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Bradyrhizobium-Lupinus mariae-josephae: a unique symbiosis endemic of a basic soil in Eastern Spain

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Lupinus mariae-josephae is an intriguing lupine species recently discovered in the Mediterranean region and constitutes an endemism of a small area of Eastern Spain (Valencia province; Pascual, 2004; Mahé et al. 2011). It opens new perspectives for ecological and agronomic interests, as it represents the sole lupine species that preferentially grows in basic soils, while almost all other lupine species occur in acid to neutral soils. The *L. mariae-josephae* symbionts isolated from soils of calcareous areas of Valencia are extremely slow-growing bacteria belonging to the *Bradyrhrizobium* genus and showing symbiotic specificity that prevents nodulation of other *Lupinus* spp. such as *L. angustifolius* or *L. luteus* typically thriving in acid soils (Sanchez-Cañizares et al, 2011). Their phylogenetic analysis based on housekeeping and symbiotic genes showed that *L. mariae-josephae* symbionts belong to an evolutionary lineage that also includes endosymbiotic bacteria from *Retama* spp. of Northern Algeria basic soils (Boulila et al. 2009). Conversely, this new lineage is phylogenetically distinct from that of endosymbiotic bacteria from other *Lupinus* spp. native of the Iberian Peninsula, which were nested mainly within B. canariense and B. japonicum lineages. A genomic diversity study of the indigenous bradyrhizobia population of the calcareous areas in Valencia, based on fingerprint and phylogenetic analysis, showed the existence of a large diversity of genotypes, some of which are related to bacteria from the *Retama* spp. symbiosis in Algeria. This singular genomic divergence of *L. mariae-josephae* symbiotic bacteria in such a small geographical area fosters attractive studies on the origin, ecology and evolution of both partners of the symbiosis. Furthermore, it is expected that ongoing seed inoculation experiments with selected strains will allow us to extend the extant distribution spots of *L. mariae-josephae* plants in Valencia area, and also to determine whether the observed edaphic restrictions represent a limitation to the expansion of *L. mariae-josephae* crops to wide areas of poor calcareous soils in the Mediterranean region.

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Mahé et al. 2010 Genet Resour Crop Evol 58, 101-114.

Pascual, H. 2004 Anal Jardín Botán Madrid 61(1): 69-72.

Sánchez-Cañizares et al 2011 Syst Appl Microbiol 34 207–215

Boulila et al 2009 Syst. Appl. Microbiol. 32, 245–255.