

## **MORPHOLOGICAL CHARACTERIZATION OF *ARABIDOPSIS THALIANA* (L.) HEYNH. ECOTYPES COLLECTED IN ITALY USING AN IMAGE ANALYSIS SYSTEM**

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The model plant *Arabidopsis thaliana* (L.) Heynh., a small annual flowered species of Brassicaceae family, shows a wide range of genetic and morphological variation among naturally occurring populations collected in the field. It has a worldwide distribution and can be found in different habitats, for instance in open or disturbed habitats, on sandy soils or on riverbanks, at the sea level or at high altitude, up to 4000 m a.s.l.. Many different genetic systems are involved in the observed plasticity of this species, therefore the wild populations represent the base material to study how different phenotypes are determined and which genes/genetic mechanisms are involved in adaptation.

Considering that this species has been poorly collected from locations in Italy and in the Mediterranean Basin, at the Institute of Plant Genetics (IGV) of CNR (National Research Council) of Bari (Italy) a research activity was started on collection, conservation and morphological characterization of *A. thaliana* ecotypes from Italy. Morphological characters for plant description were based on the Descriptors for Rocket (IPGRI 1999). They were recorded both traditionally and by means of a KS-400 image analysis system. This is a versatile image processing system that can be customized for specific applications by editing appropriate algorithms in “macros”, and it has been successfully used in species identification through shape, dimension and texture measurements of whole plants or leaves. Image analysis allowed to create an archive of morphometric data for all ecotypes; the statistical processing, obtained through LDA (Linear Discriminant Analysis Method) of the whole archived data, has allowed the creation of a classifier for the discrimination of germplasm collection with a performances of classification from 83.3% to 100.0% for each individual of a population. Moreover, morphological data gathered by traditional methods were subjected to cluster analysis in order to test the discriminant effectiveness of the selected characters. Both methods allowed a precise discrimination of samples and these results support the effectiveness of the selected characters in describing collections of *A. thaliana*.