

A Morphological Study On Endemic *Malabaila lasiocarpa* Boiss. (Apiaceae) From Bingol (Turkey)

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Abstract- In this study morphological characters of *Malabaila lasiocarpa* Boiss. has been performed and compared with the Flora of Turkey for the systematic purposes. Studied sample has shown some variations from Flora of Turkey sample in respect to some characters which are shown in Table 1. Besides, with this study new morphological properties have determined for diagnostic purposes and the description of studied sample have extended.

Key words: Apiaceae, *Malabaila*, Morphology, Systematic.

I. INTRODUCTION

The Umbelliferae (or Apiaceae) family has a cosmopolitan spreading, but most of Apiaceae taxa are confined to northern temperate areas, and high altitudes in the tropic regions [1]. Apiaceae (in Turkey called ‘Maydanozgiller’) has annual and perennial herbs, rarely shrubby, the leaves are generally alternate, hollow stems, usually exstipulate, the petioles are often large and sheathed at the base, the inflorescence is usually a compound umbel, and the flowers are generally hermaphrodite [2]. Apiaceae is a large family, composed of more than 3.700 species belonging to 434 genera all around the world [3]. In Turkey, Umbelliferae is represented by about 102 genus and 465 species from which 130 are endemic, with a 30% endemism rate [2, 4-6]. Plants of this family, generally known as carrot or parsley family, are mostly aromatic and economically important plants are well known with regard to their economic significance and varied profile of essential oils [7].

The genus *Malabaila* Hoffm. belongs to Apiaceae family, and is represented by 6 species (*M. aurea* (Sm.) Boiss., *M. involucrata* Boiss. & Spruner, *M. lasiocarpa* Boiss., *M. pastinacifolia* Boiss. et Bal., *M. dasyantha* (K. Koch) Grossh., *M. secacul* Banks & Sol.) in Flora of Turkey. *Malabaila lasiocarpa* is an endemic plant and described as erect perennial; stem 30-50 cm, stout, ridged, often lanate below, basal leaves always (?) 1-pinnate, petiolate, petiol 15-22 cm and Iran-Turanian element in Flora of Turkey [2].

In the present study, new morphological characters were determined and diagnostic characters of *M. lasiocarpa* were reinforced.

II. MATERIALS AND METHODS

A. Plant Material

M. lasiocarpa was collected from their natural habitat by O. Kilic (Leg. No: 5344), from Bingöl, vicinity of Dikme plateau, *Quercus* forest bottoms, stony slopes, on June 2013 at an altitude of 1650-1700 m. The taxonomic description of the plant sample was made according to volume 4 of Flora of Turkey [2] by O. Kilic. Plant sample was dried according to standart herbarium techniques and stored in the Bingol University Herbarium (BIN- Herb. No: 1236).

B. Morphological Studies

Morphological characters of *M. lasiocarpa* was detected by Trinocular Microscope (Leica) and scanning electron microscope (JEOL-JSM 6510) coated with gold, in Bingol University central laboratory, and all measurements were made directly on herbarium sample. General herbarium sample of *M. lasiocarpa* is shown in Figure 1.

I. RESULTS AND DISCUSSION

A. Morphological properties of *Malabaila* and *M. lasiocarpa* from Flora of Turkey

Malabaila genus is erect, biennials or perennials; basal leaves 1-3-pinnate, ultimate segments simple to pinnatisect; upper stem leaves often reduced to a sheath or petiole; umbels with 4-20 rayed. Bracts present, deciduous or

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persistent, or absent. There are no sepals; petal colour is yellow. Fruit heavily compressed dorsally, glabrous or hairy [2].

M. lasiocarpa is an erect perennial plant with 30-50 cm stem. Basal leaves always (?) 1-pinnate and 15-22 cm, petiolate; umbels 10-30 rayed; umbellules 20-35 flowered; bracts c. 10; bracteoles 6-8 setaceous; flowers are yellow; fruit 11-14 x 8-10 mm; flowering time 5-7. months; habitats generally stony slopes, follow fields, etc., 1200-2600 m [2].



Figure 1. Herbarium sample of *M. lasiocarpa*.

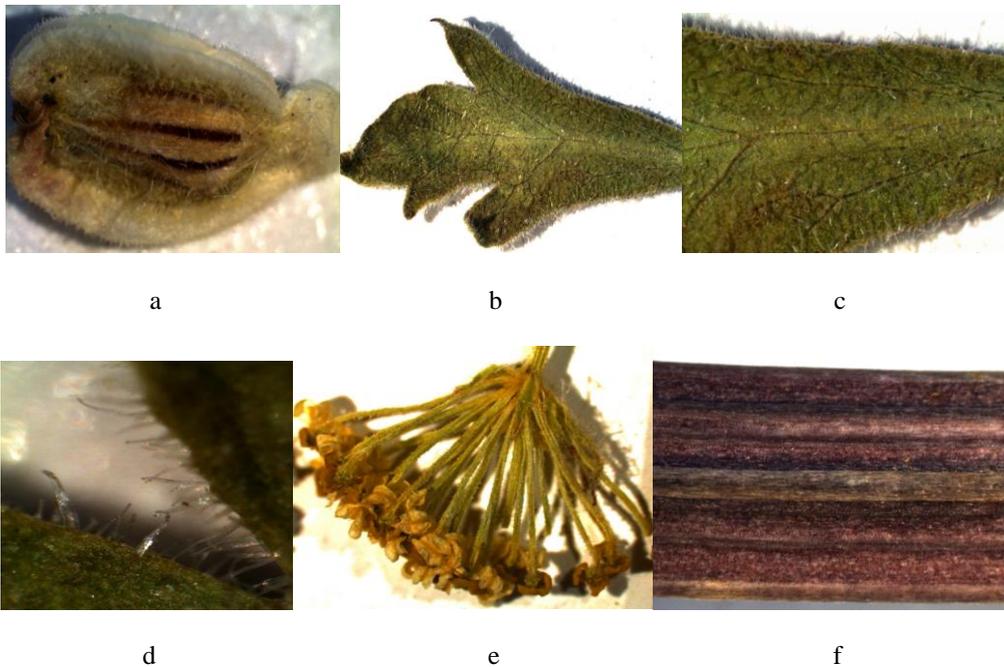


Figure 2. Plant parts of *M. lasiocarpa* with stereomicroscope a) seed, b) leaf (upper surface), c) leaf (beneath surface), d) leaf edge indumentum, e) Inflorescence, f) stem.

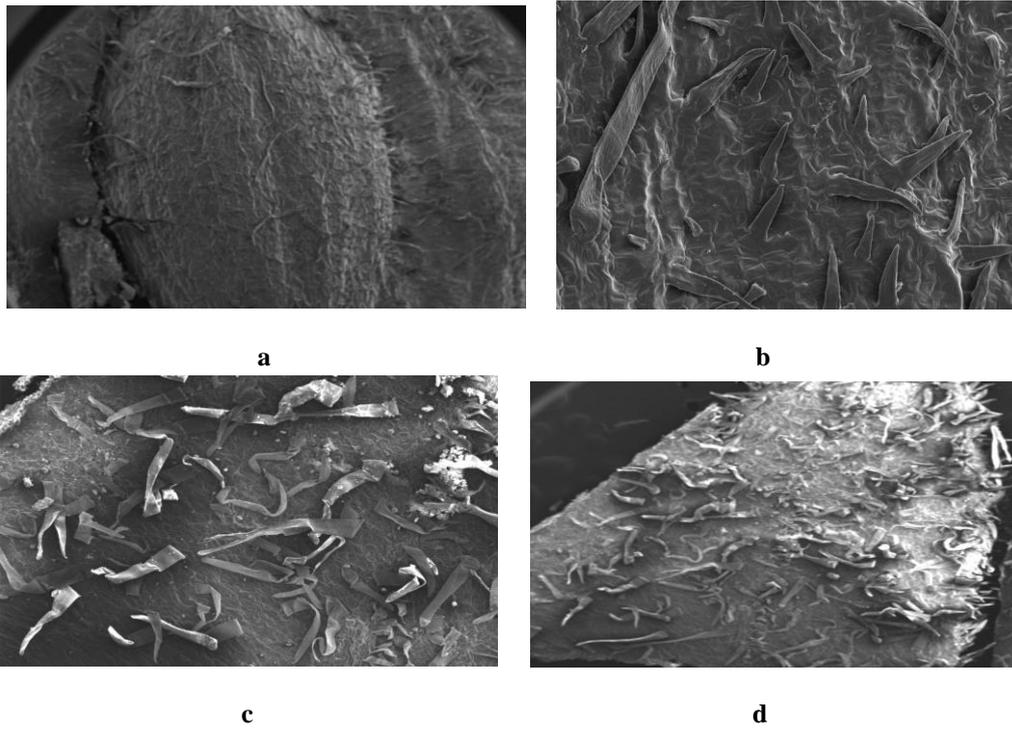


Figure 3. Plant parts of *M. lasiocarpa* with SEM a) fruit, b) fruit surface, c-d) leaf surface.

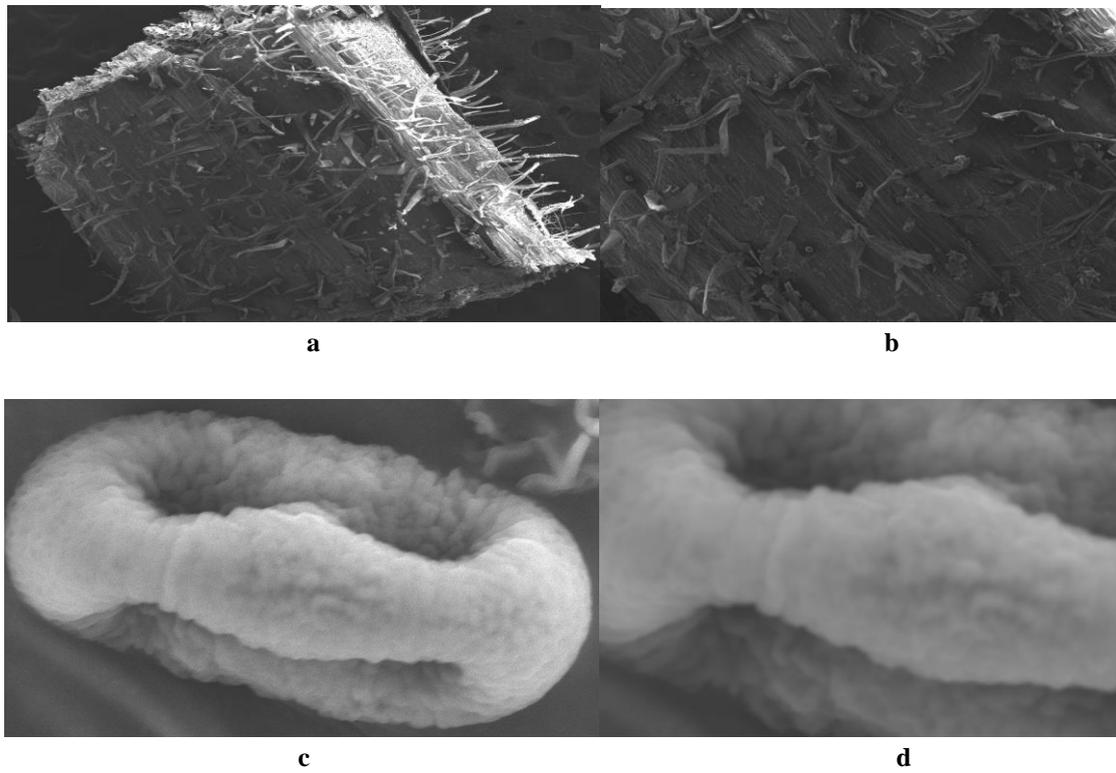


Figure 4. Plant parts of *M. lasiocarpa* with SEM a) stem, b) stem surface, c) pollen, d) pollen surface

Table 1. The comparative data of *M. lasiocarpa*.

Characters	Flora of Turkey	Studied Sample
Leaves	Basal leaves always (?) 1-pinnate, 15-22 cm with petiole; lamina oblong in outline, pubescent; segments 2.5-6 cm, ovate, crenate, sometimes lobed	Basal leaves always 1-pinnate, petiolate and petiol 10-20 cm., pubescent only leaf edge, lamina scarcely pubescent; segments 2-7 cm, crenate. Stem leaves reduced to a sheath
Stem	Erect, perennial; 30-50 cm, stout, ridged, often lanate below	Erect, perennial; 30-60 cm, deeply grooved, lanate and pubescent hairy, stout
Umbels	10-30 rayed	10-16 rayed
Umbellules	20-35 flowered	20-32 flowered
Bracts and bracteoles	c. 10 and 6-8.	6-10 and 4-8
Fruit	11-14 x 8-10 mm, obovate, ± densely tomentollus, margin c. 2 mm wide	6-12 x 4-10 mm, tomentollus, margin 1-2 mm wide
Pollen axis	--	24.4 ± 1.50 µm
Pollen Equatorial axis	--	12.6 ± 1.10 µm
Pollen type	--	Rugulate and ± striate

In this study, morphological properties of *M. lasiocarpa* were determined in order to assist in the identification of this species. Since, to our knowledge morphological studies of *M. lasiocarpa* is poorly known in literature, so this study may be useful for the systematic of the *Malabaila* genus and this species having medicinal and economic importance [8], and also the results of the study may nourish the flora of Turkey. The morphological features of *M. lasiocarpa* were compared with flora of Turkey [2], (Table 1). Basal leaves, ray characters, stem structure, fruit indumentum, bracts number are among the important characters in the identification of *Malabaila* species [2].

Although studied sample has shown some variations from Flora of Turkey samples in respect to some characters. For example, basal leaves of studied sample has been presented as always (?) 1-pinnate in flora of Turkey, we could find basal leaves always 1-pinnate. These variations and more detailed comparison of species are shown in Table 1. These differences may be related to the number of investigated samples and ecological reasons. Threatened category of *M. lasiocarpa* is LC (Least concern) in Turkey according to the 2001 IUCN Red List [9].

In conclusion, the morphological properties of *M. lasiocarpa* have generally been matched with those presented in flora of Turkey. In addition to this, new morphological properties for diagnostic purposes of *M. lasiocarpa* have detected and the description of studied sample have enlarged with this research.

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