

Hatchling size of *Dryadosaura nordestina* (Squamata: Gymnophthalmidae) in Atlantic Forest remnants of Northeastern Brazil

Maria Jaqueline Monte Andrade¹, Jaqueiuto Silva Jorge², Matheus Meira-Ribeiro³, Raul Fernandes Dantas Sales⁴, Eliza Maria Xavier Freire⁵

1. Bióloga, Doutoranda do Programa de Pós-Graduação em Psicobiologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte (UFRN), Brasil. E-mail: jackeline_monte@hotmail.com

2. Biólogo, Doutorando do Programa de Pós-Graduação em Psicobiologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte (UFRN), Brasil. E-mail: queilto@yahoo.com.br

3. Biólogo, Mestrando no Programa de Pós-Graduação em Ciências Biológicas, Centro de Biociências, Universidade Federal do Rio Grande do Norte (UFRN), Brasil. E-mail: matheusbiologia@gmail.com

4. Biólogo, Doutorando no Programa de Pós-Graduação em Psicobiologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte (UFRN), Brasil. E-mail: raulsales17@gmail.com

5. Doutora em Zoologia, Docente do Laboratório de Herpetologia, Departamento de Botânica e Zoologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte (UFRN), Brasil. E-mail: elizajuju@ufnet.br

ABSTRACT: *Dryadosaura nordestina* is a gymnophthalmid with distribution restricted to Atlantic Forest remnants of northeastern Brazil, from Rio Grande do Norte to Bahia states. This paper aimed to describe the incubation and hatching of eggs in laboratory and provide morphometric characterization of *D. nordestina* hatchlings. During a fieldwork at Serra da Jiboia, municipality of Santa Teresinha, Bahia state, we collected inside a fallen log two eggs. For the incubation, eggs were kept inside a polyethylene container lined with humus, maintained at room temperature (~25°C), and daily observed. After 13 days of incubation, the eggs hatched, and the measures of the specimens were verified. Besides the individuals from Serra da Jiboia, morphometric measures of five *D. nordestina* hatchlings previously deposited in the Herpetological Collection of the Universidade Federal do Rio Grande do Norte were also taken. This paper confirms the clutch size of 1-2 eggs for several gymnophthalmids and it is the first record on incubation and hatchling size for *D. nordestina*, thus contributing to knowledge on reproductive biology of this species.

Keyword: *Dryadosaura nordestina*, reproductive biology, incubation of eggs.

Tamanho de eclosão de *Dryadosaura nordestina* (Squamata: Gymnophthalmidae) em remanescentes de Mata Atlântica no Nordeste do Brasil

RESUMO: *Dryadosaura nordestina* é uma espécie de lagarto gminofitálmideo cuja ocorrência está restrita aos remanescentes de Mata Atlântica do nordeste do Brasil, do estado do Rio Grande do Norte até a Bahia. Este estudo teve como objetivo descrever a incubação e eclosão de ovos em laboratório e fornecer caracterização morfométrica de filhotes de *D. nordestina*. Durante um trabalho de campo na Serra da Jiboia, município de Santa Teresinha, estado da Bahia, foram coletados dois ovos dentro de um tronco em decomposição. Para incubação, os ovos foram mantidos em recipiente de polietileno forrado com uma camada de húmus, mantidos a temperatura ambiente (~25°C) e observados diariamente. Após 13 dias de incubação, os ovos eclodiram, e as medidas dos espécimes preservados foram tomadas. Além dos indivíduos da Serra da Jiboia, também foram feitas medidas morfométricas de cinco filhotes de *D. nordestina* previamente depositados na Coleção Herpetológica da Universidade Federal do Rio Grande do Norte. Este estudo confirma o tamanho da ninhada de 1-2 ovos para vários gimnofitálmideos e constitui o primeiro registro de incubação e tamanho de eclosão de *D. nordestina*, contribuindo, desse modo, para o conhecimento da biologia reprodutiva desta espécie.

Palavras-chave: *Dryadosaura nordestina*, biologia reprodutiva, incubação de ovos.

Lizards of the family Gymnophthalmidae are distributed in tropical and subtropical forests from southern Mexico to Argentina, occurring in the Caribbean and continental islands of Central and South America (VANZOLINI et al., 1980; VITTI; CALDWELL, 2009), where they are usually found associated with the leaf litter (RODRIGUES, 1997; RODRIGUES et al., 2002; TEIXEIRA; FONSECA, 2003; RODRIGUES et al., 2013). *Dryadosaura nordestina* Rodrigues, Freire, Pellegrino, Sites Jr, 2005 is a recently described gymnophthalmid whose distribution is restricted to Atlantic Forest remnants from Rio Grande do Norte to Bahia states (RODRIGUES et al., 2005; GUERRERO; RODRIGUES, 2007; SANTANA et al., 2008; SALES et al., 2009; NORONHA-OLIVEIRA et al., 2010; DELFINO; SOEIRO, 2012; RODRIGUES et al., 2013; GARDA et al., 2014). Given the lack of information regarding the biology of this species, data about reproductive biology is extremely important for understanding its natural history. This paper aims to describe the incubation and hatching of eggs in laboratory and provide morphometric characterization of *D. nordestina* hatchlings.

On 21 July 2012, during a fieldwork of the Biodiversity Research Program – PPBio Semiarid/CNPq at Serra da Jiboia (12°50' S; 39°28' W; 777 m asl.), municipality of Santa Teresinha, Bahia state, we collected inside a fallen log two white eggs, with membranous appearance and elliptical format (10.7 x 6.5 mm and 10.1 x 7.4 mm). The eggs were collected together with a part of the substrate, packed in a plastic bag and taken to the Laboratory of Herpetology of Universidade Federal do Rio Grande do Norte (UFRN), where they were incubated. For the incubation, they were transferred and kept inside a polyethylene container (11 x 13 x 17 cm) lined with humus, with a perforated plastic cover to allow aeration. The eggs were buried in the upper part of the humus until they were covered, and thus they were kept at room temperature (~25°C) and daily observed.

After 13 days of incubation, the eggs hatched on 4 August 2012 (Figure 1). Both specimens were deposited in the Herpetological Collection of the Universidade Federal do Rio Grande do Norte (Voucher numbers: UFRN 3971 and 3972). The following measures of the preserved

specimens were verified by using a digital caliper with 0.01 mm precision: snout-vent length (SVL), tail length (TL), head length from the tip of the snout to the posterior edge of the tympanum (HL) and head width at the widest point of the skull (HW). Besides the individuals from Serra da Jiboia, morphometric measures of five *D. nordestina* hatchlings previously deposited in the UFRN were also taken. These specimens were collected in Atlantic Forest remnants in Alagoas (Mata do Catolé: 9°30' S; 35°49' W; Mata da Salva: 9°33' S; 35°47' W) and Rio Grande do Norte states (Parque Estadual Mata da Pipa: 6°15' S; 35°03' W), according to Table 1.



Figure 1. Partial view of the incubation chamber with eggs hatched and *Dryadosaura nordestina* hatchlings.

Table 1. Morphometric data and locality of *Dryadosaura nordestina* hatchlings (N = 7) deposited in the Herpetological Collection of Universidade Federal do Rio Grande do Norte. **AL**-Alagoas; **RN**- Rio Grande do Norte; **BA**- Bahia; **SVL**- snout-vent length; **TL**- tail length; **HL**- head length; **HW**- head width; * autotomized tail, excluded from the analysis. ** Parque Estadual Mata da Pipa; ***Serra da Jiboia.

| Voucher | SVL | TL | HL | HW | Location | State |
|-----------|-------|-------|------|------|--------------------------|-------|
| UFRN 422 | 20.33 | * | 4.73 | 3.42 | Mata do Catolé, Maceió | AL |
| UFRN 424 | 23.14 | 27.97 | 5.29 | 3.73 | Mata da Salva, Rio Largo | AL |
| UFRN 425 | 21.67 | 21.25 | 4.60 | 3.56 | Mata da Salva, Rio Largo | AL |
| UFRN 2895 | 20.36 | 22.38 | 4.59 | 2.96 | **Pipa, Tibau do Sul | RN |
| UFRN 2896 | 20.95 | 22.22 | 4.38 | 3.90 | **Pipa, Tibau do Sul | RN |
| UFRN 3971 | 23.94 | 22.74 | 5.40 | 3.60 | ***Santa Terezinha | BA |
| UFRN 3972 | 22.13 | 21.87 | 5.23 | 3.46 | ***Santa Terezinha | BA |

Considering the entire sample, the average SVL of *D. nordestina* hatchlings was 21.79 ± 1.38 mm, (20.33–23.94 mm, N = 7), TL averaged 23.07 ± 2.45 mm (21.25–27.97, N = 6), HL averaged 4.88 ± 0.4 mm (4.38–5.40, N = 7), while HW averaged 3.51 ± 0.29 (2.96–3.90, N = 7). Morphometric measures of hatchlings from Bahia, Rio Grande do Norte and Alagoas were similar (Kruskal-Wallis H, SVL: $\chi^2 = 2.750$, $p = 0.253$; TL: $\chi^2 = 0$, $p = 1$; HL: $\chi^2 = 4.464$, $p = 0.107$; HW: $\chi^2 = 0$, $p = 1$). The average SVL of hatchlings is equivalent to 51% of average SVL of reproductively mature females described in the literature (SVL = $42.7 + 7.1$; GARDA et al., 2014). This fact can be related to the reduced and fixed clutch size of two eggs in this species (GARDA et al., 2014). This paper confirms the clutch size of 1-2 eggs for

several gymnophthalmids (TEIXEIRA; FONSECA, 2003; ROBERTO; ALBANO, 2012; WINCK; ROCHA, 2012; GARDA et al., 2014), and it is the first record on incubation and hatchling size for *D. nordestina*, thus contributing to knowledge on reproductive biology of this species.

Acknowledgments

This study was supported by Programa de Pesquisa em Biodiversidade – PPBio Semiárido/CNPq (Process N°: 558317/2009-0) and by research grants from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) to EMXF (Process N° 309424/2011-9), JSJ (Process 107757/2010-9) and MMR (Process N° 504028/2010-3), and from the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) to MJMA and RFDS.

References

- DELFINO, M. S. C.; SOEIRO, M. S. *Dryadosaura nordestina* (Bribe Cabeçuda). Geographic distribution. **Herpetological Review**, v. 43, n. 1, p. 102, 2012.
- GARDA, A. A.; MEDEIROS, P. H. S.; LION, M. B.; BRITO, M. R. M.; VIEIRA, G. H. C.; MESQUITA, D. O. Autoecology of *Dryadosaura nordestina* (Squamata: Gymnophthalmidae) from Atlantic forest fragments in Northeastern Brazil. **Zoologia**, v. 31, n. 5, p. 418-425, 2014.
- GUERRERO, A. C.; RODRIGUES, M. T. *Dryadosaura nordestina* (Bribe Cabeçuda). Geographic distribution. **Herpetological Review**, v. 38, n. 2, p. 218, 2007.
- NORONHA-OLIVEIRA, M. V.; BRITO-DE-CARVALHO, C.; FARIA, R. G. *Dryadosaura nordestina* (NCN). Geographic distribution. **Herpetological Review**, v. 41, n. 4, p. 512, 2010.
- ROBERTO, I. J.; ALBANO, C. Aspects of the clutch size and oviposition period of *Leposoma baturitensis* (Squamata: Gymnophthalmidae). **Herpetology Notes**, v. 5, p. 445 - 446, 2012.
- RODRIGUES, M. T. A new species of *Leposoma* (Squamata: Gymnophthalmidae) from the Atlantic Forest of Brazil. **Herpetologica**, v. 53, n. 3, p. 383-389, 1997.
- RODRIGUES, M. T.; DIXO, M.; PAVAN D.; VERDADE V. K. A new species of *Leposoma* (Squamata, Gymnophthalmidae) from the remnant Atlantic Forests of the state of Bahia, Brazil. **Papéis Avulsos de Zoologia**, v. 42, n. 14, p. 335-350, 2002.
- RODRIGUES, M. T.; FREIRE, M. E. X.; PELLEGRINO, K. C. M.; SITES-JR, J. W. Phylogenetic relationships of a new genus and species of microteiid lizard from the Atlantic forest of north-eastern Brazil (Squamata, Gymnophthalmidae). **Zoological Journal of the Linnean Society**, v. 144, p. 543-557, 2005.
- RODRIGUES, M. T.; TEIXEIRA, JR, M.; RECODER, R. S.; VECHIO, F. D.; DAMASCENO, R.; PELLEGRINO, K. C. M. A new species of *Leposoma* (Squamata: Gymnophthalmidae) with four fingers from the Atlantic Forest central corridor in Bahia, Brazil. **Zootaxa**, v. 3635, n.4, p. 459-475, 2013.
- SALES, R. F. D.; LISBOA, C. M. C. A.; FREIRE, E. M. X. Répteis Squamata de remanescentes florestais do campus da Universidade Federal do Rio Grande do Norte, Natal- RN, Brasil. **Cuadernos de Herpetologia**, v. 23, n. 2, p. 77-88, 2009.
- SANTANA, G. G.; VIEIRA, W. L. S.; PEREIRA-FILHO G. A.; DELFIM, F. R.; LIMA, Y. C. C.; VIEIRA, K. S. Herpetofauna em um fragmento de Floresta Atlântica no Estado da Paraíba, Região Nordeste do Brasil. **Biotemas**, v. 21, n. 1, p. 75-84, 2008.
- TEIXEIRA, R. L.; FONSECA, F. R. Tópicos ecológicos de *Leposoma scincoideis* (Sauria. Gymnophthalmidae) da região de Mata Atlântica de Santa Teresa, Espírito Santo, sudeste do Brasil. **Boletim do Museu de Biologia Mello Leitão**, v. 15; n. 17-18, 2003.
- VANZOLINI, P. E.; RAMOS-COSTA, A. M. M.; VITT, L. J. Répteis das Caatingas. **Academia Brasileira de Ciências**, Rio de Janeiro. 1980.
- VITT, L. J.; CALDWELL, J. P. Herpetology: An Introductory Biology of Amphibians and Reptiles, 3rd edition. **Academic Press**, San Diego, 2009.
- WINCK, G. R.; ROCHA, C. F. D. Reproductive trends of Brazilian lizards (Reptilia, Squamata): the relationship between clutch size and body size in females. **North-western Journal of Zoology**, v. 8, n. 1, p. 57-62, 2012.