

Colour variants in the Japanese Treefrog (*Dryophytes japonicus*) from Russia and South Korea

Irina Maslova¹, Yikweon Jang², Andrey Zhestkov¹, and Amaël Borzée^{2*}

Most Palearctic anurans display colours ranging from brown to green, with some exceptions: male *Rana arvalis* Nilsson, 1842 become bright blue during the breeding season (Hettyey et al., 2009). Temporary changes in body colouration are induced by hormones and result from the synchronised displacement of pigments in the chromatophores (Sköld et al., 2013). Body colouration plasticity is likely to be an anti-predation strategy (Stevens and Merilaita, 2011). Rare individuals display unusual variations in colour, termed abnormal colouration, which might be a maladaptation to the environment (see for instance Mahabal and Thakur, 2014). Some variants are known to have blue hints in their coloration due to genetic mutation, a different type of colour abnormalities as individuals expressing this trait cannot revert to the usual colour (Nishioka and Ueda, 1985)

Dryophytes japonicus, previously attributed to *Hyla japonica* Günther, 1859 (Duellman et al., 2016), is a widely distributed Palearctic species occurring in China, Russia, Japan and on the Korean Peninsula (Kuzmin et al., 2017). The species starts breeding when temperature reaches *circa* 12 degrees Celsius and produces advertisement calls until July at the northern edge of its range. The genus is known to display body colouration plasticity, although it has never been reported for the species on the Asian mainland (Nielsen, 1978; Nishioka and Ueda, 1985). Males are usually green to brown

during the breeding season and change colour based on their environment (Kang et al., 2016). We recorded the presence of three individuals with abnormal colourations, two individuals entirely blue, and one individual yellow with green dorsal patterns. The yellow individual was a male found in Gimpo, Seoul, South Korea (37.573167° N, 126.789189° E; 6 m a.s.l.) on 4 May 2016. The two other blue individuals were found on 12 June 2016 in Asan, South Korea (male, 36.803039° N, 36.803039° E; 5 m a.s.l.) and 27 June 2016 in Artyom, Vladivostok, Russia by Mr. Semenchenko (female, 43.386141° N, 132.185925° E; 22 m a.s.l.). All three individuals were noticed due to their strikingly unusual colours (Fig. 1).

The individual caught in Russia was placed in a terrarium after capture for observation. The individual remained blue for 106 days, until 8 October 2016 after which date it changed back to the “typical” green and brown. Following the colour change, the individual was presented with clear and dark backgrounds, both in winter and summer, to trigger it into naturally reverting to the blue colour. The trials were not successful, and the individual remained brown. The abnormal colourations reported here could be linked to genetic mutation, either spontaneous, or due to mutagenic agents as both individuals in South Korea were found in highly disturbed and polluted environments. Another potential explanation is an abnormal hormonal expression leading to the temporary displacement of pigments in chromatophores, explaining the switch back to natural colouration in the individual caught in Russia. It is not possible to select either explanations, or any alternative, based on the data presented here, but this warrants further investigation on abnormal colourations.

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¹ Federal Scientific Center of the East Asia Terrestrial Biodiversity Far Eastern Branch of Russian Academy of Sciences, Vladivostok, 690022, Russia.

² Department of Life Sciences and Division of EcoScience, Ewha Womans University, Seoul, 03760, Republic of Korea.

* Corresponding author. E-mail: amaelborzee@gmail.com

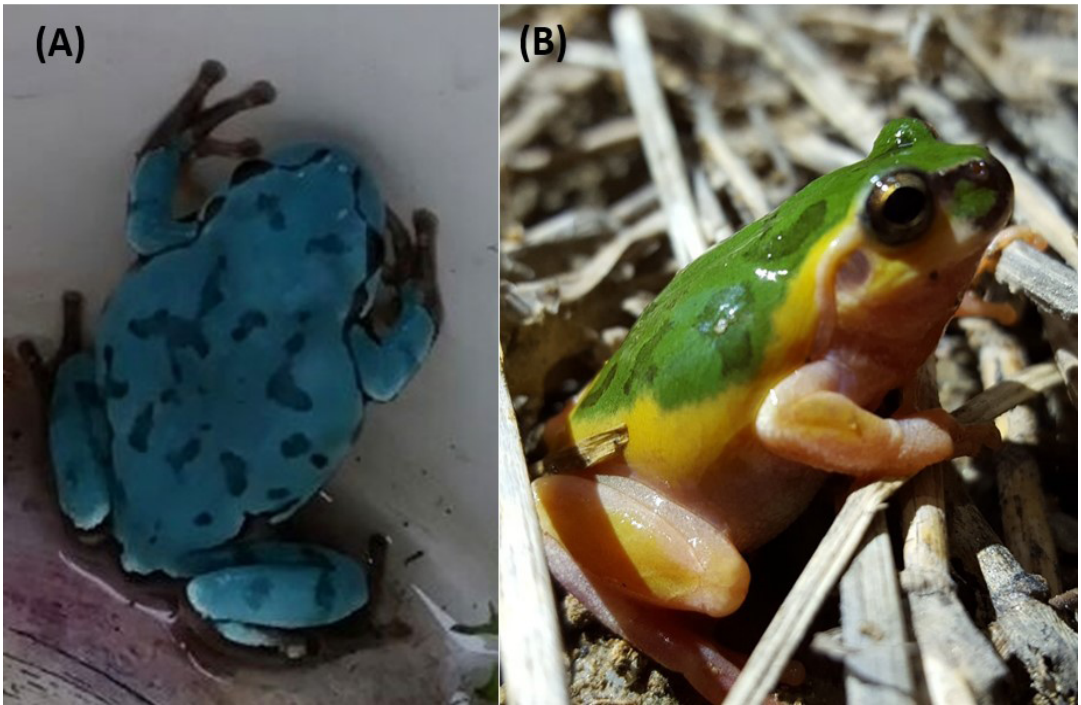


Figure 1. Photographic illustration of the two abnormal colourations recorded for *Dryophytes japonicus*. (A) A blue coloured individual from Artyom, Russia, and (B) a yellow individual with green dorsal patterns from Gimpo, South Korea.

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