

IN VITRO ASSESSMENT OF RESISTANCE OF DURUM WHEAT LANDRACES TO FUSARIUM FOOT ROT

PETRALIA R.*, MICELI C.*, CAMPANELLA V.

*) Council for Agricultural Research and Economics, Research Centre for Plant Protection and Certification Viale Regione Siciliana sud-est 8669, 90121 Palermo, Italy

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In Sicily (Southern Italy), durum wheat is one of the most important fields crops, covering 262,72 ha (Istat 2023). Among diseases affecting wheat crops, Fusarium foot rot is the most widespread and harmful in the Mediterranean area. The disease is the major yield-limiting factor for the cultivation of durum wheat in Sicily for the following reasons: lack of resistant durum wheat varieties; aspecific symptoms that make early recognition difficult for farmers; ill-advised agronomic practices (i.e., monoculture or rotations) that favor the increase of the soil-borne pathogen responsible for the disease; use of seed coated with ineffective fungicides; misuse of fungicides that are either incapable of targeting the basal stem area of wheat plants, or are ineffective due to poor timing of application; environmental conditions favoring disease (i.e., water stress).

The disease is usually managed by agronomic practices such as tillage, crop rotation with non-intermediate host crops, use of fungicide-coated seeds and fungicidal crop treatments. Accordingly, adoption of resistant varieties represents the most sustainable strategy for controlling both pathogens and diseases as well as improving productivity and stability of wheat yield. Sicily is one of the richest regions in terms of durum wheat landraces, representing an untapped resource and a remarkable reservoir of genetic diversity. In fact, they are characterized by good adaptation to hilly areas, resilience to abiotic stress and generalized resistance to disease. In the pursuit of effective strategies to sustainable agricultural practices, the objective of this investigation was to compare the responses

of both durum wheat accessions and modern wheat varieties to *F. culmorum*.

Seeds of 36 Sicilian durum wheat accessions obtained from organic crops were assayed *in vitro* to evaluate their response to *F. culmorum* during germination phase. A standardized pathogen suspension (1×10^4 conidia/ml titre) was used to artificially inoculate seeds both of accessions, and of three modern varieties (Duilio, Irìde and Saragolla), the latter used as a control. Perciasacchi2 (P2) in the inoculated treatment, and Timilia reste bianche1 (Trb1) in the uninoculated treatment, significantly increased seed germination in comparison to the controls. Giustalisa (G), Timilia reste bianche 2 (Trb2), Timilia reste bianche 3 (Trb3) and Bidi (B) significantly improved shoot height, while Russello3 (R3), Russello4 (R4) and Faricello (Fa) significantly increased root length. Overall, seedling vigour index was greatest for R3, nonetheless, R4, Scorsonera (Sc), Timilia reste nere 2 (Trn2) and Trb2 all showed significant increases in comparison to the controls.

Our findings explore the different predispositions of Sicilian landraces to resist Fusarium foot rot during seed germination phase and suggest that accessions may represent a promising source of gene-pool variability in the search for resistance factors to *F. culmorum*.