

Ecophysiological response of maize (*Zea mays*) to water stress: remote sensing and *upscaling* techniques for a more efficient management of water resources in agriculture

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One of the most relevant effects of global change is the alteration of hydrological events, which affects many human activities, including agricultural ones. Understanding how maize (*Zea mays*) – one of the most important crops worldwide – responds to these modifications is important to adapt to climate changes. In this framework, remote sensing could bring an important improvement: satellite- and drone-acquired data can be very informative and, together with physiological markers of plant stress, could improve our understanding of the effects of climate change on this key aspect of human lives.

Moreover, maize edibility depends on the absence of mycotoxins in the grain, which are produced by some fungal pathogens such as *Fusarium verticillioides* and *Aspergillus flavus*, whose presence and capacity to produce mycotoxins depend on environmental conditions, mostly on precipitations and temperature.

Therefore, the final aim of this project is to better understand how the environment affects the physiology of maize in the field, and eventually how this affects the presence of mycotoxins in the grain.

To investigate these relationships, in 2022 some drone-acquired multispectral data, physiological markers of plant stress and mycotoxin presence in the grain, have been gathered in maize fields in NE Italy on a spatial survey in different soils characterized by different agronomic and irrigation conditions. The same setup has been repropounded in 2023, and the experiments are ongoing.

The expected results are some new insights into the interplay between the environmental conditions, the physiology of maize, the presence of pathogens, and eventually the presence of mycotoxins.