

**XIV CONVEGNO NAZIONALE  
SULLA BIODIVERSITÀ**

**1<sup>ST</sup> INTERNATIONAL  
CONFERENCE ON  
MEDITERRANEAN BIODIVERSITY**



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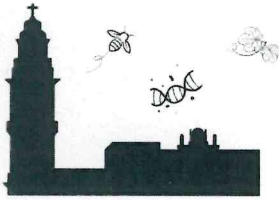


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### A.9 Unveiling the Genetic Diversity and Landscape Genomics of Maize Landraces: Insights into Adaptation and Conservation

Lezzi A.<sup>1</sup>, Stagnati L.<sup>1</sup>, Joost S.<sup>2</sup>, Lanubile A.<sup>1</sup>, **Busconi M.**<sup>1\*</sup>, Marocco A.<sup>1</sup>

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**Keywords:** landraces, landscape-genomics, maize, resilience, population analysis.

Climate change poses a formidable challenge to maize cultivation. Maize landraces, which have adapted to various agroecological conditions, can harbour valuable indigenous germplasm for future breeding programmes to further improve modern varieties. In this research 28 Italian maize landraces were analysed searching for genetic markers associated with environmental factors. Landraces from Lombardia, Emilia Romagna, Trentino-Alto Adige, Veneto, Toscana, Valle d'Aosta and Friuli Venezia Giulia were phenotyped and the genetic analysis was performed using the GBS technique. Subsequent population studies were carried out. Some populations displayed distinct and well-defined genetic profiles, representing unique populations that have not interbred with others. Conversely, there were admixed varietal groups, representing the result of historical cultivation practices, wherein farmers cultivated diverse maize varieties without territorial discontinuity, facilitating cross-pollination between distinct materials. Finally, a comprehensive analysis was conducted to investigate local adaptation in relation to the environment, using climatic variables of the landraces sampling sites, spanning a 30-year period (1970-2000). Preliminary findings from this ongoing investigation identified two specific Single Nucleotide Polymorphisms (SNPs) strongly correlated with the environmental factor of wind, and three with the latitude of the sampling site, indicating promising prospects for genetic improvement.

### A.10 Genetic diversity of the “Cavasso and Val Cosa” onion landrace from Friuli

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**Keywords:** *Allium cepa* L., landrace, agro-biodiversity, SSR, Friuli.

According to FAOSTAT, onion (*Allium cepa* L.) is the third most important vegetable crop. With its origins traced back to Central Asia, the Mediterranean region has emerged as a secondary centre, fostering a remarkable level of diversity throughout Italy. Here we present a survey about evaluation and characterization of the “Cavasso and Val Cosa” onion, a landrace with more than 80 years history of small-scale cultivation in the western portion of Friuli. Before WW II to approximately the 1976 earthquake, onion seeds passed across generations of farmers, and women took care of the production, with onions assembled in attracting braids (“Riesti” in Friulian language) and directly marketed in several villages of Friuli. Since 2004, our genebank (ITA 368) at the University of Udine, maintained the onion seeds and evaluated the performance of the landrace. As expected, adaption of the local landrace was high, compared to OPV varieties (Tonda Musona / Bianca di Giugno, Tropeana Lunga and Rossa Lunga di Firenze. Qualitative tests (storability, total sugars, pungency, total polyphenols, quercitine) are available. In parallel, a genetic diversity assessment was performed in order to ascertain whether the landrace onions from the two locations (Cavasso vs Castelnovo del Friuli) had a common genetic base or were distinct, as postulated by local experts. Green tissues from 150 individual plants collected from nine local farms in the area of Cavasso and Val Cosa and the four registered onion varieties were screened at 14 microsatellite loci. The overall panel of individuals showed HW equilibrium at several loci and small amount of variance explained by principal components, indicating limited differentiation and common ancestry of the materials analyzed. However, the local onion landrace resulted to be significantly distinct from the other OPV varieties ( $0.19 < F_{ST} < 0.23$ ). Six farms from the area of Cavasso presented materials genetically compatible with the Cavasso landrace whose seeds were originally collected; one showed more heterogeneity among varieties; the last two, corresponding to the area of Val Cosa, exhibited separated genetic profiles, supporting the traditional knowledge of two distinct populations for the local onions, despite the geographical proximity.