

Morphological Diversity in Gboma Eggplant (*Solanum macrocarpon*) as Assessed with Conventional and Tomato Analyzer Descriptors

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Abstract. The vegetable crop gboma eggplant (*Solanum macrocarpon*) and its wild ancestor *S. dasyphyllum* are native to Africa. Although it is an important crop in certain areas, there are few studies on gboma eggplant diversity and breeding. We have studied the morphological diversity of a collection of 11 accessions of *S. macrocarpon* and 1 accession of *S. dasyphyllum* using conventional descriptors for common eggplant (*S. melongena*) as well as the phenomics tool Tomato Analyzer. Results revealed that the gboma eggplant collection studied is highly diverse, with significant differences among accessions for 27 traits. Also, significant differences were found between *S. macrocarpon* and *S. dasyphyllum* for 14 traits, revealing that both species present considerable morphological differences. The large diversity found in the collection found indicates that selection and breeding can result in considerable improvement in this crop. Results also reveal that common eggplant descriptors and Tomato Analyzer are adequate tools to describe the variation present in gboma eggplant.

Keywords: diversity, genetic resources, phenomics, *Solanum macrocarpon*, Tomato Analyzer

Introduction. Gboma eggplant (*Solanum macrocarpon* L.) is a vegetable crop native to sub-Saharan Africa and used for its edible fruits and leaves (Schippers, 2000). Despite its local importance in several countries and areas of West Africa it has largely remained neglected by the scientific and breeders communities. The cultivated *S. macrocarpon* was domesticated from the wild relative *S. dasyphyllum* Schum. and Thonn. and hybrids between both species are fertile (Bukenya and Carasco, 1994). In consequence, the latter is a genetic resource for gboma eggplant breeding. Also, gboma eggplant is a relative of common eggplant (*S. melongena* L.) and sexual interspecific hybrids between both species can be obtained, although with limited fertility (Oyelana and Ugborogho, 2008). Knowledge of the diversity of this crop is essential for detecting sources of variation for breeding programmes either of gboma eggplant or of common eggplant.

Aims and objectives. This work is aimed at studying the morphological diversity of the gboma eggplant and its relationship to the wild *S. dasyphyllum*. It will also allow determining if conventional standardized eggplant descriptors specifically developed for common eggplant (IBPGR, 1990) and the phenomics tool Tomato Analyzer (Brewer *et al.*, 2006) are appropriate tools for gboma eggplant characterization and diversity studies.

Materials and methods. Eleven gboma eggplant accessions originally collected in Africa plus one accession of its wild ancestor (*S. dasyphyllum*) were evaluated. Five plants per accession were cultivated under open field conditions at Valencia (Spain) using a completely randomized design. Individual plants characterized with 18 conventional morphological descriptors (IPGRI, 1990) and longitudinally cut fruits were scanned and subjected to morphometric analysis for 24

Tab. 1. Mean, minimum and maximum values for selected traits in 11 accessions of the cultivated *S. macrocarpon* and in one accession of its wild ancestor *S. dasyphyllum*.

Trait	Leaf prickles ^a	Anthocyanin pigmentation ^b	Fruit weight (g)	Fruit length/width ratio
<i>S. macrocarpon</i> (n=11)				
Mean	0.99	1.27	119	0.767
Minimum	0.00	0.00	54	0.678
Maximum	3.80	7.00	177	1.336
<i>S. dasyphyllum</i> (n=1)				
	9.00	0.00	22	0.796

^aMeasured on a prickliness scale (0=no prickles; 9=very many (>20)).

^bMeasured on a anthocyanin pigmentation scale (0=absent; 9=very strong).

fruit shape traits with Tomato Analyzer (Brewer *et al.*, 2006). Data were subjected to ANOVA tests and to principal components analysis (PCA).

Results and Discussion. A large diversity was found in the gboma eggplant collection for both conventional and Tomato Analyzer descriptors. Significant differences among accessions were found for 27 traits, of which 13 corresponded to plant descriptors and 14 to Tomato Analyzer descriptors. High differences were found for some traits, like anthocyanin pigmentation, prickliness, and fruit weight (Table 1). Although most accessions presented the typical flattened or subspherical fruit shape (Schippers *et al.*, 2000), with a fruit length/width ratio below 0.8, one *S. macrocarpon* accession had elongated fruit shape with a fruit length/width ratio above 1.3 (Table 1). Significant differences for 14 traits were found between *S. macrocarpon* and *S. dasyphyllum*. Most relevant differences between the cultivated *S. macrocarpon* and its wild ancestor (Bukenya and Carasco, 1994) were related to the higher prickliness and smaller fruit size of *S. dasyphyllum* (Table 1). PCA analyses clearly separated both species; the odd elongated *S. macrocarpon* was also separated from the rest of accessions, which group into two clusters, in the PCA graph.

Conclusion. Gboma eggplant is a highly diverse species, indicating that there is ample

room for selection and breeding. The wild *S. dasyphyllum* is clearly distinct from *S. macrocarpon* in morphological and fruit shape traits. Finally, both conventional morphological descriptors and phenomics Tomato Analyzer descriptors have demonstrated being useful for characterizing the genetic resources of this neglected crop.

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