

## **EVALUATION OF EAR ROT RESISTANCE IN ITALIAN MAIZE INBRED LINES AND MOLECULAR CHARACTERIZATION OF FUSARIUM ISOLATES\***

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*Fusarium verticillioides*, toxigenic fungus which causes maize ear rot, yield loss and grain quality reduction through mycotoxin accumulation, is endemically present in Northern Italy, where maize is mostly grown and represents a major crop for animal feed, direct human consumption and source for commercial products. The availability of maize genotypes with tolerance to *F. verticillioides* and reduced mycotoxin accumulation in grain is of urgent importance, particularly in organic farming systems.

In order to find maize germplasm sources of ear rot resistance, ten Italian inbred lines preserved at CREA Bergamo Genebank, were evaluated by artificial inoculation: i) in field trials at CREA Experimental Farm, Bergamo during 2020 and 2021 ii) in laboratory assays on mature kernels and plantlets.

Environmental conditions were recorded for both seasons at CREA Bergamo Weather Station. Primary ears at same development stage were inoculated at 15 days after mid-silking with *F. verticillioides* isolate (CI32), through Kernel Inoculation Assay. At maturity ears were manually harvested and ear rot severity assessed: i) for *Fusarium* and water -inoculated ears, counting

number of kernels showing infection visible symptoms around inoculation point (number of infected kernels, NIK); ii) for non-inoculated primary control ears using a rating scale (% kernels with visible symptoms/ear) DSR (Disease Severity Rating). Additionally, the percentage of internally infected kernels (IKI) and mycotoxin grain content were evaluated for inoculated materials and compared with controls (non- inoculated and water inoculated).

To assess *Fusarium* tolerance/susceptibility at early stages of development a laboratory assay was conducted by soaking sterilized mature kernels in spore solution of CI32 isolate and placing them in small vermiculite green-houses; first leaf and primary root length were measured after 15 days and compared with non-inoculated controls.

Data about a preliminary survey undertaken comparing results from field and laboratory artificial inoculation assays, will be presented.

*F. verticillioides* CI32 belongs to a collection of 51 *Fusarium* spp. isolates recovered during a mycological screening on maize samples collected in the Northern part of Italy. Based on morphological characteristics, the isolates were divided into 3 distinct morphotypes. An isolate was randomly selected for each morphotype. The three chosen isolated were characterised at molecular level by Translation Elongation Factor 1- $\alpha$  (TEF-1 $\alpha$ ) gene sequencing. Only the isolate CI32 was identified as *F. verticillioides*. Further investigations confirmed isolate CI32 pathogenicity to maize and its ability to produce fumonisins. TEF sequencing Molecular characterization of the 48 remaining *Fusarium* isolates is currently in progress.

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