

### Managing the development of nurse plant species to improve tree growth and soil fertility in Mediterranean areas

Duponnois Robin <sup>1</sup>, Hafidi Mohamed <sup>2</sup>, Thioulouse Jean<sup>3</sup>, Galiana Antoine <sup>4</sup>, Ouahmane Lahcen <sup>2,5</sup>, Dreyfus Bernard <sup>1</sup> & Prin Yves <sup>4</sup>

<sup>1</sup>IRD. UMR 113. CIRAD/INRA/IRD/SUPAGRO/UM2. Laboratoire des Symbioses Tropicales et Méditerranéennes (LSTM). Montpellier. France ; <sup>2</sup>Equipe Ecologie et Environnement, Faculté des Sciences Semlalia, Université Cadi Ayyad. Marrakech. Maroc ; <sup>3</sup> Université Lyon 1 ; CNRS ; UMR 5558, Laboratoire de Biométrie et Biologie Evolutive, 43 boulevard du 11 novembre 1918, Villeurbanne F-69622, France ; <sup>4</sup> CIRAD. UMR 113 CIRAD/INRA/IRD/AGRO-M/UM2. Laboratoire des Symbioses Tropicales et Méditerranéennes (LSTM). Montpellier. France; <sup>5</sup> Centre Régional de Recherche Forestière. Marrakech. Maroc

\*E-mail: [duponnoi@ird.sn](mailto:duponnoi@ird.sn)

In the Mediterranean basin, overexploitation has led to the loss of most primeval forests and an increase of the surface area covered by shrublands that represent stages of degradation of mature forests. In this context, human intervention is usually necessary to improve recovery of woodlands. Reforestation is a common practice in Mediterranean areas to achieve this objective but its performances are very low with high rates of early mortality making this practice unprofitable in ecological as well as economic terms. In degraded semiarid ecosystems, shrub and tallgrass species grow following a patchy distribution. Traditionally, shrubs growing near to newly planted trees are considered heavy competitors, and consequently removed before planting. However the vegetation patches usually constitute “fertility islands” or “resource islands” which could promote the tree species development. It has been previously assessed that some native plant species could act as “nurse plants” through their positive impacts on soil abiotic characteristics (i.e. soil nutrient contents) but also through their positive influence on soil microbiota, especially on symbiotic microorganisms (rhizobia and mycorrhizal fungi). The main results showing the beneficial effects of these plant nurses on the growth of Mediterranean tree species (i.e. *Cupressus* spp. & *Pinus halepensis*), on the soil bio-functioning are reported and the benefits of using native plant species to rehabilitate degraded areas especially in stressful conditions are underlined.