

## New records of the striped lizard *Kentropyx paulensis* from São Paulo, Brazil

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### Abstract

The endemic Cerrado teiid lizard *Kentropyx paulensis* is classified in the “Endangered” and “Vulnerable” categories by the lists of the states of São Paulo and Minas Gerais, respectively, and is therefore considered threatened. Thus, this work aimed to compile records of *K. paulensis* obtained in several works carried out in the Planalto Ocidental Paulista, which occupies almost half of the total area of the State of São Paulo, Southeastern Brazil. Records were produced in seven municipalities (Anhembi, Assis, Castilho, Jaú, Piracicaba, Quatá and Santa Bárbara d'Oeste) in the hot and rainy season (December to March) in vegetation types ranging from natural environments such as Cerradão and Semideciduous Seasonal Forest to anthropized environments as reforestation and pastures of *Urochloa* sp. The intense process of changing the landscape that the Planalto Ocidental Paulista went through in the last century, because of the economic model that the state adopted, may have collaborated to reduce the viable areas for the maintenance of these populations. These new records indicate that the occurrence of the species may be broader, as a result of adaptations to recent conversion of cover natural that occurred in the State of São Paulo.

**Keywords:** Anthropic; brazilian savannah; Teiidae.

## Novos registros do lagarto-listrado *Kentropyx paulensis* para São Paulo, Brasil

### Resumo

O lagarto teídeo endêmico do Cerrado *Kentropyx paulensis* está classificado nas categorias “Em Perigo” e “Vulnerável” pelas listas do estado de São Paulo e Minas Gerais, respectivamente, sendo, portanto, considerado ameaçado. Com isso, esse trabalho objetivou compilar registros de *K. paulensis* obtidos em diversos trabalhos realizados no Planalto Ocidental Paulista, que ocupa praticamente metade da área total do Estado de São Paulo, sudeste do Brasil. Foram registradas ocorrências em sete municípios (Anhembi, Assis, Castilho, Jaú, Piracicaba, Quatá e Santa Bárbara d'Oeste) no período quente e chuvoso (dezembro a março) em fitofisionomias que vão desde ambientes naturais como Cerradão e Floresta Estacional Semidecidual até ambientes antropizados como reflorestamentos e pastagens de *Urochloa* sp. O intenso processo de alteração da paisagem que o Planalto Ocidental Paulista passou no século passado, fruto do modelo econômico que o estado adotou, pode ter colaborado para a diminuição de áreas viáveis para a manutenção dessas populações. Estes novos registros indicam que a ocorrência da espécie pode ser mais ampla, fruto de adaptações às recentes conversões de solo e ambientes naturais ocorridos no Estado de São Paulo.

**Palavras-chave:** Antrópico, Cerrado brasileiro, Teiidae.

Of the 212 reptile representatives in the state of São Paulo, Southern Brazil, 197 species are Squamata, of which 44 are lizards (Zaher *et al.*, 2011). With seven recorded species, the family Teiidae is the second family with the most records in the state, second only to Gymnophthalmidae (Zaher *et al.*,

2011).

The family Teiidae has an unsatisfactory systematic classification, but this fact does not hide the existence of advanced studies of particular groups and of the abundance in its distribution that ranges from southern Argentina to the

southeastern United States (Harvey, Ugueto & Gutberlet, 2012). In more recent years, several South American species have been described, highlighting the diversity in its distribution in this region, since 77-80% of the species in the family are endemic to South America (Ribeiro-Junior & Amaral, 2016).

*Kentropyx* is the only genus in the family Teiidae that has scales between the lamellae of the fingers, which interconnect between these and are more extended on the fourth and fifth finger (Harvey *et al.*, 2012). The distribution of the genus ranges from central Argentina to some islands in the southern region of the eastern Caribbean (Harvey *et al.*, 2012).

*Kentropyx paulensis* BOETTGER, 1893 occurs mainly in the open fields of Bolivia and Brazil. What differs *K. paulensis* from other species of the genus are the patterns of scale formation, the number of pre-femoral, femoral and abdominal spores, the usual division of subarticular lamellae and its stripes near the groin (Harvey *et al.*, 2012). Considered endemic to the Cerrado (Nogueira *et al.*, 2009), this species has its distribution associated with areas of the Brazilian biome in the states of Bahia, Tocantins, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo and the Federal District (Drummond, Cruz, Costa & Braga, 2014). In São Paulo and Minas Gerais the species is considered threatened in the categories Endangered and Vulnerable, respectively (COPAM, 2010; SMA, 2108). Here we present new records for the species in São Paulo State, Southeastern Brazil.

The records presented here were obtained in several field studies carried out in the Western Plateau of São Paulo, which occupies almost half of the total area of this State. This region begins about 200 km west of the capital and extends to the western (Paraná River), northern (Grande River), and southern (Parapanema River) limits (Ross & Moroz, 1997). The areas fall within the domain of the Cerrado biome, but the proximity to Atlantic Forest formations in its subtype of Seasonal Semideciduous Forest makes the region an ecotone (IBGE, 2004). The climate of the region is Cwa and Cwb, characterized by dry winters and hot and rainy summers (Peel *et al.*, 2007). The entire interior of the state of São Paulo had its landscape extremely modified due to land use for monocultures of various types (IF, 2020). The sampled areas are part of this mosaic and are isolated in small fragments. Captures were made under SISBIO permits (N° 54869-2; 31716-2; 72374-2).

Seven localities with new records of *Kentropyx paulensis* were counted (Table 1). In December 2011, an individual was captured in a pitfall trap in the municipality of Quatá (Figure 1A), in an area dominated by *Urochloa* sp., and near a Cerradão remnant immersed in a sugarcane matrix. On January 28, 2013, an individual was also captured in a pitfall trap in an area of abandoned pasture (*Urochloa* sp.) in the RPPN (Private reserve of natural heritage) Foz do Aguapeí, municipality of Castilho (Figure 1B). On February 8, 2015, in the RPPN Amadeu Botelho (municipality of Jaú), a specimen of *K. paulensis* was found dead at the reserve's headquarters after being attack by a domestic dog (Figure 1C). On March 17, 2018, an individual was seen and photographed inside a nest of a Chestnut-capped Blackbird (*Chrysomus ruficapillus*), in a flooded area, in the municipality of Santa Bárbara do Oeste

(Figure 1D), during a bird nest monitoring study (Costa *et al.*, 2020). On February 6, 2019, an individual was captured in a pitfall trap at the Assis Experimental Station (Figure 1E), in an open area dominated by *Urochloa* sp. and surrounded by *Pinus* sp. On February 21 of the same year, a specimen was found in a bathroom of a house in rural Piracicaba (Figure 1F). On January 12, 2021, one individual was captured in a pitfall trap in the Barreiro Rico Ecological Station, municipality of Anhembi (Figure 1G).

**Table 1.** Localities of new records of *Kentropyx paulensis* for the state of São Paulo, Brazil.

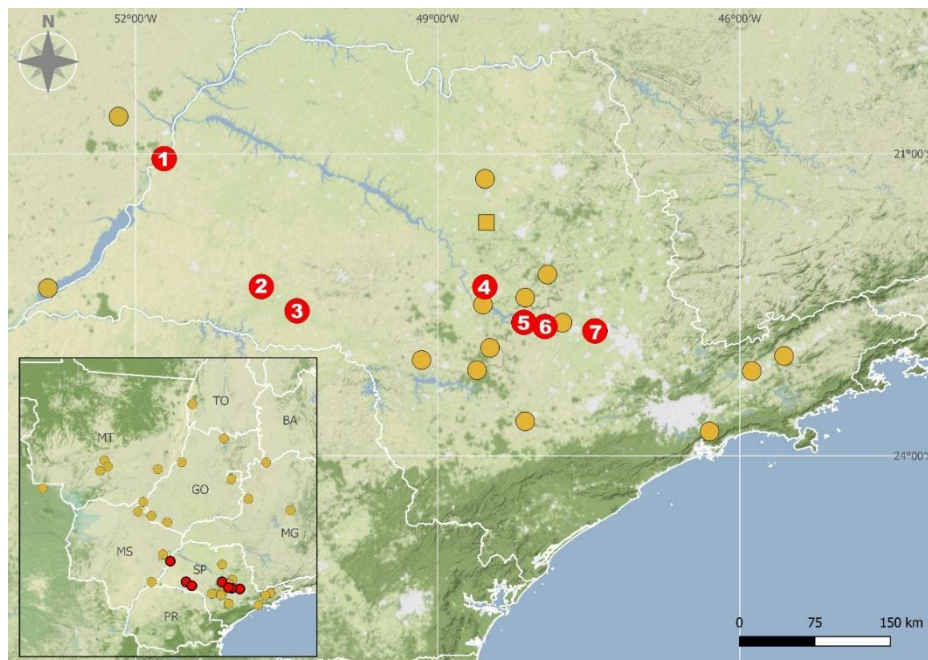
| Locality                         | Municipality          | Coordinates              | Phytophysognomy        |
|----------------------------------|-----------------------|--------------------------|------------------------|
| Toninho Maia Farm                | Quatá                 | 22°19'14"S<br>50°45'6"W  | Cerradão               |
| Reserve RPPN Foz do Aguapeí      | Castilho              | 21°2'56"S<br>51°42'58"W  | Anthropic (Pasture)    |
| Reserve RPPN Amadeu Botelho      | Jaú                   | 22°18'20"S<br>48°31'56"W | Semideciduous Seasonal |
| Rural zone                       | Santa Bárbara d'Oeste | 25°51'13"S<br>47°26'15"W | Reforestation          |
| Experimental Station of Assis    | Assis                 | 22°33'43"S<br>50°23'48"W | Reforestation          |
| Rural zone                       | Piracicaba            | 22°41'28"S<br>48° 3'23"W | Anthropic              |
| Ecological Station Barreiro Rico | Anhembi               | 22°40'33"S<br>48° 8'38"W | Semideciduous Seasonal |

Several records of this species have been made in São Paulo State, both in the eastern part of the Western Plateau and in the Atlantic Plateau (Araujo *et al.*, 2014; Drummond *et al.*, 2014; Figure 2). These are records made in areas of Ombrophylous Forest in the municipalities of Santo André (Gallagher & Dixon, 1992), São José dos Campos (Santos *et al.*, 2007) and Taubaté (Ihering, 1898); in areas of Cerrado in the municipalities of Brotas (Anjos *et al.*, 2002), Matão (Barros *et al.*, 2017), Cerqueira Cesar and Torrinha (Gallagher & Dixon, 1992); and in areas of Seasonal Forest in the municipalities of Angatuba (Araujo, 2020), Barra Bonita, Botucatu, Monte Alto, Itatinga, Piracicaba and Itapetininga (Gallagher & Dixon, 1992).

According to Nogueira *et al.* (2009), *K. paulensis* is a specialist in open areas as open fields “campo” and savannah “Cerrado”, being absent from forest formations such as riparian forests and arboreal savannah “cerradões”. Even with the specificity of the species, our records from Quatá and Anhembi were made inside forest fragments, showing that the species can enter in shaded areas. Being an active forager, *K. paulensis* has a habitat preference for open areas (Nogueira *et al.*, 2009). Open Cerrado habitats seem more suitable than forested areas for broad foraging and chemically oriented lizards (Pianka & Vitt, 2003).



**Figure 1.** Individuals of *Kentropyx paulensis* recorded in the state of São Paulo, in the municipalities: A – Quatá; B – Castilho; C – Jaú; D – Santa Bárbara do Oeste; E – Assis; F – Piracicaba; G – Anhembi.



**Figure 2.** Distribution of *Kentropyx paulensis* with new records in red (1 – Castilho; 2 – Quatá; 3 – Assis; 4 – Jaú; 5 – Anhembi; 6 – Piracicaba; 7 – Santa Bárbara do Oeste) and literature records in orange (circle – Drummond *et al.*, 2014; square – Barros *et al.*, 2017).

The open physiognomies of the Cerrado biome are the vegetation formations most vulnerable to disappearance in the state of São Paulo (Durigan *et al.*, 2003). Even when protected, these open areas have been undergoing mismanagement for protection against fires (Abreu *et al.*, 2017). There is a continuous process of forest densification, with an increase in the vegetation cover and biomass of these areas, resulting in a reduction of the grassland and savannah physiognomies and leading to a decrease in the diversity restricted to open Cerrado formations (Abreu *et al.*, 2017).

Our records were made during the warm and rainy season

(December to March). This was also the period reported in Itrapina/SP, from August to March (Anjos *et al.*, 2002); Matão/SP, October (Barros *et al.*, 2017); and Buenópolis/MG, December (Drummond *et al.*, 2014). Teiidae lizards are more active in the warmer periods of the day and of the year (Vitt & Caldwell, 2009).

In the 2010 list of threatened species of the state of São Paulo (Marques *et al.*, 2010), the species was listed as Vulnerable. In the latest revision (SMA, 2018), it is in the category Endangered. In this category are species that are at very high risk of extinction in nature, because of major

environmental changes or significant population reduction, or even a large decrease in its range. The species is currently present as endangered in Minas Gerais, also in the category Vulnerable of extinction (COPAM, 2010).

*Kentropyx paulensis* is not an abundant species and in inventories often few individuals are recorded (Araujo *et al.*, 2014; Barros *et al.*, 2018; Araujo, 2020). However, the species has been recorded in anthropized areas as cited in Barros *et al.*, (2018), in Drummond *et al.*, (2014) and in the present record from Piracicaba. The records from Quatá and Santa Bárbara d'Oeste come from remnants immersed in sugarcane matrix. The species was also recorded in areas formed by *Urochloa* sp. that replaced native grasses (Damasceno & Fidelis, 2020) in poorly preserved open areas, which shows that the species can still occur in other areas with intense modifications of its original habitat.

In addition to the records in the Angatuba, Itirapina, and Santa Bárbara Ecological Stations (Marques *et al.*, 2010; Araujo *et al.*, 2014; Araujo, 2020), our records add up to more protected areas for the species in two RPPNs, two Ecological Stations, and one Experimental Station. These protected areas likely harbor the last large populations of the species in the state (Marques *et al.*, 2010). The intense process of landscape change that the Western Plateau of São Paulo went through in the last century, a result of the economic model that the state adopted, may have contributed to the reduction of viable areas for the maintenance of these populations. This modification may have a direct influence on species that are specialists of open areas, since these environments are under severe threat and are traditionally neglected in terms of legal protection, conservation efforts, and funding for scientific research.

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