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An unusual colour morph of *Rana dalmatina* Fitzinger in Bonaparte, 1838 from the Czech Republic

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The genus *Rana* shows substantial variation in body pattern and colouration, reflecting its broad geographic distribution and species diversity across habitats ranging from lowland areas to high mountain systems (Grossenbacher, 2014). Nevertheless, apart from the well-known transient blue colouration of breeding *R. arvalis* males (Ries et al., 2008), shades of brown generally predominate, and colour changes, aberrations, or mutations have been reported only rarely in the genus (e.g., Bringsøe, 2011, 2022a, b; Allain and Goodman, 2017; Baker and Biddle, 2020; Di Marzio et al., 2026b). Available records indicate that colour anomalies in *Rana* comprise a diverse spectrum of phenotypes and are not restricted to a single taxon or pigmentation disorder. Reported examples include albinism in *R. temporaria* or *R. arvalis* (Smallcombe, 1949; Klemz and Kühnel, 1986; Bringsøe, 2023), iris depigmentation in *R. arvalis* (Vershinin, 2004), xanthochromism, erythrism, piebaldism, bright spotting, and black-eyedness in *R. temporaria* (Allain and Goodman, 2017; Baker and Biddle, 2020; West and Allain, 2020; Marushchak et al., 2021; Bringsøe, 2023), leucism in *R. dalmatina*, and/or possibly amelanism in *R. draytonii* (Bringsøe, 2022a; Jansen and Alvarez, 2022; Solis-Sotelo et al., 2022), and even true colour-mutant phenotypes in *R. japonica* (Sumida et al., 2016). Collectively, these reports show that pigment anomalies in *Rana* range from reduced or absent dark pigmentation to conspicuous red or yellow colour shifts, while also highlighting that terminology has not always been applied consistently or accurately across studies (see Ruiz-Elizalde, 2019). Even so, such anomalies appear to be documented less frequently in *Rana* than in the closely related genus *Pelophylax* (e.g., Di Marzio et al., 2026a), formerly included within *Rana*. Additional well-documented records are therefore important both for species-level natural history and for refining the comparative interpretation of colour aberrations within the genus.

On 13 and 14 March 2026, we observed an adult male *R. dalmatina* (snout–vent length approx. 48 mm) swimming in an artificial breeding garden pond in Mnichovice-Božkov, Czech Republic (49.9318°N, 14.7012°E, elevation 402 m). The frog exhibited an unusual and highly conspicuous colour phenotype (Fig. 1). The head, dorsum, flanks, and most of the hind limbs were bright red-orange to salmon-orange, with the dorsal colouration appearing nearly uniform. Darker brown pigment persisted as a narrow line in the temporal region below the eye and as several irregular blotches on the hind limbs. The iris appeared normally pigmented and was not red. In contrast to the intensely coloured dorsum, the forelimbs and parts of the ventrolateral surfaces were distinctly unpigmented, showing a whitish-pink to pale flesh-coloured appearance. Pale depigmentation was also evident in the inguinal region. Overall, the specimen combined extensive red-orange dorsal pigmentation with sharply contrasting pale unpigmented areas and residual dark markings on the hind limbs (Fig. 1). After observation and photography, the frog was released at the site where it had been found. A few days later, a normally coloured female was observed at the same spot. According to residents, the unusually coloured individual had been observed repeatedly during the spring of 2026.

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Figure 1. Adult male *Rana dalmatina* from the Czech Republic showing unusual colouration. Panels A–D show the individual in dorsal and lateral views, including details of the head, residual dark pigmentation, pale unpigmented areas, and normally pigmented iris. Photo by Tomáš Klacek.

Of the three species of the genus *Rana* recorded in the Czech Republic, *R. dalmatina* is considered the least variable in colouration (Moravec, 2019). Its typical colouration includes grey, light brown, or yellowish-brown tones, occasionally with pale pinkish or reddish-grey hues. To our knowledge, an individual showing such intense red colouration has not previously been observed in populations of this species in the Czech Republic or Central Europe and probably represents only the second case after Bringsøe (2022a) reported an individual in Denmark. As this observation allows only preliminary conclusions, the aberrant colouration of this individual is best interpreted descriptively as a form of erythrism with localized unpigmented areas, rather than being assigned uncritically to a single mechanistic category. Recent work on colour abnormalities in amphibians has emphasised that terminology is often inconsistent and that similar phenotypes may be classified differently among studies (Gould, 2025; Di Marzio et al., 2026b). This inconsistency is also evident in red-coloured specimens reported in the genus *Rana* where some records are interpreted as albinism (although the iris is normally coloured; see Ruiz-Elizalde, 2019), whereas others were not identified more precisely (Jansen and Alvarez, 2022). Moreover, the specimen which Di Marzio et al. (2026b) described as erythristic, probably falls into a category Henle et al. (2017) and Bringsøe (2023) called black-eyed anomaly. This is why conclusions based on photographs only should be considered carefully.

Within the genus *Rana*, erythrism has been documented in *R. temporaria* (West and Allain, 2020; Di Marzio et al., 2026b) and may also characterise some previously reported red phenotypes in *R. parvipalmata* (Ruiz-Elizalde, 2019) and *R. draytonii* (Jansen and Alvarez, 2022), where the overall phenotype is shifted strongly toward the red colour spectrum. On the other hand, Bringsøe (2022a) interpreted a bright orange *R. dalmatina* as leucistic because the normally dark facial mask and hind-limb cross-bands were reduced to dark orange or brownish orange, while the eyes remained normally pigmented.

In the individual we encountered (Fig. 1), the extensive red-orange dorsal colouration is most consistent with an

erythristic component, because the overall phenotype is shifted strongly toward red rather than appearing merely pale or weakly pigmented. At the same time, this frog did not appear to be purely erythristic. In addition to the red-orange dorsal surfaces, it shows conspicuously whitish-pink unpigmented areas on the forelimbs, digits, and ventrolateral regions. These pale areas suggest a localised reduction of normal skin pigmentation and therefore support the presence of a leucistic component, especially because the eyes appear normally pigmented rather than red, which is also the key criterion used by Bringsøe (2022a) in his interpretation of leucism in *R. dalmatina*. However, the persistence of distinct dark pigment on the hind limbs argues against complete leucism (or amelanism), because pigment loss is clearly not expressed uniformly across the body. The most defensible interpretation is therefore that this individual was predominantly erythristic, but with additional, partially leucistic depigmentation. Because this assessment is based on external phenotype rather than histological or genetic evidence, it should be regarded as a descriptive phenotypic interpretation rather than a mechanistic diagnosis, and should remain a subject for future investigation.

Interestingly, both aberrantly coloured *R. dalmatina* were recorded in spring, during the reproductive period, when males of this species are often very dark, almost black (Hachtel and Grossenbacher, 2014; Fig. 2), and generally more active than during the rest of the year.

Figure 2. Male *Rana dalmatina* from Ostrava-Landek, Czech Republic, showing typical early spring colouration. Photo by Petr Vlček.

This temporal coincidence raises the question of whether the observed phenotype is expressed throughout the year or instead represents a seasonal condition associated with reproductive or thermoregulatory processes. Alternatively, it may simply be an aberration that is more likely to be detected during periods of increased seasonal activity (spring), when unusual individuals have a greater chance of being observed. However, the possibility cannot be excluded that temperature fluctuations, endocrine changes associated with the breeding season, or other reproduction-related physiological processes influence the intensity or expression of such unusual colouration. At present, this interpretation remains speculative. The observed phenotype is therefore best described as an erythristic colour aberration with localized unpigmented areas, possibly representing erythristic leucism, rather than as simple erythrism, complete leucism, albinism, or xanthochromism.

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