

**SOME MORPHOLOGICAL VARIATIONS IN SCROPHULARIA
SUBAEQILOBA LALL (SCROPHULARIACEAE) RELATED TO
HABITAT**

**TÜRKİYE İÇİN ENDEMİK OLAN SCROPHULARIA
SUBAEQILOBA LALL (SCROPHULARIACEAE) TÜRÜNDE
HABİTATA BAĞLI BAZI MORFOLOJİK VARYASYONLAR**

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ABSTRACT:

Scrophularia subaeqiloba Lall (Scrophulariaceae) is an endemic species proper to the Munzur Mountains which actually grows in calcareous areas. In this study, it has been determined the populations of the species which grow on serpentine from the Kesis Mountain in Erzincan. The specimens growing on serpentine has some morphological differences from the Munzur specimens. These differences have been thought to belong to a new taxon but after a profound study, it has been reached the fact that these differences are the variations depending on the habitat of *Scrophularia subaeqiloba*.

Key words: Endemic, Morphological variations, *Scrophularia subaeqiloba*, Turkey

ÖZET:

Scrophularia subaeqiloba Lall (Scrophulariaceae) Munzur dağlarına özgü kalker kayalıklarda yetişen endemik bir türdür. Bu çalışmada, Keşiş Dağından türün serpantinde yetişen populasyonları belirlenmiştir. Serpantinde yetişen populasyonlara ait bireyler bazı morfolojik özellikleri yönünden Munzur Dağlarından toplanan örneklerden farklılıklar göstermektedir. Başlangıçta bu farklılıklar yeni bir taksonun delili gibi düşünülmüştür. Yapılan çalışmalar sonunda bu farklılıkların yetişme

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ortamından kaynaklandığı ve tür içi bir varyasyon olduğu sonucuna ulaşılmıştır.

Anahtar sözcükler: Endemik, Morfolojik varyasyonlar, *Scrophularia subaeqiloba*, Türkiye.

1. INTRODUCTION

The genus *Scrophularia* L. (Scrophulariaceae) comprises 269 taxon distributed holoartic region (Ortega & Devesa 1993) and centered mainly in southern Europe and the Mediterranean (Yuan 1983). The genus has been traditionally divided into two largely unnatural groups: Sect. *Venilia* G.D with staminode absent or rarely rudimentary, and Sect. *Scrophularia*, with a well developed staminode (Lall & Mill 1978). The genus is represented with 59 species in Turkey ((Lall & Mill 1978; Davis et al. 1988)

Some plant specimens belonging to genus *Scrophularia* were collected from Keşiş Mountain (Turkey/ B7 Erzincan) in flowering period in 2004 and 2005. The samples were not identified using the papers (Lall 1970; Lall & Mill 1978). They were close to *Scrophularia subaeqiloba* Lall. But their leaves and some floral features were different from it. Its status could be more thoroughly investigated in the Edinburgh Herbarium (E). It was thought that it was indeed a new subspecies belonging to *S. subaeqiloba*. In the light of the findings obtained after the study, we have been able to decide that the specimens from Kesis don't belong to a new taxon and that the differences result from the habitat.

2. MATERIALS AND METHODS

The materials of the study consist of the matters belonging to *S. subaeqiloba* Lall which were collected on the Munzur in 2007 and the Kesis Mountain in 2004, 2005 and 2007. The specimens obtained from both of the environments were diagnosed by using Turkey's flora (Lall & Mill 1978). Besides, they were checked with the materials of Edinburgh Herbarium. The drawings of the specimens from the Munzur and the Kesis were made. The description of the *Scrophularia subaeqiloba* Lall was remade in the light of the new findings. The fruit surface features of the specimens were studied deeply by the means of SEM.

15 randomly chosen nutlets (among 10 plants) were measured in order to obtain the nutlet sizes. For scanning electron microscopy, dried mature nutlets were mounted on stubs using double-sided adhesive tape. Samples were coated with 12.5-15 nm of gold. Coated fruit were examined and photographed with JMS-6400 type Scanning Electron Microscope (SEM). Observations were made on the surface patterns of nutlets (Stearn, 1973). The plant materials were identified and deposited at Erzincan University Herbarium.

A map was provided (Fig. 1) showing the distributions of *S. subaeqiloba* Lall.

***S. subaeqiloba* Lall. 1970**

Perennial; stem to 36 cm, erect or ascending, many from woody caudex, glabrous, purpish near base. Leaves to 3 cm, lower shortly petiolate, upper sessile; lamina 1-2 pinnatisect, primary segments to 2.3 cm glabrous, slightly attenuate at base, ultimate leaf segments longer than laterals; upper leaves similar. Inflorescence aphyllous; bracts oblong, lowest to 6 mm, glabrous, cymes alternate, distant, 2-3 -flowered. Peduncle 6-16 mm, distinctly black glandular in fresh specimens, turns to brownish in dried specimens; alar pedicels 1-8 mm, glandular. Bracteoles 0.5-2.5 mm, oblong-linear. Calyx lobes 2-3 x 2.5-3 mm, glabrous, scarious margin absent or 0.2 mm white broad. Crolla with maroon tube, and green subequal lobes, 4.5-5 mm. Stamens exserted, anthers distinctly black glandular in fresh specimens, turns to brownish in dried specimens; staminode reniform with dorsal canal, 1.6 x 2-2.5 mm. Capsule 4 x 4 mm, globose. Fl.7-9.

Specimen examined: Turkey. B7 Tunceli: Munzur Mountains above Ovacık, 2800 m, 17.VII.1957, Davis D.31231- Holotype of *S. subaeqiloba* (E); B7 Erzincan: Munzur Mountains, Ergan Mountain, 3100 m, 23. VII.2007, limestone, Kandemir 8010; Turkey. B7 Erzincan: Kesis Mountain, Aksu River, 2728 m, 19.IX.2004, serpentine, Kandemir 6856; B7 Erzincan: Kesis Mountain, Yedigöller, 2433 m, 11.IX.2005, serpentine, Kandemir 7228.

3. DISCUSSION

Munzur Mountains and Keşiş Mountain are close to each other and Munzur Mountains are made from limestone and Kesis Mountain is made from serpentine (Akkan 1964).

The specimens from Kesis Mountain seem too different from Munzur specimens in view of leaf's size, morphology and widely branched stem (Fig. 1). The leaves are 1-pinnatisect; the scarios margin of the Kesis specimens is absent or 0.2 mm in calyx and stamens are clearly exerted from corolla. The leaves are 2-pinnatisect; the calyx is with 0.5 mm scarios margins and stamens subexerted from corolla in Munzur specimens (Figure 2).

The most important taxonomic characteristics for the delimitation of the *Scrophularia* species are those relative to indumentum, leaf's size and morphology, morphology and coloration of the calyx, corolla and staminod (Ortega & Devesa 1993). At the beginning of our observations, the differences, mentioned before, have been thought that were evidences to a new taxon. In order to collect more evidence, the surface of the fruits was investigated by SEM.

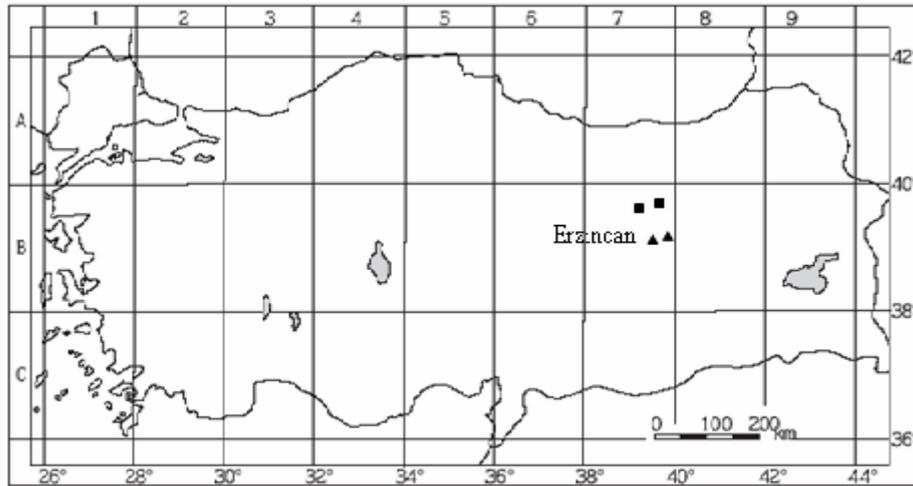


Figure 1. The distribution of *Scrophularia subaeqiloba* Lall in Turkey: (■) the populations grow serpentine and (▲)grow in limestone.



Figure 2. *Scrophularia subaequiloba* (in serpentine from Keşiş Dağ) a, habit; b, corolla; c, calyx; d, staminode



Figure 3 . *Scrophularia subaequiloba* (in limestone from Munzur Mountains- figure of type specimen) e, habit x1/2; f, corolla x2; g, calyx x2; h, staminode x2

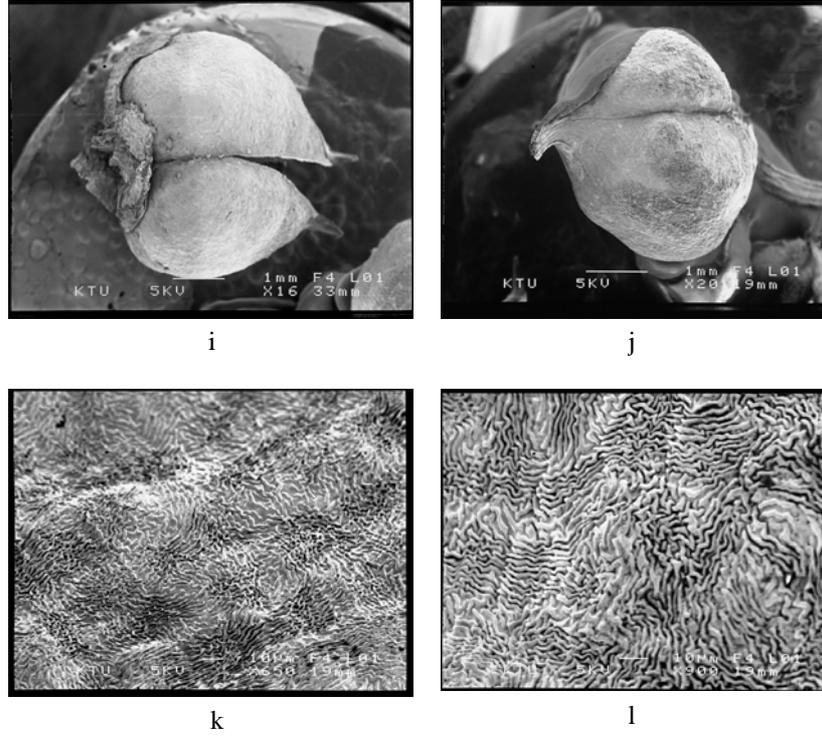


Figure 4. i, the fruit of the specimens grow in serpentine (SEM); j, the fruit of the specimens grow in limestone (SEM); k, the surface of the fruit of the specimens grow in serpentine (SEM); l, the surface of the fruit of the specimens grow in limestone (SEM)

According to SEM examinations, fruit surfaces of Munzur and Kesis Mountain specimens are rugose type (Fig. 4). Some differences are found in their fruit surfaces. In Munzur specimens, wrinkles are arranged parallel and tightly, the wrinkles are surrounded by more flabby areas. In Kesis specimens wrinkles are arranged untidy and more tightly than the other, and there are radiating wrinkles and striate around these untidy wrinkles. In spite of these small differences, the general characteristic of the fruit surfaces are same. While the specimens of Kesis Mountain grow in serpentine, Munzur's specimens are in limestone. The altitudes of the both populations are very close to each other.

The most important difference of Kesis specimens from Munzur specimens is 1-pinnatisect leaves. The other morphological characteristics are very similar to each other. In this study, it has been estimated that the leaf morphology may be differ depending on habitat types. The leaf morphology can be used in taxonomy of the genus as a character commonly (Ortega & Devesa 1993; Lall & Mill 1978). This feature may be insufficient some times for the genus like this study. Thus, we need supplementary other techniques as SEM.

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