

25 March 2017

**Scientific Research Centre of the Slovenian Academy of Sciences and Arts  
Tular Cave Laboratory at the Society for Cave Biology**

**Media only:**

Špela Gorički: +386 51 323 411, goricki.spela@gmail.com

Gregor Aljančič: +386 31 804 163, gregor.aljancic@guest.arnes.si

**Media website:** <http://www.tular.si/index.php/conservation>

**Embargoed until: 27th of March 2017, 10 AM UK time**

**Scientists overcome the inaccessibility of cave habitats through molecular genetic approach**

An international group of scientists has used a novel highly sensitive method for detection of environmental DNA in groundwater to extend the poorly known range of the rare subterranean amphibian from the Dinaric Karst. With this highly sensitive non-invasive method they discovered 12 new localities of the olm (*Proteus anguinus*). Their findings were published on 27th March 2017 in the journal *Scientific Reports*.

Puzzling the minds of many famous naturalists, from Linnaeus, Cuvier and Humboldt, to Lamarck and Darwin, *Proteus* is one of the world's prime symbols of natural heritage and study. This blind salamander is by far the largest cave animal in the world. In over 250 years of research, it has only been sighted at 300 subterranean sites along the Dinaric Karst. *Proteus* is a globally threatened species, and is vulnerable due to groundwater pollution.

So far, the hurdle to studying and protecting *Proteus* has been its subterranean habitat inaccessibility. The authors, Špela Gorički, David Stanković, and others developed an indirect method to search for *Proteus*, detecting its DNA released in water (environmental DNA or eDNA). Traces of *Proteus* eDNA were searched for in water samples collected from karst springs, wells or caves by a quantitative real time polymerase chain reaction-based approach.

The authors conducted the most extensive survey of *Proteus* distribution in Slovenia, Bosnia & Herzegovina and Montenegro, established its likely presence at seven new sites along the southern limit of its known range, and newly documented its presence in Montenegro.

The study also developed a more specific method to detect the eDNA of the black *Proteus* morph, a rarely spotted animal that is confined to an area of 30 km<sup>2</sup> in Southeastern Slovenia. This sampling doubled the known black *Proteus* sites – a new basis for an efficient conservation management – and documented that both black and white *Proteus* populations live side by side.

“Our results show that the eDNA approach is suitable not only in biogeography and conservation of rare and endangered species, but it is efficient also in addressing questions in evolution and taxonomy of the cryptic subterranean fauna.” said Dr. Špela Gorički, the first

author on the study. “All countries, both within the previously known and the newly established range of *Proteus*, should confront the challenge to preserve it. Not only would we lose such an extraordinary animal, but the people would lose their only source of drinking water”, said Gregor Aljančič of the Tular Cave Laboratory, the senior author.

The study was part of the project “A survey of the distribution of *Proteus anguinus* by environmental DNA sampling”, co-financed by the Critical Ecosystem Partnership Fund, BirdLife International and DOPPS (CEPF GEM No. 45), and the project “With *Proteus* we share dependence on groundwater”, financed by the EEA Financial Mechanism and the Norwegian Financial Mechanism 2009-2014 (SI03-EEA2013/MP-17).

###

Note to Editors: The direct link to the Scientific Reports paper will be available at:  
<http://www.nature.com/articles/srep45054>

Previous reports and media coverage, further information on this study:

- Report of the project “A survey of the distribution of *Proteus anguinus* by environmental DNA sampling” (2013-2014):

[http://www.cepf.net/SitecollectionDocuments/mediterranean/FinalReport\\_SCB.pdf](http://www.cepf.net/SitecollectionDocuments/mediterranean/FinalReport_SCB.pdf);

- CEPF inovative projects 2017: <http://www.birdlife.org/cepf-med/best-practice/cave-olm>,  
[http://www.birdlife.org/cepf-med#Best\\_practices](http://www.birdlife.org/cepf-med#Best_practices);

- Interview with Špela Gorički: <http://www.sciencemag.org/news/2016/06/crime-solving-technique-maps-underground-lair-slovenian-dragon>;

- Paper on implication of the eDNA approach on conservation of *Proteus*:

[http://www.tular.si/images/pdf/Aljancic et al 2014 Endangered Proteus combining DNA and GIS for its conservation.pdf](http://www.tular.si/images/pdf/Aljancic_et_al_2014_Endangered_Proteus_combining_DNA_and_GIS_for_its_conservation.pdf).