Microbial ecosystem at Laguna La Brava may contain novel microorganisms

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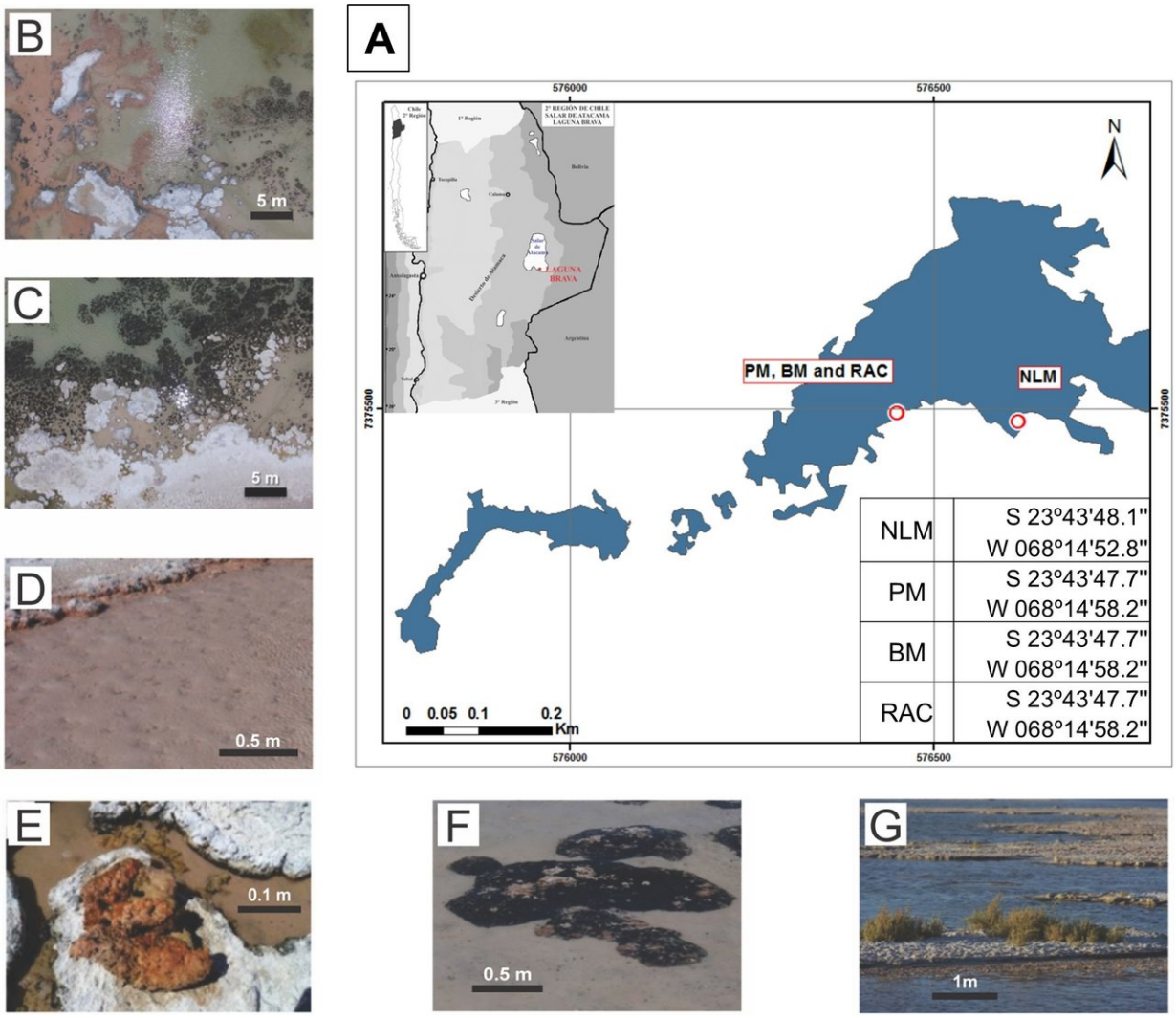

Site location and images showing systems studied.(A) Aerial view of Laguna La Brava indicating the sampling sites. (B) Aerial view of NLM (scale bar 5m). (C) Aerial view of microbialite site. (D) Detail of B, showing NLM (scale bar 0.5m).

(E) Top view showing detail of pink mat (PM; scale bar 0.1m). (F) View of black mat (BM, scale bar 0.5m). (G) View from the side of Distichlis spicata (Gramineae), with underground rhizome-associated concretions not visible, scale bar 1m). Credit: Farias et al (2017)

An investigation of the microbial environment at Laguna La Brava in Chile may suggest that novel microorganisms might be at work in the absence of cyanobacteria, according to a study published November 15, 2017 in the open-access journal *PLOS ONE* by Maria Eugenia Farias from Laboratorio de Investigaciones Microbiológicas de Lagunas Andinas, Argentina, and colleagues.

Researchers have recently been interested in the role microorganisms play in geological processes. Microbes' metabolic activities alter their microenvironment and can sometimes induce processes such as mineral precipitation and dissolution.

To learn more about microbes' interaction with their environment, the authors of the present study investigated the microbial environment of Laguna La Brava, Salar de Atacama in Chile. This lake has microbial communities growing in extreme conditions including high salinity, high solar insolation, and high levels of metals such as lithium, arsenic, magnesium, and calcium. They collected bacterial and water samples from several distinct ecosystems near the lake, including a multi-layered sheet of microorganisms known as a microbial mat, a living rock carbonate structure, and a hard compact mass formed from precipitation, and compared them to each other.

The researchers found that Euryarchaeota, Crenarchaeota, Acetothermia, Firmicutes and Planctomycetes were the most abundant bacterial and archael groups. Surprisingly, they found little or no

cyanobacteria in any of the ecosystems. Since cyanobacteria are usually an important producer of microbial mats, the authors suggest that there may be other microorganisms that are responsible for precipitating minerals in these ecosystems. Further research at these sites might reveal novel organisms and metabolisms of biotechnological interest.

More information: Farias ME, Rasuk MC, Gallagher KL, Contreras M, Kurth D, Fernandez AB, et al. (2017) Prokaryotic diversity and biogeochemical characteristics of benthic microbial ecosystems at La Brava, a hypersaline lake at Salar de Atacama, Chile. *PLoS ONE* 12(11): e0186867. doi.org/10.1371/journal.pone.0186867