



Short note / Nota breve

## New altitudinal breeding record for the common toad (*Bufo bufo*) in the Dolomites

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### Keywords

- European Alps
- Amphibia
- phenology
- reproduction
- upward elevational shift
- Trentino (Italy)

### Parole chiave

- Alpi
- anfibi
- fenologia
- riproduzione
- spostamento altitudinale
- Trentino

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### Summary

The common toad (*Bufo bufo*) is a typical European species inhabiting a wide variety of habitats. Herein, we report three new high-altitude breeding sites of *Bufo bufo* in the Italian Dolomites. The sites are found respectively at 2271, 2213 and 2060 m a.s.l. in Paneveggio-Pale di San Martino Nature Park (province of Trento, Italy) and constitute a new provincial altitudinal record for this species. Whether or not these sites became colonized only in recent times as a result of an upward elevational shift is unclear.

### Riassunto

Il rospo comune (*Bufo bufo*) è una tipica specie europea rinvenibile in un'ampia varietà di ambienti. Con la seguente nota, presentiamo tre nuovi siti riproduttivi di *Bufo bufo* ad alta quota nelle Dolomiti italiane. I siti si trovano rispettivamente a 2271, 2213 e 2060 m s.l.m. nel Parco Naturale Paneveggio-Pale di San Martino (Provincia di Trento) e costituiscono un nuovo record altitudinale per la regione. Se questi siti siano stati colonizzati solo recentemente come risultato in uno spostamento altitudinale, resta da capire.

The common toad (*Bufo bufo*; L. 1758) is a widespread yet declining European amphibian species, which inhabits and breeds in a great diversity of habitats (Bonardi et al. 2011), from the sea level to up to 2750 m a.s.l. in the southern part of its distribution range (Bons & Geniez 1996). In temperate Europe, the usual altitudinal range for breeding lays between 0 and 1500 m a.s.l. (Cabela et al. 2001) but reproduction at higher altitudes is known to occur (e.g. Malkmus 2015; Nöllert et al. 2016), and the species has shown a strong plastic response to rising temperatures (Tiberti et al. 2021). To date, breeding sites are known up to 2130 m a.s.l. in the Carpathians (Ifti-

me et al. 2009), 2221 m a.s.l. in Austria (Maletzky & Schweiger 2016) and 2340 m a.s.l. in Switzerland (Schmidt & Zumbach 2016). For the Italian Alps the upper limit is set at 2300 by Lanza et al. (2009), although whether this refers to breeding or terrestrial movements was not specified, neither details on location were provided.

On July 4th and 5th 2021 we found three spawning-sites of *Bufo bufo* above 2000 m a.s.l., in Paneveggio-Pale di San Martino Nature Park (province of Trento, northern Italy). The two highest ponds (Figure 1) were located in the northern area of the park: the first one (46.33106° N, 11.81324° E) was found between two ridges

Redazione: Valeria Lencioni e Marco Avanzini

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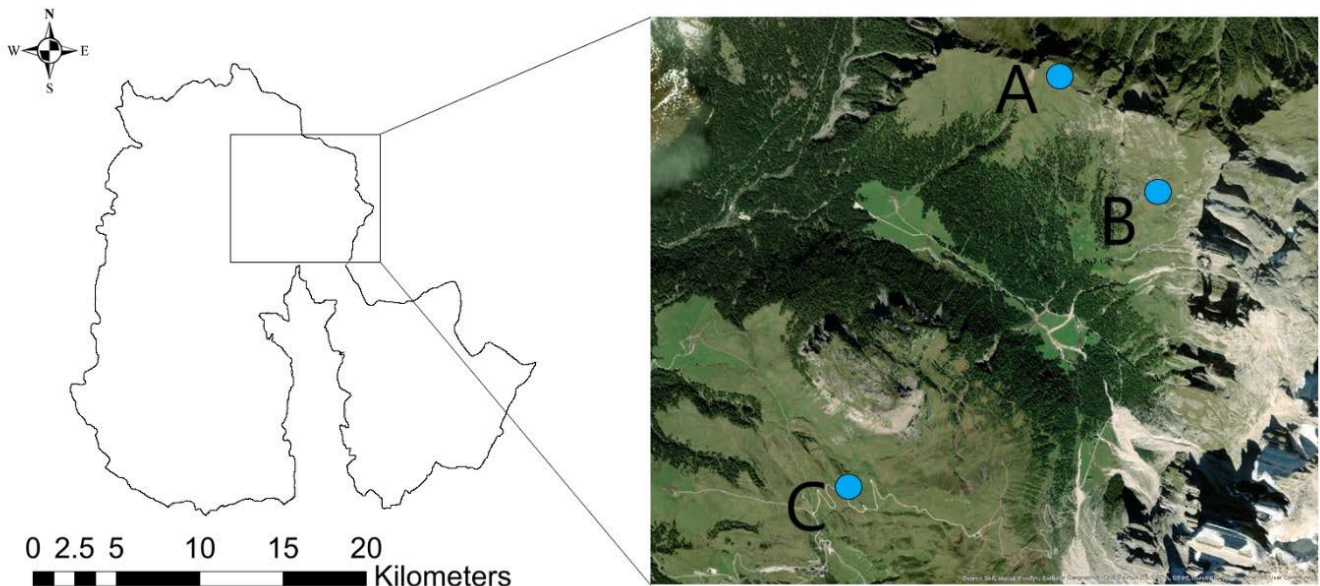
near Cima Caladora and covered approximately 1500-m<sup>2</sup> while the second one (46.32314° N, 11.82282° E) was slightly below Forcella Venegiota in a more rocky landscape and occupied a much smaller area (~20-m<sup>2</sup>). The habitat they were found in is a typical high-altitude grassland dominated by short grass vegetation, fragmented by rocky outposts and old ravines debris. In both ponds there was no evidence of macro-vegetation growing and the bare bottom was constituted by fine sandy loam (Figure 2).

The tadpoles showed the typical behavior for the species (Speybroeck et al. 2016), aggregating in large shoals in the tidal zone of the ponds, particularly along the southern and western shores. No other species were detected in the first pond, while we observed several adult individuals of *Ichthyosaura alpestris* in the second one. Also, *Rana temporaria* tadpoles were found in the near surroundings but we never observed either adults or tadpoles sharing the same pond with *B. bufo*.

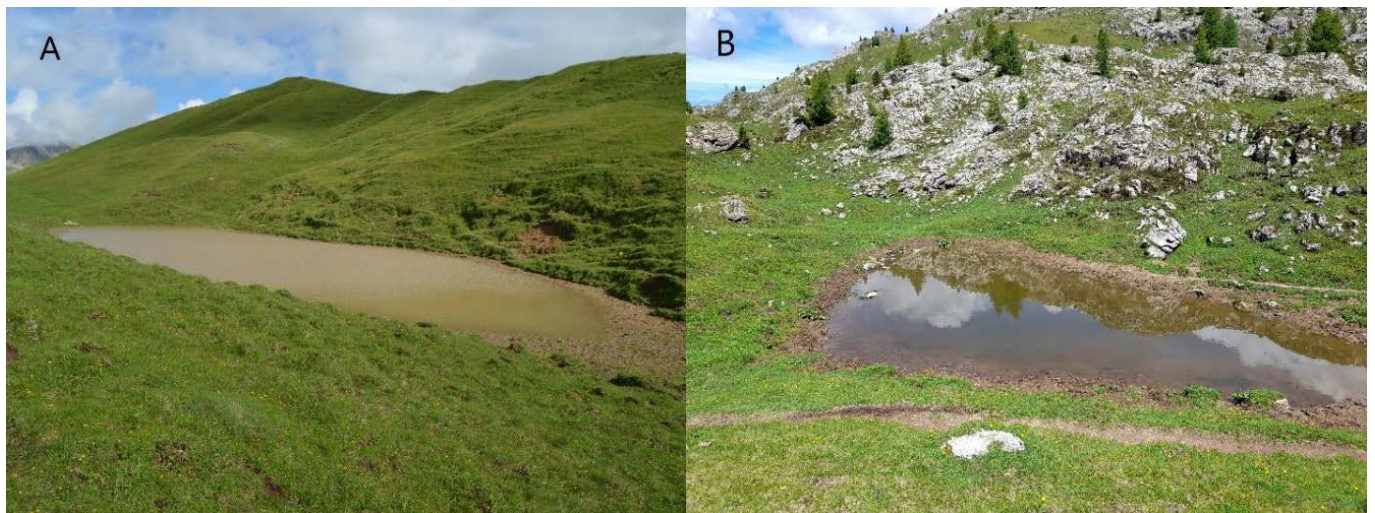
The third site, not as high as the first two but still noteworthy, was observed at 2065 m a.s.l. near Capanna Cervino (46.30249°

N, 11.79109° E). Similar to the other sites, the pond showed clear signs of usage by cattle. No other amphibian species were observed in this pond.

To the best of our knowledge, these observations constitute a new altitudinal record for the species in the province of Trento and potentially the highest confirmed breeding site of Italy. To date, most of the high-altitude breeding sites for *B. bufo* in the province come from the Lagorai mountain range, approximately 33 km south-west of the surveyed area. There, the altitudinal record was marked at 2050 m a.s.l. ("laghetto, Passo Manghen"; Di Cerbo et al. 2010), although Omizzolo et al. (2000) mentioned another site found at 2100 m a.s.l. ("Pozza Mangheneti") in the same area. Whether this is an actual different site or the result of an approximate measurement remains unclear. In the western part of Trentino, the highest confirmed breeding site for the species is found at 2035 m a.s.l. on the Brenta Massif ("Lago dello Spinale"; Caldonazzi et al. 2002). Other remarkable observations come from the Venetian Dolomites (Veneto) where reproduction was observed at 2050 m a.s.l. near the border



**Fig. 1** - Position of the three sites in Paneveggio-Pale di San Martino Nature Park: site of Cima Caladora, 2271 m a.s.l. (A); site of Forcella Venegiota, 2213 m a.s.l. (B); site of Capanna Cervino, 2065 m a.s.l. (C). / **Fig. 1** - Posizione dei tre siti riproduttivi nel Parco Naturale Paneveggio-Pale di San Martino: sito di Cima Caladora, 2271 m s.l.m. (A); sito di Forcella Venegiota, 2213 m s.l.m. (B); sito di Capanna Cervino, 2065 m s.l.m. (C).



**Fig. 2** - The ponds in which we observed *Bufo bufo* spawning: site of Cima Caladora (A); site of Forcella Venegiota (B). / **Fig. 2** - I laghetti in cui abbiamo rinvenuto girini di *Bufo bufo*: sito di Cima Caladora (A); sito di Forcella Venegiota (B).

with Trentino, and individuals were observed moving on the ground up to 2200 m a.s.l. (Bonato et al. 2007).

There are increasing evidence of traditionally lowland species pushing northward and upward their distribution limits and colonizing new habitats in response to rising temperatures (Chen et al. 2011). Unlike many other amphibians, the common toad is an exceptionally good disperser (Sztatecsny & Schabetsberger 2005) and recent evidences from the southern Italian Alps highlighted its ability to push uphill its distribution limit by about 200 m in just 15 years (Tiberti et al. 2021). Likewise, between 1974-1976 and 2004-2010 *Bufo bufo* expanded its occupancy of breeding sites about 100 m upwards in Switzerland following an abrupt warming wave in the late 1980s (Lüscher et al. 2016).

It is unknown whether the ponds surveyed by us became colonized only in recent years or constitute an historical breeding site for the species. According to the Park's personnel, *Bufo bufo* had been observed in these ponds at least since 2016 (Volcan, com. pers.) and it cannot be excluded to be the result of a relatively recent upward range expansion. Further investigations are needed to confirm the present upper limit of this species in the Italian Alps and whether or not it significantly changed from historical records.

## Acknowledgments

The study in Italy was authorised by the Italian Ministry of Environment (authorisation PNM-EU-2021-0015836) and supported by Paneveggio-Pale di San Martino Nature Park whose staff we gratefully acknowledge. In particular, we wanted to thank Gilberto Volcan, Enrico Dorigatti and Michele Doliana who shared their knowledge about the local herpetofauna.

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