

## Entomopathogenic Fungi in extreme environments

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### Abstract:

The surveys conducted in Chile by the Biological Control Program of the National Agricultural Research Institute of Chile (INIA), to collect entomopathogenic fungi from soil samples, ecosystems considered extreme for the life development were included. Some of these ecosystems were the hyper saline environment of the Salar of Atacama (S22° 32' 13.1") and Huasco (S20° 16' 58.1"), sectors with very low humidity inside the Atacama desert (S22° 9' 7.2"), volcanic lava fields (S38° 23' 46.9"), frozen soil from glaciers (S46° 29' 57.7"), the sub Antarctic climate of Tierra del Fuego (S54° 7' 24.6"), geysers in geothermal field with pumping water at 45-100°C (S22° 19' 47.1"); soils around the highest lake, Chungará, with altitudes of 4.650 m above sea level (S18° 16' 8 7"), soils from 4000 to 5000 m at the Andes Altiplano (S17° 23' 7'), high acidity and high rainfall soils from Isla Magdalena (S46° 55' 54.5"), and the high alkalinity environments at the Pampa del Tamarugal (S20° 19' 50.8"). The search area corresponded to 4,170 kilometers long, from latitude S18° 31' 40" to S54° 11' 37". Entomopathogenic microorganisms were collected from the soils through the baiting technique, using larvae of the wax moth (*Galleria mellonella*). A total of 1,216 isolates were collected, corresponding to 58.2% of the total samples; mainly the genera *Beauveria*, *Metarhizium* and *Paecilomyces*. 108 isolates were isolated from extreme environments; 8.88% of the total. Twelve isolates of *Beauveria* with halophylic characteristics were collected from the Salar of Atacama and Huasco, 11 isolates of *Beauveria* and 2 of *Paecilomyces* with potential anhydrobiosis characteristics were isolated from the Atacama Desert and Pampa del Tamarugal. Also, seven isolates of *Metarhizium* were collected from the Atacama Desert, including one from the Devil's Throat canyon and associated with a dry plant. Two isolates of *Beauveria* with thermophilic potential were isolated from the Tatio geothermal fields. Volcanic lava fields, frozen soils and Tierra del Fuego subantarctic climates contributed with 28 isolates, 86% for these isolates belonging to the genus *Metarhizium*. On the other hand, areas with 4000-5000 m above sea level contributed with 17 isolates of *Beauveria*, five *Paecilomyces* and two *Metarhizium*, including isolates collected over 4800 m. Soils with high acidity and rainfall contributed with 24 isolates, 80% were *Metarhizium*. The ex situ collection is lyophilized and cryopreserved now, in order to assess their biochemical properties that allow these organisms to live in such extreme environments.

**Key words:** Loreto Merino 1, Andrés France 1, Steve Edgington 2, Dave Moore 2