

Morphological Characterization of Bulbs: A Study on the Genetic Relatedness of Eleven Shallot Varieties (Allium ascalonicum L.)

by

Ihsan Syafiq Luthfi Fauzi

Abstract

The morphological similarity of bulb characteristics among shallot varieties can determine the genetic relatedness between them, which is valuable for selecting potential parent varieties in plant breeding programs. This study utilized eight qualitative and three quantitative bulb morphological characteristics to analyze the relatedness of eleven elite shallot varieties in Indonesia. The aim of this research was to determine the genetic relatedness of eleven shallot varieties (Kuning, Gempita, Pikatan, Kramat-1, Pancasona, Katumi, Bima Brebes, Trisula, Violetta 1, Maja Cipanas, and Ambassador 2) based on the identification of eleven morphological bulb characteristics using the UPOV (International Union for the Protection of New Varieties of Plants: Onion, Echalion, Shallot, Grey Shallot) guidelines from 2008. Relatedness analysis was conducted using cluster analysis with OriginPro 2022 software to determine similarity values that aid in data grouping. The results showed that at 0 - 25% morphological similarity, there were two main clusters; at 50% morphological similarity, there were seven sub-clusters; and at 75% morphological similarity, there were eleven clusters, each consisting of a single variety. Among the eleven shallot varieties, some exhibited high similarity values ranging from 61% to 71%, such as Gempita Agrihorti and Ambassador 2 Agrihorti, Violetta 1 Agrihorti, and Kramat 1. This high similarity may be due to the use of the same parent varieties, Maja Cipanas and Trisula, in the breeding process.

Keywords: shallot, genetic relatedness, bulb morphological characteristics.