KARYOTYPE OF COMMON SUN SKINK *Eutropis multifasciata* (KUHL, 1820) (SQUAMATA: SCINCIDAE) IN SOUTHERN THUA THIEN HUE PROVINCE, VIETNAM

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**Abstract.** The common sun skink *Eutropis multifasciata* (Kuhl, 1820) belonged to the family Scincidae, ordo Squamata of Reptile. This study herein presents the karyotype of this species collected from Thua Thien Hue province, Vietnam. Mitotic chromosomes were prepared by culturing lymphocytes and those were afterward stained by using the G banding technique. The chromosome number was counted for each specimen based on photographs of 30 metaphase cells that contained chromosomes enlarged. Consequently, a total of 32 diploid chromosomes were mostly documented in 23/30 specimens (76.67%), comprising 18 macrochromosomes and 14 microchromosomes. The formula for the karyotype of common sun skink *E. multifasciata* presents 18M + 14m.

**Keywords:** *Eutropis multifasciata*, chromosome number, karyotype, macrochromosome, microchromosome.

1. INTRODUCTION

The common sun skink *Eutropis multifasciata* (Kuhl, 1820) is a widely distributed species in India, China, Taiwan, Pakistan, Bangladesh, Myanmar, Thailand, Laos, Indochina, Philippines, Indonesia, Singapore, Malaysia, New Guinea, Vietnam, and introduced to the United States (Chung et al., 2014a, 2015a; Hazarika and Sharma, 2018). The species inhabits open regions, villages, and occasionally in secondary forests at various temperature and humidity regimes and it is often found under leaf litter, or in sunny spots for basking, or sheltering under rotting logs, and tree buttresses (Kumar et al., 2023). The species generally feeds on insect larvae, green grasshoppers, crickets, spiders, snails, flowers, and other vegetable items (Chung et al., 2014b; 2015b).

Karyological studies have significantly contributed to the gap of systematics (Kupriyanova, 1986; Odierna et al., 1996), and biological diversity (Mezzasalma et al., 2024). Karyotype determination was carried out in many lizard species, such as two Australian lizards of *Tiliqua rugosa* and *Diplodactylus tessellatus* (King, 1973); four species of lizards from peninsular India (Krishna and Aswathanarayana, 1979); five species in Cuba of *Leiocephalus carinatus*, *L. raviceps*, *Anolis homolechis*, *A. porcatus*, and *Ameiva auberi* (Porter et al., 1989); 25 species from the *Egernia* group, and *Tribolonotus gracilis* (Donnellan, 1991); the Iberian rock lizards (Odierna et al., 1996);
four Agamid lizards from Southeast Asia (Ota et al., 2002); *Lygosoma bowringii* from Thailand; the Eurasian lizard *Zootoca vivipara* from Central Europe (Kupriyanova, 2006); five amazon lizard species of the subfamilies Teiinae and Tupinambinae from Brazil: *Ameiva ameiva*, *Cnemidophorus* sp.1, *Kentropyx calcarata*, *Kentropyx pelviceps*, and *Tupinambis teguixin* (Carvalho et al., 2015). Karyotype of *Eutropis* species was further reported: *E. multifasciata* (De Smet, 1981; Donnellan, 1991; Kaewsri, 2014); *E. trivittata*, and *E. carinata* (Krishna et al., 1979); *E. frenata* (Hernando and Alvarez, 2005); *E. macularia* (Makino and Asana, 1950; Makino, 1951); *E. longicaudata* (Eremchenko, 1992); *E. rudis*, *E. rugifera* (Ota et al., 1996); *E. affinis*, *E. maculilabris maculilabris*, and *E. quinquetaeniata sharica* (Adegoke and Ejere, 1991).

From Vietnam, the study on the karyotype of some lizard species was documented for *Leiolepis reevesii* (Gray, 1831) and *L. guentherpetesi* (Darevsky and Kuprianova, 1993) (Dung et al., 2008; 2009). In this study, we carried out field survey in Southern Thua Thien Hue province, Central Vietnam to collect specimens of *E. multifasciata*. The study aims to provide the first data on the karyotype of the common sun skink.

2. MATERIALS AND METHODS

Common sun skink *E. multifasciata* were collected from Thuy Chau ward, Huong Thuy town, Thua Thien Hue province (16°25'13"N, 107°39'47"E) by hand or with noose traps (Figures 1 and 2). The morphological characteristics of captured specimens matched the description of *E. multifasciata* by Hossain and Jing (2019).

![Sampling locality of common sun skink Eutropis multifasciata, Thuy Chau ward, Huong Thuy town, Thua Thien Hue province, Vietnam](image-url)

**Figure 1.** Sampling locality of common sun skink *Eutropis multifasciata*, Thuy Chau ward, Huong Thuy town, Thua Thien Hue province, Vietnam

Sterile blood samples of individuals with *E. multifasciata* were obtained by cardiac puncture. Lymphocytes were cultured in PB-MAX media at 37 °C for 72 h. One hour after
adding 30-40 μL Concemid solution (10 mg/mL) per culture, cells were fixed in the Carnoy solution (1:3, glacial acetic acid: absolute methyl alcohol). Mitotic chromosome preparations were made by an air-dry method and stained by the modified G-banding technique. Chromosome counting was performed on mitotic metaphase cells under a light microscope. Thirsty observable and well-spread chromosomes of each male and female were selected and photographed. The karyotype was made according to Levan et al. (1964). The karyotype was determined for each specimen by comparing photographs of 30 metaphase cells. All specimens of *E. multifasciata* used in this study were preserved in 70% ethanol and deposited in the Zoology laboratory, Department of Biology, University of Education, Hue University, Vietnam.

![Figure 2](image1.png)

*Figure 2. Adult common sun skink Eutropis multifasciata. A. Female, B. Male*

### 3. RESULTS AND DISCUSSION

#### 3.1. Chromosome number of common sun skink *Eutropis multifasciata*

![Figure 3](image2.png)

*Figure 3. Mitotic metaphase chromosome of common sun skink Eutropis multifasciata. A. Female, B. Male. An arrow indicates a secondary constriction on the short arm of machromosome No. 1 (Scale bar = 10 μm)*
The chromosome number of 30 mitotic metaphase cells of common sun skink *E. multifasciata* was counted. The percentage of chromosome number “<32” was 20.00% (6/30), the percentage of chromosome number “>32” was 3.33% (1/30) and the percentage of chromosome number “=32” was 76.67% (23/30). The cases of chromosome number <32 or >32 can be explained due to the overlap of microchromosomes or the breaking down of macrochromosomes during metaphase mitotic chromosome preparation. With a total of 32 chromosomes, we documented comprising 18 macrochromosomes and 14 microchromosomes, 2n=32.

The total number of 32 chromosomes in *E. multifasciata* was also noted in previous studies by De Smet (1981), Donnellan (1991), Kaewsri et al. (2014); as well as in other lygosomine species, including nine species of the genus *Eutropis*: *E. trivittata*, *E. carinata* (Krishna and Aswathanarayan, 1979); *E. macularia* (Makino and Asana, 1950; Makino, 1951), *E. longicaudata* (Eremchenko, 1992); *E. rudis*, *E. rugifera* (Ota et al., 1996); *E. affinis*, *E. maculilabris* maculilabris, and *E. quinquetaeniata* sharica (Adegoke and Ejere, 1991). However, this chromosome number is greater than that of *E. frenata* (2n=30) (Hernando and Alvarez, 2005) (Table 1). The chromosome number in the family Scincidae varies from 2n=24 (e.g. in *Riopa punctata*) to 2n=32 (e.g. in a majority of the genus *Eutropis*) (Adegoke and Ejere, 1991). On the other hand, the diploid number tends to be approximately genus-specific, for example, 26 in the genus *Eumeces*, 28 in the genus *Chalcides*, and 32 in the genus *Eutropis* (almost 2n≤32) (De Smet, 1981; Adegoke and Ejere, 1991; Kaewsri et al., 2019).

Secondary constrictions were located on the distal portions of the short arms of the largest pair of macrochromosomes (Figure 3). This is in accordance with the previous studies of Donnellan (1991), De Smet (1981), and Kaewsri et al. (2014).

### Table 1. Review of skink chromosome number reports in the genus *Eutropis* (Reptilia: Scincidae)

<table>
<thead>
<tr>
<th>No</th>
<th>Species</th>
<th>2n</th>
<th>Reference</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>32</td>
<td>Present study</td>
</tr>
<tr>
<td>2</td>
<td><em>E. trivittata</em></td>
<td>32</td>
<td>Krishna and Aswathanarayan (1979)</td>
</tr>
<tr>
<td>3</td>
<td><em>E. carinata</em></td>
<td>32</td>
<td>Krishna and Aswathanarayan (1979)</td>
</tr>
<tr>
<td>4</td>
<td><em>E. frenata</em></td>
<td>30</td>
<td>Hernando and Alvarez (2005)</td>
</tr>
<tr>
<td>5</td>
<td><em>E. macularia</em></td>
<td>32</td>
<td>Makino and Asana (1950), Makino (1951)</td>
</tr>
<tr>
<td>6</td>
<td><em>E. longicaudata</em></td>
<td>32</td>
<td>Eremchenko (1992)</td>
</tr>
<tr>
<td>7</td>
<td><em>E. rudis</em></td>
<td>32</td>
<td>Ota et al. (1996)</td>
</tr>
<tr>
<td>8</td>
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<td>32</td>
<td>Ota et al. (1996)</td>
</tr>
<tr>
<td>9</td>
<td><em>E. affinis</em></td>
<td>32</td>
<td>Adegoke and Ejere (1991)</td>
</tr>
<tr>
<td>10</td>
<td><em>E. maculilabris maculilabris</em></td>
<td>32</td>
<td>Adegoke and Ejere (1991)</td>
</tr>
<tr>
<td>11</td>
<td><em>E. quinquetaeniata</em> sharica</td>
<td>32</td>
<td>Adegoke and Ejere (1991)</td>
</tr>
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</table>
2. Karyotype of common sun skink *E. multifasciata*

The karyotype of common sun skink *E. multifasciata* was photographed in Figure 4. The diploid karyotype of *E. multifasciata* includes 18 macrochromosomes and 14 microchromosomes. As a result, the formula for the karyotype of common sun skink *E. multifasciata* presents 18M + 14 m.

There were no irregularly sized chromosomes related to the different sexes of *E. multifasciata*. These homomorphic sex chromosomes are typical in genotypic sex-determination lizards, as well as in amphibians and fishes (Ezaz et al., 2009). Nearly 1000 of the lizard species have been karyotyped, whereof fewer than 200 species have sex chromosomes (Kaewsri et al., 2019).

*Figure 4. Karyotype of common sun skink Eutropis multifasciata with 18 macrochromosomes and 14 microchromosomes. A. Female, B. Male (Scale bar = 10 µm)*
4. CONCLUSION

Using a G-banding technique, the karyological study of the common sun skink *E. multifasciata* mostly documented the chromosome number of 2n=32 (76.67%), which consisted of 9 pairs of macrochromosomes and 7 pairs of microchromosomes. As a result, the formula of its karyotype presents 18M + 14m. No sex chromosome heteromorphisms were noted in the karyotype of *E. multifasciata*.

REFERENCES


Báo cáo khoa học về nghiên cứu và giảng dạy sinh học ở Việt Nam


**KIỂU NHẤN CỦA THÀN LÀN BÔNG HOA Eutropis multifasciata (Kuhl, 1820) (Squamata: Scincidae) Ở NAM THỪA THIÊN HUẾ**

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**Từ khóa:** Eutropis multifasciata, số lượng nhiễm sắc thể, kiểu nhân, nhiễm sắc thể kích thước lớn, nhiễm sắc thể kích thước bé.

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