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**ACTIVITY RYTHMS AND HABITAT OF
HEMIDACTYLUS TURCICUS
(REPTILIA, GEKKONIDAE) IN ÉVORA, PORTUGAL**

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RESUMO: Efectuou-se uma amostragem de *Hemidactylus turcicus* por transectos nocturnos cada 3 semanas de Março a Novembro de 1997 na cidade de Évora, Portugal. É uma espécie estritamente nocturna com o pico médio de actividade diária às 2h00 da manhã (UTC). É dado um modelo de correlação actividade/temperatura do ar. O microhabitat preferencial observado são as paredes (78%) e portas (16%) de casas pouco usadas, e a altura média é de 3 metros, aproximadamente.

ABSTRACT: A survey of *Hemidactylus turcicus* (Reptilia, Gekkonidae) was carried out every 3 weeks from March to November of 1997, in nocturnal transects in the city of Évora, Portugal. In this country this species is strictly nocturnal with a mean daily activity peak at 2h00 A.M (UTC). A model that correlates Activity and Temperature of the air is given. *H. turcicus* prefers, as microhabitat, walls (78%) and doors (16%) of low used houses. The average height in which they were found is about 3 meters.

INTRODUCTION

There are 3 species of Gekkonidae in Portugal:

Tarentola bischoffi

Tarentola mauritanica

Hemidactylus turcicus

The species *Tarentola bischoffi* is endemic of the insular territory of Selvagens (Archipelago of Madeira). The other two exist in Portugal, mostly in the south half, existing places where they live together (sympatry), like, for instances, in Montemor-o-Novo and Sines (Alentejo) and Aldeia das Açoteias (Algarve), etc., (personal observations) and places where there exists allopatry probably due to a competitive exclusion like in Évora (MATEUS, 1996).

H. turcicus is distributed all over the mediterranean coast and extends East to India and South up to the North of Kenya. It was introduced in the american continent, existing in the USA, cuba and Mexico (FRETEY, 1987). The Portuguese subspecies is *H. turcicus turcicus*. The "Livro Vermelho de Vertebrados de Portugal" (SNPRCN, 1 990) classifies this species as Insufficiently Known while the "Lista Roja de España" (ICONA, 1986) classifies it as Not Threatened. *T. mauritanica* is classified as Not Threatened in both countries (Portugal and Spain). These two species are found especially in urban environment, however *T. mauritanica* is often associated with low density forests.


H. turcicus is known by its' vocal behaviour (FRANKENBERG, 1982). In this species, the voice plays a very important role in the establishment and delimitation of the territories.

In *H. turcicus* the timing of social activity seems to differ from that of foraging. The distribution pattern of vocal interactions throughout the day corresponds to locomotion activity (FRANKENBERG, 1978) but not to the field counts of active geckos (KING, 1958; ROSE & BARBOUR, 1968). Most vocal activity occurs during the afternoon, before foraging starts (FRANKENBERG, 1982).

The Gekkonidae are accepted as nocturnal reptiles (FRANKENBERG, 1982). The Portuguese *H. turcicus*'s activity patterns are poorly known, although a few data are described for some other countries: Frankenberg (1978) measured, in Israel, a nocturnal locomotion activity in the Summer, diurnal-nocturnal in Autumn and Winter and diurnal activity in Spring using laboratory data. In France has a strictly nocturnal range activity: leaves the perch site with the beginning of the night and perched again at morning totalling about 9 hours of activity (DELAUGERRE, 1984 cit. in FRETEY, 1987). In Texas, USA, the circadian activity starts at night increasing till midnight, from which decrease abruptly (SELGER, 1986).

METHOD

The study area consists in a about 800 meters transect of several streets with low human use of Évora's world Heritage site (South PortugaD. The transect, chosen by its high frequency



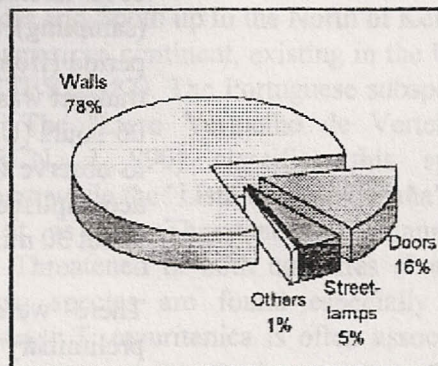
of *H. turcicus* (MATEUS, 1996), was carried out every 3 weeks (sampling) to determine the activity rhythms along the study period (from March to November, 1997). In each sampling, the transect was carried out every 2 hours (shifts), from 18 hours to 06 hours (U.T.C.- Universal Time Coordinated) of the next day to observe the circadian field activity. The transect was always accomplished by the authors simultaneously, and each shift took about 30 minutes to finish.

There were not made samplings before March, because preliminary data (MATEUS, 1996 & pers. observ.) showed total absence of *H.turcicus*'s activity in Winter, and according to Zari (1996), in Saudi Arabia, the *H. turcicus* is active since March to November but only in the warmest night in Winter. It was also considered that there was not any activity during day light hours (these do not include twilight) that was confirmed by our samplings. For each observed individual it was recorded the age rank, comparing the approximated snout-vent-length (SVL) with Selcer's criteria (1986), where individuals > 44 millimeters are considered adults. It was also recorded microhabitat, approximated height in which each individual was observed, air temperature and time of each observation.

RESULTS AND DISCUSSION

Habitat and Microhabitat

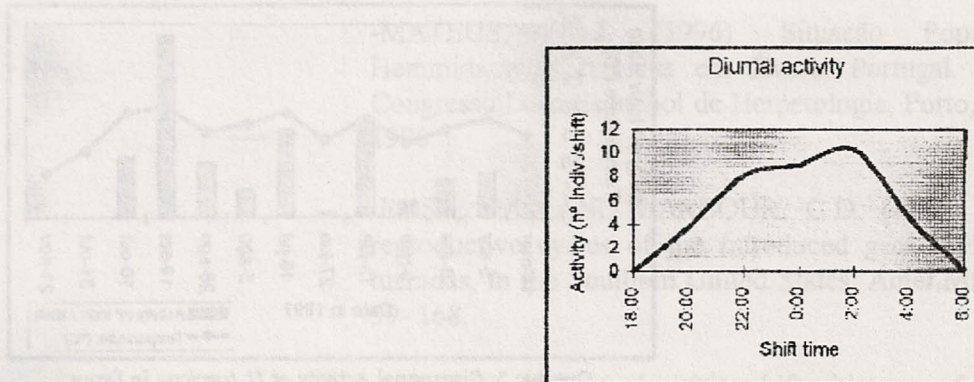
Hemidactylus turcicus was found mostly in low human use streets and in uninhabited or less used houses. The microhabitat registered were walls (78%), doors or nearby them (16%), street-lamps or nearby them (5%) and others (1%) (see Graphic 1). The average height in which we found *H. turcicus* was 3.9 (s.d.=1.9; n=393). As cryptic species, the perch sites and shelters are, usually, in small holes and slits of the roofs, doors, walls, windows, etc. It was usually also found hidden between the wall and electric cords or tubing. Sometimes prefer highly lighted places where there is more prey.



Graphic 1: Microhabitat of *Hemidactylus turvicus* in Évora.

Circadian Activity.

There were observed individuals from 20h00 to 6h00 UTC (see Graphic 2). The mean activity peak is at 2h00 UTC, although we registered a few peak at 22h00 and 0h00 UTC. This data differs from the circadian activity described by Selcer (1986) and Frankenberg (1978) cited in the Introduction; the geographical position of the each country study (USA and Israel, respectively) may explain the difference. In the second study we can also point out some differences due to the nature of that study (Frankenberg measured the real locomotion activity in a laboratory). However, the activity referred by Zari (1996) and Delaugerre (1984, cit. in FRETEY, 1987) supports our data.



Graphic 2: Circadian Activity of *H. turicensis* in Evora

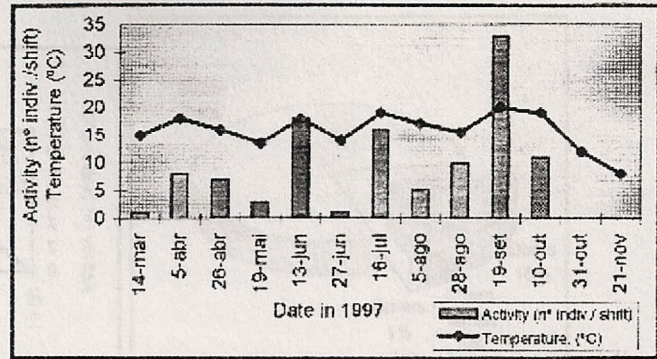
Circannual Activity

The results revealed themselves quite oscillating along the study period due, essentially to abiotic factors variations (air temperature and moisture). The activity observed along the transect during the 2h00 UTC shift has a relation with the temperature (measured in °C) that can be translated by the equation:

$$\text{Activity} = 4.051 + 8.342 \times 10^{-19} \text{Temp}^{15}$$

With a Correlation Coefficient de 0.901 and an Adjusted R2 of 0.791. However, the activity is not strictly connected with the temperature, because the time of the day and or the hour of the shift seems to be very relevant. There were not observed individuals by day or twilight even with warm temperatures.

This linear regression permits prediction, with an accuracy of 90%, the number of individuals that will be seen at 2h00 UTC in the transect through air temperature. To obtain this equation we use the 2h00 UTC shift because that shift average is the one with greater average activity.



Graphic 3: Circannual Activity of *H. turcicus* in Évora

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