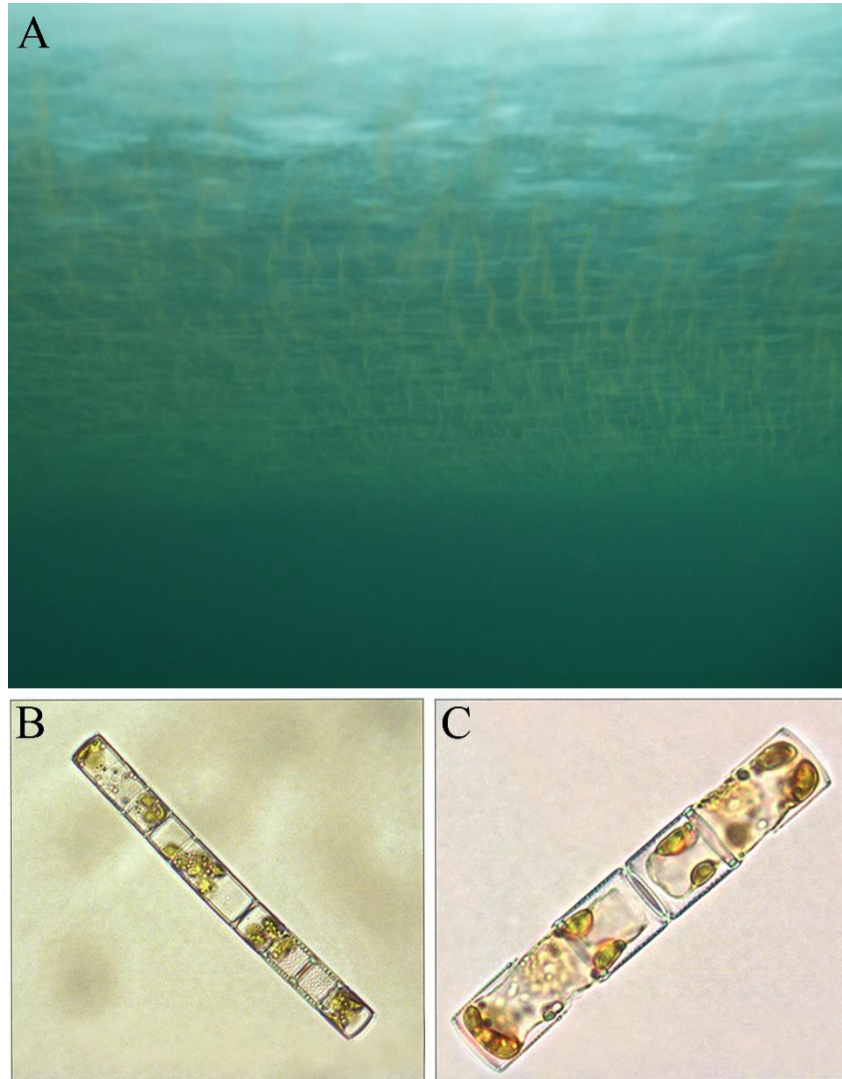


The MicroPrimaryProducerStars:

The Aulaco sisters (*Aulacoseira islandica* & *Aulacoseira baicalensis*)

(Maria Bashenkhaeva)



A: Under-ice bloom of diatoms *Aulacoseira islandica* and *Aulacoseira baicalensis* in Lake Baikal (Under-ice photo by Khanaev I.V). The Aulaco threads can be seen attached to and growing down from the surface ice cover. B and C: Microscopy images of *A. baicalensis* and *A. islandica*, respectively.

Claim to fame: Under-ice wizards – the main primary producers in winter phytoplankton.

In the clean waters of the temperate and northern latitudes, amazing life is hidden. There, among the cold waters, live two sisters, small diatom algae named *Aulacoseira islandica* and *Aulacoseira baicalensis*: the Aulaco sisters. These algae are real wizards. Their names themselves sound like a spell: "Aulacoseira"!

The Aulaco sisters are photosynthetic – *primary producers* – like plants they use the energy of sunlight and dissolved carbon dioxide in the water to produce sugars which they use to grow. And, like plants, they produce oxygen, which enables other creatures to breathe. They grow in

long colonies, as if weaving a carpet of their babies, and have a unique ability to survive where others would have difficulty. And one of the sisters *Aulacoseira islandica* is able to form "time capsules" - spores in which it stores all the information about itself.

When winter reigns on the earth, water bodies at high latitudes are covered with a thick layer of ice. But for the Aulaco sisters, this is not an obstacle! They are friends of the cold and have specially adapted to life under the ice. Like other diatoms, their cells have hard walls made of silica, which give them strength and protection.

Every spring, when the sun begins to warm up, the Aulaco sisters begin to grow rapidly. Their long colonies begin to bloom, as if they were going on a merry holiday. They make the water around them brighter and cleaner, helping other creatures to breathe. And some of the crustaceans patrolling their waters are not averse to snacking on and enjoying the taste of these diatoms. While other algae hide from the cold, the Aulaco sisters proudly look at the world, full of joy and hope.

One day, a curious boy named Misha came to Lake Baikal to explore its inhabitants in the spring. He looked under the ice and - Oh, miracle! - the very first thing he saw was the Aulaco sisters. "What lovely algae!" he thought. The boy did not yet know what an important role these algae play in nature, but he felt that they were simply magicians. Every time Misha came to the lake, he smiled, seeing how the Aulaco sisters held tightly under the ice and became longer and richer, ready to delight the whole world in the spring. Thus, the little Aulaco sisters showed everyone that even in the harshest conditions you can find joy and beauty.

The Aulaco sisters are mighty microbes giving life to cold waters

The importance of the Aulaco sisters for us.

Photosynthetic organisms are primary producers at the base of most food chains and webs, and so feed most other organisms. The process of photosynthesis also yields oxygen which many organisms need to breathe, in order to extract the energy of the food they digest. Photosynthetic organisms thus power life. Although plants are the major photosynthetic organisms on land, microbes are the photosynthetic heroes in water. Different microbes play this role in different types of water. The Aulaco sisters are in charge of cold lake waters, providing food and oxygen to their inhabitants, and thus supporting life and biodiversity in these inhospitable environments: they are key vitalisers of life!