DEVELOPMENT OF SCREENING ASSAYS TO DETERMINE MAIZE PLANT SUSCEPTIBILITY TO *FUSARIUM VERTICILLIOIDES* INFECTION*

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The availability of reliable methods for the screening and evaluation of maize plants for improving tolerance to *Fusarium* attacks is an invaluable tool in breeding programmes to increase crop protections against fungal infection. Some *Fusarium* strains produce mycotoxins which can be formed in infected plants before harvesting, or in grains during post-harvest storage. The occurrence of mycotoxins in cereal grains is a great concern worldwide, because their presence in feed and foods is often associated with chronic or acute mycotoxicoses in livestock and also in humans.

The proposed research is focused on the screening of maize genotypes for resistance to *Fusarium verticillioides*, fungal pathogen which attacks maize, causing root, stalk and ear rot diseases, producing mycotoxins (fumonisins). One important goal of the current study, is to i) evaluate the effectiveness of inoculation and selection techniques to study variability in fungal disease susceptibility among genotypes tested, ii) determine the most efficient and reproducible plant inoculation method. For this purpose, during 2006 commercial maize hybrids were used as experimental material and tested for fungal pathogen resistance in two separated artificial inoculation experiments by applying i) the non-wounding Silk Channel Inoculation Assay (SCIA) technique applied to each primary ear, and ii) the Kernel Inoculation method. The test included: i) self pollinated non–inoculated ears, ii) self-pollinated inoculated ears, iii) open-pollinated non inoculated ears, iv) open-pollinated inoculated ears. At pollination, silk channel (region within the husk between the tip of the cob and tip of the husk where the silks emerge) length was recorded for each maize genotype. At maturity, ears were manually harvested. For husk cover visual rating ranging from 1 (good tight long husks extending beyond the tip of the ear) to 5 (poor: loose short husks with exposed ear tips) were recorded. After hand de-husking; the severity of ear *F. verticillioides* attack was evaluated using rating scales based on the percentage of kernels with visible symptoms of infection, such as rot and mycelium growth. After visual inspection ears were dried and shelled; the kernels were bulked within plots. To evaluate internal kernel infection 50 kernels were randomly chosen from each sample, surface-disinfected, and plated on potato DRBC agar. Fumonisin content was evaluated using enzyme-immunoassay-ELISA kit. Furthermore, each entry tested in the artificial inoculation experiments, was evaluated in field tests at different locations in North Italy in order to compare the response of hybrids in different environmental conditions.

Correlation analyses between visual ear rot ratings, internal kernel infection evaluation, fumonisin content, silk channel length at pollination, husk cover ratings, are in progress.

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