

## Phenotypic Diversity of the Tomato Germplasm from the Lazio Region in Central Italy, with a Case Study on Molecular Distinctiveness

**Authors :** Barbara Farinon, Maurizio E. Picarella, Lorenzo Mancini, Andrea Mazzucato

**Abstract :** Italy is notoriously a secondary center of diversification for cultivated tomatoes (*Solanum lycopersicum* L.). The study of phenotypic and genetic diversity in landrace collections is important for germplasm conservation and biodiversity protection. Here, we set up to study the germplasm collected in the region of Lazio in Central Italy with a focus on the distinctiveness among landraces and the attribution of membership to unnamed accessions. Our regional collection included 30 accessions belonging to six different locally recognized landraces and 21 unnamed accessions. All accessions were gathered in Lazio and belonged to the collection held at the Regional Agency for the Development and Innovation of Agriculture in Lazio (ARSIAL, in the application of the Regional Act n. 15/2000, funded by Lazio Rural Development Plan 2014 - 2020 Agro-environmental Measure, Action 10.2.1) and at the University of Tuscia. We included 13 control genotypes as references. The collection showed wide phenotypic variability for several traits, such as fruit weight (range 14-277 g), locule number (2-12), shape index (0.54-2.65), yield (0.24-3.08 kg/plant), and soluble solids (3.4-7.5 °B). A few landraces showed uncommon phenotypes, such as potato leaf, colorless fruit epidermis, or delayed ripening. Multivariate analysis of 25 cardinal phenotypic variables grouped the named varieties and allowed to assign of some of the unnamed to recognized groups. A case study for distinctiveness is presented for the flattened-ribbed types that presented overlapping distribution according to the phenotypic data. Molecular markers retrieved by previous studies revealed differences compared to the phenotyping clustering, indicating that the named varieties "Scatolone di Bolsena" and "Pantano Romanesco" belong to the Marmande group, together with the reference landrace from Tuscany "Costoluto Fiorentino". Differently, the landrace "Spagnoletta di Formia e Gaeta" was clearly distinct from the former at the molecular level. Therefore, a genotypic analysis of the analyzed collection appears needed to better define the molecular distinctiveness among the flattened-ribbed accessions, as well as to properly attribute the membership group of the unnamed accessions.

**Keywords :** distinctiveness, flattened-ribbed fruits, regional landraces, tomato

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