

Intercropping impacts on microbial diversity and the risk of mycotoxin contamination

Problem

Mycotoxins are secondary fungal metabolites present in foods that cause adverse effects in humans and animals. They can be present in both cereals and grain legumes. It is important to ensure that intercropping does not increase mycotoxins in either crop type due to growing systems effects (e.g., microclimate).

Solution

Test whether mycotoxin infection and diversity differ in intercropped and monocropped wheat and peas, in organic and conventional agriculture, with or without fertilisation in 2024 and 2025, in 3 geographical areas: Greece, France, Germany.

Benefits

Information on mycotoxin contamination and associated fungal diversity will enable management decisions to limit the mycotoxin problem.

Practical recommendations

In two consecutive years, all wheat samples exhibited low levels of mycotoxins (*aflatoxins*, *DON*, *fumonisin*, *zearalenone*, and *ochratoxin A*) below the detection limit.

Cropping system (intercrop vs. monocrop) did not affect the fungal diversity of the wheat mycotoxins. However, wheat fungal diversity differed significantly between countries over the period monitored (Figure 1).

Applicability box

Theme

Cropping systems, Arable crops, Food chain management, Seed quality and health

Keywords

Food quality; Product quality; Food hygiene

Context

Greece, France and Germany

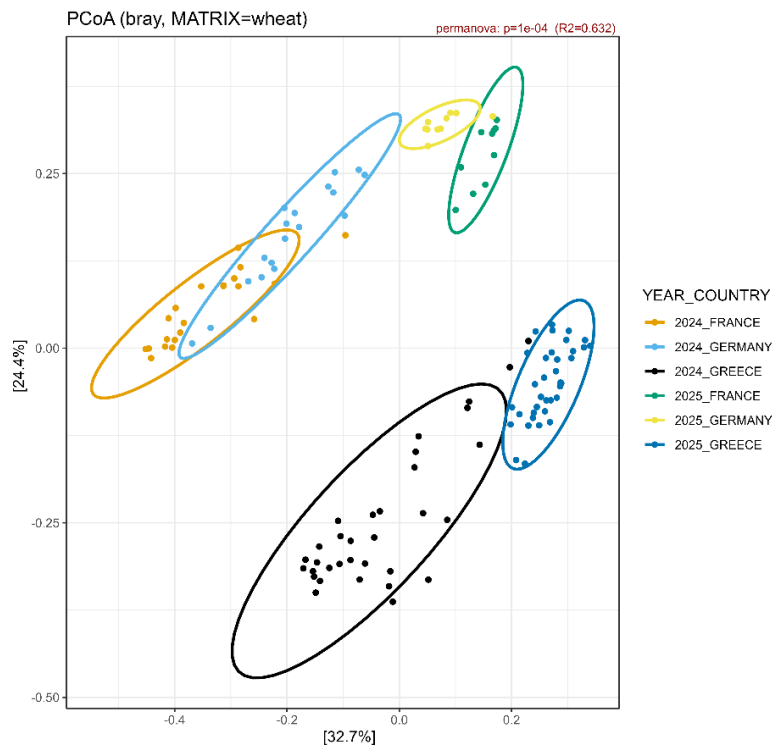


Figure 1: Comparison of fungal diversity of wheat as a function of countries and seasons monitored.

Regardless of season, crop types, or treatment type, no major contamination by mycotoxins was observed. Consequently, intercropping did not increase mycotoxin contamination for either crop type on all samples studied during the two seasons (2024 and 2025), indicating no negative effect of an intercropping system in terms of increased mycotoxin contamination and changes in fungal diversity.

Further information

Further readings

Drakopoulos D, Kägi A, Six J, Zorn A, Wettstein FE, Bucheli TD, Forrer HR, Vogelgsang S (2021). The agronomic and economic viability of innovative cropping systems to reduce *Fusarium* head blight and related mycotoxins in wheat. *Agricultural Systems* 192:103198. <https://doi.org/10.1016/j.agsy.2021.103198>.

Chabert A, Marchand D, Sarthou JP (2020). Data from extensive comparative measurements of conventional, conservation and organic agricultures in southwestern France. *Data in Brief* 31:105827. <https://doi.org/10.1016/j.dib.2020.105827>.

About this practice abstract

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IntercropVALUES aims to exploit the benefits of intercropping to design and manage productive, diversified, resilient, profitable, environmentally friendly cropping systems acceptable to farmers and actors in the agri-food chain. As a multi-disciplinary and multi-actor project, it brings together scientists and local actors representing the food value chain. It includes 27 participants from 15 countries (3 continents) from a wide diversity of organizations and stakeholders. The project will run for four years and started in November 2022.

Project website: <https://intercropvalues.eu/>