# NEW RECORDS OF TWO GECKO SPECIES (SQUAMATA: GEKKONIDAE) FROM OUDOMXAY PROVINCE, LAOS

**Saly Sitthivong[1,2], Ha Van Ngoan[1], Nguyen Huyen Thuong[1], Vilay Phimphasone[1,2], Nguyen Quang Truong[3,4], Luu Quang Vinh[1*]**

[1]*Vietnam National University of Forestry*

[2]*National University of Laos, Dong Dok Campus, Vientiane, Lao PDR*

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

[4]*Graduate University of Science and Technology, Vietnam Academy of Science and Technology*

## SUMMARY

*Cyrtodactylus wayakonei* was originally described from Luangnamtha Province in 2010, Northern Laos, and it was recently reported from Yunnan Province, China. *Hemiphyllodactylus kiziriani* was described from Luangprabang Province in 2014 and it is currently known only from Laos. This study provides the first records of the two species from Oudomxay Province, Laos based on a new collection of geckos found in the karst forest in Namor District. The new collected specimens of *C. wayakonei* from Oudomxay Province slightly differ from the original description of Nguyen et al. (2010) by having fewer number of ventral scales from mental to anterior edge of cloacal (152–156 *versus* 151–163 in type series), fewer precloacal pores in males (6–7 *versus* 6–8 in the type series). The new collected specimens of *H. kiziriani* from Oudomxay Province slightly differ from the original description of Nguyen et al. (2014) by having longer snout-vent length (maximum SVL 43.5 mm *versus* 40.8 mm in the type series), fewer ventral scale rows (11–13 *versus* 11–15 in the type series), more precloacal pores in males and females (males 13–14 and females 8–12 *versus* males 10–13 and female 8–10 in the type series, respectively).

**Keywords: *Cyrtodactylus wayakonei,* distribution, *Hemiphyllodactylus kiziriani,* new record, Oudomxay province.**

## 1. INTRODUCTION

*Cyrtodactylus wayakonei* and *Hemiphyllodactylus kiziriani* are two poorly known of geckos, both recently discovered from limestone karst forests of nothern Laos. *C. wayakonei* was originally described by Nguyen et al. (2010) from Luangnamtha Province of Laos and subsequently was recorded in Yunnan Province of China by Yuan & Rao (2011). *H. kiziriani* was discovered from Luangprabang Province, Laos by Nguyen et al. (2014) and no further information about this species has been reported since the original description.

During a recent herpetological survey, three adult and one subadult specimens of *C. wayakonei* and six adult specimens of *H. kiziriani* were collected in the karst forest of Namor District, Oudomxay Province, Laos. Based on morphological examination of these specimens, we herein report *C. wayakonei* and *H. kiziriani* for the first time from Oudomxay Province, Laos.

## 2. RESEARCH METHODS

### 2.1. Sampling

A field survey was conducted in April 2019 in the limestone karst forest of Namor District, Oudomxay Province. Specimens were euthanized in a closed vessel with a piece of cotton wool containing ethyl acetate and fixed in approximately 85% ethanol for five hours, then later transferred to 70% ethanol for permanent storage (Simmons, 2002). Specimens were subsequently deposited in the collection of the Vietnam National University of Forestry (VNUF), Hanoi, Vietnam.

### 2.2. Morphological characters

Measurements were taken following Nguyen et al. (2014) for *Hemiphyllodactylus* and Luu et al. (2017) for *Cyrtodactylus* with a digital caliper to the nearest 0.1 mm. Abbreviations are as follows: snout-vent length (SVL), from tip of snout to anterior margin of cloaca; m±SD: mean±standard deviation; tail length (TaL), from posterior margin of cloacal to tip of tail; from posterior edge of forelimb insertion to anterior edge of hindlimb insertion; maximum head height (HH), from occiput to underside of jaws; head length (HL), from tip of snout to the posterior margin of the

*Corresponding author: vinhlq@vnuf.edu.vn

retroarticular; maximum head width (HW); greatest diameter of orbit (OD); snout to eye distance (SE), from tip of snout to anterior corner of eye. Scale counts were taken as follows: supralabials (SL); infralabials (IL); granular scales surrounding dorsal tubercles (GST); ventral scales in longitudinal rows at midbody (V); number of scales along the midbody from mental to anterior edge of cloacal (SLB); precloacal pores (PP); postcloacal tubercles (PAT); subdigital lamellae on fourth finger (LD4); subdigital lamellae on fourth toe (LT4). Bilateral scale counts were given as left/right.

## 3. RESULTS AND DISCUSSION

***Cyrtodactylus wayakonei* Nguyen, Kingsada, Röesler, Auer & Ziegler, 2010 (Fig. 1)**

*Specimens examined (n=3)*. One adult male, VNUF R.2021.50 (Field no. SL.50), one subadult male VNUF R.2021.49 (Field no. SL.49), and one adult female, VNUF R.2021.58 (Field no. SL.58), collected in April 2019 by Saly Sitthivong, Vinh Quang Luu, Ngoan Van Ha & Thuong Huyen Nguyen in a karst cave (20°52' N, 102°13' E, at elevations between 642 and 658 m a.s.l.), in Namor District, Oudomxay Province, Laos.

***Morphological characters.*** Morphological characters of the specimens from Oudomxay Province agreed with the description of *Cyrtodactylus wayakonei* by Nguyen et al. (2010). Size medium SVL 77.9–89.6 mm (mean±SD: 83.5±8.3 mm); tail length (TaL) 82.7–85.3 mm (mean±SD: 84.0±1.8 mm); head elongated, depressed (mean HW/mean HL 0.66), distinct from neck; loreal region concave; snout long (mean SE/mean HL 0.39), longer than diameter of the orbit (mean OD/mean SE 0.56); snout scales small, granular; eye large (mean OD/mean HL 0.22), 7 or 8 supralabials; 7–9 infralabials; rostrum bearing smooth scales; 18–20 rows of dorsal tubercles; ventrolateral folds slightly developed, with large tubercles; 32 or 33 ventrals; 93–97 scales around midbody; 152–156 scales between mental and cloacal slit; 6 precloacal pores in males and 7 in the female; femoral pores absent; 2/2 postcloacal tubercles; 18–20 subdigital lamellae on fourth finger; 18–21 subdigital lamellae on fourth toe; precloacal groove absenr; femoral scales not enlarged; subcaudals somewhat enlarged; tail tubercles flat, smooth, head and dorsum with blotched to reticulated pattern.

**Table 1. Measurements (in mm) and morphological characters of the specimens of *Cyrtodactylus wayakonei* (* = tail regenerated)**

| Character | VNUF R.2021.50 | VNUF R.2021.49 | VNUF R.2021.58 |
|---|---|---|---|
| Sex | adult male | subadult male | adult female |
| SVL | 89.6 | 77.9 | 83.1 |
| TaL | 78.7* | 82.7 | 85.3 |
| TrunkL | 38.4 | 32.3 | 34.8 |
| HL | 25.7 | 22.3 | 24.2 |
| HW | 17.1 | 14.7 | 16.2 |
| HH | 9.9 | 8.6 | 9.3 |
| SE | 10.1 | 8.8 | 9.6 |
| EyeEar | 7.4 | 6.3 | 6.4 |
| ForeL | 16.5 | 13.4 | 13.6 |
| FemurL | 16.9 | 15.7 | 16 |
| CrusL | 17.5 | 16.1 | 16.3 |
| LD4A | 10.3 | 8.1 | 9.5 |

| Character | VNUF R.2021.50 | VNUF R.2021.49 | VNUF R.2021.58 |
|---|---|---|---|
| Sex | adult male | subadult male | adult female |
| LD4P | 11.1 | 9.8 | 10.7 |
| OD | 6.4 | 4.8 | 4.9 |
| EarL | 2.3 | 1.1 | 2.1 |
| RW | 3.6 | 3.3 | 3.7 |
| RH | 2.6 | 2.1 | 2.2 |
| MW | 3.1 | 2.6 | 2.8 |
| ML | 1.8 | 1.6 | 1.8 |
| CS | 3/4 | 2/4 | 5/4 |
| N | 3/3 | 3/3 | 4/4 |
| IN | 0 | 0 | 0 |
| SL | 7/8 | 8/8 | 8/8 |
| IL | 7/7 | 9/8 | 8/8 |
| IO | 23 | 24 | 26 |
| PO | 13 | 12 | 13 |
| PM | 2 | 2 | 2 |
| GP | 7 | 7 | 6 |
| DR | 18 | 18 | 18 |
| GST | 9 | 9 | 9 |
| SMC | 155 | 152 | 156 |
| SR | 94 | 93 | 97 |
| V | 32 | 32 | 33 |
| LF1 | 14/12 | 12/14 | 14/14 |
| LF4 | 18/18 | 18/19 | 19/20 |
| LT1 | 14/13 | 12/14 | 13/14 |
| LT4 | 21/21 | 19/18 | 20/21 |
| PP | 6 | 6 (pitted scales) | 7 (pitted scales) |
| FPl+FPr | 0 | 0 | 0 |
| PAT | 2/2 | 2/2 | 2/2 |

**Figure 1. Dorsal view of the *Cyrtodactylus wayakonei* (VNUF R.2021.50) in life from Oudomxay Province, Laos. Photo: Ngoan Van Ha**

***Coloration in life.*** Dorsum grey-brown with dark purplish-brown blotches and banded to reticulated pattern; tubercles beige to yellow; dorsal surface of tail greyish-black with beige pattern.

***Remarks.*** The new specimens from Oudomxay Province slightly differ from the original description of Nguyen et al. (2010) by having fewer number of ventral scales from mental to anterior edge of cloacal (152–156 *versus* 151–163 in the type series), fewer precloacal pores in males (6–7 *versus* 6–8 in type series).

***Distribution.*** This is a new record of the species *Cyrtodactylus wayakonei* from Oudomxay Province and it is about 75 km far from the type locality in Luang Namtha Province (Fig. 2).

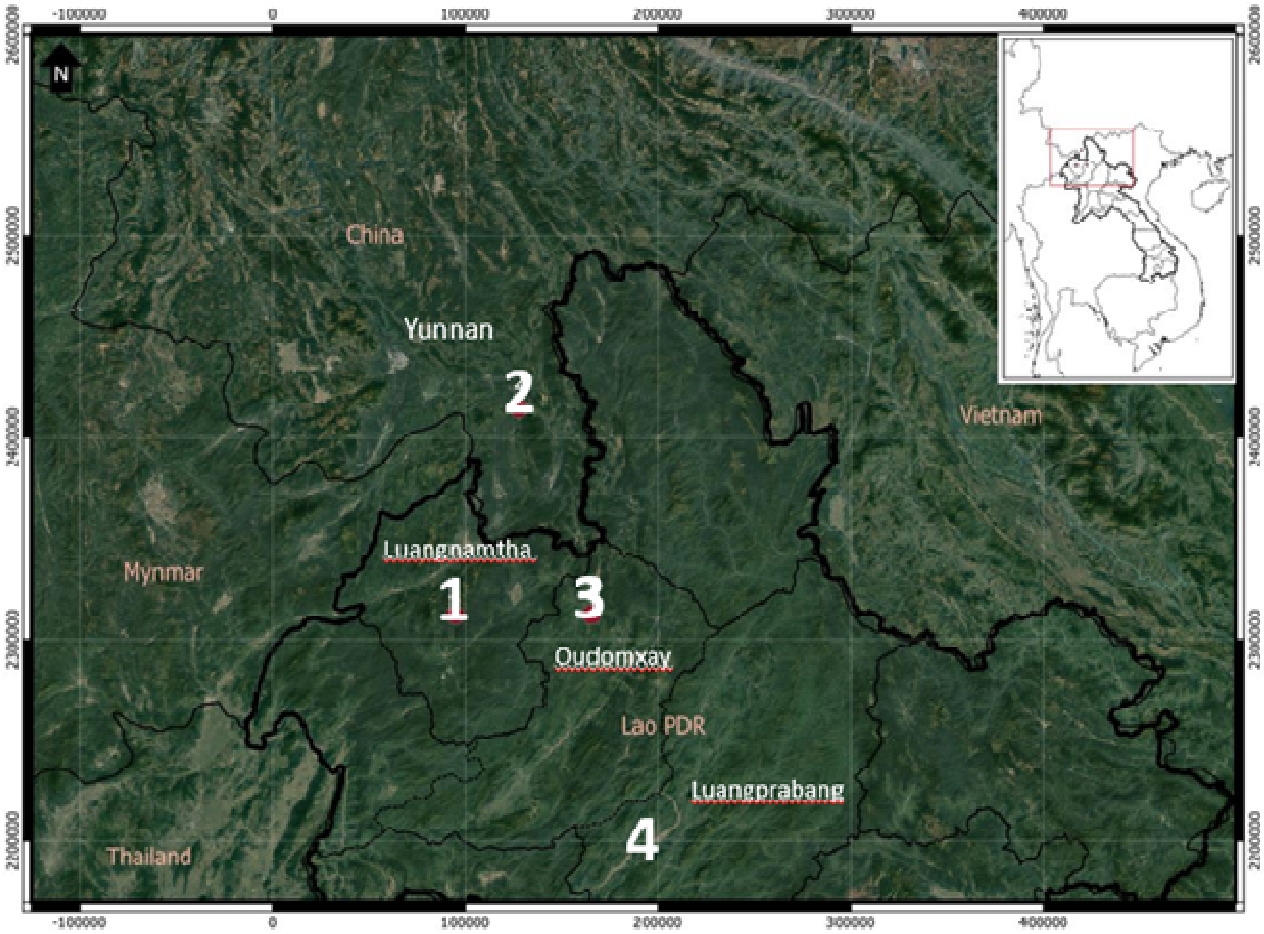


**Figure 2. Distribution of *Cyrtodactylus wayakonei*: A new record from Oudomxay Province, Laos (3); the record from Yunan, China (2); and the type locality from Luangnamtha Province, Laos (1). Distribution of *Hemiphyllodactylus kiziriani*: A new record from Oudomxay Province, Laos (3); and the type locality from Luangprabang Province, Laos (4).**

*Ecological notes*. Specimens were collected between 19:32 and 20:28 in a karst cave, approximately 1.0–2.5 m above the ground, at elevations between 642 and 658 m a.s.l. The air temperature was 28.6ºC and the relative humidity at the time of collection was 82%. The surrounding habitat was secondary forests with rice and corn fields.

**Figure 3. Microhabitat of *Cyrtodactylus wayakonei* in a karst cave of Namor District, Oudomxay Province. Photos: Sitthivong Saly**

***Hemiphyllodactylus kiziriani* Nguyen, Botov, Le, Nophaseud, Bonkowski & Ziegler, 2014**

*Specimens examined (n=6)*. Two adult males, VNUF R.2021.54-55 (Field no. SL.54, SL.55) and four adult females VNUF R.2021.51-53&56 (Field no. SL.51, SL.52, SL.53, and SL.56), collected between 20 and 30 April 2019 by Saly Sitthivong, Vinh Quang Luu, Ngoan Van Ha & Thuong Huyen Nguyen in a karst cave (20°52' N, 102°13' E, at elevations between 642 and 663 m a.s.l.), in Namor District, Oudomxay Province, Laos.

**Table 2. Measurements (in mm) and morphological characters of the specimens of *Hemiphyllodactylus kiziriani* (* = tail regenerated)**

| Character | VNUF R.2021.54 | VNUF R.2021.55 | VNUF R.2021.51 | VNUF R.2021.52 | VNUF R.2021.53 | VNUF R.2021.56 |
|---|---|---|---|---|---|---|
| Sex | adult male | adult male | adult female | adult female | adult female | adult female |
| SVL | 41.3 | 43.2 | 31.2 | 42.2 | 41.8 | 43.5 |
| TaL | 15.7* | 38.9 | 29.4 | 35.3 | 34.8 | 25.4* |
| TrunkL | 20.6 | 21.8 | 14.3 | 21.2 | 20.6 | 20.6 |
| HL | 10.4 | 11.3 | 8.1 | 10.8 | 10.9 | 10.8 |
| HW | 7.6 | 8.1 | 5.9 | 7.6 | 7.5 | 7.9 |
| HH | 4.5 | 4.9 | 3.8 | 4.4 | 4.6 | 4.8 |
| SE | 4.1 | 4.2 | 3.7 | 4.3 | 4.4 | 4.6 |
| EyeEar | 3.6 | 3.8 | 2.5 | 3.4 | 3.6 | 3.8 |
| ForeL | 6.2 | 5.6 | 4.2 | 5.3 | 5.8 | 5.6 |
| FemurL | 7.3 | 5.7 | 4.8 | 6.2 | 5.9 | 5.6 |
| CrusL | 5.9 | 5.8 | 4.4 | 5.8 | 5.5 | 5.5 |
| LD4A | 2.2 | 2.7 | 1.9 | 2 | 2.1 | 2.5 |
| LD4P | 3.6 | 3.6 | 3.2 | 3.4 | 3.5 | 3.6 |
| OD | 2.3 | 2.4 | 1.8 | 2.3 | 2.4 | 2.4 |
| EarL | 0.8 | 0.6 | 1.2 | 0.8 | 0.8 | 0.7 |
| RW | 1.8 | 1.9 | 1.6 | 1.8 | 1.9 | 1.6 |
| RH | 0.8 | 0.9 | 0.7 | 1 | 0.9 | 1.2 |

| Character | VNUF R.2021.54 | VNUF R.2021.55 | VNUF R.2021.51 | VNUF R.2021.52 | VNUF R.2021.53 | VNUF R.2021.56 |
|---|---|---|---|---|---|---|
| Sex | adult male | adult male | adult female | adult female | adult female | adult female |
| MW | 1.4 | 1.5 | 1.2 | 1.3 | 1.5 | 1.3 |
| ML | 0.7 | 0.7 | 0.5 | 0.7 | 0.8 | 0.9 |
| CS | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| N | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 | 3/3 |
| IN | 2 | 3 | 2 | 3 | 2 | 3 |
| SL | 10/9 | 8/8 | 10/10 | 9/8 | 10/10 | 9/10 |
| IL | 9/9 | 9/9 | 9/9 | 8/8 | 9/9 | 9/9 |
| IO | 24 | 29 | 27 | 28 | 28 | 29 |
| PO | 15 | 15 | 16 | 16 | 15 | 16 |
| PM | 2 | 2 | 2 | 2 | 2 | 2 |
| GP | 6 | 5 | 6 | 5 | 6 | 6 |
| DR | 0 | 0 | 0 | 0 | 0 | 0 |
| GST | 0 | 0 | 0 | 0 | 0 | 0 |
| SMC | 181 | 180 | 183 | 183 | 184 | 178 |
| SR | 134 | 139 | 135 | 135 | 137 | 138 |
| V | 45 | 47 | 46 | 45 | 47 | 44 |
| LF1 | 4/5 | 5/4 | 5/5 | 4/4 | 5/5 | 4/4 |
| LF4 | 9/10 | 9/9 | 9/10 | 9/9 | 9/9 | 9/9 |
| LT1 | 5/6 | 5/5 | 5/5 | 5/5 | 5/? | 5/5 |
| LT4 | 10/9 | 9/8 | 10/9 | 8/8 | 8/9 | 9/9 |
| PP | 15 | 13 | 12 | 8 | 11 | 11 |
| PAT | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 |

***Morphological characters.*** Morphological characters of the specimens from Oudomxay Province agreed with the description of *Hemiphyllodactylus kiziriani* by Nguyen et al. (2014). Size medium SVL 31.2–43.5 mm (mean±SD: 40.5±8.7 mm); tail length (TaL) 29.4–38.9 mm (mean±SD: 34.6±6.7 mm); head elongated, depressed (mean HW/mean HL 0.71), distinct from neck; loreal region concave; snout long (mean SE/mean HL 0.40), longer than diameter of the orbit (mean OD/mean SE 0.54); snout scales small, granular; eye large (mean OD/mean HL 0.22), 8–10 supralabials; 8 or 9 infralabials; rostrum bering smooth scales; dorsal tubercles absent; ventrolateral folds slightly developed, with large tubercles; 11–14 ventrals; 13–15 precloacal pores in males and 8–12 in females; femoral pores absent; 1/1 postcloacal tubercles; 4/4–4/5 subdigital lamellae on fourth finger; 4/4–5/5 subdigital lamellae on fourth toe; precloacal groove lacking; femoral scales not enlarged; subcaudals somewhat enlarged; tail tubercles flat, smooth.

***Coloration in life.*** Ground color of dorsal surface of head and body yellowish-grey; two dark brown streaks originating from posterior corner of eye on each side, the upper one extending to the neck but not forming a nuchal loop, the lower one connecting with a dark dorsolateral stripe, extending along the flank to tail base; a dark brown band present on neck;

neck and dorsum with a row of vertebral light spots; two rows of narrow dark brown bands present along dorsum but not connected with each other; dorsal surface of limbs grey with dark bars; upper and lower lips with dark bars; distinct postsacral mark with middorsal dark brown spot, bordered posteriorly and reterally by an U-shaped arm which can extend to posterior edge of abdomen; dorsal tail base with dark bands, generated part of the tail dark grey; throat, venter, and precloacal region cream, outer area with small dark brown dost; caecum and testis wite, unpigmented.

**Figure 4. Dorsal view of the *Hemiphyllodactylus kiziriani* (VNUF R.2021.52) in life from Oudomxay Province, Laos. Photo: Ngoan Van Ha**

***Remarks.*** The newly collected specimens from Oudomxay Province slightly differ from the original description of Nguyen et al. (2014) by having longer snout-vent length (maximum SVL 43.5 mm *versus* 40.8 mm in the type series), fewer ventral scale rows (11–13 *versus* 11–15 in the type series), more precloacal pores in males and females (males 13–14, females 8–12 *versus* males 10–13, female 8–10 in the type series, respectively).

***Ecological notes.*** Specimens were collected between 19:25 and 20:25 in a karst cave, approximately 1.0-5.0 m above the ground, at elevations between 642 and 663 m a.s.l. The air temperature was 28.6ºC and the relative humidity at the time of collection was 82%. The surrounding habitat was secondary forest.

**Figure 5. Microhabitat of *Hemiphyllodactylus kiziriani* in a karst cave, Namor District, Oudomxay Province, Laos. Photos: Ngoan Van Ha**

**Figure 6. Threats to the habitat of *Cyrtodactylus wayakonei* and *Hemiphyllodactylus kiziriani*. Photos: Sitthivong Saly**

## 4. CONCLUSION

This study provides the first records of C. wayakonei and H. kiziriani from Oudomxay Province, Laos. The specimens of afore mentioned species were collected in the disturbed limestone karst forest of Namor District, Oudomxay Province. Their natural habitats in the area have been heavily impacted by human activities, for instance cultivation activities and quarying (Fig. 6).

Currently, twenty-five species of the genus *Cyrtodactylus* and four species of the genus *Hemiphyllodactylus* have been recorded from Laos. Our research results have extended distributional ranges of the two known species from Laos. Further studies are needed to know about population status of two species for effective conservation solutions.

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# GHI NHẬN PHÂN BỐ MỚI CỦA HAI LOÀI TẮC KÈ (SQUAMATA: GEKKONIDAE) Ở TỈNH OUDOMXAY, LÀO

**Saly Sitthivong[1,2], Hà Văn Ngoạn[1], Nguyễn Huyền Thương[1], Vilay Phimphasone[1,2], Nguyễn Quảng Trường[3,4], Lưu Quang Vinh[1*]**

*[1]Trường Đại học Lâm nghiệp*

*[2]Trường Đại học Quốc gia Lào, Cơ sở Dongdok, Viêng Chăn, Lào*

*[3]Viện Sinh thái và Tài nguyên sinh vật, Viện Hàn lâm Khoa học và Công nghệ Việt Nam*

*[4]Học viện Khoa học và Công nghệ, Viện Hàn lâm Khoa học và Công nghệ Việt Nam*

## TÓM TẮT

*Cyrtodactylus wayakonei* được mô tả lần đầu năm 2010 tại tỉnh Luangnamtha, miền Bắc Lào và sau đó loài này được ghi nhận phân bố tại tỉnh Vân Nam, Trung Quốc vào năm 2011. *Hemiphyllodactylus kiziriani* được mô tả năm 2014 tại tỉnh Luangprabang và hiện tại chỉ biết đến phân bố tại khu vực mô tả lần đầu ở Lào. Nghiên cứu này cung cấp ghi nhận đầu tiên của hai loài trên từ tỉnh Oudomxay, Lào dựa trên các mẫu vật thu thập ở rừng trên núi đá vôi ở huyện Namor. Các mẫu vật thu được của *C. wayakonei* từ tỉnh Oudomxay có đặc điểm hình thái khác với mô tả lần đầu của Nguyen et al. (2010) bởi có ít số hàng vảy từ cằm đến trước lỗ huyệt (152–156 *so với* 151–163 của mẫu chuẩn), có ít hơn số lỗ trước huyệt ở con đực (6–7 *so với* 6–8 của mẫu chuẩn), các đốm ngang thân rõ ràng và đồng đều hơn hơn (so với các đốm sắp xếp không theo trật tự ở mẫu chuẩn) và cũng có ít các điểm màu tối ở phần trước của đầu. Các mẫu thu thập của *H. kiziriani* từ tỉnh Oudomxay có đặc điểm hình thái khác so với mô tả lần đầu của Nguyen et al. (2014) bởi có kích thước cơ thể lớn hơn (SVL đạt tới 43.5 mm *so với* 40,8 mm của mẫu chuẩn), có ít hơn số hàng vảy bụng (11–13 *vo với* 11–15 của mẫu chuẩn), nhiều hơn số lỗ trước huyệt ở cả đực và con cái (con đực 13–14; con cái 8–12 *so với* con đực 10–13; con cái 8–10 của mẫu chuẩn).

**Từ khoá: *Cyrtodactylus wayakonei,* ghi nhận mới, *Hemiphyllodactylus kiziriani*, phân bố, tỉnh Oudomxay.**

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