

# MORPHO-ANATOMICAL REVIEW AS A TOOL TO IDENTIFIED BIODIVERSITY IN ANDEAN *LUPINUS* SPECIES COMPLEX

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## INTRODUCTION

The Argentine flora has 34 species of *Lupinus* distributed in two areas of speciation, where 10 species grown in the Atlantic Subregion and 24 in the Andean Subregion. Among the species growing in these environments are: *L. grisebachianus* C.P.Sm., *L. subacaulis* Griseb. and *L. subinflatus* C.P.Sm., which are found in the high valleys and hillsides of Jujuy, Salta and Tucumán provinces, forming a morphologically complex of turf plants with embedded inflorescences between the leaves of the basal rosette (Fig. 1). As part of a critical review of Argentinean native *Lupinus*, key morphological characters that define species growing in the Northwest of the country were evaluated. The objective of this study is to present the results of a morpho-anatomical review of leaflets pubescence of the *Lupinus grisebachianus*-*subacaulis*-*subinflatus* complex, along with an overall analysis of vegetative and floral characters using numerical taxonomy.

## MATERIALS & METHODS

We worked with identified herbarium specimens from several herbaria (ACOR, CORD, F, LIL, MCNS, MO, SI, US) and authors personal plant collections. The density of the pubescence was encoded as 0=glabrous; 1=sparse trichomes, 2=trichomes scattered across the surface; 3=dense pubescence; 4=very dense pubescence. Epidermal extractions and cross-sections of the leaflets were analyzed from representative specimens of each species. A cluster analysis was based on 26 Operational Units (OTUs) using Euclidean Distance, and Principal Components based on a matrix containing 4 qualitative data and 19 quantitative data, with a total of 23 morphometry parameters, from which 11 were vegetative characters and 12 floral characters.

## RESULTS

The leaflet morpho-anatomical characters showed two different sizes of trichomes; short (200-600 µm) and long (600-800 µm). All the trichomes are appressed, simple and with three cells. A globose larger cell than the other epidermal cells is at the base, a second cell with thick wall that form an epitricopodium is in the middle and a third acicular cell in the apex. Big differences were found in leaflets pubescence (Tabla 1). The abaxial side of the leaflets always has higher density of trichomes regarding adaxial face. Leaflets of *L. subinflatus* and *L. subacaulis* are glabrous in de adaxial face in contrast *L. grisebachianus* is woolly on both sides (Fig. 2 D-E). The numerical taxonomy analysis presented several clusters, which separate the species in groups of OUT's by the combinations of similar and different morphological characters. The principal component shows that the variables of greater weight are the distribution of pubescence that is related with the energy balance and photosynthetic rate and flower characters such as the length of upper and lower lip of the calice and the longitude and latitude of the banner (Fig. 2 F-G).

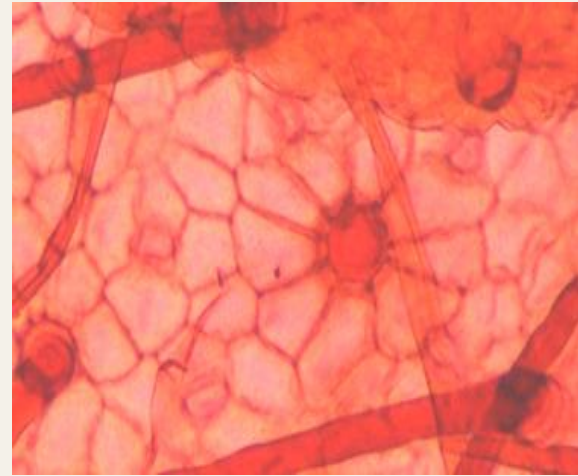
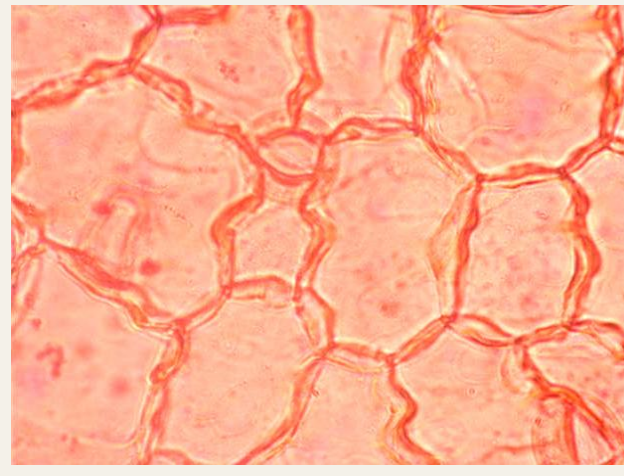
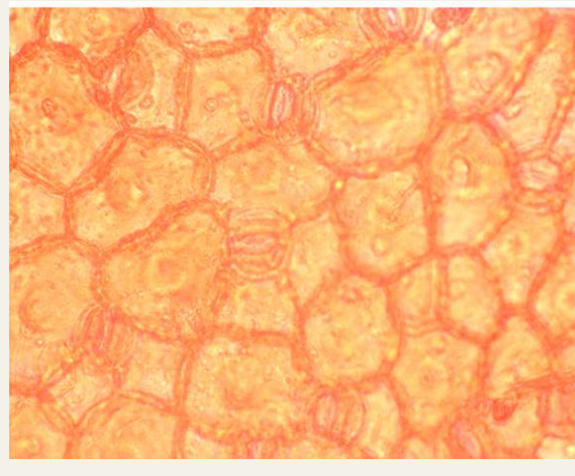
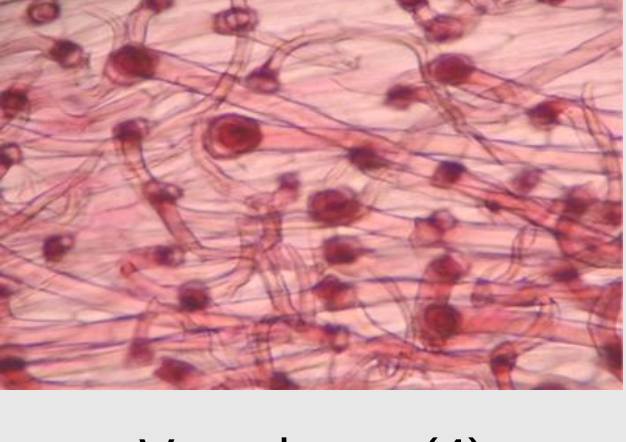
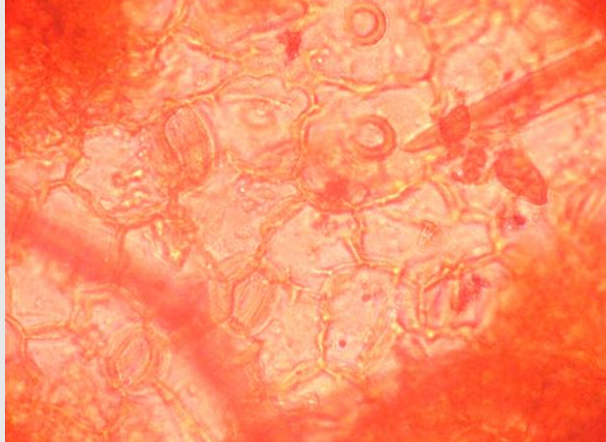


Figure 1: Plants of *Lupinus grisebachianus* (A); *L. subacaulis* (B) y *L. subinflatus* (C) in its natural habitat



Figure 2: Flower details of *Lupinus grisebachianus*, leaflets pubescence in the adaxial face (D) abaxial face (E); Dissected calyx (F) Banner (G).

Table 1: Morphoanatomical studies: Leaflets pubescence in the studied species

| Leaflets     | <i>L. grisebachianus</i>                                                                                | <i>L. subacaulis</i>                                                                                          | <i>L. subinflatus</i>                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Adaxial face | <br>Dense (3)      | <br>Glabrous (0)         | <br>Glabrous (0)         |
| Cara abaxial | <br>Very dense (4) | <br>Sparse trichomes (2) | <br>Sparse trichomes (2) |

## CONCLUSION

These studies support the definition of species and reaffirm the need of morpho-anatomical studies in germplasm complex such the ones that are relate with the wild relatives of *Lupinus mutabilis*.

## REFERENCES

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