Nymphargus grandisonae (red-spotted glassfrog): Reproductive behaviour

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The family Centrolenidae (glassfrogs) includes about 150 species (Frost, 2014) of nocturnal Neotropical anurans that reproduce along streams. Egg laying typically occurs on vegetation or rocks overhanging water, where larval development occurs (Cisneros-Heredia & McDiarmid, 2007). Several studies have examined phylogenetic relationships (e.g Guayasamin et al., 2008), diversification patterns (e.g. Hutter et al., 2013a) and ecological and behavioural aspects of glassfrogs (e.g. Vockenhuber et al., 2008; Delia et al., 2010; Vargas-Salinas et al., 2014). However, details of the natural history of most species remains poorly documented. The red-spotted glassfrog *Nymphargus grandisonae* is a Centrolenid species for which information is available. Its tadpole, egg clutches, territorial behavior and diversity of auditory signals have been described (Hutter et al., 2013b), but there are no detailed descriptions about its reproductive behaviour. Here, we provide data about amplexus and oviposition behaviour of *N. grandisonae*. On 17 April 2014, we observed an amplectant pair of *N. grandisonae* in the municipality of Pijao (3° 55'10" N; 68° 7'36' W; 1747 m elevation), department of Quindío, central Andes of Colombia. To observe the behaviour we used red light to minimise disturbance. The amplexus was observed on the upper side of a large leaf at 260 cm height from water surface at 20:25 hrs (Fig. 1a). During 3.08 hrs of continuous monitoring, we observed the pair moving around the leaf before moving to other leaves then returning to the location of the initial observation. Possibly the female was looking for a place for oviposition. Frequently, the male exhibited muscle contractions in body flanks. Sometimes the male twisted his body separating his ventral area from the female dorsum, but always maintaining the axillary amplexus position. At 23:33 hrs the pair returned to the initial place of observation, but this time the female rotated her body and her posterior part was near the leaf edge; minutes later the oviposition began. From all places where amplexus was seen, this specific place was the one with lower height above water. The female laid several eggs while moving forward; simultaneously, the male also moved forward, but additionally raised the posterior portion of his body and moved his legs rhythmically in circular shapes (Fig. 1b-c). We assumed that by this time the male had released his sperm and the leg movements assisted in egg fertilization. The synchronized forward movement of female and male continued several centimeters until egglaying was completed. Later, the male moved away from the female dorsum and jumped to another leaf (~20 cm from the female); during the following eleven minutes the male emitted 13 auditory signals, which sounded similar to the advertisement call of the species. The female stayed motionless on the leaf for a short period (seconds) before moving backward gently and covering the egg clutch with her body (Fig. 1d-e). She remained on the eggs for more than 25 minutes. Male and female were captured and their body size (snout-vent length, SVL) was recorded with a digital caliper (SVL male= 27.94 mm, SVL female= 32.64 mm). The clutch consist of 61 eggs with a mean diameter of 2.12 mm ± 0.24 (N= 20). Females of other glassfrogs *Espadarana prosoblepon* and *Ikakogi tayrona* also stay covering their eggs for a time after oviposition (Jacobson, 1985; M. Rada, pers. comm. cited by Cisneros-Heredia & McDiarmid, 2007). It is not known if in *N. grandisonae* this behaviour enhances fertilization or increase egg hydration (i.e. maternal care). We hope our observations offer baseline data for further comparable studies in this and other taxa, to get a more comprehensive understanding of the evolutionary biology of Centrolenidae.

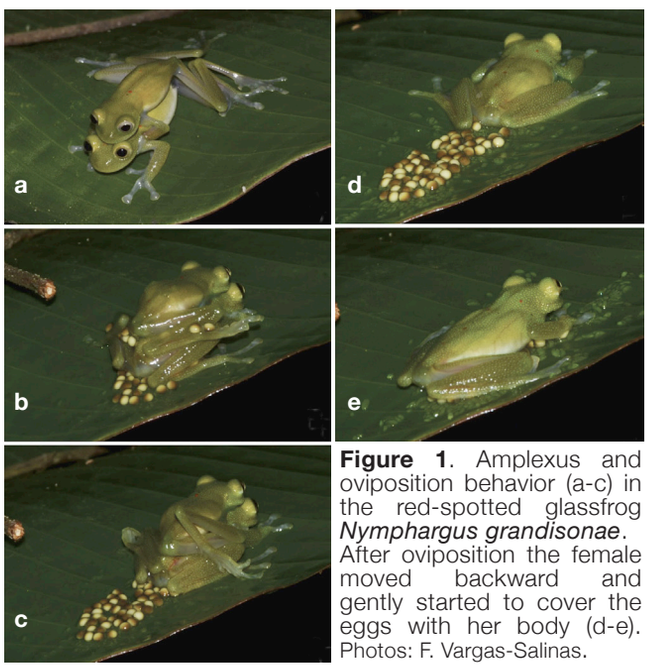

Figure 1. Amplexus and oviposition behavior (a-c) in the red-spotted glassfrog *Nymphargus grandisonae*. After oviposition the female moved backward and gently started to cover the eggs with her body (d-e). Photos: F. Vargas-Salinas.

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