

## Maize landraces as sources of important bioactive compounds

Clarissa Clemente<sup>1\*</sup>, Silvia Tavarini<sup>1</sup>, Alessandro Rossi<sup>1</sup>, Luciana G. Angelini<sup>1</sup>

<sup>1</sup>Dipartimento di Scienze Agrarie, Alimentari e Agro-ambientali (DiSAAA-a) -  
Università di Pisa

\*E-mail : clarissa.clemente@phd.unipi.it

### Abstract

Facing the challenges posed by climate change, loss of biodiversity, resource depletion and food insecurity, the valorisation of traditional crop varieties emerges as a key strategy for building resilient and sustainable food systems. Therefore, the conservation of local germplasm adapted to specific environments, is crucial for preserving agrobiodiversity as well as for identifying valuable genetic traits that could potentially contribute to future breeding efforts. Maize (*Zea mays* L.), one of the major staple cereals worldwide, has evolved for centuries into hundreds of landraces, adapting to many agroecological niches under careful farmer selection.

Maize landrace adaptations to different and, often, difficult environmental conditions, such as marginal areas, offers several advantages, including low input requirements, good tolerance to abiotic and biotic stresses, enhanced food security, and preservation of local biodiversity. Since Tuscany is characterized by the presence of several traditional maize varieties, in the present study, seeds of 14 local maize varieties, conserved *ex situ* by Tuscany Region Germplasm Bank's herbaceous species section located at the Department of Agriculture, Food and Environment of the University of Pisa) were evaluated in terms of phytochemical properties (free phenols and flavonoids, anthocyanins, xanthophylls, antiradical and antioxidant activities) in comparison with a modern hybrid (PR 36Y03 - Pioneer). The local varieties were Trentolino, Formenton, Maggese, Quarantino di Monteviale, Quarantino di Sansepolcro, Quarantino di Frassineto, Quarantino di Anghiari, Quarantino Ville di Roti, Villa di Pietranera, Nano di Verni, Orecchiella, Palazzaccio, Marranino Giallo and Marranino Rosso. Our results showed that these local varieties exhibited higher nutraceutical value than the commercial hybrid, with the highest content of bioactive compounds achieved by Quarantino Ville di Roti, Quarantino di Sansepolcro, and Trentolino. The study highlighted as local maize varieties can be sources of valuable bioactive compounds and their in situ preservation can represent an opportunity for the creation of agri-food chains based on functional and healthy food products.

### Keywords

*traditional maize varieties, Tuscany Region Germplasm Bank, preservation of local biodiversity, bioactive compounds, nutraceutical value*