Short Note

Communal nesting of *Psammodromus algirus* (Linnaeus, 1758), under extreme environmental conditions

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On 9 July 2000, among the rear dunes of Lariño beach (Muros, A Coruña province, N Spain; 9°8'W-42°47'N, 5 m asl), a lizard nest containing 32 eggs was found. The nest, hidden beneath a stone, 60 × 45 cm in size, in loose siliceous sand with very little organic matter, contained 32 eggs, and averaged 4 cm in depth. All eggs were together but formed two sets of different size. The smaller eggs measured (mean ± one standard deviation): 12.9 mm ± 0.5 mm long (range 11.9–13.8 mm; n = 18) and 7.9 ± 0.3 mm wide (range 7.5–8.6 mm; n = 18). The larger eggs measured 13.8 ± 0.3 mm in length (range 13.6–14.0 mm; n = 14) and 10.6 ± 0.4 mm in width (range 10.0–11.5 mm; n = 14). The two sets attained significantly different sizes (unpaired t-test, t = 5.20 for the length of the eggs, t = 17.28 for the width of the eggs; df = 30 and p < 0.001 in both comparisons). These results suggest two sets to correspond to two different incubation stages (therefore to different laying dates), the smaller ones apparently corresponding to more recent clutches, and the larger ones apparently corresponding at a more advanced incubation stage (especially because of their larger width). The eggs were removed from the wild and young of *Psammodromus algirus* hatched under laboratory conditions, after 31–33 days for the larger eggs, and 52–59 days for the smaller ones. Newborns were released in the wild close to the nest.

On 16 July 2002, on the southern slope of Sierra Elvira (Atarfe, Granada province, S Spain, 3°42'W-37°14'N, 650 m a.s.l.), a lizard nest containing 42 eggs was found buried in
a pile of limestone sand intended for construction. The sand, covered by debris, retained high moisture content. Only a sample of the eggs was measured, because all were similar in size (mean ± one standard deviation): 12.5 ± 0.9 mm in length (range 10.8-14.1 mm; \( n = 14 \)) and 8.9 ± 0.9 mm in width (range 6.6-10.2 mm; \( n = 14 \)). These dimensions match previously published data for *P. algirus*, and a hatching confirmed the identity of this species. Thus, the eggs had been found in the final incubation stage.

Clutch size of *P. algirus* ranges from 2 to 11 eggs (Pérez-Mellado, 1998), although this number correlates with maternal body size (Pérez-Quintero, 1996). The mean clutch size has been established at 4.9 and 5.4 eggs in the south-western and central Iberian Peninsula, respectively (Díaz, 1994; Pérez-Quintero, 1996). Consequently, the two nests described in the present work correspond to the clutches of approximately six and eight females (A Coruña and Granada populations, respectively) and thus exemplify communal nesting.

Communal nesting has been described for reptiles in situations of high density (Shine, 1991), females attracted by eggs already laid (Petzold, 1982), high intraspecific social affinity (Swain and Smith, 1978), or the lack of appropriate nesting sites (Blázquez and Villafruente, 1990; García-Márquez et al., 1996), situations in which females actively seek these places (Galán, 1994, 1996). The two study areas considered here are not heavily populated by *P. algirus*, implying that the communal nesting was not caused by population density. Because we have no direct observations on the behaviour of laying females, we cannot discuss the second situation. With respect to the third situation, in this species a single male territory can coincide with up to ten female territories (Salvador et al., 1995), making it plausible to find the combined clutches of six or eight females. Finally, with respect to the fourth possibility, precipitation at the southern site is rather low (430 mm of annual rainfall in the closest meteorological station) and temperatures during July are very high (mean maximum temperature for that month 38.5°C; standard 30-year meteorological averages; MMA, 2001); the ombrothermic conditions would be even harsher in the exact nesting location, facing south. This appears to explain the selection of a soft, moist substrate as a nesting site. The northern communal nest reported here pertains to the northernmost population for this species throughout its western geographic range (Galán and Fernández, 1993; Carretero et al., 2002), marking the limit of the environmental conditions for the species. Conditions selected for the northern nest included less soil moisture (loose beach sand) and strong sun radiation, in a rather wet climate (1380 mm annual rainfall), with also mild temperatures (mean temperature of July 20.8°C; 30-year standard meteorological averages; Martínez-Cortizas and Pérez-Albreti, 1999). This scenario supports the hypothesis of communal nesting due to a scarcity of suitable nesting places.

Although the breeding ecology of *P. algirus* has been intensively studied (see review in Pérez-Mellado, 1998), communal nesting has never been described for the species. The populations considered here are in diametrically opposed geographic positions in the Iberian Peninsula, and thus under markedly differing conditions that represent two limits of environmental conditions that the species can withstand (hot, dry south-eastern zone of
the Iberian Peninsula vs. the temperate, wet north-western zone). Despite these possible different ecological constraints, both populations seem to rely on the same communal nesting strategy. Therefore, we deduce that, under such adverse conditions, the search for a site favourable to egg incubation would induce communal nesting in *P. algirus*. However, only two communal nests were found, and more findings in the same study areas are necessary to support this hypothesis.

The stressful scenario at the distribution limit described here raises the issue of the conservation of this species. The southern population, in relying for nesting on an artificial substrate (a pile of sand for construction) with artificial conditions to conserve moisture (sand under debris), shows an unusual condition for nesting in Mediterranean ecosystems for this species. In fact, the site where the communal nesting was found is a degraded area because of the presence of stone quarries, cultivated fields, and coniferous plantations. Certainly, in the Iberian Peninsula, Mediterranean landscapes with complex and structured vegetation are shrinking in area from year to year, such habitats being preferred by *P. algirus* (Santos and Tellera, 1989; Díaz and Carrascal, 1991). The northern population considered here, inhabiting beach dunes, is threatened by encroaching construction and tourism (Galán, 1999). Therefore, conservation of Spanish Mediterranean reptiles requires a broad perspective that takes into account the overall biology and ecology of the species, and particularly its reproductive ecology. A reptile species becomes threatened when appropriate nesting places area are lacking in the wild (Castilla and Swallow, 1995), even though the all other habitat requirements remain suitable.

Acknowledgements. Field research of the senior author was funded by the Spanish Ministerio de Educación y Cultura (Ref: REN2000-1376 GLO).

References


Received: May 16, 2003. Accepted: July 15, 2003.