

Additional records and Further Data on Indian garden lizard *Calotes versicolor* (Daudin, 1802) (Sauria: Agamidae) from Iran

Damadi, E.¹, Rastegar-Pouyani, N.², Karamiani, R.² and Akbarpour, M.^{2,3}

¹*Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Iran*

²*Iranian Plateau Herpetology Research Group (IPHRG), Razi University, Kermanshab, Iran*

³*Department of Biology, Faculty of Science, Razi University of Kermanshab, Iran*

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In this study a total of four *Calotes versicolor* specimens (three males, one female), collected in different localities from April 2013 to March 2014 in Southeast of Iran were examined. The study was based on morphological features including color pattern, morphometric measurements, habits, biological observations especially habitat and distribution. Habits features, habitat and new distribution localities were documented. This is the first record of *Calotes versicolor* from the Kalesari village is 44 km away from the last record in Nahang River.

Key words: *Agamidae, Calotes versicolor, Distribution, Habits, Habitats, Iran.*

INTRODUCTION

The genus *Calotes* Cuvier, 1817 belongs to the family Agamidae and contains at least 26 species distributed in South and Southeast Asia (Uetz & Hosek, 2016) and only one species reported from Iran (Anderson, 1999; Rastegar-Pouyani *et al.*, 2008; Šmíd *et al.*, 2014). *Calotes versicolor* (Daudin, 1802) has a wide distribution in Afghanistan, Iran, Pakistan, Nepal, Bhutan, India, Sri Lanka, Myanmar, southern China (Yunnan, Hainan Island, Hong Kong), Laos, Thailand, Vietnam, Singapore, western Malaysia, Indonesia (Sumatra) (Ananjeva *et al.* 2011). The majority of the species are relatively restricted to small geographic regions of the Western Ghats, Sri Lanka, Northeast India and Indo-Burma (Hallermann, 2000), with the exception of *Calotes versicolor* which has a larger range compared to its congeners (Uetz & Hosek, 2016).

Daudin (1802) examined two specimens from Muséum national d'Histoire naturelle, Paris (MNHN) for the first time and described this species as *L'Agama arlequin*, a deux raies, which means Harlequin Agama with two stripes. He was not aware about the type locality of the examined specimens (Gowande *et al.* 2016). Smith (1935) specified the type locality of *Calotes versicolor* from Pondicherry, India.

Calotes versicolor has several common names in different geographic locations: Blood-sucker Lizard (India), Crested Tree Lizard (Florida, US), Garden Fence Lizard (Thailand) and Garden Lizard (China, Sri Lang Ka) (Cox *et al.* 1998; Enge & Krysko, 2004; Matyot, 2004; Radder, 2006), Baghar (Iran) (Mobaraki *et al.* 2013). Most of these common names have been derived from its morphology and habitat (Radder, 2006). Recently new specimens of this tropical agamid were recorded by Mobaraki *et al.* (2013) from Saravan, Sistan and Baluchestan province, after the immemorial records by Blanford (1876) and Anderson (1999). The aim of this paper is to provide more complete information on the distribution, behavior, and morphology of *Calotes versicolor*.

MATERIAL AND METHODS

This study was carried out from April 2013 to March 2014. Four individuals of *Calotes versicolor* (Three males and one female) were collected from three localities: Kalesari village ($26^{\circ} 50' 03.06''$ N; $62^{\circ} 27' 02.39''$ E), Kalegan village ($27^{\circ} 30' 51.56''$ N; $62^{\circ} 45' 22.24''$ E) and Nahang River ($26^{\circ} 39' 38.30''$ N; $62^{\circ} 54' 44.91''$ E) (Fig. 1). This is the first record of *Calotes versicolor* from the Kalesari village. The Kalesari village is part of the Hiduj area, it is a mountainous locality, with small gardens and streams. The average air temperature in summer is 32°C to 35°C and in winter is about 25°C . Some of the samples were caught by hand and some specimens were captured by shooting. Our specimens were fixed by 96% ethanol and then deposited in 75% ethanol. The specimens were deposited at the Razi University Zoological Museum (RUZM), Kermanshah, Iran. Detailed information about the morphology, distribution, and expedition localities of each specimen was also provided. In this study, 20 morphological characters, consisting of 13 morphometric and seven meristic characters were examined.

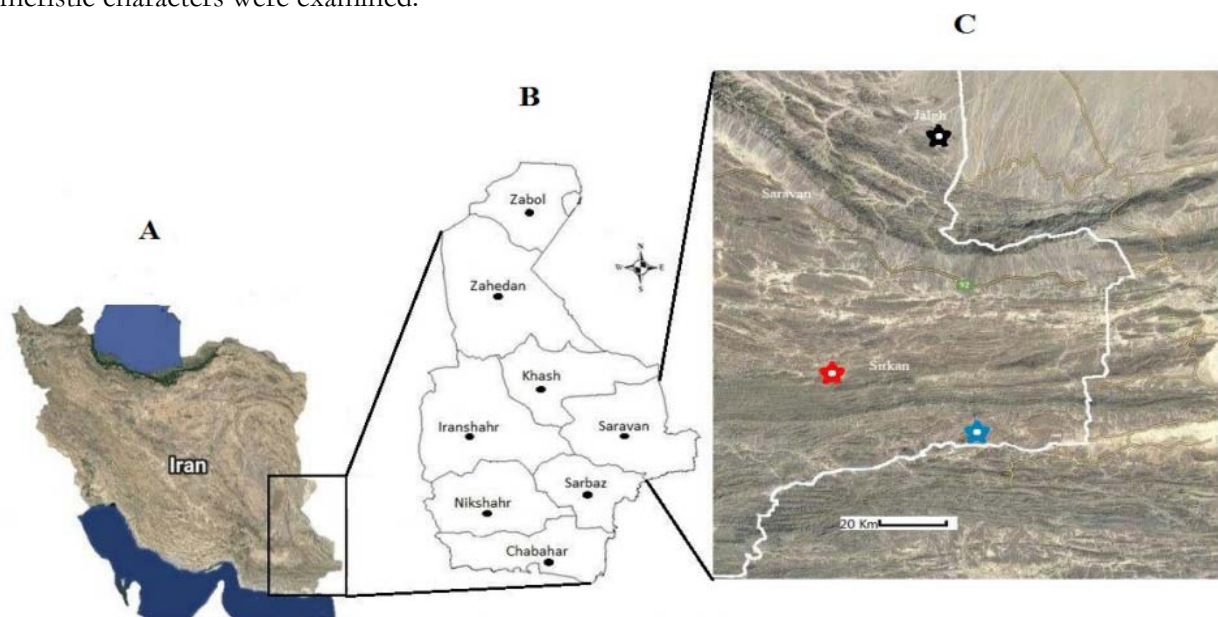


FIGURE 1. Distribution of *Calotes versicolor* in Sistan and Baluchestan province, southeast of Iran. A: Iran map, B: Sistan and Baluchestan province, C: Study area. Red star: Kalesari village, black star: Kalegan, blue star: Nahang River.

Morphometric characters

Snout-Vent Length (SVL; from tip of the snout to cloaca), Tail Length (TL; from cloaca to tip of the tail, only measured when not partially or completely missing), Tail Width (TaW; at widest point), Fourth Toe Length (T4L), Fourth finger Length (F4L), Lower arm Length (LA), Pectoral width (PW), Upper arm length (UA), length of upper hindlimb (UhL; from pelvis to knee), length of lower hindlimb (LhL; from knee to heel), Length of hindlimb (LH; from pelvis to heel), Tympanum Diameter (TD; at widest point of the ear opening) Head Length (HeL; from tip of the snout to rear of the skull), Head Width (HeW; at widest point), Vent Width (VW), Trunk Length (Tl) and Interorbital width (IW).

Meristic characters

Infralabials (IL), Supralabials (SL), Temporal spines (TS; on each of Head), Lamellae under 4th toe (LUT4), Number of Scales between Eyes (SEE; at the widest point), Number of Scales between Nasal (SNN; at the widest point), Midbody Scales (MBS) and Dorsal Crest Scales (DC).

RESULTS

In this study we collected four specimens of *Calotes versicolor* from Sistan and Baluchestan province including: 1. RUZM AC10.1 from Kalegan village (Female), 2. RUZM AC10.2 from Kalesari village (Male), 3. RUZM AC10.3 from Nahang River (Male) and 4. RUZM AC10.4 from Kalesari village (Male) (Table 1).

TABLE 1. Meristic and mensural characters of four *Calotes versicolor* specimens collected from southeast of Iran.

Sex character	RUZM AC10.1 Female	RUZM AC10.2 Male	RUZM AC10.3 Male	RUZM AC10.4 Male
SVL	84.93	110.51	119.54	86.39
TL	108.96	288.14	300	232.18
T4L	18.23	21.69	23.69	16.22
F4L	10.34	11.43	12.01	10.38
LA	12.94	16.98	16.90	12.84
PW	12.89	15.85	21.1	13.54
UA	27.31	37.23	35.19	28.04
LhL	14.71	20.31	20.71	14.07
TD	3.25	4.86	4.95	3.33
UhL	19.28	25.49	26.14	21.69
LH	61.96	82.41	86.7	51.96
HeL	24.95	34.74	39.19	25.04
HeW	14.27	20.08	21.66	14.05
TaW	7.64	11.51	11.34	7.01
VW	8.88	11.79	12.09	7.91
TI	45.54	53.52	54.43	42.57
IW	10.28	14.96	15.79	10.92
SL	22	23	23	24
IL	24	23	24	23
TS	2	2	2	2
LUT4	25	25	24	25
SEE	13	14	14	13
SNN	6	6	6	7
MBS	42	40	44	40
DC	47	47	48	47

Distinguishing characters. Head elongate, males with gular sac, 40-44 scales around middle of body, 10-12 supralabials and 11- 12 infralabials on each side the head, 47-48 spines from nape to base of tail, 24-25 Lamellae under 4th toe. Maximum Snout-Vent Length (SVL) and Tail Length (TL) of male and female respectively: 119.54 mm and 300 mm; 84.93 mm and 108.96 mm. Sexual dimorphism occur in shape, size and color between male and female of species (Olsson *et al.*, 2002).

Color pattern. These lizards can change their color and these color changes may reflect their moods. The Oriental Garden Lizard usually has grey dorsal regions. Females have a series of darker bars which are lacking in males (Fig. 2). Females also lack a dark ventral partial collar at the base of the neck and throat scales somewhat red which is characteristic of the adult males (Fig. 3A), which in the breeding season and in stress situations becomes more prominent. There are four stripes around their eyes, two of which connect to supralabials, one stripe to the ears and last stripe connects to spines above the ear (Fig. 3B).



FIGURE 2. Adult female of *Calotes versicolor* in Kalagan village on Pomegranate, Sistan and Baluchestan province, Iran.

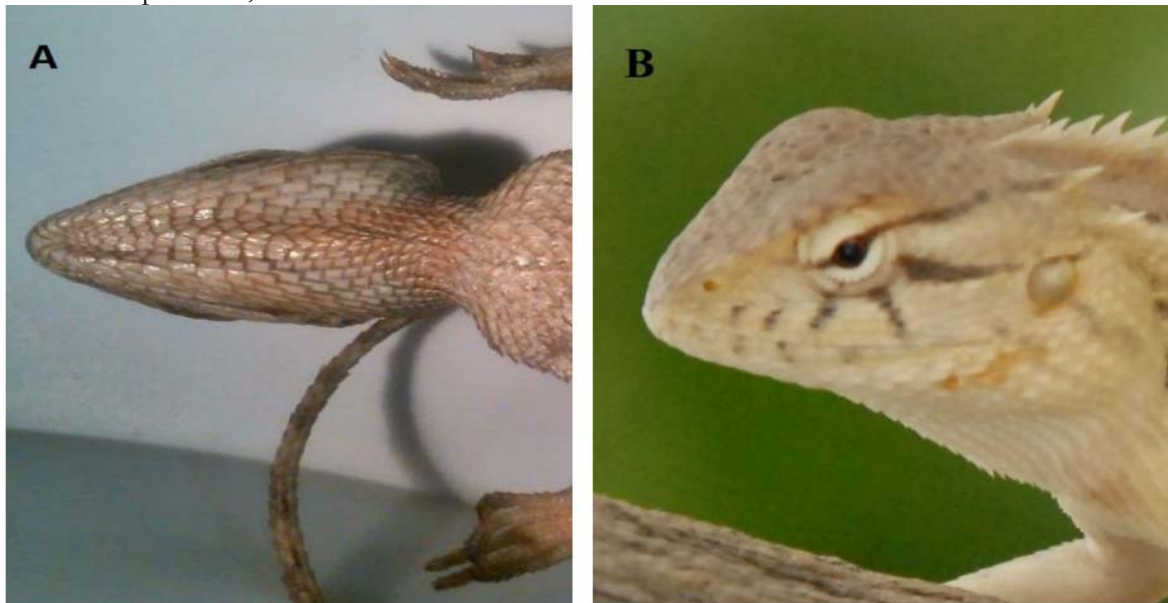


FIGURE 3. *Calotes versicolor*: (A) head from ventral; (B) head from lateral.

Habitat. They are commonly found in natively inhabits for example shrubs and gardens, mostly on trees: Dates plam, *Mulberry*, *Pomegranate*, *Vines*, *Ziziphus*. Other reptiles species that occur sympatrically with *Calotes versicolor* and collected in Kalesari village including: *Laudakia nupta nupta* and *Trapelus agilis agilis* from Family Agamidae, *Agamura persica* from Family Gekkonidae, *Mesalina watsonana* from Family Lacertidae.

Habits. They climb with great agility, often jumping from branch to branch (Khan *et al.*, 2004). When sleeping or basking, they usually lie with the body closely pressed against a stem (Khan *et al.*, 2004). Specimens are diurnal and active from early day from early January to late November and its hibernation from early December to late December. All specimens collected between 08.00 to 11.00 am from three different locations.

Distribution. The new record localities were added to distribution map of this species in Iran. Previously, this species had been collected from Marginal regions including Khor Askan, north of Bampusht and Kalagan (Blanford, 1876). However, prior to this study, was no record from Kalesari village (Fig. 4). In this study new distribution localities are reported. This new record from Kalesari



FIGURE 4. Habitat of *Calotes versicolor* in Kalesari village.

village is located 44 km far from the last record (Nahang River). Our record indicates a wider distribution for *Calotes versicolor* in southeast of Iran. Also some other localities in different parts of the area are documented. It seems that this lizard has a broad distribution in different locations.

DISCUSSION

This note provide the more detailed about the morphological characters, distribution, habitats and color pattern of *Calotes versicolor* which is one of rare lizards in Iran. According to Blanford (1876), Anderson (1999) and Mobaraki *et al.* (2013) distribution of *Calotes versicolor* in Iran has been limited to small areas, restricted only to some parts of Baluchistan, close to the Pakistan border, whereas we showed that this species is distributed throughout the study area, although Blanford, (1876) observed this species on dates plam of Sarbaz in the region but not reported any data about it. This study supported the idea that *Calotes versicolor* is usually found in man-made habitats such as rubber plantation, orchards and gardens. Comparison notable characters of our adult male specimen with of adult male specimen report by Gowande *et al.* (2016) from the Pondicherry shows the length SVL, TL, HeL, HeW and T4L in of our specimen were 119.54, 300, 39.19, 21.66, 23.69 mm and in Gowande *et al.* (2016) report were 110.1, 310, 25.8, 25.6, 20.3 mm, respectively. Comparison our also confirmed viewpoint Sears and Angilletta (2004) about Bergmann's rule.

Morphological difference could occur due to various reasons. Radder (2006) mentioned that the difference between *C. versicolor* specimens in India and China was influenced by environmental factors. The geographic variation in stripe pattern of *Calotes versicolor*, may be indicative of variation in habitat and climatic differences. A comprehensive study is needed to through more light on various aspects of biology and natural history of this scarce lizard in Iran.

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