

Genetic diversity and utilization of cultivated eggplant germplasm in varietal improvement

ABSTRACT

Eggplant is the fifth economically most important vegetable in the Solanaceae family after tomato, potato, chili, and tobacco. Apart from the well-cultivated brinjal or aubergine eggplant (*Solanum melongena* L.), two other underutilized eggplant species, the African eggplant (*S. macrocarpon* L.) and the scarlet eggplant (*S. aethiopicum* L.), were also cultivated with local importance where the leaves and fruits are used for food and medicinal purposes. The major objectives of the eggplant breeding program are to improve fruit quality, increase yield performance through heterosis breeding, and introduce pest and disease resistances from wild relatives. Europe and Asia hold a wide collection of germplasm resources with significant potential for genetic improvement. While cultivated eggplant is susceptible to several fungi and bacteria, many wild relatives offer potential resistance to these pathogens. In this paper, we review the genetic resources and diversity of cultivated eggplant and its wild relatives. As a point of departure, we examine the economic importance, domestication, taxonomy characterization, and relationships of the crop and its wild relatives. The importance of evaluating and safeguarding wild relatives is highlighted, as crop wild relatives are highly underrepresented. A key section in this study is an overview dedicated to genetic resources, resistance to biotic and abiotic stresses, pre-breeding, and breeding for sustainable eggplant production.

Keyword: Diversity; Genetic resources; Morphological characterization; Taxonomy; Varietal improvement