

Cyanobacterial Populations from a Michigan Grassland Alvar

N.A. Pudlo, K.A. Tipton, A.J. Stockero and G.M. Colores
Central Michigan University, Mount Pleasant, MI 48859

The Great Lakes Region harbors nearly all of the North American alvars. Alvars are communities named after similar areas in the Baltic regions of Sweden, Estonia and to a limited extent, western Russia. Alvars are open areas of calcareous bedrock, typically limestone or dolomite, with little to no soil cover or organic matter. This exposed landscape is characterized by extreme seasonal temperature differences and low moisture retention. Although this habitat is inhospitable for most woody growth, undisturbed alvars with thin soils are able to sustain plant communities. The Maxton Plains on Drummond Island, MI was chosen as a study site because it is globally represented as one of the largest, undisturbed alvars. Although there has been research performed on the flora and fauna of North American alvars, little has been done to investigate the microorganisms populating these rare habitats. Since soil and organic matter conditions are poor on alvars, we chose to examine cyanobacterial presence based on their abilities to fix carbon and in some species, Nitrogen. Various soil-substrate samples were obtained, stored and also enriched in BG-11/BG-11_o for each sample. Additionally, a microscopic examination was performed on enrichment cultures. DNA was extracted from soil and enrichment samples and PCR amplified using cyanobacteria-specific primers. Mixed PCR products were separated via Denaturing Gradient Gel Electrophoresis (DGGE). Single unique bands from DGGE were sequenced and subjected to a BLASTn search to determine the closest relatives. BLASTn searches accompanied by microscopy revealed the presence of several cyanobacteria including *Calothrix* sp., *Chroococcidiopsis* sp., *Leptolyngbya* sp., *Microcoleus* sp., *Nostoc* sp., *Petalonema* sp., *Phormidium* sp., *Scytonema* sp. and uncultured cyanobacteria. Based on our results, the harsh conditions of the Maxton Plains Alvar appear to select for a diverse range of cyanobacteria.