

Genetic and bioclimatic variation in *Solanum pimpinellifolium*

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Abstract *Solanum pimpinellifolium*, due to its close relationship to *S. lycopersicum*, has been a genetic source for many commercially important tomato traits. It is a wild species found in the coastal areas of Peru and Ecuador. In this study, the genetic variation of *S. pimpinellifolium* was studied using the diversity found in 10 microsatellites in 248 plants spread throughout its entire distribution area, including Ecuador, which has been underrepresented in previous studies. Peruvian and Ecuadorian accessions are genetically quite differentiated. A possible cause of these differences could be the non-uniform nature

of the coastal Ecuadorian and Peruvian climates, seeing as an important correlation between genetic differentiation and climate has been found. In addition, Ecuadorian and south Peruvian accessions have a lower genetic diversity and a higher homozygosity due to their higher autogamy, lower population size, and possible colonization bottlenecks. The Galápagos Islands population is an extreme case, with no diversity, likely caused by a recent colonization from the northern continental Ecuadorian region where genetically identical plants have been found.

Keywords Andean · Climate · Colonization · Genetic structure · Microsatellite · *Solanum pimpinellifolium*

Elena Zuriaga and José M. Blanca contributed equally to this work.

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Introduction

Solanum pimpinellifolium L. is a small perennial bush common in the coastal areas of Peru and Ecuador. In central and southern Peru, *S. pimpinellifolium* is restricted to cultivated fields, roadsides and dumping grounds, and its distribution is sparse; but in Ecuador and northern Peru, it is found in dense populations located in undisturbed areas (Rick et al. 1977; Caicedo and Schall 2004). The former name of this species, *Lycopersicon pimpinellifolium* (L.) Mill., has been changed because recent studies, based on molecular data, have classified the genus *Lycopersicon* (Miller

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Genetic Variation In Solanum:

Genetic Variability and Fruit Morphological Diversity in the Tomato Germplasm Ramhari Thapa, 2014 Tomato *Solanum lycopersicum* L broadly divided into two varieties *Solanum lycopersicum* var *lycopersicum* domesticated tomato and the weedy *Solanum lycopersicum* var *cerasiforme* cherry tomato is closely related to the wild tomato species *Solanum pimpinellifolium* Studies show presence of a very low genetic diversity among tomato cultivars which is estimated to be lower than 5% of that available in nature With the estimation of such a low level of genetic variability in the germplasm assessment of the extent and nature of the genetic variation in tomatoes would be important for breeding and genetic resource conservation programs I used AFLP data to analyze the genetic variability within the germplasm of *Solanum lycopersicum* var *cerasiforme* 112 accessions and genetic variability along with fruit morphological diversity in the accessions of *Solanum lycopersicum* var *lycopersicum* 219 accessions from different parts of the World Cherry tomato *Solanum lycopersicum* var *cerasiforme* in terms of genetic distance and molecular variance 1% molecular variance was very close to *Solanum lycopersicum* var *lycopersicum* than its wild sister taxa *Solanum pimpinellifolium* 20% molecular variance It also showed more genetic diversity H_j 0.42052-0.48361 than that of *S. lycopersicum* H_j 0.26008-0.42017 and among its geographic groups South American accessions had more genetic diversity H_j 0.43703-0.48361 than that of Mesoamerican H_j 0.42052-0.46946 and Caribbean accessions H_j 0.42287 The germplasm of *S. lycopersicum* showed presence of more genetic diversity in the accessions from Western South America Caribbean and Mediterranean regions H_j 0.42017 and Mesoamerica H_j 0.41790 the places associated with tomato domestication and subsequent dispersal after domestication Studied tomato germplasm was divided into three genetically distinct clusters K3 and one of the clusters cluster 3 in *S. lycopersicum*

Assessment of Genetic Variation in Tomato (*Solanum Lycopersicum* Mill.) Gyanendra Kumar Rai, Deeksha Jamwal, 2016-10-14 **Genetic Diversity in Plants** Mahmut Caliskan, 2012-03-14 Genetic diversity is of fundamental importance in the continuity of a species as it provides the necessary adaptation to the prevailing biotic and abiotic environmental conditions and enables change in the genetic composition to cope with changes in the environment Genetic Diversity in Plants presents chapters revealing the magnitude of genetic variation existing in plant populations The increasing availability of PCR based molecular markers allows the detailed analyses and evaluation of genetic diversity in plants and also the detection of genes influencing economically important traits The purpose of the book is to provide a glimpse into the dynamic process of genetic variation by presenting the thoughts of scientists who are engaged in the generation of new ideas and techniques employed for the assessment of genetic diversity often from very different perspectives The book should prove useful to students researchers and experts in the area of conservation biology genetic diversity and molecular biology *Plant Regeneration and Genetic Variability* Indra Vasil, 2012-12-02 *Plant Regeneration and Genetic Variability* Plant Breeding Abstracts, 1995 **Breaking the myth: Breeding for stress tolerance, grain**

yield, and quality traits simultaneously by diversifying the narrow genetic base Karansher Singh Sandhu, Ali Raza, Sunil S. Gangurde, Shabir Hussain Wani, 2023-07-20 Genetics, New Frontiers, 1984 **Genetic Diversity and Crossing Relationships of *Lycopersicon Chilense*** Elaine Brigid Graham, 2005 **Bibliography of Agriculture**, 1975

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in this volume Genome projects already initiated on vegetable crops particularly on Solanaceae and Brassicaceae species may ignite further interest in other vegetables as well

Potato Genetics J. E. Bradshaw, G. R. Mackay, 1994 Origins species and cytology Theory and methods of genetical analysis Cellular and molecular genetics Environmental stress morphology and quality Inheritance of resistance to pests and diseases Potato breeding

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Achieving sustainable cultivation of tomatoes Dr A. K. Mattoo, Prof. A. K. Handa, 2017-03-31

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