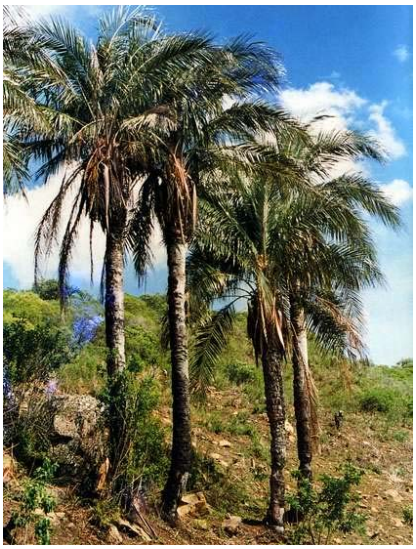
Case study
Parajubaea sunkha

Species: ***Parajubaea sunkha* Moraes**
Common Name: Sunkha Palm
Class: LILIOPSIDA
Order: ARECALES
Family: PALMAE / ARECACAE



Distribution:
Parajubaea sunkha is endemic to only a few inter-Andean valleys in the province of Vallegrande, in the department of Santa Cruz, Bolivia (Vargas 1994). Using Figures 1 and 2 below, the extent of occurrence (EOO) and area of occupancy (AOO) for *P. sunkha* can be determined.

Population:
According to Vargas (1994) (see Figure 3) there are 14 subpopulations, most of which comprise only a few individuals (1 to 100). The only significant subpopulations are to be found in locations numbered 11 (Mataralcito) and 12 (El Palmar) with an estimate of up to 17,000 mature individuals. The degree of fragmentation is high. Approximately half of the subpopulations are fragmented and are thought to be barely viable. Figure 4 shows the population structure at four sites.

Habitat:
P. sunkha is a montane palm species which grows at an altitude of 1,700 to 2,500 m above sea level in subtropical forest, dry forest and even grassy areas. Mean annual precipitation in this region is about 550 mm per year with a marked dry season of five months between June and October; in some years it lasts even longer. In the wet season frosts can occur at night. This makes the palm suitable for cultivation in Mediterranean localities with similar climates (Vargas 1994). Seedlings and young plants prefer shady conditions, but as they grow they out-compete the adjacent vegetation and become a canopy plant in full sunlight. In the dark *Parajubaea* understorey, the humid microclimate and rotten leaves forming a humic topsoil provide ideal conditions for the germination of the palm seeds. After pollination, the fruit ripens for about 20 months. When the fruits fall to ground, the seed is dispersed by rodents that feed on the fruit. It is estimated that rodents do not disperse the seeds further than 100 m from the parent tree. Under natural conditions, the seeds need another 17 months until they germinate (Vargas 1994), but with the help of *in vitro* cultivation the germination time of *P. sunkha* and *P. torallyi* can be brought down to only several weeks (Ibisch 2004).

Threats:
If the palm is left undisturbed it shows abundant natural regeneration, but overgrazing, land clearing, fires and human use of the palm's fibres have a strong impact on the regeneration dynamics of this species (Vargas 1994).

At many sites the palm is a direct competitor to agriculture. The custom of felling the tallest trees when their productivity ceases, clearly shows that a palm will not be preserved unless it provides important socio-economic benefits to the farmers. This means that there is a dilemma between the usefulness and the subsequent overexploitation of the species, and the uselessness and clear cutting of the remaining populations.

A first inventory was carried out in January 2001. The diagrams of the forest inventory (see Figure 4) depict the population structure of four representative palm stands of one hectare in size that belong to four different farmers. The diagrams show that the population structure is skewed: while two to five year old palm plants are very abundant in all subpopulations, the number of 0.5 m tall palm trees is missing in subpopulations P1 and P2 and is underrepresented in populations P3 and P4.

The absence of palms around 0.5 m of height (+/-20 years old) can be traced back to the construction of a road that connects the rural area with the town. Before the road was built, farmers transported the palm fibre to the local market on the backs of donkeys. This limited them in terms of the quantity they could transport which meant that adult palms could produce enough fruit to ensure adequate regeneration. Since the road was built in 1984, it has been possible to harvest and transport much larger quantities of palm fibre. Farmers confirm that after the road was built almost all palms were over-exploited. As a result, regeneration almost came to a halt. This is shown by the absence of the 0.5 m tall palms in subpopulations 1 and 2 (Figure 4).

The subpopulations 3 and 4 belong to farmers that live within about an hours walk from the road. As a result, exploitation in these palm stands was not as intensive and regeneration could occur to some degree. This is testified by the presence of more young palms between 0.5 and 1 m of height compared to subpopulations 1 and 2 (Figure 4).

Utilization

The palm produces a fibre, which grows in its leaf axils and is locally used to make mattresses, ropes and saddle pillows. Apart from subsistence use these products are sporadically sold on local markets.

The leaves are used to manufacture hats, baskets and fans (Vargas 1994). Leaves and fruits serve as fodder for livestock. Furthermore, the species is internationally traded as an ornamental plant.

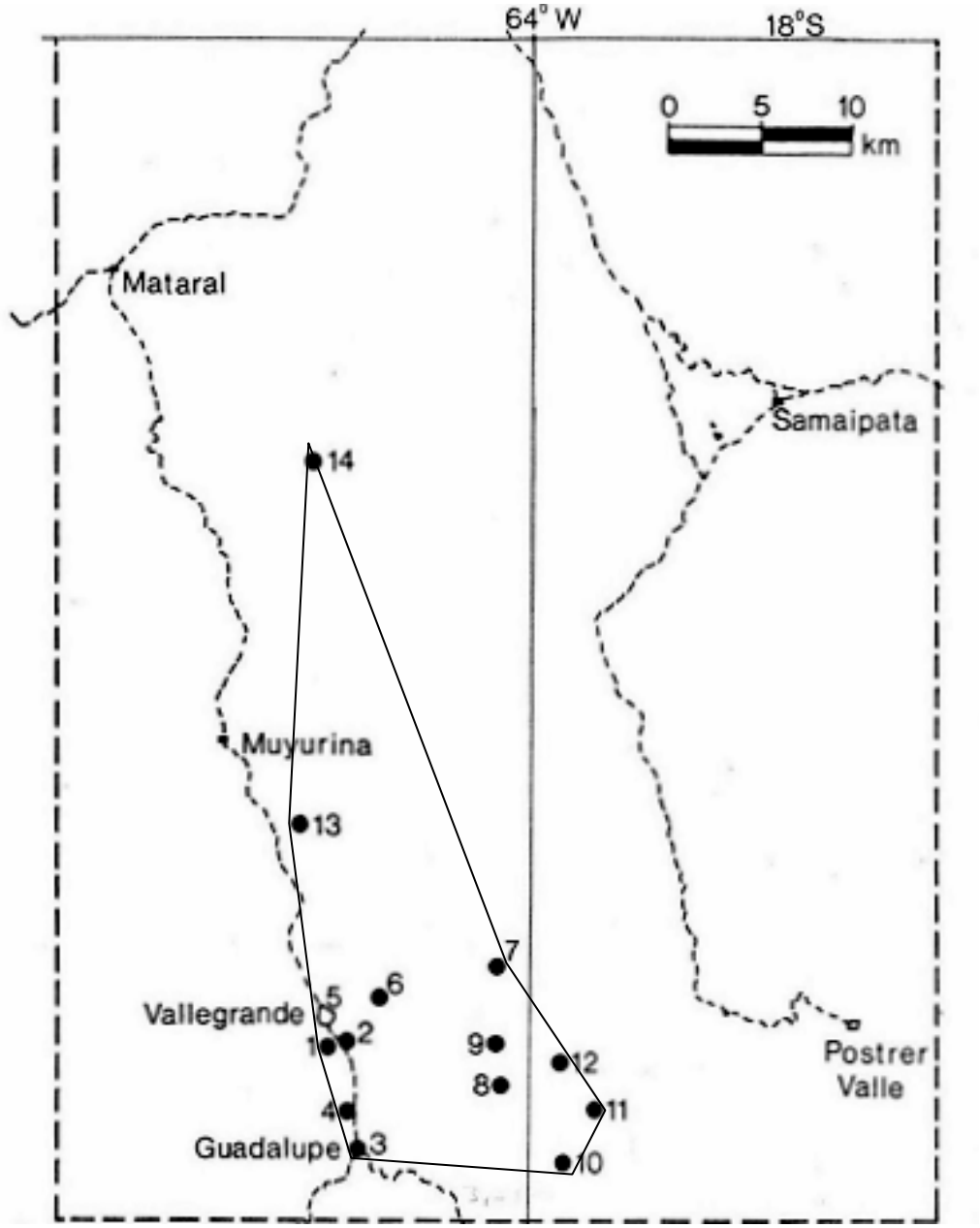
Sources:

Fundación Amigos de la Naturaleza (FAN-Bolivia). 2003. Perfil de proyecto: Conservación, manejo y commercializavión de la palmera endémica *Parajubaea sunkha* Moraes. Santa Cruz, 04/2003 (unpublished).

Ibisch, P.L. 2004. Degradation and loss of terrestrial biodiversity through direct use. In: P.L. Ibsich and& G. Mérida (eds) *Biodiversity, the richness of Bolivia*, pp: 209- 429. Fundación Amigos de la Naturaleza (FAN) 2004.

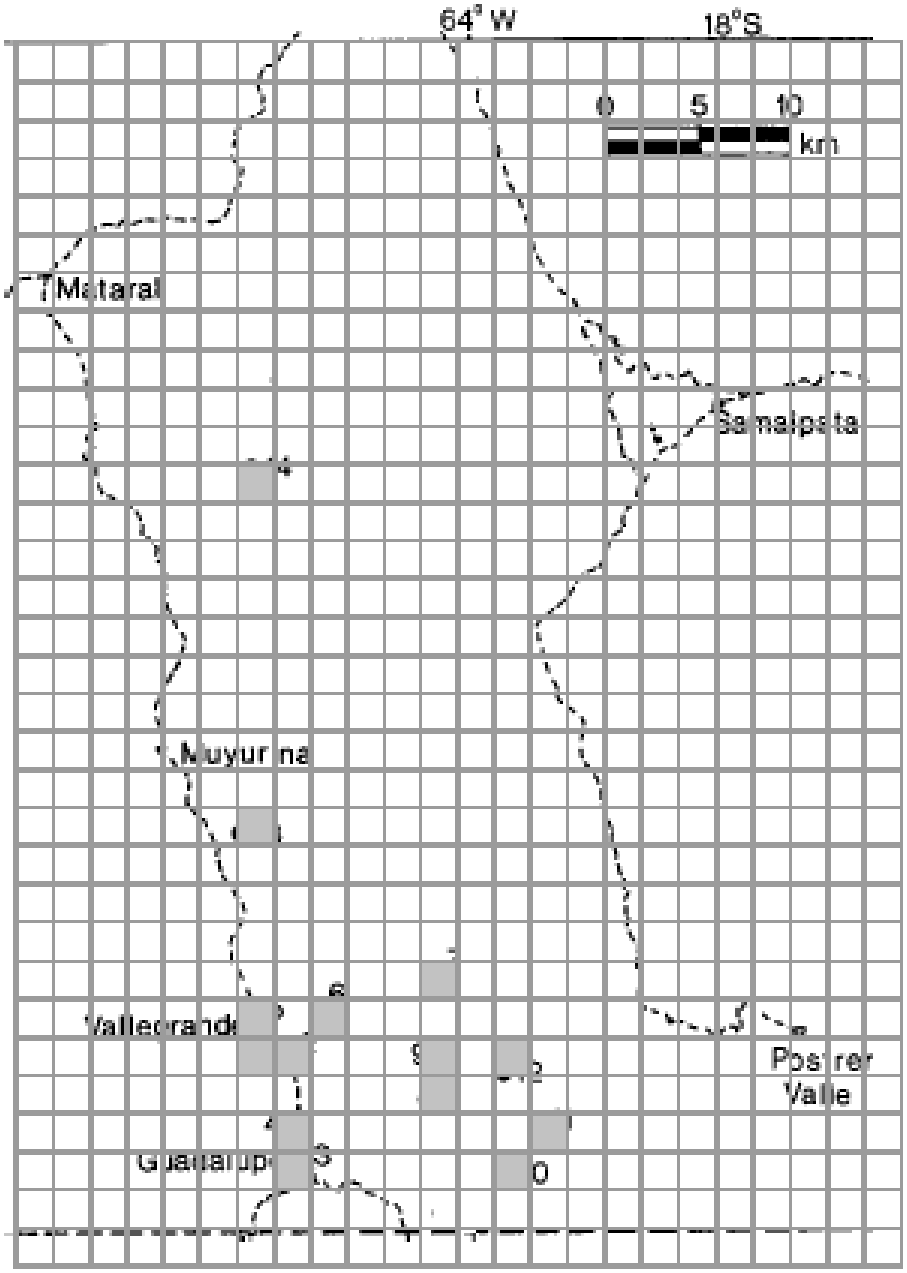
Moraes, R.M. 1996. Novelities of the genera *Parajubaea* and *Syagrus* (Palmaea) from inter-Andean valleys of Bolivia. *Novon* 6: 85–92.

Vargas, C.I. 1994. Ecology and uses of *Parajubaea torallyi* in Bolivia. *Principes* 38: 146–152.



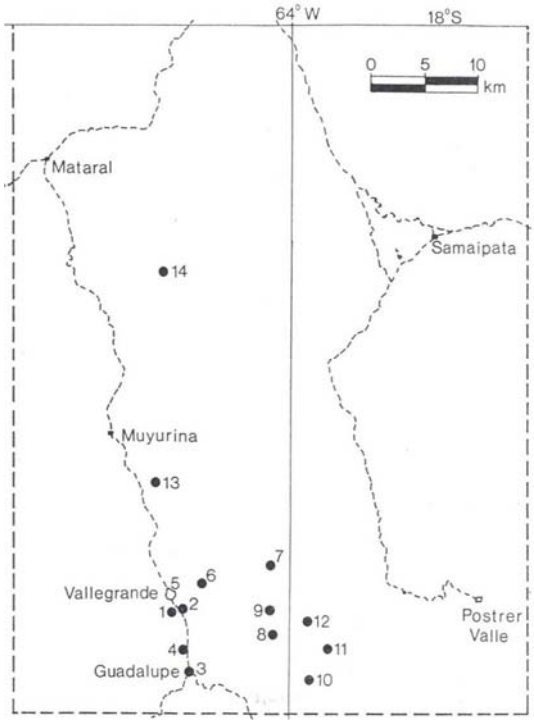
Map: Vargas (1994)

Figure 1. Extent of occurrence for *Parajubaea sunkha*



Map: Vargas (1994) Grid scale: 4 km²

Figure 2. Area of occupancy (AOO) for *Parajubaea sunkha*



1. *Quebrada del Zorro* (3 old individuals)
2. *San Antonio*, on the road from Vallegrande to Guadelupe (3 individuals)
3. *Guadelupe* (3 cultivated individuals)
4. *Quebrada Huasacañada* (2 cultivated trees)
5. *Vallegrande* (single young tree)
6. *Cañada Arteaga*, three km NE to Vallegrande (2 very tall individuals, formerly palm grove)
7. *Río San Blas* (2 tall trees and many small ones, formerly abundant in this area but cut down)
8. *Río San Blas – Río Rodeo* (only small trees in this population)
9. "Nameless" (many trees in the ravines)
10. *Río Piraymirí* (10 young trees in a steep valley)
11. *Mataralcito* (a number of larger trees which are under fibre exploitation)
12. *Alto El Palmar* and *Peñon* (the biggest population of *Parajubaea sunkha*, as well as under exploitation; according to rough estimates (Enssle) approx. 17,000 mature individuals)
13. *Abra Qunia-Quina* (steep canyon with scattered trees with regeneration in association with *Ceroxylon* sp.)
14. *Quebrada La Palma* (several mature individuals)

Figure 3. Location of *Parajubaea sunkha* subpopulations (Vargas 1994)

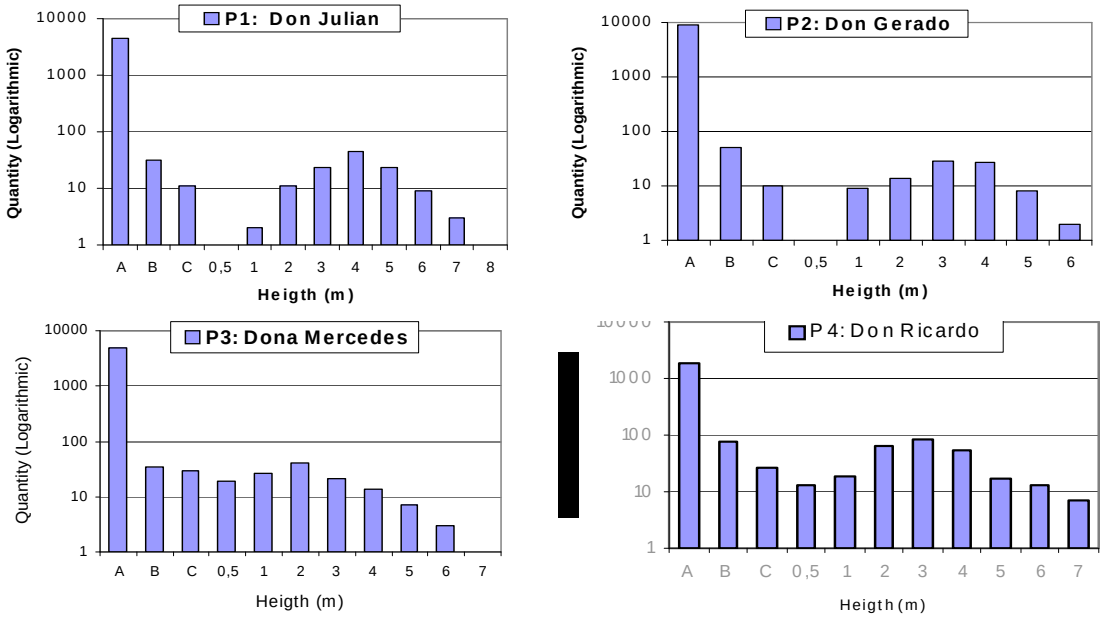


Figure 4. Population structure of four representative palm subpopulations. Where A = 1–2 years (Saplings); B = 3–5 years (Rosettes); C = stem smaller 0.5 m