

Expedition to the groves of *Polylepis* (queñua) Locality Puina

The expedition to the groves of *Polylepis* (queñuales), had two stages, first we worked in the vicinity of Puina and later we moved on to Queñuapata. According to the vegetation map of the area drawn up based on satellite images, these environments correspond to timberline forest and are extremely humid and is frequently covered in dense fog. There are obvious signs of human intervention in the vegetation, mainly from the extraction of firewood for firewood and charcoal (mainly done in the 1950s), and grassing by cattle, alpacas, and llamas. We installed 13 transects (Fig. 1), inventoried 4198 stems and 1571 individuals, we recorded only three species in these forests: *Polylepis pepeí*, *Gynoxys sp. nov.* and *Gynoxys sp.*

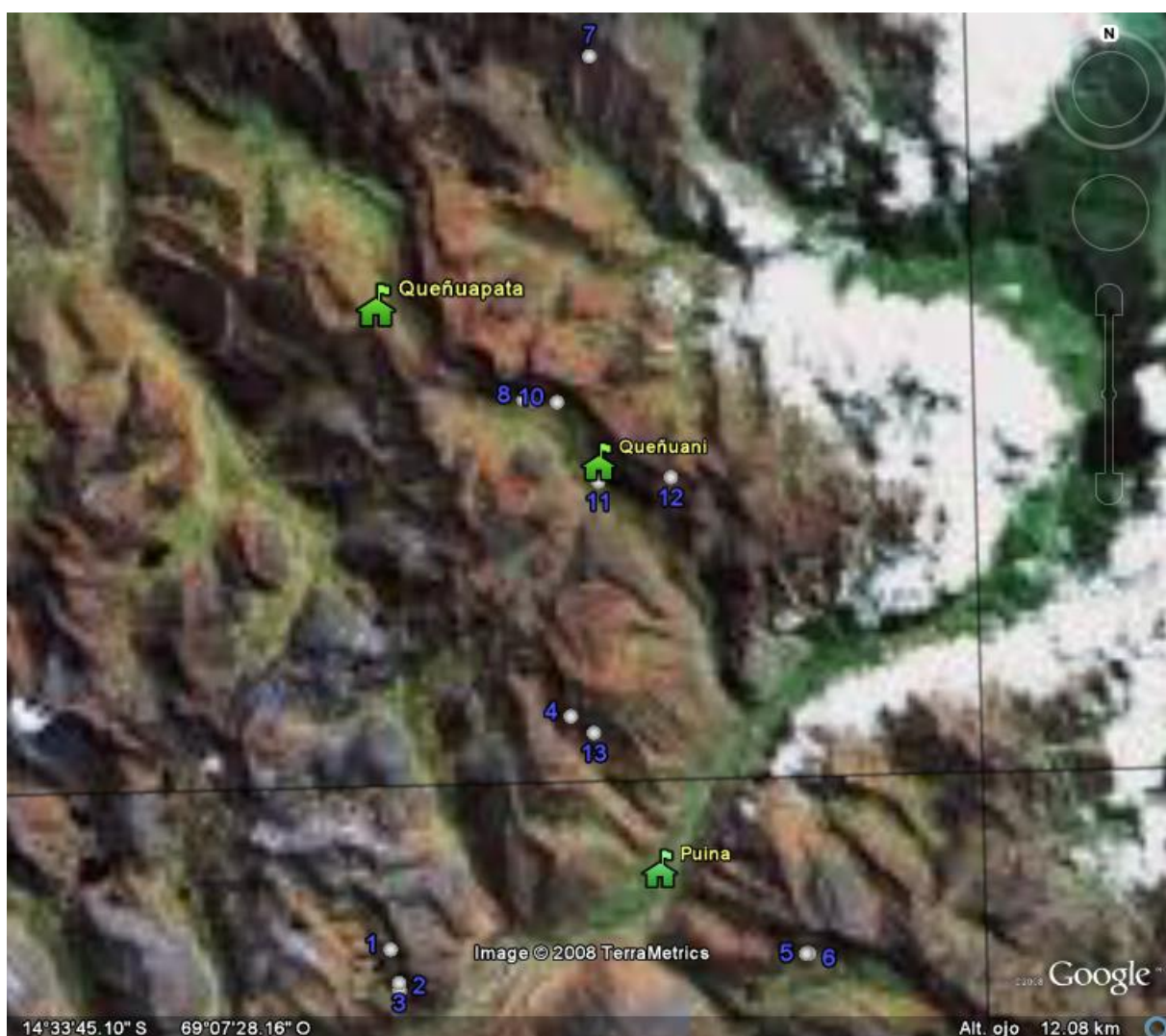


Fig 1. Location of the temporary plots done in the *Polylepis* groves.

Staff

Our group was formed by Javier Quisbert, the leader of the expedition and Jhonny Gutierrez, thesis student in the project. Our guides were Concepcion Miranda & Noa Alejandro from the Puina Community.

Expedition's Notes

On Monday, April 7, 2008 we left the National Herbarium of Bolivia in La Paz and arrived in Pelechuco 6 pm, we stayed at hotel "Llajtaymanta". On Tuesday we continued to Queara and on Wednesday before going to Puina, we standardized the inventory method of 20×50 m so that our data could be compare to the inventories performed near Queara. Puina (Photo 1) is located within the National Park and Natural Area of Integrated Management Madidi and very close to the border with Peru. The road to Puina was very difficult because of the topography, it is very rocky and has many curves. The people in Puina said that they regularly work on it to keep it pasable, but a strong rain is enough to fill the road with stones.



Photo 1. Panoramic view of Puina, Madidi National Park. Photo J. Quisbert.

Puina is a calm community with kind quechua speaking people, their main activities are agriculture and gold mining. They raise alpacas, llamas, and cattle and cultivate tubers (potatoes, oca and others), grains, and legumes. According to our guides, the inhabitants are a mixture of Bolivians and Peruvians, mainly from the communities of Sake and Titora. Three months ago the community got a park rangers post with a shortwave radio, two rangers from the National Service for Protected Areas (SERNAP) are now stationed here. We contacted the Mallku or mayor of Puina, who gave us permission to stay at one of the classroom in the school and also recommended us two people that could work as guides for us: Concepcion Miranda and Alejandro Noa. We installed six temporary plots in the *Polylepis* forest near Puina. Most of these forests are characterized by their low stature (Photo 2), and by a well developed moss carpet.

The *Polylepis* forests are developed on top of very rocky places and on steep slopes, oftent adjacent to moors. We recorded only three species *Polylepis pepeí*, *Gynoxys* sp. nov. and *Gynoxys* sp.



Photo 2. *Polylepis* sp. forest, near Puina.
Photo J. Quisbert.



Photo 3. Track Puina-Queñuani. Madidi National Park.
Photo J. Quisbert.

Later we changed base camp to Queñuani, we started walking from Puina very early on Tuesday, April 19. The journey was slow the llamas who carried food and equipment (Photo 3), walked slowly along the difficult trail. We had to climb several slopes and cross many streams and moors to reach the site where we thought we could camp, we arrived at approximately 4:00 pm. Queñuani is a plain located between two mountain ridges, and it was the location of a farm in the past. There are still several abandoned houses with their courtyards defined by the stone walls (Photo 4). Its original inhabitants worked for a landlord at raising cattle, horses, mules, and pigs. In front of the farmsite there is a hillside with queñuales.



Photo 4. Stone walls delimiting the old houses that existed in Queñuapata. Photo J. Quisbert.



Photo 5. Panoramic view of the *Polylepis* grove in Palomani, Puina. Photo J. Quisbert.

The next day, we went to queñuales furthest away from Queñuani. It was a long walk but along the way we saw condors (*Vultur gryphus*), two typical bird species of these environment: *Cinclodes aricomae* and *Anairetes alpinus*, numerous viscachas who lives among the rocks, evidence of foxes, and moors with both cattle and alpaca. Close

to midday we arrived at the queñual called Palomani (Photo 5), beyond Palomani is the Peruvian community called Totorá. The queñuales are taller here than those near Puina, they are on average 3 m tall and have a DBH of about 10 cm. There are still some individuals standing that were burned during the years 50–60 (Photos 6 and 7). As in Puina we only recorded *Polylepis pepeí*, *Gynoxys* sp. nov and *Gynoxys* sp. The following days we worked on queñuales closer to base camp, in general these forests were well preserved and the area has little human intervention currently because they grow on the rocky slopes, and it is difficult for the cattle to enter these forests (Photo 8).



Photo 6. Some dead *Polylepis* trees burned nearly 50 years ago that are still standing. Photo J. Quisbert.

Photo 7. Panoramic view of the *Polylepis* grove in Palomani, in the Puina community. Photo J. Quisbert.

We installed seven plots in the vicinity of Queñuani in all cases we had difficulties in measuring the trees. The topography with steep slopes and the rocky surface interfered with our work. The weather also played a role, it was good only in the morning, but by midday a thick fog rolled up the south, so the temperature dropped and it began to rain. We returned to Puina with the llamas, collecting some fertile specimens from the characteristic vegetation around the community. On Sunday, April 27, 2008 we arrived to La Paz.



Photo 8: Rocky substrates makes a natural barrier for cattle and fire, permitting a luxurious development of the *Polylepis* forests and the understory dominated by large carpets of mosses. Photo J. Quisbert.