ITM INDIGENOUS TERRITORIAL MANAGEMENT

TACANA INDIGENOUS PEOPLE

LECO INDIGENOUS PEOPLE

GENETIC DIVERSITY OF AMAZON CACAO

ENVIRONMENTAL VALUE

Mileniusz Spanowicz/WCS

The genetic diversity of cacao from the Amazon of northern La Paz

In the Amazonian forests of northern La Paz varieties of cacao with high organoleptic quality (related to taste and aroma) have naturally evolved and recently gained national and global recognition. Historically, indigenous communities gather cacao from the forest and also grow it from seeds in traditional agroforestry systems.

Knowledge of the genetics of wild populations and their relationship with cultivated populations provides opportunities to identify promising varieties that could boost productivity and open up markets for quality cacao in Bolivia and worldwide. This knowledge is held by indigenous people who protect the genetic diversity through the conservation and management of wild cacao stands.

A study was carried out to record the genetic characteristics of Amazonian cacao (*Theobroma cacao*) from northern La Paz. To determine the structure and genetic diversity of the cacao, 201 leaf tissue samples from 19 populations of cacao (11 wild stands and 8 cultivated) were analyzed. These samples came from various communities of the Tacana and Lecos Larecaja Indigenous Territories, as well as the municipalities of Guanay and Mapiri. Information on genetic relationships was obtained at the individual, lineage and population levels. Moreover, the cacao populations' genetic evolution was analyzed.

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Results of the of genetic structure analysis using indices of genetic diversity, heterozygosity, and polymorphic content show that populations of wild cacao represent twice the average of cultivated populations, meaning they have greater genetic variability. This was especially relevant in some stands along the Beni River (Isla de Oro, Tacana) and the Madidi River (Ojaki). Cultivated populations in Villa Alcira (Tacana) and Chavarria (Lecos of Larecaja) have a recent process of domestication, while cultivated cacao populations in Tutilimundi, Candelaria. and Michiplaya (Lecos of Larecaja) have already gone through processes (natural or induced) to select varieties.

The analysis of the phylogeny, or evolutionary history, of the 19 populations of cacao – by sequencing the trypsin inhibitor – shows the relationships between them. It indicates that cultivated populations originate from populations of wild cacao that have been domesticated by indigenous peoples since pre-Hispanic times. Three genetic groups were observed:

A) The related populations of Carmen del Emero and El Camba.

B) The populations of Isla de Oro (1), Peñas y Bibosal (2), Chaparro (3), Ojaki and Esperanza del Madidi (4), from the four oldest clades.

C) The single lineage population derived from these old clades comprising Paraíso and Don Nelo and another lineage in Candelaria, San Antonio, Chavarria, Tutilimundi, Mapiri, San José, Michiplaya and Villa Alcira.

A comparison was made with data from GenBank of populations of cacao from Brazil and Costa Rica. It was found that the Amazon cacao in Bolivia is genetically distinct to those of Brazil and Costa Rica. Further comparisons are needed to establish if there is any genetic relationship with populations found in Ecuador and Peru.

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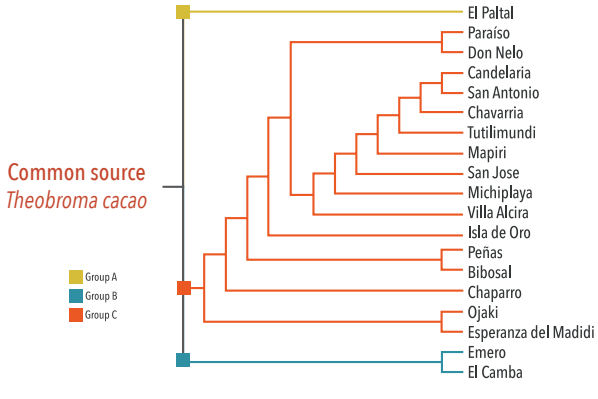
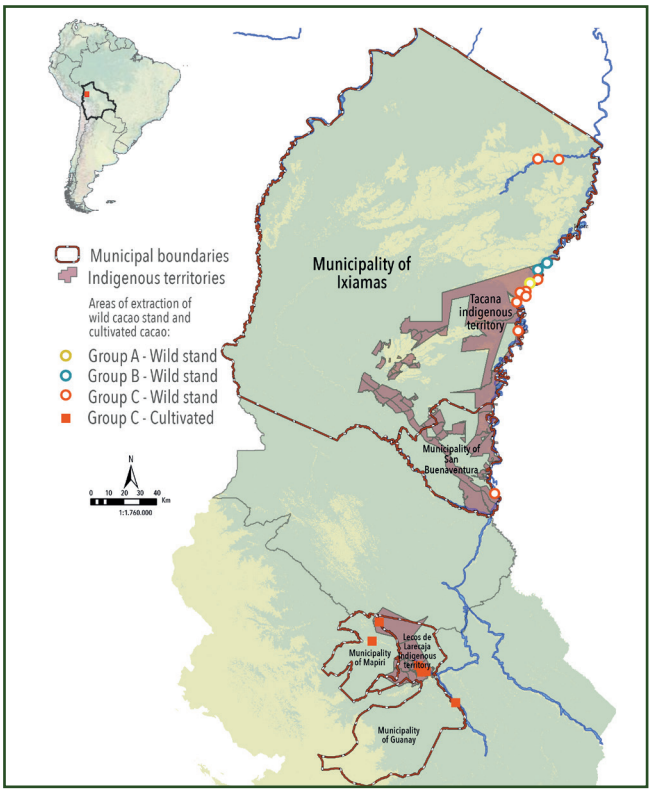
Evolutionary history of cacao populations and their location in the municipalities of northern La Paz





Another important result from the study is the establishment of a national protocol for the extraction of DNA from cacao leaf tissue samples, which will enable the development of a genetic database of all the cacao varieties found in Bolivia.

The Amazon forests of northern La Paz harbor a great genetic variability that ensures the production of high quality cacao. They are also a haven for Amazon species such as the jaguar, black spider monkey, and the harpy eagle. The management of indigenous territories are key to their conservation and sustainable management for the long term.

CACAO

Dating back to pre-Hispanic times, the gathering of cacao is a traditional activity for Amazonian indigenous communities of the northern La Paz Department. The forests harbor a great genetic variability that with good management practice can improve productivity. The traditional ways of gathering and processing of cacao has been enriched with technical innovations. The result is the improvement of aromas and flavors that the cacao bean emits during the roasting process. The commitment of the Tacana indigenous people to the conservation of natural wild standings of cacao guarantees the preservation of genetic resources for the benefit of Bolivia and the world.

THE WILD CACAO IS A GENETIC HERITAGE OF THE INDIGENOUS PEOPLE AND A FUNDAMENTAL ECONOMIC OPPORTUNITY FOR THE TACANA FAMILIES

The importance of diversity in cacao production

- More than 3,500 hectares of wild standings of cacao in the Amazon forests of northern La Paz.
- Exploitation of promising varieties for productive purposes and the identification of varieties that are resistant to disease and have excellent flavor.
- Cultivation of cacao crops by indigenous and intercultural communities that originate from wild cacao plants.
- Forest conservation that keeps wild cacao standings healthy and helps to preserve biological and genetic diversity.
- World recognition for the high quality and native origin of Amazon cacao.

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This study was carried out by the Tacana Indigenous People´s Council (CIPTA), the Carmen del Emero Wild Cacao Association (APROCACE), the Native Cacao Ecological Producers Association of the Mapiri municipality (APCAO-Mapiri), the Native Cacao Ecological Producers Association of the Leco People of Larecaja (Chocolecos), the Ojaki, Barracón and Esperanza del Madidi communities, Wildlife Conservation Society (WCS) and the Scientific Technical Research Institute of the Police University (IITCUP). It was supported by the John D. and Catherine T. MacArthur Foundation, the Gordon and Betty Moore Foundation, the Blue Moon Fund and Helvetas Swiss Intercooperation (HSI).

CIPTA
CONSEJO INDÍGENA DEL PUEBLO TACANA

CHOCOLECO
PRODUCTORES DE CACAO DEL PUEBLO LECO DE LARECAJA

WCS

MACARTHUR
The John D. and Catherine T. MacArthur Foundation

GORDON AND BETTY MOORE FOUNDATION

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Swiss Intercooperation