

BRAZILIAN RESEARCH IN ANTARCTICA SEEKS TO UNDERSTAND THE ADAPTATION OF PLANTS TO COLD ENVIRONMENT

- Plant communities - Ardley Island. Photo: Graciele Alves – UNIPAMPA

The Antarctic Vegetation Study Group - NEVA - the Federal University of Pampa - UNIPAMPA in São Gabriel - RS, in conjunction with the National Institute of Science and Technology of Southern Environmental Research - INCT-APA UFRJ, has been developing research activities since 2009 focused on evaluating the vegetation and biodiversity of plant communities in thawed areas of the Antarctic Continent.

The proposed investigation of the subject stems mainly from the fact that the Antarctic plants possess a potential for molecular studies, particularly because their cells are under constant effect of stressful environmental factors such as, for example, ionizing radiation, UV rays (UV-A

and UV-B), extreme temperature, a deficit in water and metals, which affect the development of plants that are not adapted to these factors, jeopardizing the integrity of the DNA. With this, NEVA's current interest is to understand how these plants have adapted themselves, leading to the production of different molecular mechanisms, which may even affect the transfer of genetic information as they are exposed to varying levels of environmental stress. These changes include the increase of molecules that can be exploited in a biotechnological point of view like, for example, antifreeze proteins.

Over the years, these studies could analyze: the increase and/or decrease of the plant communities in Antarctica throu-

ghout the archipelago of the South Shetlands; an assessment of the flow of greenhouse gas effect in thawing land areas in the Antarctica; an evaluation of the insecticide action mechanism of the terrestrial algae extract *Prasiola crispa* in neuromuscular models of insects (where a patent is already proposed with the results of this research); monitoring edaphoclimatic factors for correlation with the flow of gas from the greenhouse effect on soil; and an assessment of the conservation status of species of lichenized mosses and fungi in Antarctica thaw areas.

This year researchers at NEVA are mainly focusing their activities on the description of the genome of *Prasiola crispa* Lighthfoot (terrestrial algae), *Deschampsia*



Nelson Island Camp, CrulsRefuge. Photo: Filipe Victoria - UNIPAMPA



Fungi Sample collection for Biotechnological Studies. photo: Rodrigo Alves- UNIPAMPA

antarctica Desv (an Antarctic native grass related to the rice grown in Brazil) and *Polytrichum juniperinum* Hedw (a kind of moss that has existed since the origin of land plants), enabling the development of a gene database that can be explored in evolutionary and biotechnological studies, seeking to contribute to exploratory analyzes of molecular markers associating genes with differential expression in environmental stress conditions such as the cold.

The core research today includes a team of twelve researchers; all doctors, with ten professors from UNIPAMPA and two from the Universidade de Santa Cruz do Sul - UNISC. Due to the important work carried out, NEVA was given a 400m² build-

ing, financed by FINEP and MEC.

As for the scientific production team, the researchers from UNIPAMPA published 36 works in the last three years - all in internationally recognized scientific journals - promoting Brazilian research in Antarctica. This scientific production owes much to the training of teachers and collaborations among lab institutions in other countries, totaling 19 national and foreign institutions as of today.

The contribution of Antarctic research is undoubtedly very significant for Brazil, considering that this is a program that has already been in place for 33 years and is firmly consolidated. In this sense, the contribution by the research team of the Antarctic Vegetation Study Center of the

Federal University of Pampa - UNIPAMPA for Brazilian science has contributed, in a decisive way, in the formation of human resources (dissertations and completion of course work) scientific production (published papers) and generation of research products in biotechnology, which can be showed by the increasing number of professors and doctors with research carried out on plants and fungi in Antarctica.

Source: Prof. Dr. Antonio Batista Pereira.