

Evaluation of Genetic Diversity of Some Damask Rose (*Rosa damascena* Mill.) Genotypes of Kurdistan Province Using Morphological Traits

Fardin Nasri^{1*}, Arsalan Fadakar², Bayzid Yousefi³ and Bahman Zahedi²

¹ Department of Horticulture Science, Agricultural Faculty, University of Kurdistan, Sanandaj, Iran

² Department of Horticulture Science, Agricultural Faculty, University of Lurestan, Khoramabad, Iran

³ Research Center of Agriculture and Nature Resources, Sanandaj, Iran

Received: 02 March 2016

Accepted: 15 June 2016

*Corresponding author's email: FardinNasri1@gmail.com

This study was conducted to assess the genetic variety of 12 damask rose genotypes of Kurdistan using morphological traits in Zaleh Research Farm affiliated to Kurdistan Province Agriculture Research Center. The experiment was carried out as a randomized complete block design with three replications and each replication included three stocks in each genotype. Results of analysis of variance showed significant differences among the studied genotypes at the probability level of 1%. Results of mean comparison showed a wide variety for studied traits in different genotypes. Relationship between traits showed that the number of flowers, plant height, average width, average length, average number of leaves, mean flower diameter, and petal to flower weight ratio per stem had positive and significant correlation at 1% probability level. Based on cluster analysis, 12 genotypes of damask rose were divided into four distinct groups according to different traits. Thus, according the results, genotypes Kurdistan 3 and Kurdistan 2 can be introduced as superior genotypes. Kurdistan 3 had high yield in flower per hectare and the number of flowers in per bush, and Kurdistan 2 had the highest flower diameter.

Abstract

Keywords: Flower diameter, Genotype, Morphologic traits, Number of flower.

INTRODUCTION

Rose is the most ancient ornamental species. There is evidence that roses were cultivated 5,000 years ago in China, Western Asia, and Northern Africa (Gudin, 2001). Damask rose is one of the most aromatic species of the rose genus that are of great food and pharmaceutical applications. Inflorescence is the most valuable part of the plant that is used for different products such as rose water, jam and dried flowers used in human foods. The essential oil of the plant is used in aromatherapy and cosmetic industry and perfumery (Chevallier, 1996; Tabaei-Aghdai *et al.*, 2005; Kumar *et al.*, 2013). Damask rose is one of several plants that have beautiful flowers in different colors (mostly red and pink) and can be used in landscape and gardens as beautiful and fragrant plant. Flower size and growth rate has a great effect on its beauty (Rahmani *et al.*, 2011). Process and evolution of damask rose is not well understood, although according to one of the pioneers of systematic study of the rose (Lindley, 1979) an extraordinary attention is paid especially to the European roses. The plant grows for wild in some parts of the world including in Syria, Morocco and Australia. Create new cultivars of damask rose have been selected during a long period and also it has been crossed with local species. For instance, in Anatolia which is one of *Rosa damascena* culture centers, about 30 to 40 species of the genus *Rosa* is available, but has not been collected from the wild damask rose (Nilson, 1972). Damask rose that is used in mass culture and commercial operation is a perennial shrub with a lot of thorny branches and multiple large and very fragrant flowers. Plant height is usually 1 to 2 meters (Carins, 2003). Iran represents a center of genetic diversity of the damask roses (Babaei *et al.*, 2007; Tabaei-Aghdai *et al.*, 2007; Kiani *et al.*, 2008, Nasri *et al.*, 2015).

This research aims to implement the general plan on the genetic study of various rose genotypes in Kurdistan province so as to assess the genetic diversity and favorable characteristics of different genotypes in different geographical locations. Also, the information needed for the selection and breeding, cultivation and mass production of the plant are provided.

MATERIALS AND METHODS

Damask rose germplasm used in this study consisted of 12 different genotypes (Kurdistan 1 to 12) collected from different regions of Kurdistan Province. Genotypes used were provided by the Institute of Agricultural Research Center of Kurdistan. Damask rose collection was created in March 2010 and was assessed in the spring of 2015. The experimental farm of the research station is located at an altitude of about 1,373 meters above sea level, over the geographical longitude of 47° east and latitude of 35.20° north to the west of Iran. The study is a randomized complete block design with three replications and each replication had three stocks in each genotype in that the genotypes were planted as suckers and then were studied. In each replication of uniform healthy stocks which were free of any pests and diseases were sown (in March) in holes with a diameter and depth of 1 meter with inter-hole spacing of 3 meters on a substrate of a mixture of soil and manure. Then, they were irrigated by drip method. At the start of vegetative growth and flowering, the recorded traits included plant height (cm), number of leaves at the base, average leaf length (cm) and average leaf width (cm), number of flowers at the base, performance of flowers at the base (g), average weight of the flowers (g), flower dry weight (g), average fresh and dry weight of petals (g), average flower diameter (cm) including average diameter of 30 flowers from each plant and weight ratio of petal to flower were evaluated.

To determine the genetic variation among studied genotypes, analysis of variance was performed and the means of the traits were compared using Duncan's multiple range test by SAS software. SPSS software was used to determine the coefficients correlations among traits and to group the genotypes through cluster analysis (by Ward method) using Euclidean squared distance.

RESULTS AND DISCUSSION

According to the analysis results of the studied genotypes of the damask rose, plant height, average of leaf length, average of leaf width, number of flowers at the base, yield flowers at the base, average diameter of the flower, average weight of flowers, flower dry weight, and average