

First record of *Bombina variegata* (Linnaeus, 1758) at the southern part of Euboea Island, Greece

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Abstract

The herpetofauna of Greek islands is fairly well known. However, new records enhance our knowledge of the insular distribution of reptiles and amphibians. Here, we report a new addition to the herpetofauna of Euboea Island: a dense population of the yellow-bellied toad (*Bombina variegata*) was found in Ochi Mountain, at the south part of the Island.

Key Words

Anura, distribution, islands, Mediterranean

The anuran genus *Bombina* comprises six species that mainly occur in Europe and parts of northeast Asia (Hofman et al. 2007; Fijarczyk et al. 2011). The yellow-bellied toad, *Bombina variegata* (Linnaeus, 1758), is a small-bodied (snout vent length up to 56 mm) amphibian that feeds on invertebrates, mainly insects (Ghiurca and Zaharia 2005; Bisa et al. 2007). The species has a wide distribution in central and southeast Europe (Gasc et al. 1997; Sillero et al. 2014). In Greece, the yellow-bellied toad occurs in the central and northern part of the country, in altitudes varying from 600 to 2,000 m (Valakos et al. 2008; Pafilis and Maragou 2020). Recently, a new population was reported from Paros Island (Troidl and Troidl 2019) that was presumably introduced to the Island (Tzoras et al. 2023).

On 23 September 2022, we visited the southern part of Euboea Island during a herpetological survey (under the national monitoring project of Greek herpetofauna). Around noon, close to the summit of Ochi Mountain (38.0654°N, 24.4582°E, 945 m a.s.l.), we discovered a network of small ponds that were supplied with water

from a mountainous fountain (Fig. 1). Within these ponds, we counted over 80 individuals of *B. variegata*, adults and juveniles. The weather was good with partially clouded sky and air temperature around 18 °C. We captured one adult individual (Fig. 2, SVL: 62 mm, body weight: 4.9 g) that was later deposited in the Herpetological Collection of the Zoological Museum of the National and Kapodistrian University of Athens (ZMUA 4000) under a special permit issued by the Ministry of Environment and Energy (YPIEN/ΔΔΔ/79427/2548). The site is designated as a Special Area of Conservation (GR2420001) of the Natura 2000 network of protected areas.

Though Euboea is an island, because of its close proximity to mainland Greece – nowadays it is separated by a channel (shortest distance: 29.3 m) – it shares the fate, in terms of herpetological research, of the largely undiscovered mainland (Pafilis and Maragou 2013). Indeed, islands have always attracted scientific research since the time of the founding fathers of Greek herpetology (Bedriaga 1883; Boettger 1888; Werner 1930), especially the Aegean Islands that harbour many endemic taxa have



Figure 1. The fountain, just below the summit, that waters the pond network.



Figure 2. Adult *Bombina variegata* (Linnaeus, 1758) (ZMUA 4000) from south Euboea, Greece.



Figure 3. The distribution of *Bombina variegata* in Greece (yellow shading), including the new record from south Euboea Island reported here (red point). The occurrence of the species on north Euboea (red shading) is dubious.

been thoroughly surveyed (Pafilis 2010; Lymberakis et al. 2018). To the contrary, few studies focus on the mainland Greece and, thus, our knowledge on the continental herpetofauna remains poor (e.g. Annousis et al. 2021; Christopoulos 2022). As such, new entries in the herpetofauna of Euboea have been added during the last few years

(Christopoulos et al. 2019; Pafilis et al. 2020; Strachinis 2021). We believe that the presence of the yellow-bellied toad in Euboea should be attributed to the long-standing connection with mainland Greece, from which it became isolated only recently, some 5,500 years ago (Mariolakos and Bantekas 2002).

The presence of *Bombina variegata* has never been plotted in distribution maps or been reported from the Island (Boettger 1891; Werner 1938; Valakos et al. 2008; Sillero et al. 2014; Pafilis and Maragou 2020). The only exception comes from the recent work by Tzoraz et al. (2023), that probably echoes the unclear distribution of the species in Greece, as depicted in the coarsely detailed map (50 km × 50 km grid) of the European Atlas (Gasc et al. 1997), where it is hard to tell whether the yellow-bellied toad occurs on Euboea or not (Fig. 3). However, this is a typical flaw in small scale maps when zooming in on specific regions. However, even in this case, the map includes exclusively the northern part of the Island. We do believe that the species also occurs in the central and northern part of Euboea. Further targeted fieldwork will bring together the missing pieces of this small biogeographical puzzle.

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References

- Annousis I, Kapsalas G, Pafilis P (2021) A review of the herpetofauna of Attica, mainland Greece. *Herpetozoa* 34: 1–8. <https://doi.org/10.3897/herpetozoa.34.e60668>
- Bedriaga J (1883) Die Amphibien und Reptilien Griechenlands. *Zoologischer Anzeiger* 6: 216–220.
- Bisa R, Sfenthourakis S, Fraguedakis-Tsolis S, Chondropoulos B (2007) Population density and food analysis of *Bombina variegata* and *Rana graeca* in mountainous riverine ecosystems of northern Pindos (Greece). *Journal of Biological Research-Thessaloniki* 8: 129–137.
- Boettger O (1888) Verzeichniss der von Hr. E. von Oertzen aus Griechenland und aus Kleinasien mitgebrachten Batrachier und Reptilien. Verlag der Koeniglichen Akademie der Wissenschaften. Berlin 1: 139–186.
- Boettger O (1891) Reptilien von Euboea. *Zoologischer Anzeiger* 14: 418.
- Christopoulos A (2022) New record of *Telescopus fallax* (Squamata: Colubridae) in Rhodope Prefecture, Thrace, Greece. *Herpetology Notes* 15: 873–876.
- Christopoulos A, Verikokakis AG, Detsis V, Nikolaidis I, Tsiokos L, Pafilis P, Kapsalas G (2019) First records of *Eryx jaculus* (Linnaeus, 1758) from Euboea Island, Greece (Squamata: Boidae). *Herpetology Notes* 12: 663–666.
- Fijarczyk A, Nadachowska K, Hofman S, Litvinchuk SN, Babik W, Stuglik M, Gollmann G, Choleva L, Cogălniceanu D, Vukov TD, Džukić G, Szymura JM (2011) Nuclear and mitochondrial phylogeography of the European fire-bellied toads *Bombina orientalis* and *Bombina variegata* supports their independent histories. *Molecular Ecology* 20: 3381–3398. <https://doi.org/10.1111/j.1365-294X.2011.05175.x>
- Gasc JP, Cabela A, Crnobrnja-Isailović J, Dolmen D, Grossenbacher K, Haffner P, Lescure J, Martens H, Martínez Rica JP, Maurin H, Oliveira ME, Sofianidou TS, Veith M, Zuidervijk A (1997) Atlas of amphibians and reptiles in Europe. Collection Patrimoines Naturels 29. Muséum National d’Histoire Naturelle, Paris, 516 pp.
- Ghiurca D, Zaharia L (2005) Data regarding the trophic spectrum of some population of *Bombina variegata* from Bacău county. *North-Western Journal of Zoology* 1: 15–24.
- Hofman S, Spolsky C, Uzzell T, Cogălniceanu D, Babik W, Szymura JM (2007) Phylogeography of the fire-bellied toads *Bombina*: independent Pleistocene histories inferred from mitochondrial genomes. *Molecular Ecology* 16: 2301–2316. <https://doi.org/10.1111/j.1365-294X.2007.03309.x>
- Lymberakis P, Pafilis P, Poulakakis N, Sotiropoulos K, Valakos ED (2018) Amphibians and Reptiles of the Aegean Sea. In: Sfenthourakis S, Pafilis P, Parmakelis A, Poulakakis N, Triantis KA (Eds) *Biogeography and Biodiversity of the Aegean*. Broken Hill Publishers Ltd, Nicosia, 169–190.
- Mariolacos I, Bantekas I (2002) Paleogeographical evolution of Evia Island. In: Kalemis A (Ed.) *Evia and Skiros: Historical documents*. Evoikes Ekdoseis Kinitro, Istiaia, 16–20.
- Pafilis P (2010) A brief history of Greek herpetology. *Bonn Zoological Bulletin* 57(2): 329–345.
- Pafilis P, Maragou P (2013) One more record of *Lacerta viridis* (Laurenti, 1768) from Macedonia. *Herpetozoa* 26: 101–102.
- Pafilis P, Maragou P (2020) Atlas of Amphibian and Reptiles of Greece. Broken Hill Publishers Ltd, Nicosia, 231 pp.
- Pafilis P, Triantis K, Anastasiou I, Proios K, Valakos ED (2020) A Gecko archipelago: a herpetological survey on Lichadonissia, a small islet group in Greece. *Herpetology Notes* 13: 25–28.
- Sillero N, Campos J, Bonardi A, Corti C, Creemers R, Crochet P-A, Crnobrnja-Isailović J, Denoël M, Ficetola GF, Gonçalves J, Kuzmin S, Lymberakis P, de Pous P, Rodríguez A, Sindaco R, Speybroeck J, Toxopeus B, Vieites DR, Vences M (2014) Updated distribution and biogeography of amphibians and reptiles of Europe. *Amphibia-Reptilia* 35: 1–31. <https://doi.org/10.1163/15685381-00002935>
- Strachinis I (2021) First evidence on the occurrence of the Greek newt *Lissotriton graecus* and the Aesculapian snake *Zamenis longissimus* on Evia island, Greece. *Parnassiana Archives* 9: 115–117.
- Troidl S, Troidl A (2019) Fotoexkursion zu den Eidechsen des Paros-Archipels (Griechenland). *L@certidae* 2020: 1–14.
- Tzoraz E, Foufopoulos J, Volz M, Troidl S, Troidl A, Jablonski D (2023) Lost in the Cyclades: genetic affiliation of the Yellow-bellied Toad, *Bombina variegata* (Anura: Bombinatoridae), from Paros Island, Greece. *Salamandra* 59: 92–95.
- Valakos ED, Pafilis P, Lymberakis P, Maragou P, Sotiropoulos K, Foufopoulos J (2008) The amphibians and reptiles of Greece. Edition Chimaira, Frankfurt, 463 pp.
- Werner F (1930) Contribution to the knowledge of the reptiles and amphibians of Greece, especially the Aegean islands. Occasional papers of the University of Michigan Museum of Zoology 211: 1–47.
- Werner F (1938) Ergebnisse der achten zoologischen Forschungsreise nach Griechenland (Euboea, Tinos, Skiathos, Thasos usw.). Sitzungsberichte der Österreichischen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse (Abt. 1) 147: 151–173.