

Title The emerging problem of *Aspergillus flavus* in southern Europe
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Abstract

In 2003, the summer was hot and dry in Europe and *Aspergillus* section *Flavi* caused severe problems on maize. High levels of aflatoxins (AFs) in grain produced in northern Italy resulted in the production of severely contaminated milk, with AFM1 above the legal limit. As a consequence, batches of milk had to be discarded with severe losses for farmers. A quick response to this outbreak enabled short-term help to be given to farmers, with appropriate pre- and post-harvest guidelines, and research support for rational management of the maize chain. Several aspects were considered, starting from the characterization of *A.* section *Flavi* isolates, regarding their ecology and nutrition, niche overlap with *Fusarium verticillioides*, and the effect of weather and cropping system on AF contamination and the influence of post-harvest storage conditions on fungi and mycotoxin contamination dynamics. The Italian population of *A.* section *Flavi* included almost all *A. flavus*, with 70% being AF producers. These strains seemed less thermophilic than those reported in other areas, with variable adaptation to ecological conditions. *A. flavus* was more competitive and dominated *F. verticillioides* when *aw* was <0.90 or 0.90 and 30°C. Grain contamination at harvest was significantly influenced by meteorological conditions, especially dryness. Temperature lower than 10°C, 0.80 *aw* or CO₂ at 50% limited *A. flavus* activity. All these data will be used to develop a predictive model to be included in a Decision Support System aimed to minimise consumer exposure to AFs.