

EXPLORE GENETIC VARIABILITY TO ABIOTIC AND BIOTIC STRESS IN DIPLLOTAXIS TENUIFOLIA

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Rocket is a typical horticultural crop traditionally cultivated in South of Italy (Piana del Sele, Salerno) where it has been defined as a IGP mark, following the approval by the European Union. The cultivation covers about 3000 hectares in covered greenhouses with an average production of 400 thousand tons. Approximately, 73% of the national production generates an annual turnover of approximately 600 million euros.

Rocket has always been considered as a wild plant, therefore rocket breeding begun only recently and only few information are available about genetics and trait heritability, so as for knowledge of loci involved in resistance to biotic and abiotic stress.

Two studies were conducted: a phytopathological assay to explore allelic variability for resistance to *Fusarium oxysporum f.sp. raphani* and an in vitro experiment to verify the rocket resilience to salt stress.

In North-Western Italy serious losses were observed in extensive wild rocket varieties (*Diplotaxis spp.*) infected by *Fusarium oxysporum f.sp. raphani*, which causes severe production losses. Infected and symptomatic leaves are discarded during packaging phase, causing product waste and reduction in economic value for producers. Moreover, there are only few pesticides effective on these pathogens, especially for *Fusarium spp.*, whose spores overwinter in soil and eradication is complex.

For the reasons of above, discovery of tolerant genetic background becomes more important.

Genetic variability was explored with the setup of phytopathological assays with *Fusarium oxysporum f.sp. raphani* in *Diplotaxis tenuifolia* to identify sources of resistances useful for breeding programs. Several resistant genetic backgrounds were identified and were used to develop hybrids and segregant populations.

The most resistant accession resulted from the above experiment was crossed with the most susceptible. The obtained F1 was self-pollinated to produce an F2 segregant population. Heritability studies were performed infecting all genetic material of above with *Fusarium oxysporum f.sp. raphani*.

Abiotic stresses must be considered as a high added value trait in genetic improvement of rocket varieties. Salt tolerance and drought resistance are important for marginal lands where these vegetables are generally cultivated.

To evaluate root growth and resistance to increasing salt concentration, an experiment was set up in vitro using standard MS culture media containing different salt concentrations (0, 40, 80 mM). Different commercial varieties were tested. Germinability, root length and leaf expansion were evaluated at regular interval to identify more adaptable genetic, with high resilience to abiotic stress.

This research provides powerful tools for genetic selection in modern rocket breeding programs.