

Discovering the black proteus *Proteus anguinus parkelj* (Amphibia: Caudata)

Kako smo odkrivali črnega močerila *Proteus anguinus parkelj* (Amphibia: Caudata)

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The famous proteus was first mentioned in literature as 'a vermin' by Valvasor (1689), and scientifically described by Laurenti (1768). The animals were highly troglomorphic, without dark pigmentation and with eyes covered by skin. Later, very similar animals were found along the Dinaric karst from the Italian Carso/Kras through Slovenia, Croatia, down to the extreme SE of Herzegovina (Sket 1997) and probably molecularly detected in Montenegro (Gorički et al. 2017). *Proteus anguinus*, človeška ribica, čovječja ribica, močeril, protej, (German) Olm, became a very popular animal, a kind of a mascot of the Dinaric underground; its occasional findings have been often mentioned even in newspapers. Additional troglomorph and troglobiotic amphibians were found in North America; they belong to another family, Plethodontidae, while proteids are represented in North America by epigean relatives of proteus, the *Necturus* spp.

But it was only in the 20th century that a non-troglomorph proteus was found. The first specimen was caught by researchers of the Institut za raziskovanje krasa (from Postojna) during a pumping experiment on the Dobljica spring near Črnomelj, in Bela krajina, SE Slovenia (Aljančič et al. 1986). The specimen was given to the Biology Department, University of Ljubljana, for study purposes. The animal caught our attention since it greatly differed from the white protei. As even the common white proteus is very popular, this finding caused much attention and resulted in numerous newspaper articles: immediately, as well as in the following year(s).

The black proteus, beside nearly black pigmentation and well developed eyes, exhibited all characters which one would expect from the epigean ancestor of the troglobiotic *Proteus anguinus*. But we were cautious; instead of immediately describing a new species, or even a new genus, as was often the case with cave animals and their eyeless epigean relatives (compare the case *Anoptichthys* – *Astyanax*), we were first trying to obtain additional specimens. Scuba diving in the lakelet and epigean drains of the Dobljica spring did not provide any specimens, which suggested the troglobiotic nature of the 'black proteus'. Later, an additional specimen was seen and photographed in a spring at Jelševnik and finally, after a strong rain, we found more than ten specimens creeping from holes through the thin turf, evidently covering a porous karst rock, in another spring, Na trati, at Jelševnik.

After that, a coworker was engaged, able to find out phylogenetic relations by molecular means. The result was a description of a new subspecies *Proteus anguinus parkelj* by Sket & Arntzen (1994). Our caution seemed justified. Instead of being an outgroup to populations of the white proteus, the black one from Jelševnik appeared to be more closely related to the white populations from SE Slovenia than those were to the white proteus from SW Slovenia. These analyses, grounded on allozymes, were later followed by DNA analyses with a higher number of samples (Gorički & Trontelj 2006), which only confirmed the black proteus as a distally split branchlet of the species' tree. Its morphological characters are most probably plesiomorphies, preserved during a number of (repeated) innovations in other populations. Beside dark pigmentation and evidently functional eyes, these are a normally shaped head without a snout elongation, differently shaped skull bones, lower teeth number, shorter legs, shorter tail (with lower vertebrae number), and longer trunk with higher vertebrae number. Another view was expressed by Sessions et al. (2015), who consider this animal a victim of secondary 'de-troglomorphisation'. In spite of near-absence of troglomorphies, *P. a. parkelj* is evidently a troglobiont, appearing outside caves not more often than the white proteus.

Beside proteus, the springs at Jelševnik are draining also some epigeal and even terrestrial (Diplopoda, Chilopoda) animals, which indicates a relatively good food supply, resulting in a comparatively weak selection pressure for this non-trogloform troglobiont. Beside that, maintaining of the non-trogloform appearance might be a result of a late immigration underground; note that the presence of the black proteus is paralleled by the only cave shrimp race with still present and pigmented eye rudiments (*Troglocaris anophthalmus ocellata* Jugovic et al. 2012) living in the same area.

The distribution area of the black proteus seems not to reach beyond several kilometers in diameter, SW to W of Črnomelj in SE Slovenia.

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