

Research Notes

Reproduction in the San Lucan Banded Rock Lizard, *Petrosaurus thalassinus* (Phrynosomatidae) from Baja California Sur, Mexico

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Petrosaurus thalassinus is restricted to the Cape Region of Baja California, occurring in four disjunct populations (Grismer 2002). The biology of this species was summarized by Grismer (2002), however information on the reproductive biology in *P. thalassinus* is limited to anecdotal accounts (Asplund 1967; Grismer 2002). The purpose of this paper is to present information on the reproductive cycle from a histological examination of gonadal material and to provide the first clutch sizes for this species.

Forty-four male (mean snout-vent length, SVL = 110 mm \pm 19 SD, range = 80–152 mm), sixteen female (mean SVL = 90 mm \pm 14 SD, range = 71–110 mm), and two neonate *P. thalassinus* (mean SVL = 35 mm \pm 1.4 SD, range = 34–36 mm) from the Natural History Museum of Los Angeles County (LACM), San Diego Society of Natural History (SDSNH) and University of Arizona (UAZ) were examined (Appendix).

The left testis and left ovary were removed from males and females respectively. Gonads were embedded in paraffin, sectioned at 5 μ m and stained with Harris' hematoxylin followed by eosin counterstain. Oviductal eggs or enlarged follicles (> 6 mm length) were counted but not examined histologically. An unpaired *t*-test was performed to compare male and female mean body sizes. The relationship between female body size and clutch size was investigated by linear regression analysis.

Mean male body size (SVL) was significantly larger than that of females ($t = 4.0$, $df = 58$, $P < 0.001$). Stages of the testicular cycle are presented in Table 1. Regressed testes of *P. thalassinus* (May–September) contained spermatogonia and Sertoli cells. The single testis in recrudescence (May) exhibited a proliferation of primary spermatocytes for the next period of spermiogenesis. Testes undergoing spermiogenesis (February–May) contained rows of metamorphosing spermatids and spermatozoa. During May, 55% of the sample was in late spermiogenesis. Germinal epithelium consisted of a few layers of cells and small clusters of sperm lined the lumina of the seminiferous tubules. The smallest reproductively active male (i.e., late spermiogenesis) was LACM 128018 which measured 80 mm SVL.

The seasonal ovarian cycle is presented in Table 2. Females with enlarged follicles (> 6 mm length) and oviductal eggs were present in April–May (Table 3). Mean clutch size ($n = 10$) is 8.6 ± 3.9 SD (range = 4–18). Linear regression analysis revealed there was no significant correlation ($r = 0.61$, $P = 0.061$) between female body size (SVL) and clutch size for 10 *P. thalassinus*. These are

Table 1. Seasonal testicular cycle of *Petrosaurus thalassinus*.

Month	<i>n</i>	Regression	Recrudescence	Spermiogenesis	Late spermiogenesis
February	1	0	0	1	0
March	1	0	0	1	0
April	2	0	0	2	0
May	33	4	1	10	18
June	3	3	0	0	0
July	1	1	0	0	0
August	2	2	0	0	0
September	1	1	0	0	0

the first clutch sizes recorded for *P. thalassinus*. Females with inactive ovaries (i.e., no yolk deposition) were observed in May and August. Three females from May (Table 2) were undergoing moderate yolk deposition (LACM 127996, SVL 73 mm, 3 ovarian follicles, 5.1 mm length \pm 0.55 SD; LACM 128001, SVL 83 mm, 5 ovarian follicles, 4.7 mm length \pm 0.63 SD; LACM 127997, SVL 83 mm, 8 ovarian follicles, 5.6 mm length \pm 0.67 SD). It is uncertain if all follicles would have completed yolk deposition and were not considered as clutches. The smallest reproductively active female (i.e., moderate yolk deposition) was LACM 127996 which measured 73 mm SVL. Two neonates (UAZ 22348, 22349) collected 25 July measured 35.0 mm SVL \pm 1.4 SD, range = 34–36 mm. Asplund (1967) observed hatchlings of *P. thalassinus* during August and speculated that breeding occurred before late summer. Data presented herein confirms that *P. thalassinus* breeds early in the year. Grismer (2002) observed gravid *P. thalassinus* from mid-April to mid-August and hatchlings from mid-July to mid-August at San Bartolo. *Petrosaurus thalassinus* is active year-round (Grismer 2002) allowing reproduction to begin early in the year.

The timing of female reproduction in *P. thalassinus* is similar to that of other species of *Petrosaurus* from Baja California. Gravid females of *P. mearnsi* were observed in May and hatchlings from August to October. *P. repens* was reported to breed in spring, with egg deposition occurring in summer and hatchlings appearing in late summer to early fall, and gravid females of *P. slevini* were observed in June with mating occurring in spring and hatchlings appearing in late summer and early fall (Grismer 2002). In southern California, two *P. mearnsi* females from Riverside County with oviductal eggs were found in June (Hain 1965) and one from San Diego County in July (Cozens 1974), suggesting the

Table 2. Seasonal ovarian cycle of *Petrosaurus thalassinus*.

Month	<i>n</i>	No yolk deposition	Early yolk deposition	Moderate yolk deposition (follicles < 6 mm)	Enlarged follicles (> 6 mm)	Oviductal eggs
April	3	0	0	0	2	1
May	12	1	1	3	3	4
August	1	1	0	0	0	0

Table 3. Clutch sizes for 10 *Petrosaurus thalassinus* estimated from counts of yolked follicles > 6 mm length or oviductal eggs.

Date	SVL	Clutch size	Source
10–12 April 1978	110	7	LACM 127408
10–12 April 1978	102	9	LACM 127407
30 April 1978	94	8 ¹	LACM 127958
1 May 1978	88	7 ¹	LACM 127962
1 May 1978	91	4 ¹	LACM 127961
2 May 1978	93	8 ¹	LACM 127975
10 May 1978	110	18	LACM 128012
10 May 1978	78	6	LACM 128017
11 May 1978	108	12	LACM 128028
23–28 May 1975	74	7 ¹	LACM 116389

¹ Oviductal eggs, all other females contained enlarged follicles.

ovarian cycle may be delayed in the north compared to Baja California populations.

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Appendix

Specimens of *Petrosaurus thalassinus* examined from the Natural History Museum of Los Angeles County (LACM), San Diego Society of Natural History (SDSNH) and the University of Arizona (UAZ).

LACM 51835, 64378, 64379, 64381, 95411, 99425, 116389, 127406–127408, 127958, 127961–127972, 127975, 127977, 127980–127983, 127989, 127994, 127996–127999, 128001, 128002, 128005, 128009, 128010, 128012, 128014, 128016–128018, 128021, 128025, 128027, 128028, 128030, 128031, 128033, 128034, 138242; SDSNH 30041, 38072, 45041, 45050, 52986; UAZ 22348, 22349, 22391.