Research team taking fish samples in the Langete river using the electrofishing method (Photo: Dario Josi).

Two new fish species discovered in Swiss waters

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Topics: Biodiversity

The public can take part in a survey to decide on the names of two fish species discovered by Bárbara Calegari and her colleagues. In this interview, the biologist explains where they live and how to make the diversity of our waters visible.

Ms. Calegari, you have discovered two new species of fish – were you surprised?

Bárbara Calegari: No, not really. The genus of fish we were studying, Barbatula, is known for its genetic diversity. However, the individual species have a similar morphology, meaning similar external traits, which makes it difficult to identify differences. The genus was described by early naturalists, but has hardly been studied since.

Where did you discover the new species of fish?

The new species were both discovered in Swiss waters, but populate different habitats. One species lives in the fast-flowing streams and rivers of the Rhine system and extends into the Danube in Bavaria, Germany and Austria. The other species lives in the quieter lakes of the Aare system and appear in the Neuchâtel, Biel, Lucerne, Zurich and Walensee lakes. Fish belonging to the genus Barbatula inhabit waters in Europe and Asia.

How could you be sure that these were new species?

We studied the fishes extensively using modern genetic methods, in terms of external traits

(morphology), the bone development and structure (osteology) and their habitat (ecology). The studies discovered consistent differences to confirm and validate the two new species.

The newly discovered fish species. Top: Barbatula species from calmer waters. Bottom: Barbatula species from fast-flowing waters (Photo: Bárbara Calegari).

How do the new fish species differ from already known species?

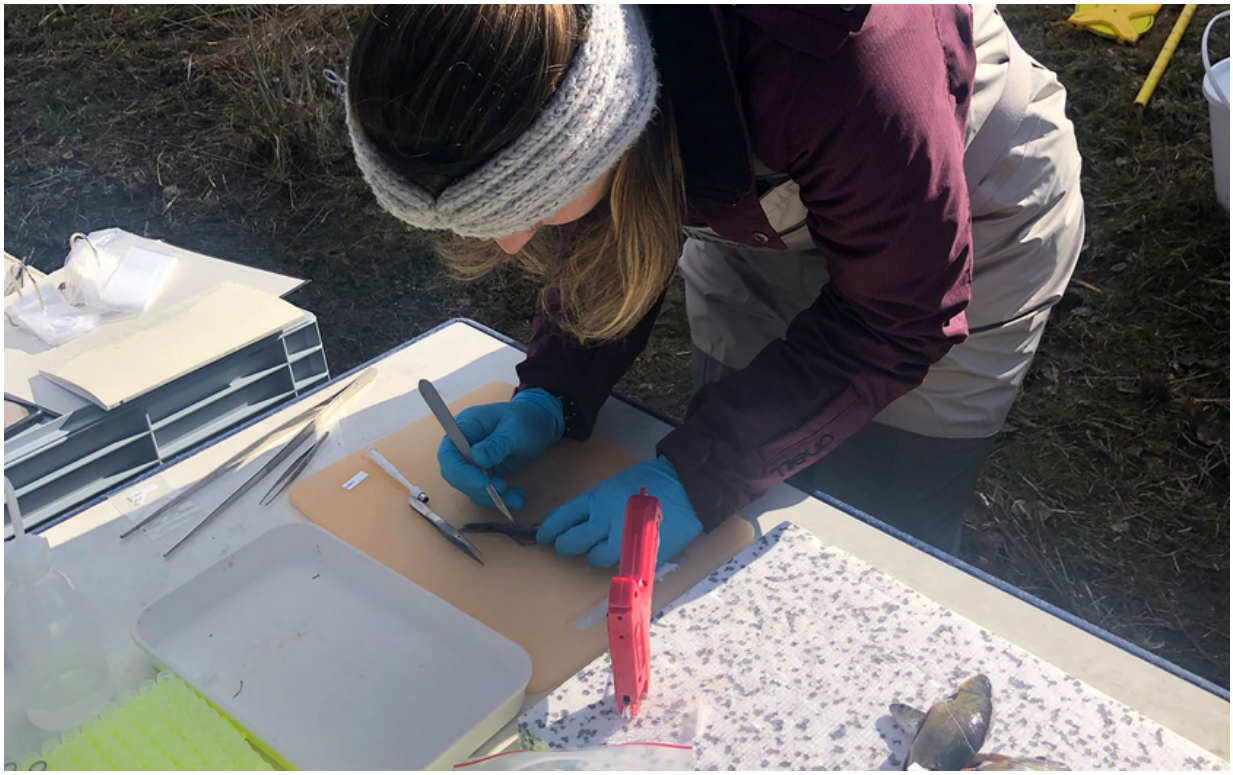
The new fish species differ from the 13 European Barbatula species known so far both in terms of morphology and genetics. Morphological differences are particularly evident in the head and body structure: for example, how flat or long the trunk is, the length and position of the head relative to the body, the width of the head and the distance between the eyes, and the pigmentation of the abdomen and chest. Compared to each other, the two new species have differences related to their habitats. The species living in fast-flowing waters has larger and stronger pectoral fins that give it stability and support in turbulent currents. By contrast, the species from calmer waters has smaller and more delicate pectoral fins and a larger swim bladder, which allows for better buoyancy control at different water depths.

How can new species of fish still be discovered in Switzerland? Are not all the species known by now?

No, there are around 36,400 known fish species worldwide, but many are still undiscovered. It is estimated that some 800 species have yet to be described in Europe alone. In Switzerland, fish species are often overlooked because their habitats are considered to be well researched. Since many European species were described over 200 years ago, few researchers have devoted themselves to these populations in recent years. However, modern DNA analyses make it easier to detect genetic differences and identify new species.

Can you give us an insider tip – where is the best place to look if you want to discover more fish species?

There is no easy answer to that. The discovery of new fish species requires extensive expertise and often begins with catching an unusual specimen in the wild or by finding unidentified specimens in museum collections. The chance of finding new species is higher in remote, unexplored areas, such as tropical regions.



Bárbara Calegari taking genetic samples of fish from the Emme river (Photo: Conor Waldock).

What is the next step if a new species of fish is discovered?

If it is confirmed to be a new species, selected specimens will be included as type material in a scientific collection and made available to research. This is followed by the formal description of the species – an indispensable step for documenting biodiversity. This involves documenting traits such as appearance, differences to related species, habitat and the name. Finally, everything is recorded in a publication that serves as a basis for further studies and the identification of more specimens.

Where do new fish species get their names from? Are the fish be named after you, Calegari 1 and Calegari 2?

No, it's not common to name a new species after yourself. The naming process is a creative process that is a lot of fun. Although it is possible to name a species after a person, most often a name is chosen that reflects a specific characteristic of the fish species – be it the appearance, the region where it is found or an aspect of its habitat. Scientific names are often

Latin or Greek and follow the binomial nomenclature: They consist of the genus name, in our case Barbatula, and a specific epithet, the second part of the scientific name, which gives a more precise description or distinction of the species. This second part is still missing for our fish species. For the two new species, we would like to involve the population and give them the opportunity to help decide on the names in a survey.

Survey decided

6 March 2025: The survey has now been completed and the names for the two newly discovered Barbatula species have been decided. A total of 1,919 people took part in the survey and voted on the proposed names. The name chosen for the species from the fast-flowing waters was "fluvicola". The name comes from the Latin fluvicola and means "inhabitant of rivers". It thus refers to the favoured habitats in rivers in which this species was found. The name "ommata" was chosen for the species from calmer waters. The name is derived from the Greek ómmata (??????) and means "eyes". This refers to the large diameter of the eyes of this fish species compared to others.

More information

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Bárbara Calegari and Conor Waldock measuring the size and weight of the fish during field work in the Emme river and photographing them (Photo: Dario Josi).

How did you come up with the idea of letting the population take part in naming the fish?

I think it gives us a good opportunity to raise awareness for biodiversity among the population. People can learn more about the fish species in their waters and at the same time be made aware of the worrying decline in biodiversity, especially in aquatic ecosystems. By actively involving the population in the discovery process, we want to promote a deeper connection to nature, encourage an interest in science and motivate them to protect biodiversity, also underwater.

How can the discovery of fish species contribute to species protection?

The discovery of new species is crucial for species protection – because we cannot protect what we do not know. The description of a species documents its existence and allows for appropriate conservation planning. Intact freshwater ecosystems are also important for humans, and understanding their diversity is the key to protecting these habitats, with their already known species but also many undiscovered and yet to be described species.

Cover picture: Research team taking fish samples in the Langete river using the electrofishing method (Photo: Dario Josi).

Financing / Cooperations

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Website of the Eawag Fish Ecology & Evolution department on the Lanat-3 research project

Website of the Eawag Department of Environmental Social Sciences on the Lanat-3 research project

Project LANAT-3

Bárbara Calegari and the team from the University of Bern, the Natural History Museum of Bern and Eawag, in collaboration with the Wyss Academy for Nature, the Canton of Bern, the Federal Office for the Environment, and the Swiss Competence Center for Fisheries discovered the unknown fish species as part of the LANAT-3 project on behalf of the Wyss Academy for Nature, the Canton of Bern and the Federal Office for the Environment (FOEN), in collaboration with the Swiss Competence.
More information

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https://www.eawag.ch/en/info/portal/news/news-detail/two-new-fish-species-discovered-in-swiss-waters