

## ASSESSMENT OF GENETIC VARIATION IN SICILIAN *HELICHRYSUM* (ASTERACEAE) AND IMPLICATION TO GERMPLASM CONSERVATION

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*Helichrysum* Mill. (Asteraceae, Gnaphalieae) is distributed worldwide, and widespread in Europe and in the Mediterranean region. Since the classical antiquity it has been used as an ornamental plant, in pots and gardens. Today, *Helichrysum* is employed to produce dry flowers and as an ornamental plant resistant to drought. The genus is used in the pharmaceutical and cosmetic industries for its medicinal properties, namely anti-inflammatory, antiallergenic, antipsoriasis and diuretic, which are connected with its content of oils and flavonoids.

Most *Helichrysum* taxa are rare and vulnerable or at risk of extinction, so that their conservation requires an appropriate approach based on systematics and genetics. Genebank collections consist of multiple accessions of the same or similar taxa that make it possible to conserve a portion of the genetic variation. Therefore, it is necessary to assess the genetic variation of the taxa, and to identify which target alleles should be preserved. Besides the widely distributed alleles, priority should be given to local alleles, exclusive to populations in specific sites. Taxonomic misidentification of genebank accessions can be common, thus leading to confusion for germplasm users. Molecular markers can be used to solve this problem: they help to assess the relationships among *taxa*, and can provide species-specific diagnostic markers. For endangered species, a genetic analysis with the definition of a heterozygosity index at a high number of loci, has been used as a criterion to assess the fitness of populations. However, in the case of small wild samples, such as endangered species, it is difficult to determine if a population is in Hardy–Weinberg Equilibrium (HWE), and therefore to assess its heterozygosity correctly.

Alternatively, the polymorphism index gives a broad and general description of the genetic diversity within a sample. In particular, AFLPs (Amplified Fragment Length Polymorphisms), because of their high multiplexing degree, are very informative.

In this work, we describe the application of AFLP in an attempt to: *i*) investigate relationships between the rare and endangered Sicilian *Helichrysum* entities; *ii*) plan a strategy to capture the highest genetic variation that can be preserved in a genebank.

The results of the genotype analysis showed that the *Helichrysum* populations are poorly differentiated at the DNA level. The overall variation could be attributed to differences between individuals, rather than between populations.

The low genetic differentiation of *Helichrysum* populations suggests that the entities studied form a single group, probably derived from a common ancestor with high phenotypic plasticity for adaptation to different environmental conditions, and with consequent advantages for the survival

of the species. The genetic relationships are in accordance with the geographical distribution and solved some controversial points in their botanical classification.

The identification of local markers, were used to calculate the number of plants required to preserve a copy of each marker and therefore to plan a strategy for conservation of *taxa*.