

BCCM/ULC

A Public Culture Collection as Reservoir of Cyanobacterial Diversity and Taxonomic Reference Strains

A. C. Ahn¹, K. Beets¹, D. Berthold², H. D. Laughinghouse² & A. Wilmotte¹

¹BCCM/ULC Cyanobacteria collection, InBioS-Centre for Protein Engineering, University of Liège, Liège, Belgium
²Agronomy Department, Fort Lauderdale Research and Education Center, University of Florida, Davie, USA



Cyanobacterial Diversity at BCCM/ULC

The BCCM/ULC public Cyanobacteria collection (<https://bccm.belspo.be/about-us/bccm-ulc>) aims to gather a representative portion of terrestrial, freshwater and marine cyanobacterial strains from different ecosystems with a focus on the polar diversity (140/272 strains). Amongst the 243 strains, for which the 16S rRNA gene sequence was determined, 93 OTU's (99% 16S rRNA similarity) could be detected. Several strains are the reference (or 'type') for newly described taxa and recently, the BLCC (Berthold-Laughinghouse Culture Collection) deposited 196 strains with several new taxa.

What Are Reference (or 'Type') Strains?

A reference or 'type' strain in the cyanobacterial taxonomy is an isolate, which was used to describe a novel genus or a species, and which will serve as a reference to assign new isolates to this novel genus or species.

Described reference strains within BCCM/ULC

The ULC/BCCM collection harbors the formerly described reference strains for *Plectolyngbya hodgsonii* (ULC009^T), which is endemic in Antarctic continental lakes, *Shackletoniella antarctica* ULC037^T with a polar distribution, *Timaviella circinata* and *T. karstica* (ULC401^T, ULC402^T) that were isolated from the 'Lampenflora' of the Giant Cave in Italy, *Cephalothrix komarekiana* (ULC718^T) obtained from an alkaline lake in the Brazilian Pantanal wetlands, and *Parakomarekiella sesnandensis* (ULC591^T), which was isolated from the biodeteriorated walls of the Old Cathedral of Coimbra (UNESCO World Heritage Site).

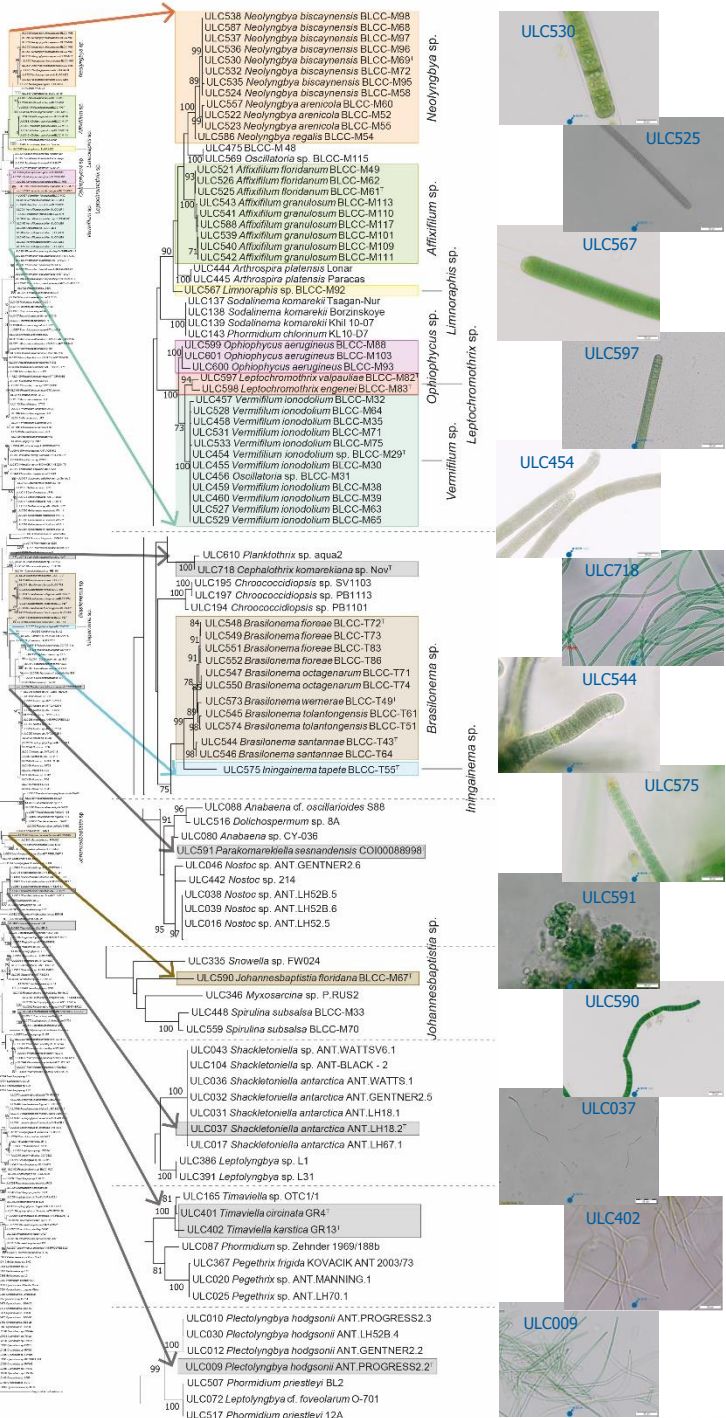
Many isolates deposited by the BLCC collection originate from coastal areas such as *Johannesbaptistia floridana* (ULC590^T) isolated as epilic from benthic coastal substrata, *Neolyngbya biscayensis* (ULC530^T) and *Affixillum floridanum* (ULC525^T) coming from marine benthic cyanobacterial mats, and *Leptochromothrix* (ULC597^T), *Ophiophycus* sp. (ULC454^T) purified from benthic mats of mangrove forests. During a study at the BLCC collection that investigated the identity of nuisance Cyanobacteria occurring in greenhouses and developed new algicides against those, several isolates were described as novel species, including *Iningainema tapete* (ULC575^T), which is capable of producing two isoforms of nodularin in high quantities and therefore forming a threat to the food production in greenhouses as well as the novel species *Brasilonema fioreae* (ULC548^T), *B. santannae* (ULC544^T) and *B. wernerae* (ULC573^T).

Novel bioactive compounds

The rather unexplored ecosystems of benthic coastal areas and greenhouses in tropical areas are a potential source of novel secondary compounds. Indeed, it has been shown that strains of *Neolyngbya* sp. and *Brasilonema* sp. are able to produce compounds with antibiotic and antifungal properties (Sanz et al., 2015; Caires et al. 2018).

In addition, Biondi et al. (2008) showed that extracts of *Shackletoniella antarctica* ULC037^T culture had antibacterial activities against *Staphylococcus aureus*.

Contact: acahn@uliege.be



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