

significantly different (t-student,  $t = -2.5$ ,  $df = 24$ ,  $p < 0.01$ ). Mean TC was  $20.5^{\circ}\text{C}$  ( $SD = 1.6$ , range =  $19.4\text{--}24^{\circ}\text{C}$ ,  $N = 13$ ). TC was positively associated with TS (Spearman,  $R = 0.6$ ;  $p < 0.02$ ), and TA (Spearman,  $R = 0.67$ ;  $p < 0.02$ ). TC was not significantly different from TS (t-student;  $t = -0.3$ ,  $df = 24$ ,  $p > 0.7$ ) and was significantly different than TA (t-student,  $t = 2.33$ ,  $df = 24$ ,  $p < 0.02$ ). There was no association between TC and SVL ( $p > 0.91$ ).

These results indicate *O. occidentalis* in this situation is thermopassive, a mechanism where individuals do not need to invest time and energy actively selecting microhabitat for thermoregulation (Labra and Videl. 2003. In F. Bozinovic [ed.], *Fisiología Ecológica y Evolutiva*, pp. 207–224. Ediciones Universidad Católica de Chile. Santiago, Chile). These individuals were in a breeding chorus, when the biggest demand for energy is in calling to attract females, thus this thermopassive mode seems to be the most effective strategy for thermoregulation.

We thank Alejandro Laspiur for help with fieldwork.

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**OSTEOCEPHALUS YASUNI** (NCN) and **OSTEOCEPHALUS PLANICEPS** (NCN). **TERRESTRIAL BEHAVIOR.** Frogs of the genus *Osteocephalus* are largely arboreal and nocturnal and occur throughout the Amazon Basin and along the eastern Andean slope. There are 18 species recognized, at least 8 of which are known from Yasuní Research Station (YRS) ( $0^{\circ}40'S$ ,  $76^{\circ}24'W$ ) and Tiputini Biodiversity Station (TBS) ( $0^{\circ}37'S$ ,  $76^{\circ}8'W$ ) in the Province of Orellana, Ecuador. Information on the natural history of most *Osteocephalus* species is scarce, although species exhibit a variety of reproductive strategies including the use of streams, seasonally flooded pools, and phytotelm for amplexus and egg deposition.

*Osteocephalus yasuni* and *O. planiceps* are common species at YRS and TBS. Eggs and tadpoles are undescribed, but it is suspected that *O. planiceps* is a phytotelm breeder, because males often call from bromeliads in the canopy (Ron 2006. <http://www.bio.utexas.edu/grad/ecuador/web/yasuni/esp/anfyas.htm>), and that *O. yasuni* uses seasonally flooded ponds for breeding, because males form large choruses around pools after heavy rains (Ron and Pramuk 1999. *Herpetologica* 55:433–446). Like other *Osteocephalus* species, *O. yasuni*, and *O. planiceps* are nocturnal and arboreal (Ron 2006, *op. cit.*) although, *O. yasuni* choruses may occasionally continue calling into the day following their nocturnal assembly and pairs in amplexus have been witnessed during the morning hours (pers. obs.).

Here we report an unusual behavior: during 2 field seasons in the Ecuadorian Amazon, we observed *O. planiceps* and *O. yasuni* females sleeping in the litter during the day. The first individual, a small adult female *O. yasuni* (SVL 48.9 mm, mass 6.97 g), was found at YRS on 24 May 2005 (ca. 1030 h) in a  $5 \times 5$  m forest floor quadrat that was sampled for leaf litter herpetofauna. The frog was buried under the leaf litter and completely concealed from view. Despite disturbance, it remained motionless until it was picked up by hand, at which point it attempted to escape.

During our second field season, we encountered three additional *O. yasuni* and two *O. planiceps* sleeping in the litter at TBS. On 27 March 2006, we found an adult female *O. planiceps* (SVL 56.5 mm, 9.74 g) at ca. 1030 h. On 28 March at ca. 830 h, we encountered a second *O. planiceps* (SVL 59.5 mm, 12.05 g). We found two *O. yasuni* on 29 March: the first (SVL 57.0 mm, 12.14 g) at ca. 1030 h and the second (SVL 59.0 mm, 14.6 g) at ca. 1500 h. All were found during searches of  $5 \times 5$  m forest floor plots, and they were buried under the litter, just as the first individual found at YRS in 2005. On 31 March at ca. 1000 h, while searching an  $8 \times 8$  m quadrat we encountered a third female *O. yasuni* (SVL 59.2 mm, 11.28 g) sleeping on the ground. Five of the individuals were photographed and released.

All six females were found in primary, terra firme forest within a week following a heavy rain. At TBS, the rain stimulated a very large chorus of *O. yasuni* males. However, the females were found a kilometer or more away from where the males were calling and they were completely inactive when found. Because the females were so well buried under the litter, the possibility that they fell from the trees seems unlikely. The leaf litter habitat may represent an important and previously unrecognized part of the life cycle of adult female *O. planiceps* and *O. yasuni*. We suggest that this behavior may be typical and that *O. planiceps* and *O. yasuni* may only exhibit this behavior in the breeding season, though this warrants further investigation.

We thank our field assistants at YRS and TBS, especially A. Enomenga and I. Nenqemo, as well as K-H. Jungfer and D. Cisneros-Heredia for verifying species identification. These observations were made during dissertation fieldwork of JLD, which was supported by grants from the Conservation, Food and Health Foundation, and the Louisiana Governor's Office of Environmental Education. Research was conducted under permit issued by the Ecuadorian Ministerio del Ambiente (004-IC-FA-PNY-RSO).

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**PELOBATES CULTRIPES** (Iberian Spadefoot Toad). **MAXIMUM SIZE.** *Pelobates cultripes* occurs in southern France and throughout most of the Iberian Peninsula (Spain and Portugal) (Lizana et al. 1994. *J. Herpetol.* 28:19–27). De La Vega (1988. *Anfibios y Reptiles de la Provincia de Huelva*, Ertisa [Ed.], Huelva, Spain. 238 pp.) reported maximum size as 89 mm SVL. Talavera (1990. *Evolución de Pelobatidos y Peloditidos [Amphibia: Anura]: Morfología y Desarrollo del Sistema Esquelético*. Unpubl. Ph. D. Thesis, Universidad Complutense de Madrid, Spain.) reported maximum size for females from Madrid, Spain as 101 mm SVL. The record size reported for females is 113 mm SVL (Salvador and García-París 2001. *Anfibios Españoles. Identificación, Historia Natural y Distribución*. Canseco [Ed.], Talavera de la Reina. 269 pp.). Herein, we report a new maximum size for this species.

On 21 Oct 2002, between 1900–2200 h, we captured three gravid adult female *P. cultripes* that surpassed the previous record length (119 mm SVL, 124 g; 120 mm SVL, 145 g; 125 mm SVL, 168 g) in a temporary pond near Aznalcóllar (Seville Province, Spain,  $37^{\circ}31'N$ ,  $6^{\circ}16'W$ ; 130 m elev.). Each individual was measured in

the field and then carefully released into the pond where they were captured. The terminal phalange of the third digit of the right forefoot was removed for a skeletochronological study to estimate the age of each individual based on successive resting lines in the bone (Hemelaar 1998. *J. Herpetol.* 22:369–388). The biggest female was five years old, but in the remaining individuals age determination was not possible.

Recently reported geographic variation in body size of *P. cultripipes* (Marangoni 2006. Variación clinal en el tamaño del cuerpo a escala microgeográfica en dos especies de anuros [*Pelobates cultripipes* y *Bufo calamita*]). Ph.D. Thesis. Universidad de Sevilla, Spain), suggests that the differences in body size among different studies could be due to latitudinal variation in body size.

We thank the Consejería de Medio Ambiente de la Junta de Andalucía and the Reserva Biológica de Doñana, for providing the corresponding permits and facilities.

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**PELOBATES CULTRIPES** (Iberian Spadefoot Toad). **PREDATION.** *Pelobates cultripipes* occurs in southern France and throughout most of the Iberian Peninsula (Spain and Portugal) (Lizana et al. 1994. *J. Herpetol.* 28:19–27). In southern Spain, *P. cultripipes* breed in a mosaic of small temporary ponds and streams that generally fill with the first autumnal rains in October–November, and dry at the end of May (Tejedo and Reques 2002. In Pleguezuelos et al. [eds.], *Atlas y Libro Rojo de los Anfibios y Reptiles de España*, pp. 94–96. Dirección General de Conservación de la Naturaleza, Madrid). Birds, mammals, and reptiles have been reported as important predators of juvenile and adult *P. cultripipes* (Salvador and García-París 2001. *Anfibios Españoles. Identificación, Historia Natural y Distribución*. Canseco [Ed.], Talavera de la Reina. 269 pp.; Díaz-Paniagua et al. 2005. *Los Anfibios de Doñana*. Organismo Autónomo Parques Nacionales, Ministerio de Medio Ambiente



FIG. 1. Ventral side photo of *Pelobates cultripipes*, showing three injuries caused by *Natrix maura*. The photo was taken 12 h after the capture.

[Ed.], 181 pp. and references therein). In addition, the snake *Natrix maura* may also be an important predator of this species (Santos 2004. In Carrascal and Salvador [eds.], *Enciclopedia Virtual de los Vertebrados Españoles*. Museo Nacional de Ciencias Naturales, Madrid. <http://www.vertebradosibericos.org>).

On 5 Nov 2001 at 1920 h, we observed a gravid female *P. cultripipes* being preyed upon by *N. maura* in a temporary pond near Aznalcóllar (Seville Province, Spain, 37°31'N, 6°16'W; 130 m elev.). The middle anterior part of the toad's body was inside the snake's mouth, and only its stomach and legs were visible. The snake was captured and the toad (SVL 79.5 mm, head width 29.5 mm, right hind leg length 92 mm, mass 41.5 g) was photographed and released alive. Injuries were observed on the body of the toad; three on the ventral side (with two apparent bite marks: Fig. 1), and two on the head immediately behind the eyes. The toad died ca. 30 min after capture. We estimated the age of the female (five years old) by skeletochronology (Hemelaar 1998. *J. Herpetol.* 22:369–388).

The *P. cultripipes* (ID AZN2) was deposited in the Estación Biológica de Doñana (CSIC), Seville Province, Spain. We thank the Consejería de Medio Ambiente de la Junta de Andalucía and the Reserva Biológica de Doñana, for providing the corresponding permits and facilities.

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**PHYSALAEMUS PUSTULOSUS** (Tungara Frog). **DISPERSAL.** *Physalaemus pustulosus* is widely distributed along the isthmus of Central America and northern South America through northwestern Venezuela (Ryan 1985. *The Tungara Frog: A Study in Sexual Selection and Communication*. Univ. Chicago Press, Chicago), and occurs as two disjunct populations on the northern and southern Pacific Coast of Costa Rica, with an approximately 165 km gap between them (N. J. Scott, pers. comm.; Savage 2002. *The Amphibians and Reptiles of Costa Rica: a Herpetofauna Between Two Continents, Between Two Seas*. Univ. Chicago Press, Chicago). The northern population occurs in the Tropical Dry Forest of Guanacaste Province and the southern population occurs in the Tropical Moist Forest of the Golfo Dulce region (Holdridge 1967. *Life Zone Ecology*. Tropical Science Center, San Jose, Costa Rica). The northern population is contiguous with the species' range in Nicaragua, and in the south the population is continuous into Panama and east into South America (Ryan 1985, *op. cit.*). *Physalaemus pustulosus* is a small, conspicuous species as males vocalize loudly in choruses and breed in altered and disturbed habitats including roadside ditches, puddles, ponds, and flooded agricultural fields (Rand 1983. In Janzen [ed.], *Costa Rica Natural History*, pp. 333–335. Univ. Chicago Press; Savage 2002, *op. cit.*).

The apparent Costa Rican gap in distribution has been surveyed periodically since 1964 (Savage and Scott, unpubl.; Bolaños and Chavez, unpubl.) and this species had not been recorded from 1964–2002. I surveyed the south-central Pacific Coast of Costa Rica from Dec 2000–April 2002 from Quepos to Palmar Norte,