

Notes on the biology of the Cretan frog *Pelophylax cretensis*

Jiří Moravec¹ & Petros Lymberakis²

¹ Department of Zoology, National Museum (Natural History), Václavské náměstí 68, 110 00 Praha 1, Czech Republic

² Natural History Museum of Crete, School of Sciences and Engineering, University of Crete, Irakleio, Greece

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Abstract: *Pelophylax cretensis* is an endemic Cretan frog, whose biology has not still been studied in detail. Here we present some details regarding the hypsometric distribution and habitat requirements of *P. cretensis* that indicate this frog is an adaptable species, and can inhabit different types of water bodies up to 1330 m a. s. l.

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Pelophylax cretensis (Beerli, Hotz, Tunner, Heppich, Uzzel, 1994; figs. 1–3) is an endangered endemic Cretan amphibian (listed as vulnerable in the IUCN Red List of threatened species 2022). According to published data, it is patchily distributed in the lowlands of Crete, and the upper limit of its distribution is assumed to be 100 m a. s. l. (Valakos et al. 2008, Frost 2022, IUCN 2022). *Pelophylax cretensis* is associated with slow-flowing rivers, streams, lakes and marshes. Loss of aquatic habitats due to agricultural irrigation is a major threat to its survival, and an additional detrimental influence from the introduced Bull frog *Litobates catesbeianus* (Shaw, 1802) is expected. Nevertheless, further research on the abundance and distribution of *P. cretensis* is still needed (see Valakos et al. 2008, Cengic 2016).

During short-term surveys of amphibian and reptile fauna carried out in eastern and central Crete in 2021 and 2022, the following complementary data on hypsometric distribution and biology of *P. cretensis* were obtained: (i) breeding assemblages of *P. cretensis* were recorded up to 920 m a. s. l., (ii) an autumnal



Fig. 1. Basking adult female of *Pelophylax cretensis*, Richtis gorge, 210 m a. s. l., 15 November 2021. Photo: J. Moravec.



Fig. 2. Adult female of *Pelophylax cretensis*, irrigation pool at the entrance of the Richtis gorge, 280 m a. s. l., 24 May 2022. The wet skin of basking frogs attracts European honeybees (*Apis mellifera*). Photo: J. Moravec.



Fig. 3. Tadpole of *Pelophylax cretensis* in a slow-running stream in Richtis gorge, 260 m a. s. l., 15 November 2021. Photo: J. Moravec.

development of *P. cretensis* tadpoles was documented, and (iii) an ability of *P. cretensis* to tolerate completely artificial water reservoirs was confirmed.

Hypsometric distribution. A breeding site located at an altitude of 280 m a. s. l. was found in the area of the Richtis gorge (Faraggi tou Richti; ca. 10 km W of Sitia, eastern Crete) – artificial irrigation pools in the garden at the entrance of the gorge (35.17113° N, 25.99345° E, 24 May 2022). Two localities lying above 800 and 900 m were recorded near the village of Anogia (central Crete) – an artificial pond in the Delina Resort area ca. 1.5 km SE of Anogia (35.28024° N, 24.89119° E, 840 m a. s. l., 28 May 2022) and a large artificial water reservoir ca. 2.5 km SE of Anogia (35.27403° N, 24.89981° E, 920 m a. s. l., 31 May 2022; fig. 4). Choruses of up to 10 and 20 calling males were recorded in the above reservoirs. Moreover,

voucher specimens were collected from the area of Selakano – an artificial pond filled by a small spring (35.0898° N, 25.5595° E, 800 m a. s. l.; voucher code NHMC80.2.46.85), and a small stream east of the village (35.0917° N, 25.5436° E, 880 m a. s. l.; voucher code NHMC80.2.46.84, both specimens collected 18 November 2021). Finally, according to older data, the highest locality of *P. cretensis* was observed in Omalos Viannou (35.072837° N, 25.449406° E, ca. 1330 m a. s. l., observed at the beginning of 21st century by Michalis Dretakis), for which no voucher is available.

Autumnal development of the tadpoles. About 10 tadpoles of *P. cretensis* of the approximate stage 26–28 (Gosner 1960) were observed in a small natural pool on a slow-running stream in the Richtis Gorge (35.17420° N, 25.99103° E, 260 m a. s. l., 15 November 2021).

Tolerance of the artificial nature of available breeding sites. It turns out that *P. cretensis* is able to breed even in artificial water bodies, which have a rather “sterile” character of their littoral zone. The banks of a large water reservoir located 2.5 km SE of Anogia were formed by a continuous thick layer of black matter, preventing the growth of littoral vegetation (the layer was interrupted only in a narrow area near the outlet of the reservoir). Under these conditions, the frogs were confronted with a significant lack of natural shelters and very limited food sources. Likewise, the artificial pond at Delina Resort had a minimal littoral zone. In addition, there was a dense fish population in this reservoir.

The above observations indicate that *P. cretensis* is an adaptable species that can breed in different types of standing water at least up to an altitude of 920 m a. s. l. and can reach elevations up to 1330 m a. s. l. This finding is supported by other more or less precisely specified records of *P. cretensis* from higher elevations of inland Crete – see e.g. Krips (2008), GBIF (2022) and iNaturalist (2022). In addition, it appears that its tadpoles can develop in different parts of the growing season. We can therefore conclude that the today’s character of the distribution of *P. cretensis*, when the species occurs mainly in the lowest parts of the island, is not due to the specific requirements of the species, but to the limited amount of open water reservoirs in higher elevations. In mountainous areas (e. g. in Psiloritis massif, central Crete), water from higher elevations is diverted not only for irrigation and infrastructure of human settlements, but also to numerous local shallow watering holes for goats and sheep. In order to reduce evaporation, the catchment water reservoirs are closed with a concrete cover and thus inaccessible for frogs. We can therefore expect that an appropriate (“frog-friendly”) management of water reservoirs in the higher elevations would have a positive impact on the population abundance and distribution of *P. cretensis* in the inland parts of Crete.

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Fig. 4. Artificial water reservoir occupied by the breeding population of *Pelophylax cretensis*, ca 2.5 km SE of Anogia, 920 m a. s. l., 31 May 2022. Photo: J. Moravec.

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