

# Portuguese accessions of *Cucurbita* spp. and *Citrullus lanatus*: conservation, evaluation and breeding

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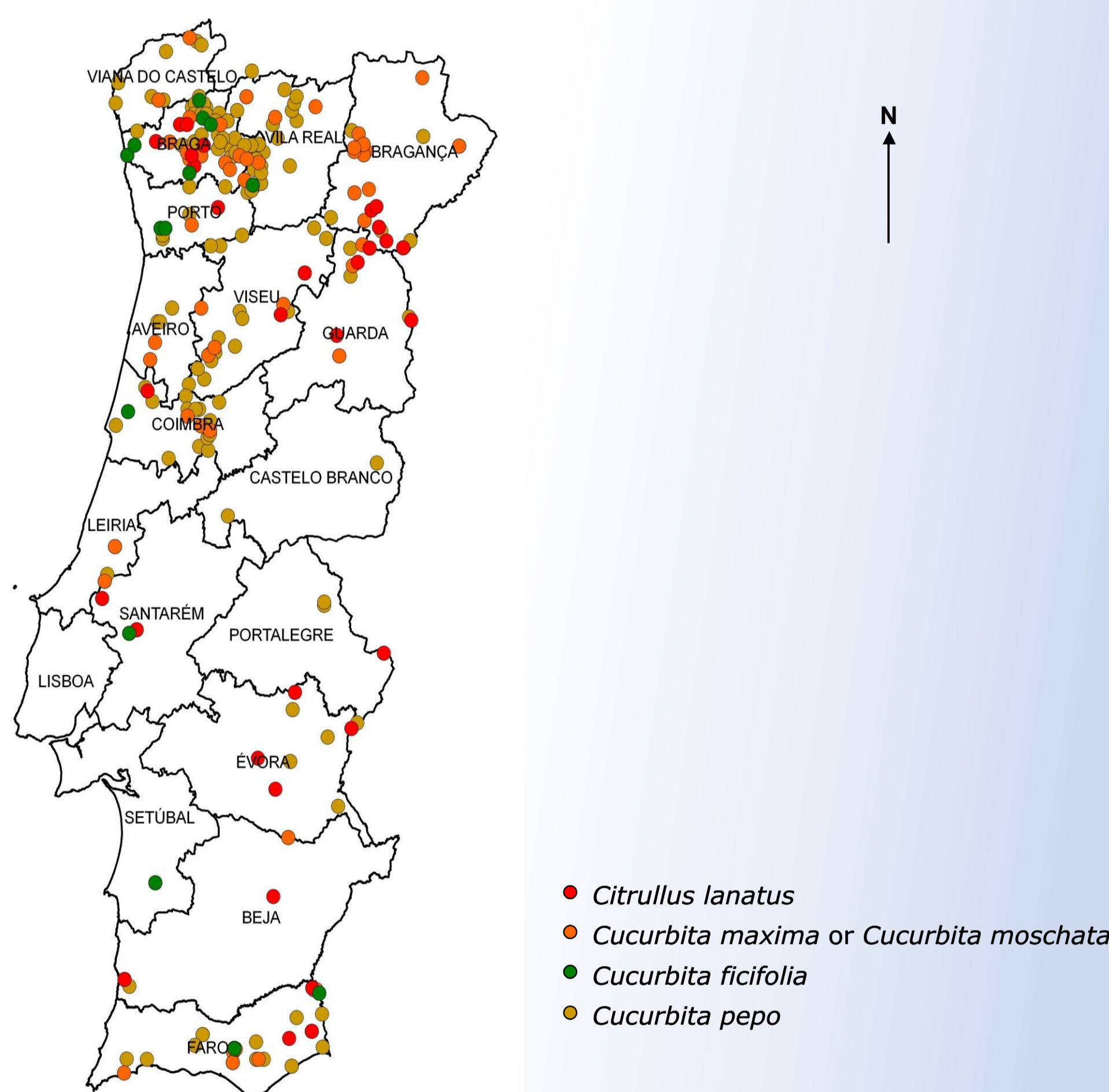
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## Introduction

*Cucurbitaceae* is one of the most important families of vascular plants. This family includes 118 genera and 825 species.

The Portuguese National Genebank (BPGV) has done systematic collecting missions in Portugal (Mainland and Madeira Island) and maintained medium and long term ex situ collections of cucurbits.

The collections include 573 accessions, of which 62% belong to *Citrullus lanatus* and *Cucurbita* spp.: 37 of *Citrullus lanatus* Thumb Mansf., 19 of *Cucurbita ficifolia* Bouché, 74 of *Cucurbita maxima* Duch ex Lam and *Cucurbita moschata* Duchesne ex Poir and 224 of *Cucurbita pepo* L. The geographic distribution of the collecting sites for the species *Citrullus lanatus*, *Cucurbita ficifolia*, *Cucurbita maxima* and *Cucurbita pepo* are given in Figure 1.



**Figure 1.** Collecting sites in Portugal by species: *Citrullus lanatus*, *Cucurbita ficifolia*, *Cucurbita maxima* or *Cucurbita moschata* and *Cucurbita pepo*

Since 2001, BPGV in partnership with other National Entities, Escola Superior Agrária do Instituto Politécnico de Santarém, Direcção Regional de Agricultura e Pescas do Algarve and Universidade do Algarve, has been carrying out activities related to preservation, characterization, evaluation and pre-breeding. This presentation reports the characterization of watermelon (*Citrullus lanatus*) and figleaf gourd (*Cucurbita ficifolia*) and the pre-breeding achievements from cucurbits of the BPGV.

## Material and methods

Accessions of watermelon (29) and figleaf gourd (8), each represented by 20 plants at sowing, were grown for characterization and preliminary evaluation. Twenty five and twenty nine descriptors were applied to watermelon and figleaf gourd, respectively. The descriptors were those given by Esquinas-Alcazar, published by IBPGR (1983), in the case of watermelon, the descriptors were adapted from those for *Cucumis melo*. Following characterization and preliminary evaluation a few accessions and their recombination products were selected for further registration in the National Catalogue of Varieties.

## Results and Discussion

In watermelon some characters showed little or no variation, but most were very polymorphic (Figure 2).

Four accessions segregated for presence/absence of secondary skin colour, while all the others showed secondary skin colour (lighter or darker green), mostly in strips and streaks; a single accession was speckled (accession 03354) and another was spotted (accession 02533).

Most accessions presented round fruits, but accession 02466 exhibited pyriform fruits, four accessions had oblate and other four had elongate fruits and the remaining segregated for fruit form.

Fruit length and weight were minimum in accession 03353 (18.5 cm, 3 kg) and maximum in accession 05124 (60 cm, 18 kg). Fruit width ranged between 16.5 cm and 27 cm, in accessions 02533 and 06059, respectively.

Accession 04845 was the only with yellow flesh colour. Light red was the most frequent colour and only accessions 03354 and 03423 exhibited a uniform dark red flesh.

Observed Brix degrees varied between 12 (accession 04870) and 6.3 (accession 05080), with twelve accession above 10°Bx.

Accession 07798 segregated for orange seed colour; in all others cases seeds were brown, dark or both.

The morphological characterization suggests the introgression of several accessions by commercial varieties (mainly Crimson Sweet and Sugar Baby types), but a large polymorphism between and within accessions still persists.

The variation between the eight accessions of figleaf gourd was small, and regarded the following descriptors: plant growth habit, that was intermediate in accessions 02889, 02892 and 08303, and prostrate in the remaining; design produced by the secondary colour, with a single accession (08303) segregating streaked and speckled, while in all others the pattern was streaked; leaf lobes, as accession 06648 exhibited very shallow ones, in contrast with the prevailing intermediate type; and °Bx was 9.5 in accession 02161, while in all others this index was no greater than 7.5.

Not only was the number of accessions small, but this species is also known for its low polymorphism.

AFLP and RAPDs markers were used to check the assignment of accessions to *Cucurbita* species (*C. pepo*, *C. maxima* and *C. moschata*) and to identify clusters within each species (Dandlen et al, 2005; Veiga et al, 2005) and preliminary characterization of eighteen accessions of *C. maxima* and *C. moschata* (not shown here) allowed the identification of promising accessions.

Departing from accessions of *Citrullus lanatus*, *Cucurbita maxima* and *C. moschata*, three varieties, one of each species, were selected and registered in the National Catalogue of Varieties (Table 1). "Monteluz" (Figure 3) is an accession from Algarve that has simply been multiplied, while "Famoesa" and "Esaloque" came out of short pedigree selection programs.

**Table 1.** List of varieties registered in the National Catalogue of Varieties

Species	Common Portuguese crop name	Varieties	Year of Registration
<i>Cucurbita moschata</i> Poir.	Abóbora gerimum	"Famoesa"	2008
<i>Cucurbita maxima</i> Duchesne	Abóbora menina	"Monteluz"	2008
<i>Citrullus lanatus</i> Thumb Mansf	Melancia	"Esaloque"	2008



**Figure 3.** Pumpkin "Monteluz"

## Conclusions

Portuguese germplasm of watermelon and main *Cucurbita* spp. is rather polymorphic. *Cucurbita ficifolia* shows poor variation, but accession 02161 deserves further research.

BPGV's collection gathers important resources for either the registration of landraces or the development of new varieties.

For this purpose further agronomic evaluation of morphologically interesting accessions is needed.

## Literature cited

Dandlen, S. et al. (2004). Assessing the Genetic Variability of *Cucurbita pepo* Germplasm by AFLP and RAPD Markers. XXX Jornadas Portuguesas de Genética, Oeiras.

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