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ASSESING PHENOTYPIC DIVERSITY OF LUPIN LANDRACES (*Lupinus mutabilis* Sweet)

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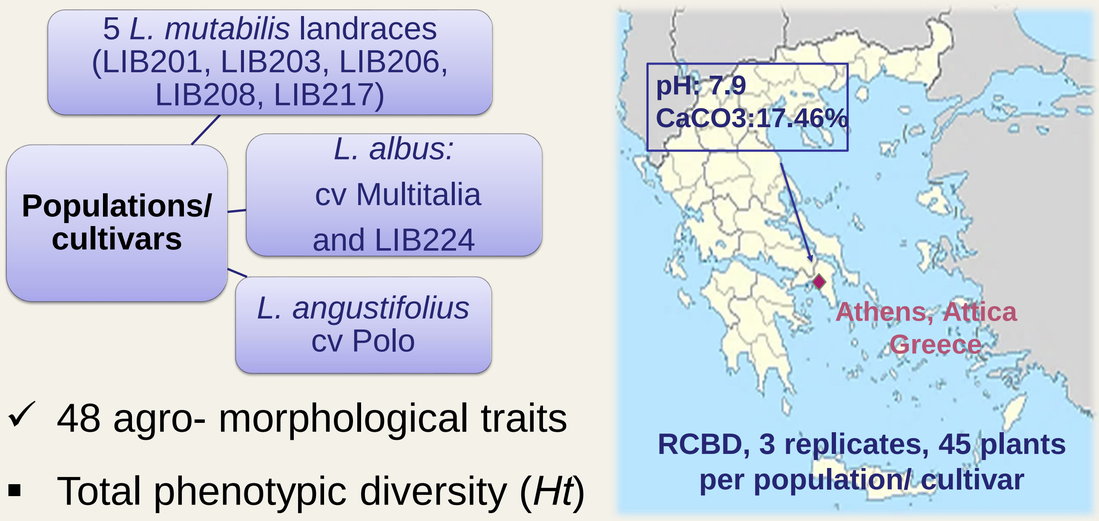
INTRODUCTION

Lupins are known and cultivated by humans since antiquity. *Lupinus angustifolius* L. (narrow-leaf, blue lupin), *L. albus* L. (white lupin) and *L. luteus* L. (yellow lupin) are cultivated species of the Old World, and *L. mutabilis* Sweet (Andean lupin) is the New World cultivated species. Nowadays, *L. mutabilis* receives a renewed interest in developing varieties adapted in South European edapho-climatic conditions, as it grows well in poor soils and is a good source of protein, oil and biomass. ***For this reason**, **we aimed to assess the diversity of five L. mutabilis populations and preliminary evaluate them under a Mediterranean environment in comparison to two endemic lupin species.***

MATERIALS AND METHODS



- ✓ 48 agro- morphological traits
- Total phenotypic diversity (*Ht*)
- Inter- population (*Gst*)
- Intra- population phenotypic diversity (*Hs*) and average across all populations (*Ḣs*)
- Mean phenotypic diversity within each population across all traits (*Ḣp*) using Nei's genetic diversity index (*He*) (Nei, 1973)

RESULTS

- ➢ Seed shape and number of seeds per pod were the traits that contributed most to the total phenotypic diversity of the collection (*Ht*).**(Table 1).**
- ➢ Number of seeds per pod was the trait that ranged the most within each population (*Hs* = 0.715) **(Table 1).**
- ➢ Two flower color types observed in LIB206 **(Figure 1)**
- ➢ *L. mutabilis* landraces presented significantly higher *Ḣp* (0.21-0.26) than blue lupin (0.14) and white lupin (0.17-0.20) cultivars (*Tukey's* HSD ($p \leq 0.05$)).
- ➢ The higher *Ḣp* (0.26) presented by LIB201 and LIB203.
- ➢ There was a discrimination among the three lupin species **(Figure 2).**
- ➢ All *L. mutabilis* populations grouped together except LIB208 **(Figure 2).**

Table 1. Traits with higher (green) and lower (purple) total, among and within populations diversity

***Ht* = 0.000-0.766**	**seeds/pod**	**0.766**	**stem color**	**0.007**
	seed shape	**0.726**	**primary seed color**	**0.023**
***Gst* = 0.000-0.985**	**stem waxiness**	**0.985**	**petiole color**	**0.048**
	standard petal heart color	**0.975**	**seeds/pod**	**0.065**
***Hs* = 0.000-0.975**	**seeds/pod**	**0.715**	**stem color**	**0.005**
	leaves color intensity	**0.523**	**stem waxiness**	**0.007**

Figure 1. Different flower color types within population LIB206

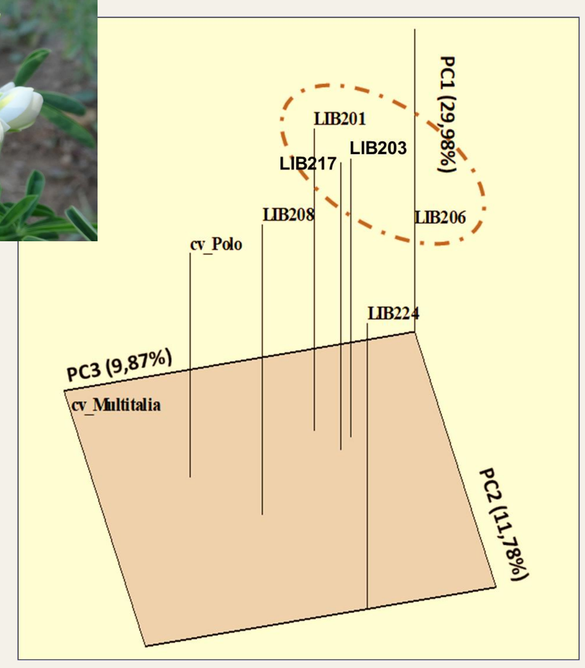


Figure 2. The first 3 principal axes of PCA explained 51.61% of the total diversity.

CONCLUSIONS

Lupin populations tested can therefore be cultivated and be productive under a Mediterranean climate and alkaline, calcareous soil conditions. Furthermore, they are characterized by a remarkable amount of between and within population diversity and therefore consist a valuable source of desirable traits for breeding.

REFERENCES

Nei, M., 1973. Analysis of gene diversity in subdivided populations. Proc. Natl. Acad. Sci. U.S.A. 70, 3321–3323

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