

Microbes welcome protected habitat

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A pond in Salzburg has been granted nature conservation status due to its unusually diverse population of ciliates. As the results of an Austrian Science Fund FWF research project show, this small water body is home to an excess of 100 different species of ciliates, i.e., single celled organisms that have many hair-like cilia (e.g. Paramecium, the slipper-shaped ciliate). The data, which have been published in the scientific journal *Diversity*, also reveal that some of the species were previously unknown. They owe their survival to the vigilant taxonomists from the University of Salzburg, who saved the ephemeral pond from being filled in permanently and applied for conservation status. The latter was granted by the city of Salzburg and Krauthügel pond is now acknowledged as a globally unique "natural monument".

Cockatoos and [cheetahs](#) are clearly impressive organisms - [ciliates](#) less so. This explains the enormous efforts made to conserve some species while the loss of others goes entirely unnoticed. According to Prof. Wilhelm Foissner from the Department of Organismic Biology at the University of Salzburg, Austria however, the situation with regard to such [species loss](#) is decidedly dramatic: He estimates that for every multicellular species lost, a protist species also becomes extinct. Thanks to his efforts, 150 species of protists now have a protected habitat at the foot of the Hohensalzburg fortress.

By a hair's breadth

As recently as 2010, the survival of the numerous ciliates and their habitat was under threat: As part of an outdoor art project, the pond,

which is sometimes dry, was filled in with earth. Thanks to the rapid reaction of Prof. Foissner and his colleagues, the owner removed the earth before any [permanent damage](#) was inflicted on the habitat and the city of Salzburg declared the pond a "natural monument".

A current publication by the research team in the scientific journal *Diversity* shows how justified this special conservation status is. Prof. Foissner explains: "We have been observing and analysing this water body for 30 years and have found over 100 species of ciliates - [single-celled organisms](#) with hair-like organelles called cilia - of which ten were undescribed. Quite remarkable in an area just 30 x 15 m in size!" This species diversity is probably due to the pond's alternating wet and dry phases, which provide special living conditions for different ciliate species for limited periods of time.

The pond's conservation status is one of a kind in the world. No other location is known that has been granted conservation status solely on account of its protist biodiversity. In Prof. Foissner's view this problem is not only due to the unprepossessing nature of the species in question: "Protists - that is life forms that are not fungi, animals or plants - are generally viewed as cosmopolitans and the only species that are usually deemed worthy of protection are those that are (still) restricted to a particular region. However, it is known today that the distribution of a good third of protists is restricted." Prof. Foissner also assumes that this applies to five of the new species whose presence he and his team were able to confirm in Krauthügel Pond, the official name of the water body. Despite comprehensive research, they failed to discover any other locations in which they are found.

Location and species protection

In the article in *Diversity* Prof. Foissner argues convincingly that the pond's special conservation status is particularly necessary on account of

the presence of the newly discovered species. Some of them may very well only live there (endemic), and hence present one of the traditional arguments for special conservation status. Another - and new - argument is the so-called type locality. This refers to the locality from which a [species](#) has been described for the first time. The type locality is usually viewed as being of secondary significance in multicellular organisms which can be well conserved and held in collections as references. For microscopic organisms like ciliates, however, this is only possible in part. Consequently, the conservation of the type locality is very important because this enables its future use as a source of reference material.

Prof. Foissner and his team actually succeeded in persuading the officials responsible for nature conservation in Salzburg, and a total area of over 5,000 m² has now been protected. In this way, the results of an FWF project have contributed to the implementation of new approaches in [nature conservation](#).

More information: Cotterill, F. et al. Conservation of Protists: The Krauthügel Pond in Austria, *Diversity* 2013, 5, 374-392. [DOI: 10.3390/d5020374](#)

Provided by University of Salzburg

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