

## Improvement of native perennial forage plants for sustainability of Mediterranean farming systems

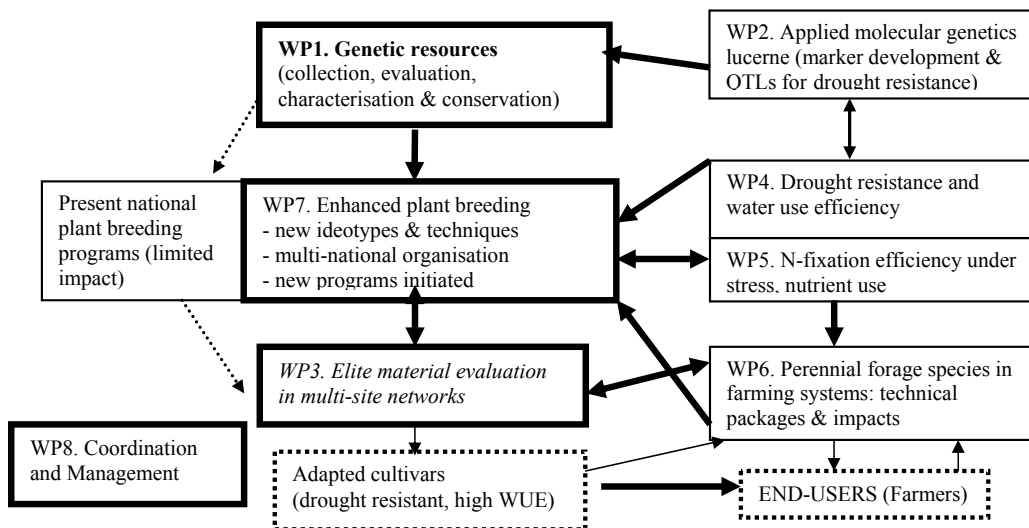
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**Introduction** The amount of water available to agriculture in the Mediterranean is declining because of increasing population pressure and greater incidence of drought. Therefore, the efficiency of the use of water for agricultural production must be maximized and, in this context, perennial forage species have a number of advantages in comparison to the predominantly-used annuals. They can utilize water throughout the whole year besides being able to halt rangeland degradation, restore soil fertility and enhance forage production, thereby contributing to greater sustainability of rain-fed agricultural systems in the southern European Union and North Africa. Despite these advantages, the small size of individual national markets has so far worked against the development of a viable forage industry based on perennials. By adopting a multi-national approach and targeting the key breeding objectives of superior drought-resistance and water-use efficiency (WUE), an European Commission-funded project aims to produce commercially cultivars of a number of species of broad regional interest and adaptation.

**Methods** The project PERMED (1 October 2004 – 31 September 2008) includes ten research groups from southern Europe (INRA France-F. Lelièvre, CNR Italy- C. Porqueddu, INIAP Portugal-M. Tavares de Sousa, University of Barcelone-S. Nogues, University of Balears- J. Cifre, ISCF Italy – P. Annicchiarico) and North Africa (INRA Algeria- A. Abdelguerfi, INRA Morocco-C. Al Faiz, Institut des Régions Arides, Tunisia-A. Ferchichi, Pôle de Recherches Agronomiques Tunisie, M. Ben Younes). They combine work on species, including lucerne, cocksfoot, tall fescue and sulla, to enhance cultivar development across environments ranging from the sub-humid to arid. Complementary work packages (Figure 1): (i) completing North African forage germplasm collection and evaluation, (ii) assessing the use of molecular genetics in breeding of drought-resistant lucerne, (iii) evaluating elite forage populations across the region for high WUE and adaptation to drought as bases for new cultivars, (iv) enhancing knowledge of physiological traits for drought survival and WUE, and (v) determining optimal use of perennial forages in four representative farming systems. The results will contribute to the development of technical packages for easy on-farm adoption across the western Mediterranean, thereby ensuring a long-term interest of the seed industry.



**Figure 1** Relationships between work packages in the European-INCO project 'PERMED'