

## EVALUATION OF *HELIOTROPIMUM GREUTERI* FOR MORPHOLOGICAL CHARACTERISTICS AND POTENTIAL USE AS AN ORNAMENTAL PLANT

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### Abstract

*Boraginaceae* is an important family distributed worldwide that includes herbs, subshrubs, shrubs, or trees. The paper aims to introduce a potential ornamental plant in the Kayseri city of Turkey. Belonging to the family *Boraginaceae*, the plants of *Heliotropium greuteri* naturally occur. In this study, 50 genotypes were examined for two morphological features (leaf size and flower diameter). The data obtained in the study were analysed with SPSS statistical software. *Heliotropium gruteri* genotypes indicated quite different characteristics studied in this region. Leaf size is highly variable (11- 42 cm) and leaf sizes of genotype 2, 9 and 17 are the largest; genotypes 37, 42 and 44 mm have smaller leaves. Looking at the flower top diameter, genotypes had values between 8.09 and 12.37 mm. Genotypes 25, 39 and 9 have the highest flower top diameters and genotypes 31, 10, 48 have the smallest flowers. No significant difference between genotypes in terms of flowers top diameter was detected. There was no correlation between leaf length and diameter of flower diameter. Thus, with fragrant flowers, it is suitable for use as a ground cover, which provides a decorative appearance to their environment, which can grow even in rocky areas, affected by harsh winds. They are able to tolerate moving and attracts honey bees as well. Because of the many features of *H. greuteri* such as drought tolerance and fragrance, it can have potential as ornamental plant. They can be suggested in parks, road sites, cemeteries and all low input areas as well as high input areas.

**Key words:** *Heliotropium greuteri*, *Boraginaceae*, ornamental plants

### INTRODUCTION

*Boraginaceae* family of *Lamiales* order has 100 genera and 2.000 species of tropical, subtropical and temperate regions. *Boraginaceae* is an important family distributed worldwide that includes herbs, subshrubs, shrubs and trees. Within the family *Boraginaceae*, *Heliotropium* species exhibit great variation in many features of biological interest including habitat preferences, physiognomy and morphological traits (Al-Turki, 2001). The genus *Heliotropium* is part of the *Heliotropieae* tribe and *Heliotropioideae* subfamily; it is a eurytopic genus with 250 species (Saad-Limama, 2005). South-West and Central Asia are major centers of diversity in the genus *Heliotropium*. Most species of *Heliotropium* grow in areas with an arid and semi-arid climate, mostly on dry soils, gypsum hills, sandy and gravelly deserts, disturbed soils, eroded slopes, as weeds in cultivated lands and wastelands, along riversides, and, rarely, around hot springs (Akhani, 2007)

The genus *Heliotropium* L., according to a recent survey, comprises nearly 300 species assigned to 19 sections (Al-Turki, 2001). Most species are distributed in tropical and temperate regions of both hemispheres in a variety of habitats, including drifting sands, hardened sandy plains, edges of cultivated or saline waste ground and steep rocky outcrops as high as 1.500 m (Collenette, 1999). Many researchers, in an effort to confirm the identity of *Heliotropium* taxa. *Heliotropium gruteri* that described by our study, is the new species described in Kayseri region. *Heliotropium gruteri*, seen as extensively in the region, have fragrant flowers. These plants are suitable for use in the refuges and ground cover plants. They are very attractive and actively grows up until the first frost by forming flowers. Research is needed for further information on the properties of this species.

### MATERIALS AND METHODS

Kayseri province is natural habitat of *Heliotropium gruteri*. In this study, 50

genotypes were characterized for leaf and flower characteristics, two most important features of ornamental plants. Comparative morphological analyses were conducted at the sites where the plants naturally grow. The observation sites are in the elevation at 1000-1800 meters within Kayseri province of Turkey in Central Anatolia. Means of leaf sizes and flower diameters were analyzed with SPSS statistical software.

## RESULTS AND DISCUSSIONS

*Heliotropium gruteri* belonging to *Boraginaceae*, is an annual and branched plant. The observations have been made in Kayseri region with hot summers and cold winters. The soil is mostly sandy-loam with desert pavement and coralline features. Flowering and fruiting occurs profusely from June to November. This study revealed valuable information on *H. gruteri*'s leaf and flower structure of 50 genotypes. *Heliotropium gruteri* genotypes had high level of variation in this region. Leaf sizes ranged between 11 and 42 cm. These properties are given in Table 1 below. While leaf size of genotype 2, 9 and 17 were the largest, genotypes 37, 42 and 44 had the smallest leaves. Looking at the flower top diameter, genotypes had the values between 8.09 and 12.37 mm. While genotypes 25, 39 and 9 having the highest flower diameter, genotypes 31, 10, 48 had the smallest flowers. These properties are shown in Table 2 below. No significant differences were detected between genotypes in terms of flowers top diameter. There was no correlation between leaf length and diameter of flower top.

Literally, *H. gruteri* are 20-60 cm high herbs, with spreading and retrorse hairs, herbs annual and much branched. Petiolate, up to 11.5-42.0 cm long, gradually reduced in upper portion of the stem; narrowly ovate, undulate, spreading and retrorsely bristly hairy; hairs of 2 to 3 types, the basal portion of the hairs on the midrib and veins extremely swollen.

Inflorescence terminal, of usually more than 2, spicate cymes, elongating in fruit. Flowers white, 5-10 mm long. Calyx 3 mm long, the lobes 2.5 mm long, densely bristly hairy, setose except at the bases. Corolla 5 mm long; tube slightly constricted near the mouth and below the stigma level; lobes obtuse, and spreading. Anthers 1 mm long, pointed, inserted at about the middle of the corolla tube. Stigma short, conical, apex obtusish, glabrous. Nutlets shortly winged, 3 mm long and wide including the wings, glabrous, with or without one or two spongy callosities on the outer surface. Shrubs of *H. gruteri* are given in Figure 1 below.



Figure 1. Pictures of shrubs of *Heliotropium gruteri* plants in August

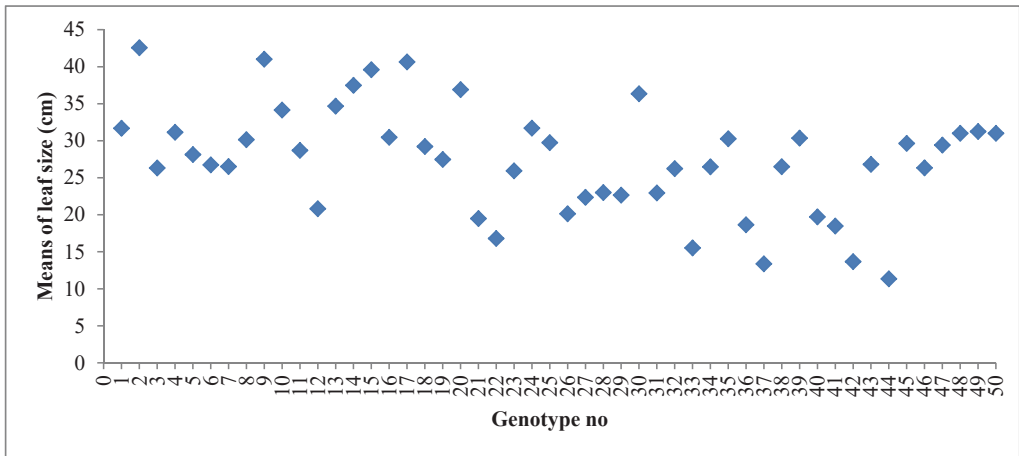


Figure 2. Means of leaf size

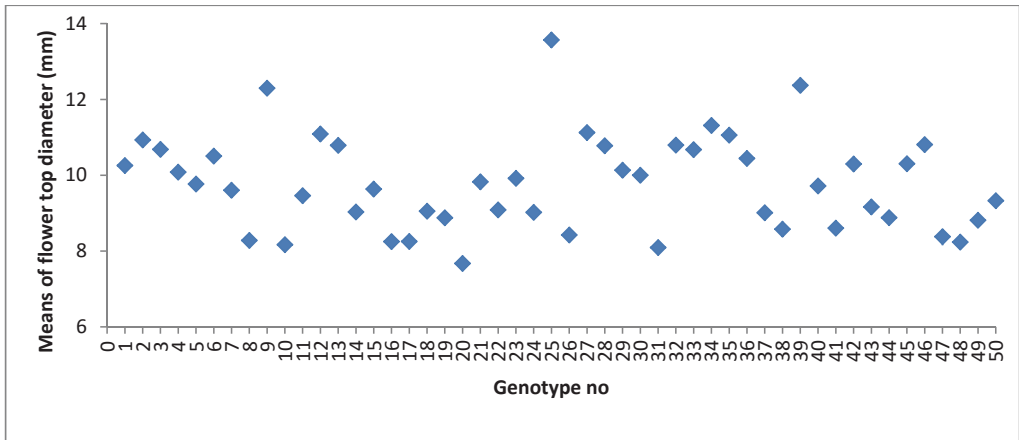


Figure 3. Means of flower top diameter

## CONCLUSIONS

Turkey, because of its geographical location, high variable climates due to elevation differences, mountains ranging in short distance, geological, geomorphological structure, soil diversity and historical reasons, is one of the most important diversity centers in the world in terms of plant species.

As endemics of Turkey, *H. greuteri* may play a role in landscaping. We emphasize aesthetic value of natural species with their ornamental plant capacity. The usage of natural species play significant mission with ecological and providing identity for cities.

In this study, we indicated variation and potential of two important ornamentally important characteristics of 50 *H. greuteri* plants occurring in Kayseri, Turkey with elevation of 1200-1800 meters.

They are highly drought tolerant, attractive for fragrance, but having little size of flowers. Improving flower sizes may be better by breeding through selection, mutation breeding, etc.

Study results showed that *H. greuteri* have high potential for the use in landscape design.

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