TITLE: R- and K- selection strategies on the microbial community succession of soils exposed by glacial retreat in Antarctica.

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ABSTRACT:

Antarctic Peninsula is one of the most sensible areas to climatic changes and has experienced a recent rapid warming during the last half century. As ice melts, the subglacial soil is gradually exposed back to the atmosphere every year, creating a natural chronosequence in front of glaciers. These new exposed soils are unique fields to study microbial succession and soil development by using distance from the glacier front as a proxy for time. The aim of this study was to characterize the microbial community succession in soils from two Antarctic Peninsula chronosequences retreating for 30-35 (Baranowski Glacier) and ~2500-3000 years (Collins Glacier). Our hypothesis is that the proportion of r- and k- strategists changes along the chronosequence. Soil samples were collected from Baranowski and Collins glaciers at distances of 0, 50, 100, 200, 300 and 400 meters from the glacier front. The proportion of bacteria considered r- or k-strategists were estimated by an index of "opportunism", that is the ratio between the number of viable cells (counted in R2A solid medium) and the total cells counts (estimated on microscope using DAPI). Moreover, it was determined the rate of colony forming units (CFU) growing in R2A medium, i.e., the number of CFU that emerges as a function of time. As a criterion for r-strategist it was considered the number of colonies that grow up to 48 hours, and k-strategists the number of colonies that appear after this period. The cultures were incubated at 25 °C and daily counts were made over a total of 16 days. In general, the results indicate a shift from r- to k- strategists along the early exposed soils (0 to 100 m), followed by a trend to increase r- strategists on older soils (200 to 400 m) on both Baranowski and Collins chronosequences. Interestingly, while the 0-100 m soils are bulk or mineral, the 200-400 m soils present lichens, mosses and the Antarctic grasses (*Deschampsia antarctica* and *Colobanthus quitensis*). Therefore, our results suggest the possible role of bacteria with different r- and k- selection strategy on the Antarctic soil development. Experiments of viable and total cell counts are still being conducted. The results of this study have shown that bacterial communities in soils exposed by glacial retreat have the potential to yield valuable information regarding microbial succession in Antarctica.

KEYWORDS: Antarctica, glacial retreat, microbial ecology, microbial succession, extremophiles

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