TITLE: Growth strategies of Antarctic soil microorganisms in terms of r/K selection

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ABSTRACT: The melting of Antarctic glaciers is a clear example of the Climate Change effects. As the melting occurs, the front of the glacier retreats and exposes a portion of the subglacial soil to the atmosphere. These exposed soils represent a spatiotemporal gradient (chronosequence) and are important sites for studying ecological succession. Ecological succession reflects natural selection processes according to the availability of resources and the growth strategies of the organisms, as described by r/K selection. This work aims to evaluate the ecological succession in Antarctic soils through the study of r- and K-strategist microorganisms, comparing the presence and proportion of these populations along the chronosequence. Soil samples were collected at distances of 0, 50, 100, 200, 300 and 400 m from the front of two Antarctic glaciers that differ in retraction time (Baranowski Glacier, approx. 40 years; Collins Glacier, approx. 2000 years). Viable cell count was performed in each soil sample using 1% Nutrient Agar medium (w/v) incubated at 20 °C for 14 days. The emerging colonies were counted daily and classified into r-strategists (colonies formed within 48 hours) or K-strategists (colonies formed after 48 hours). The colonies were distributed in eco-collections according to: a) growth strategy and b) soil sample (distance from the glacier). Using the viable cell count data, colony accumulation curves (CFCs) were constructed. CFCs revealed differences in colony formation behavior, indicating that accumulation is dependent on soil age. We hypothesize that a change happens in the proportion of r- and K-strategists along the chronosequence. Soils closer to the glaciers (0 and 50 m) showed a higher proportion of r-strategists, while distant soils (200 to 400 m) prevail the K-strategists. This result is in accordance to the ecological succession theory for newly exposed environments, where the complexity of interactions and biodiversity increases with time of ecosystem development. Staining with DAPI will be performed and the total cell number will be estimated using a fluorescence microscope. An index of opportunism will be calculated by dividing the number of viable cells by the number of total cells, to classify a soil sample in terms of r/K selection. Comparison of the index of opportunism between the two glaciers could be used to understand the role of glacier melting in Antarctic ecological succession, and also monitor the effects of Climate Change.

KEYWORDS: Antarctica, chronosequence, ecological succession, glacier retreat, opportunism index
DEVELOPMENT AGENCY: CNPq-PROANTAR-CAPES