

Cucurbitlocal – A Collaborative Initiative to Strengthen Valorization of *Cucurbita* Local Germplasm for Sustainable Agriculture

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Genetic resources contain a vast reservoir of genes to foster the breeding of new cultivars suitable for low input conditions. Conservation of local germplasm is crucial to maintain the extant natural genetic diversity of *Cucurbita* spp. and to provide novel traits for the cultivation of crops in sustainable agri-food systems. In the framework of the Cucurbitlocal project, we aimed to valorize and to rationalize conservation efforts of *Cucurbita* local landraces stored in major European genebanks (IPK, UPV, SvG), and/or in regional communities in Spain, Italy, and Tunisia to make them available for growers in their respective countries through EURISCO/AEGIS network or other European or national initiatives.

In 2021 and 2022, researchers in five countries (Germany, Italy, Romania, Spain, and Tunisia) evaluated the diversity of 132 *Cucurbita* landraces (Figure 1) based on standardized descriptors related to growth habit, fruit and seed type. Taxonomic determination of cultivar groups was assigned according to the criteria described in Mansfeld's Encyclopaedia of Agricultural and Horticultural Crops (Jeffrey, 2001).

Leibniz Institute of Plant Genetics and Crop Plant Research (IPK, Germany) characterized 39 (2021) and 36 (2022) *Cucurbita* accessions including *C. maxima*, *C. pepo*, *C.*

argyrosperma, *C. moschata*, and *C. ficifolia* for agromorphological characters, especially fruit and seed traits. All data are publicly available in the Genebank Information System (GBIS).

University of Naples Federico II (Italy) evaluated 12 *C. pepo* landraces for morphological plant and fruit traits. In addition, an open field trial under water deficit was conducted using the same genotypes. A potential genotype tolerant to drought was identified.

Suceava Gene Bank (Romania) assessed the diversity of 10 local landraces of *C. pepo* and 10 of *C. maxima*.

In CRRHAB (Tunisia), 12 landraces belonging to *C. maxima*, *C. pepo*, and *C. moschata* were characterized for their agromorphological traits under open field conditions; these landraces were previously collected from local farmers a few years ago. A preliminary evaluation for low watering regime as well as powdery mildew tolerance was done. Such information can be valuable to select accessions adapted to diverse agroclimatic and stressful conditions.

UPV (Universitat Politècnica de València, Spain), evaluated 13 traditional landraces (1 *C. pepo*, 7 *C. moschata*, and 5 *C. maxima*) using descriptors under greenhouse conditions in Valencia and in an open, saline-stressed field in Alicante (saline soil and water). Organic farming conditions were used

in both trials. The greenhouse trial in Valencia was strongly affected by Watermelon Mosaic Virus (WMV) as these traditional landraces lack resistance to this virus. Two accessions with lower susceptibility were identified: *C. maxima* 'De Torrar' and *C. moschata* 'Cacahuet'. The Alicante field trial was less affected by viruses (although some plants infected by WMV and Cucumber Mosaic Virus (CMV) were detected). A stronger incidence of powdery mildew was found under saline conditions.

The Cucurbitlocal project (<https://www.ecpgr.cgiar.org/working-groups/cucurbits>) strengthened collaboration among researchers with unique scientific expertise to increase crop genetic conservation and the valorization of *Cucurbita* local germplasm diversity and richness. Moreover, this pilot project will contribute to the sustainable use of *Cucurbita* resources and could be extended in Europe and other regions.

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Literature Cited

Jeffrey, C. 2001. Cucurbitaceae. In: P. Hanelt and Institute of Plant Genetics and Crop Plant Research (eds.). Mansfeld's Encyclopaedia of Agricultural and Horticultural Crops, Vol. 3, Springer-Verlag Berlin, Heidelberg, New York.



Figure 1. *Cucurbita* accessions evaluated in the Cucurbitlocal project.