

## Potential of nitrogen-fixing symbiotic systems for revegetation strategies of calcareous quarries in mediterranean conditions

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Anthropogenic degradation activities (overgrazing, deforestation, quarry exploitation...) together with a long dry and hot summer, with scarce, erratic but torrential rainfalls, is a major threat to Mediterranean ecosystem sustainability. Quarry exploitation, in particular, removes native plants and soils, and generates an anthropogeomorphic soil material. Revegetation of such degraded ecosystems requires selection of suitable plant species adapted to unfavorable soil and climatic conditions. Therefore, nitrogen-fixing legumes are key components of plant successions because symbioses associated with rhizobium are major nitrogen input to poor ecosystems. Several Mediterranean native legumes were selected from different areas in the South of France: some of them, *Coronilla glauca* and *Medicago arborea*, belonged to the shrub community whereas others like *Astragalus monspessulanus*, *Dorycnium hirsutum* and *Coronilla varia* were herbaceous.

Seeds were collected for plant multiplication. Rhizobial partners were isolated, characterized and the most N<sub>2</sub>-fixing ones were selected for inoculum's preparation. Seedlings were transferred into plastic containers according to usual forestry nursery practices, then were inoculated with the appropriate inoculum and allowed to grow for 6-9 months in an experimental nursery before vegetalisation. Symbiotic plants were transferred into a rock-spolic soil material of a calcareous quarry and experimental variables including survival rates, plant growth, endomycorrhizae, soil organic matter and total N accumulation were recorded after three years.

Plant growth rates were major for *C. glauca*, *M. arborea* and *D. hirsutum*, despite adverse conditions. A thin (0-5 mm) and discontinuous O horizon was formed under plants of *C. glauca*, *M. arborea* and *D. hirsutum*. In this last case, an important amount of organic carbon was accumulated in some points (11.9 % ± 13). Total nitrogen (0.03-0.1 %) was slightly incorporated into top vegetalised spolic material (0-5 cm) in comparison with non-vegetalised material. Thus, *C. glauca*, *M. arborea* and *D. hirsutum* was the most suitable legume species for reclamation and rehabilitation of spolic soil material.