontis* (2012) from Bidoup - Nui Ba National Park, Lam Dong province, and Khanh Vinh district, Khanh Hoa province. It suggests that the distribution limit of *C. cattienensis* is broader than many other species of the genus *Cyrtodactylus* in Vietnam.

4. CONCLUSION

The results of the survey extend the distribution area of *Cyrtodactylus cattienensis* from Nui Ong Nature Reserve, Binh Thuan province. The distribution of *Cyrtodactylus cattienensis* is larger than most species of the *Cyrtodactylus* genus which recently discovered in Vietnam.

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GHI NHẬN MỚI CỦA LOÀI *Cyrtodactylus cattienensis* Geissler, Nazarov, Orlov, Bohme, Phung, Nguyen & Ziegler, 2009 (Squamata: Sauria: Gekkonidae) Ở KHU BẢO TỒN THIÊN NHIÊN NÚI ÔNG, TỈNH BÌNH THUẬN, VIỆT NAM

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TÓM TẮT

Loài *Cyrtodactylus cattienensis* được phát hiện ở tỉnh Đồng Nai và Bà Rịa – Vũng Tàu bởi Geissler và cộng sự (2009). Một vài vị trí khác của loài này cũng đã được phát hiện trong các nghiên cứu sau này. Chúng tôi cung cấp ghi nhận mới của loài này ở tỉnh Bình Thuận dựa trên 3 mẫu vật được thu thập ở Khu Bảo tồn thiên nhiên Núi Ông. Dẫn liệu hình thái của các mẫu vật thu thập được cũng được cung cấp. Các mẫu gồm tổ hợp các đặc điểm đặc trưng: trên đầu, thân, chi và đuôi có các củ hạt; 28 - 47 hàng vảy gian ổ mắt; 19 hàng củ dọc giữa thân; 35 - 38 hàng vảy bụng nhẵn, trung bình lớn hơn 3 lần vảy trên lưng, thiếu gờ bên; cá thể đực với 6 - 7 lỗ trước hậu môn; vảy dưới đuôi không mở rộng; 17 - 20 bản mỏng dưới ngón chân IV. Kết quả nghiên cứu cũng cho thấy đặc điểm phân bố của loài *Cyrtodactylus cattienensis* là rộng hơn hầu hết các loài trong giống *Cyrtodactylus* được phát hiện gần đây ở Việt Nam. Ghi nhận mới cũng mở rộng vùng phân bố của loài này khoảng 60 km (từ Vườn Quốc gia Cát Tiên đến Khu Bảo tồn thiên nhiên Núi Ông), hoặc mở rộng về phía Bắc 70 km (từ Khu Bảo tồn thiên nhiên Bình Châu – Phước Bửu đến Khu Bảo tồn thiên nhiên Núi Ông).

Từ khóa: *Cyrtodactylus cattienensis*, ghi nhận mới, Khu Bảo tồn thiên nhiên Núi Ông, phân bố.

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