

Title Management of *Fusarium verticillioides* in maize
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Abstract

Fusarium verticillioides is a maize pathogen causing ear and stalk rots worldwide; in grain it produces a family of mycotoxins called fumonisins. Fumonisin B1 (FB1), the most important, can damage health if eaten by animals or humans. The European Commission has fixed maximum admissible levels for fumonisins (B1+B2) in maize and derived products, that are frequently exceeded in southern Europe. Since 2002, several research projects have been developed in Italy, to understand the maize-*F. verticillioides* pathosystem aiming at developing a Decision Support System. The main topics were: 1. ecophysiology of *F. verticillioides*; 2. triggering conditions for grain infection; 3. the role of cropping system on fumonisin production; 4. selection of maize lines resistant to infection; 5. direct control actions against *F. verticillioides*. The fungus is active from 5 °C to 40 °C, optimum 25–30°C, and above 0.90 aw, optimum 0.99. Inoculum is always present in the field and, whether air- or splash-borne, easily reaches the ear where it can start infection along with growth stages, till ripening. Fumonisin is detected in grain from the early dough stage, and a cumulative effect is normally observed, that increases also when aw of kernels is lower than 0.90. Some steps in crop management, like geographic region, hybrid variety, seeding period, manuring, irrigation and harvest time can influence fumonisin production, but meteorological conditions play the main role. Promising results have been obtained studying genetic resistance, but the use of new hybrids, and the control of the European corn borer and the fungus can contribute to reducing fumonisin contamination.