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NOTA CIENTÍFICA

Notes on the ecology of *Phyllodactylus reissi* (Phyllodactylidae: Sauria) in Parque Nacional Cerros de Amotape (Tumbes, Peru)

Notas sobre la ecología de *Phyllodactylus reissi* (Phyllodactylidae: Sauria) en el Parque Nacional Cerros de Amotape (Tumbes, Perú)

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Abstract

Some basics aspects on the ecology of the nocturnal gecko *Phyllodactylus reissi* from Parque Nacional Cerros de Amotape (Tumbes, Peru) are described. This species used rock boulders (57,4%) and trees (31,9%) as microhabitats primarily, exhibiting a nocturnal activity pattern, with a peak between 2100-2200 hours, remaining active until midnight. Body temperature (mean 24,4 ºC) was correlated with both air and substrate temperature, with the last variable affecting in higher degree (47%) the body temperature of this species. The slightly high body temperature of *Phyllodactylus reissi,* compared to other *Phyllodactylus* geckos, could be related to nocturnal microhabitat use and diurnal retreat site selection. More studies on lizard ecology from this endangered ecosystem are needed.

Keywords: *Phyllodactylus reissi*, northewestern dry forest, lizard ecology, Parque Nacional Cerros de Amotape.

Resumen

Se describen algunos aspectos básicos de la ecología de *Phyllodactylus reisii* en el Parque Nacional Cerros de Amotape (Tumbes, Peru). Esta especie emplea paredes rocosas (57,4%) y árboles (31,9%) como microhábitats principalmente, exhibiendo un patrón de actividad nocturno, con un pico entre las 2100-2200 horas, permaneciendo activos hasta la medianoche. La temperatura corporal (promedio 24,4ºC) se correlacionó con la temperatura del aire y la del substrato, donde esta última variable afecta en un mayor grado (47%) la temperatura corporal de esta especie. La ligeramente alta temperatura corporal de *Phyllodactylus reissi,* comparado con otros *Phyllodactylus,* podría estar relacionada con la selección de microhábitats nocturnos y refugios diurnos. Estudios sobre la ecología de los saurios en este ecosistema amenazado son necesarios.

Palabras clave: *Phyllodactylus reissi*, bosques secos del noroeste, ecología de lagartijas, Parque Nacional Cerros de Amotape.

Phyllodactylus Gray 1828, is a widespread genus of nocturnal lizards in Peru, with 13 species currently recognized (Dixon & Huey 1970, Venegas et al. 2008). These geckos occur in deserts, foothills, dry forests, and inter-Andean valleys ecosystems (Dixon & Huey 1970, Pérez 2005, Jordán 2006, Venegas et al. 2008).

Phyllodactylus reissi Peters 1862 is a common gecko in desert, dry and tropical forests in northwestern Peru (Dixon & Huey 1970, Huey 1979, Jordán 2006, Catenazzi & Donnelly 2007, Venegas et al. 2008) and also occurs in northeastern inter-Andean valleys (Venegas et al. 2008). Locally named "jañape" or "saltojo", this species occurs in sympatry with other species of *Phyllodactylus* along its geographic range (Dixon & Huey 1970). For example, in Piura region (northwestern Peru) *P. reissi* is sympatric with P. *kofordi*, *P. clinatus*, *P. microphyllus* (Dixon & Huey 1970, Huey 1979, Catenazzi & Donnelly 2007) and in Amazonas region with *P. thompsoni* and *P. delsolari* (Venegas et al. 2008).

To date, there are few data on *P. reissi* ecology (Jordán 2006, Werner et al. 1996). In this study, I present information about microhabitat use, activity patterns, and thermal ecology of *Phyllodactylus reissi* living in the dry forest at Cerros de Amotape

I carried out this study in the area surrounding Quebrada Faical Biological Station (03º48´ 23.3"S, 080º16´00.4"W, elevation 651 m), located inside Cerros de Amotape National Park. A team of two herpetologists conducted field observations on *P. reissi* during 05 days at the dry season (October - December 2006), yielding an effective sampling effort of 18 hours/man. The area has dense deciduous forest, with great portions of secondary forest in lower areas and transitional vegetation between dry forest and Tropical Pacific forest (Wust 1998, Pacheco et al. 2007). I used trails already established in the forest to register data about activity pattern, microhabitat use and thermal ecology of active *Phyllodactylus reissi* individuals. All trails were visited between 19:00 and 24:00 hours each night recording the hour when lizard was first observed and the substrate and perch height and width.

Body, substrate and air temperatures (1 cm above substrate) were registered with Miller and Weber® quick-reading cloacal thermometer. Histograms of microhabitat use and activity patterns were constructed for further analysis. Thermal data were tested with a one-way ANOVA and with a simple and multiple regressions. Data normality was assessed with Levene's test. All statistical analysis were performed with the software Statistica

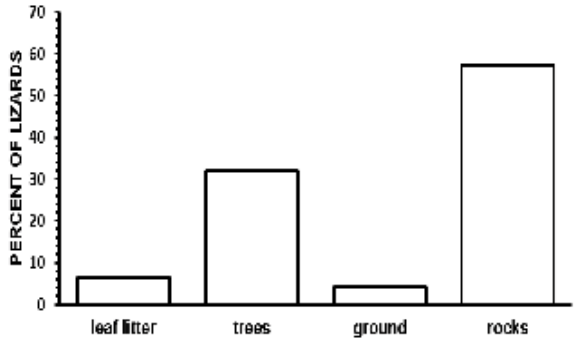

Figure 1. Microhabitat use by *Phyllodactylus reissi* in Cerros de Amotape National Park.

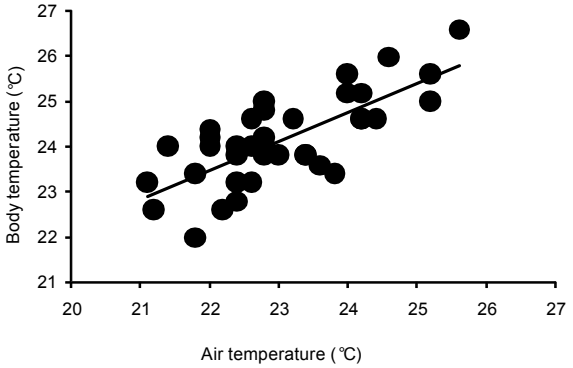

Figure 2. Relationship between air temperature and body temperature at the study site for *Phyllodactylus reissi* (y = 0,640x + 9,382, n=38, p = 0,036).

Fourty-eight individuals of *Phyllodactylus reissi* were observed during field work. They were found primarily on rock walls (57,4%) and trees (31,9%; Fig. 1). Some individuals were seen in leaf litter (6,4%) and walking on the ground (4,3%), apparently moving between perches. Mean perch height (rocks) was 84.36 cm (10-260) while mean perch height and diameter (trees) were 101.7 cm (12-186) and 96.71 cm (7 – 259), respectively.

Mean body temperatures of *Phyllodactylus reissi* was 24 Cº ± 1,04 (n= 38). Mean air and substrate temperature were 23, 2 Cº and 23,7 Cº, respectively (Table 1). Body temperatures of *P. reissi* differed significantly from air temperature ($F_{1,74}$ =10,58, p=0,001) but not from substrate temperature ($F_{1,74}$ =1,89, p=0,17).

Air temperature was not different from substrate temperature in the study site ($F_{1,74}$ =2,70, p=0,10). Body temperature was significantly correlated with air temperature and substrate temperature (Table 1). Both, substrate and air temperature interacted with body temperature of *P. reissi* (Fig. 2 and 3) with substrate temperature accounting for 47% of the variation in lizard body temperature.

Individuals were registered active from 19:30 to 00:00 hours. Peak activity was observed between 21:00 and 22:00 (Fig. 4).

Use of rocks as microhabitats is common in *Phyllodactylus* geckos in Peru (Dixon & Huey 1970). For example, two recently described species of *Phyllodactylus* use boulders in canyons and stones as microhabitats (Venegas et al. 2008). *P. lepydopigus* use mainly "tara" trees (*Caesalpinia* sp.) and, in a lesser percentage, "pircas" (pre-hispanic or contemporary stone walls for cattle raise) in Lomas de Lachay National Reserve (Pérez 2005). *Phyllodactylus reissi* is a scansorial gecko, using primarily vertical rock boulders and, to a lesser extent, trees as perches in the study area. However, Huey (1979) reported *P. reissi* as an arboreal species, using primarily mesquite trees (*Prosopis* spp.) as perches in Cerro Illescas (Piura). Indeed, Catenazzi and Donnelly (2007) confirmed this trend with a substantial increase in geckos and mesquite trees abundance in the same study area at Cerro Illescas, where rock boulders are not abundant (Jordán, pers. comm.). Other study recorded *P. reissi* as common in human constructions inside Cerros de Amotape National Park (Jordan 2006). *Phyllodactylus reissi* presents morphological characteristics typically of scansorial lizards, as flat heads and bodies, similar-sized extremities and large toe pads (Miles 1994, Vanhooydonck et al. 1999, Zaaf & van Damme 2001), that allow them to occupy vertical surfaces (J. Jordán, unpublished data). No other species of nocturnal gecko were registered in the study area, except the

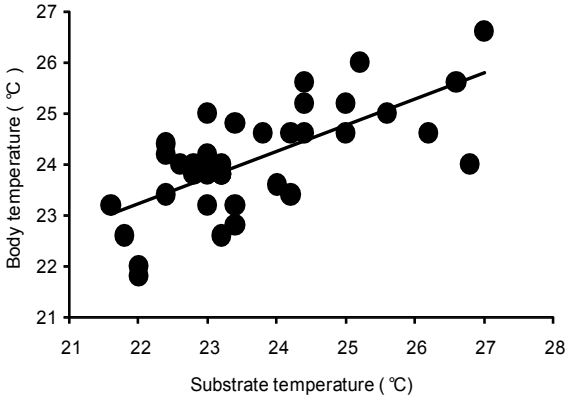

Figure 3. Relationship among body temperature and substrate temperature for *Phyllodactylus reissi* in Parque Nacional Cerros de

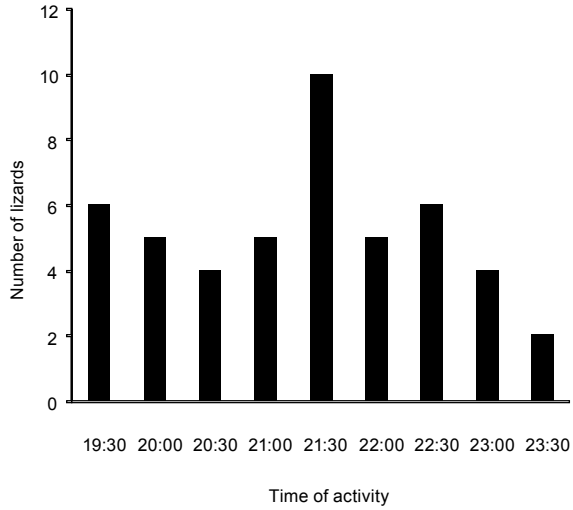

Figure 4. Activity pattern of *Phyllodactylus reissi* in Cerros de Amotape

Table 1. Multiple regression values among temperature variables from *Phyllodactylus reissi* (n=38).

Variables	*Tb*	*Ta*	*Ts*	*Ta vs. Ts*
X ± SD	24 C° ± 1,04	23,2 C° ± 1,2	23,7 C° ± 1,26	-
Range	21,8-26,6	21,1-28	21,6-27	-
R^2		0,12	0,47	0, 47
F		4,93	32,50	15,91
p		<0,03	<0,001	<0,01

diurnal *Gonatodes caudiscutatus* (Sphaerodactylinae), which apparently, occupies similar microhabitats (J. Jordán, pers. observ.).

Phyllodactylus reissi presents nocturnal activity similar to other species of the same genus (Dixon & Huey 1970, Huey 1979, Pérez 2005, Catenazzi & Donnelly 2007, Venegas et al. 2008). The activity period of *P. reissi* may extend beyond 00:00 h, as other nocturnal geckoes which present an extended activity pattern, even crepuscular (Cooper et al. 1985, Kingsbury 1989, Vitt & Zani 1997). However, more sampling between 00:00 h and sunrise is needed to determine the extent of nocturnal activity in *P. reissi*.

Low body temperatures are common among nocturnal species compared to diurnal lizards (Huey et al. 1989, Autumn et al. 1997, Kearney & Predavec 2000). *Phyllodactylus* geckos present a range of temperatures between 21.9 ºC and 22.3 ºC, usually higher than environmental temperatures (Werner et al. 1996, Pérez 2005). In Parque Nacional Cerros de Amotape, *P. reissi* present high body temperatures similar to those reported for the genus and this species in Peru by Werner et al. (1996). Thermal data collected by Pérez (2005) from *Phyllodactylus lepidopygus,* a scansorial species from central Peru, which used trees and rocks as microhabitats, showed a similar body temperature with *P. reissi.* However, differences in environmental temperatures related to geographic patterns, probably affects body temperature of these two gecko species. In this case, both *Phyllodactylus* species maintain high body temperatures, may be via selection for warmer nocturnal microhabitats and retreat diurnal sites as have been reported for other nocturnal geckos (Schlesinger & Shine 1994) rather than local physiological adaptations.

More studies concerning the ecology of lizard community in Cerros de Amotape National Park are needed as there are very few contributions in lizard ecology from this endangered ecosystem (Jordán 2010).

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