

MOLECULAR AND PHENOTYPIC CHARACTERIZATION OF CICHORIUM ENDIVIA FOR BREEDING PURPOSES

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Endive (*Cichorium endivia* L.) is leafy vegetable crop member of the sunflower family (Asteraceae, Compositae) recognized for its nutritional value due to the considerable level of antioxidant compounds, minerals and for the high content of dietary fibre. Two different types of *Cichorium* salads are known on the market: *C. endivia* var. *crispum* characterized by with crinkled and sour-taste leaves and *C. endivia* var. *latifolium* with broad and pale green leaves less bitter than other endives. Both can be eaten raw, as fresh produce or minimally processed product, grilled, sautéed, or cooked in dishes. Italy is a main producer of both smooth and curly endives in the world, however climatic changes and market trends require continuous development of the novel varieties. Characteristics of the leaf are attributes of particular importance to be considered. Their evaluation can be done with standardized descriptors (e.g., IPGRI) which, although immediate to assess, are not efficient to phenotype those traits related to production quality and physiological response of plants. To that end, remote sensing would corroborate manual measurements toward a better phenotyping. Additional characterizations across season are crucial would for better determining the performance of cultivars and for dissecting the effects of genotype and environment.

Understanding genetic diversity is another crucial step for selection and breeding of endive germplasm resources. Different types of molecular markers can be used for germplasm screening, among these the high-

resolution melting analysis (HRM) is a reliable real-time polymerase chain reaction (PCR)-based method used to identify genetic variation between individuals and detect single-nucleotide polymorphisms (SNPs) in nucleic acid sequences.

In this study we assessed 31 *Cichorium* genotypes through a multidisciplinary approach which include in field crop phenotyping sensing technologies and genotyping by SNP detection. Plants were grown across two consecutive seasons in the experimental station of the Research Centre for Vegetable and Ornamental Crops (CREA, Monsampolo del Tronto, AP, Italy, (42°53' N, 13°48' E, 40 m.a.s.l) following a randomized block design. Leaf surface and leaf weight were collected in order to characterize phenotypic diversity. HRM profiles were obtained from 20 molecular markers spanning different chromosomes.

This information will be useful to dissect the diversity of the collection studied and to identify superior endive genotypes.