

## The Taxon Imperfectly Known and Doubtfully: *Hermodactylus Tuberosus* (L.) Miller var. *Tuberosus* (Iridaceae) From Turkey

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### Abstract

*Hermodactylus tuberosus* (L.) Miller var. *tuberosus* (Iridaceae) have been described morphologically and anatomically from the Üçpınar village of Muradiye in Manisa [B1]. Morphologically diagnostic features detailed description and figured of the var. *tuberosus* that is imperfectly known and doubtfully. Root cross section has 1-2 metaxylem in the root centre. Shape of scape cross-section was very special. Rectangular scape's corners were protruding outward. There was no differentiation as palisade and spongy parenchyma at mesophile of the leaf.

### Key words:

Anatomy, *Hermodactylus*, Iridaceae, Morphology

## Türkiye'den Eksik ve Şüpheli bilinen bir Takson: *Hermodactylus Tuberosus* (L.) miller var. *Tuberosus* (Iridaceae)

### Özet

Çalışmamızda Manisa Muradiye Üçpınar [B1]'dan toplanan *Hermodactylus tuberosus* (L.) Miller var. *tuberosus* (Iridaceae) morfolojik ve anatomik olarak araştırılmıştır. Eksik ve şüpheli olarak bilinen bu taksonun morfolojik olarak ayırt edici karakterleri detaylı bir şekilde tanımlanmıştır ve fotoğraflanmıştır. Kök enine kesiti merkezinde 1-2 adet metaksilem barındırmaktadır. Skape enine kesiti özel bir şekle sahiptir. Skape dikdörtgen şekillidir ve köşeleri dışarıya doğru çıkıntı yapmıştır. Yaprak mezofilinde palizat ve sünger parankiması ayrımı gözlenmemiştir.

### Anahtar kelimeler

Anatomi, *Hermodactylus*, Iridaceae, Morfoloji

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### 1. Introduction

The genera *Hermodactylus* Miller is represented by two varieties [var. *longifolius* (Swett) Baker and var. *tuberosus*] in Flora of Turkey and The East Aegean Islands (Mill, 1984). The investigated var. *tuberosus* is obviously different from var. *longifolius* with number of spathe valves (Table 1). *H. tuberosus* var. *tuberosus* was described from the material brought from Naples (Italy) by Charles Ridgway in 1829. The type material has not been seen. The type is illustration in Swett, Brit. Fl. Gard. ser.2, 2:t.146 1832 (Davis, 1984). Record of var. *tuberosus* is doubtful in West Anatolia. According to Flora of Turkey (Mill, 1984) the literature records of var. *tuberosus* had observed from B1 İzmir, Bornova, Kurutepe by Schwarz. Unfortunately the plant have never been recollected in the same

locality during our excursion. The description of this taxon is insufficient and no material was available, so its status could not be evaluated.

### 2. Material and Methods

Plant specimens were taken from the Turkey B1 Manisa : Üçpınar village of Muradiye, edge of fields, natured in cemetery, c.100-120 m, 25 March 2006, E. Alçitepe 2317, 2338. Specimens were preserved in the herbarium Celal Bayar University, Faculty of Art and Science, Department of Biology. Taxonomical description of the plant taxon followed Davis (Davis, 1984). For anatomical studies plant specimens were fixed in 70 % alcohol. Hand-cut sections were made and stained with safranin reagent (Çelebioğlu *et al.*, 1949).

### 3.Results

#### 3.1.Morphological Findings

Tubers are 1-2 in number and 14-26 mm in length. Tubers are digitate shaped, cream colored, glabrous without tunic. The old tubers are clear brown colored, coriaceous, with vertical fibres. In the vegetative period, it has contractile root up to 4.5 cm in length. Stem is 23.5-33.5 cm high. Leaves are linear, quadrangular, 1.5-5 mm x 28.5-71 cm in size. Spathe valves are 2. Outer spathe valve is 9-11 cm x 1.7-2.2 cm and inner spathe is membranous, 8.5-9.7 cm x 7-10 mm. Flowers are yellowish-green, except for blackish-velvety limb of falls. Hypanthial tube is infundibular about 4.5 mm in length. Falls are emarginate shaped, 5.5-6 cm x 13-18 mm in size. Claw is iridescent outside. Limb is shorter than claw, with narrow yellow border and blackish signal patches at near base. The same feature are also present at the base of filament and standards. Standards are green, 2.3-2.5 cm x 10-13 mm, narrowly ovate, cucullate, very slender being narrowed at the base. They are expanded at the middle and have a long filiform cusp. Styles are 3.7-6 cm x 1.1-1.7 cm in size, deeply bifid at apex. Styles have membranous projection at abaxial part. Margins of styles are lacerately, toothed. Anthers have an elongated black line at abaxial part and 13-16 mm x 1.2-3 mm in size. Capsule is ovoid-ellipsoid, the fertile portion is gradually tapered to base, 15-22 mm x 3-8 mm in size. The sterile portion is 3-6 mm (Figure1,2,Tab1).



**Fig. 2.** *Hermodactylus tuberosus* var. *tuberosus* a. flowering plant b.standards c.fall d.spathe valves e. style branches f.stamen g. capsule a: x 0.75; b: x 2.3; c: x 0.6; d: x 1.2; e: x 0.9; f: x 0.8; g: x 0.7



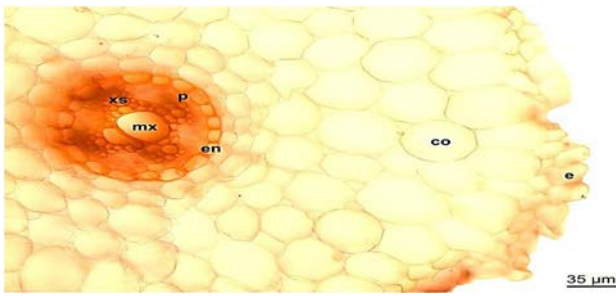
**Fig. 1.** *Hermodactylus tuberosus* var. *tuberosus* in natural area

**Tab. 1.** Comparison of diagnostic morphologic characters of var. *tuberosus* and var. *longifolius*

Characters	var. <i>tuberosus</i>	var. <i>longifolius</i>
Stem	23.5-33.5 cm	19-30 cm
Leaf	1.5-5 mm x 28.5-71 cm	1.5-4 mm x (20-30-70 cm)
Spathe valve	2	1
Fall	5.5-6 cm x 13-18 mm	4-6 cm x 10-20 mm
Standard	2.3-2.5 cm	2-2.6 cm
Style	3.7-6 cm	4-6 cm
Anther	13-16 mm	8-18 mm
Capsule fertile	15-22 mm x 3-8 mm	16-18 mm x 2.5-7 mm
Sterile	3-6 mm	

#### Anatomical Findings

**Root:** Epidermis is two-layered on the outer surface of root, cells are irregularly different in size. Cortex is 4-7-layered, parenchymatous cells are circular in shape and intercellular spaces present in the cortex. Endodermis is single-layered. The wall thickenings of the endodermal cells are three sided and adjacent to cortex. Pericycle is single layered and located under the endodermis. There are 1-2 metaxylem on the center of root. Four protoxylem groups are present on the periphery of the vascular cylinder (Fig. 3).

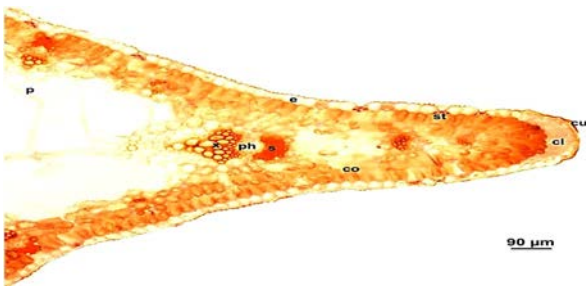


**Fig. 3.** Cross section of root of *H. tuberosus* var. *tuberosus*, co: cortex, e: epidermis, en: endodermis, mx: metaxylem, p:perisikil, xs: xylem strands

**Scape:** Cross section of scape is quadrangular shaped and corners of scape are outward protruding. Outer surface of scape is covered by thick serrated cuticle. Epidermis is single-layered and stomata are present in the epidermis layer. 5-8 layered collenchyma is present under the epidermis at the corners of scape. Cortex parenchyma under the epidermis is 2-3 layered. Cortex cells are rectangular in shaped and have intercellular spaces. Thick sclerenchyma groups are present above vascular bundles at the corners. Phloem is located under sclerenchyma. Cambium is not very clear. Thickness of xylem as much as sclerenchyma plus phloem. The number of vascular bundles is 22-25. Vascular bundles at the corners are large. A large pith under vascular bundles is present at the center of stem (Fig. 4,5).

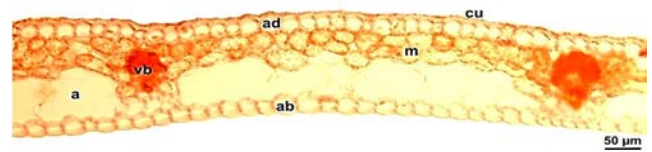


**Fig. 4.** Cross section of scape of *H. tuberosus* var. *tuberosus*, co: cortex, e: epidermis, p:pith, vb: vascular bundle

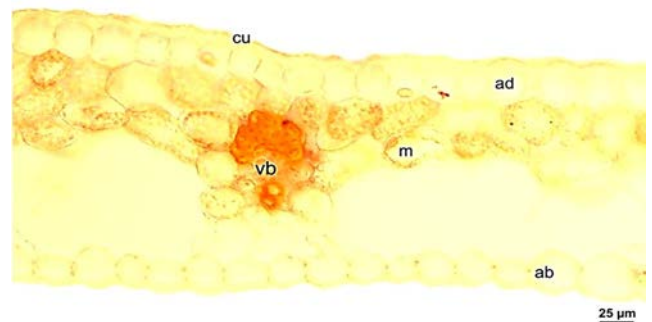


**Fig. 5.** Cross section of stem of *H. tuberosus* var. *tuberosus*, , cl: collenchyma, co: cortex, cu: cuticle, e: epidermis, p:pith, ph:phloem, s: sclerenchyma, st: stoma, x: xylem

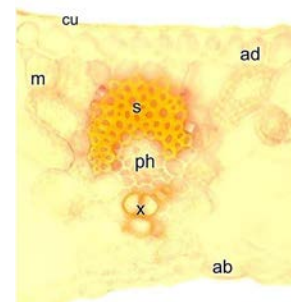
**Leaf:** Both adaxial and abaxial surfaces have a cuticle but adaxial cuticle is thicker than other surface. The epidermis is single layered on abaxial and adaxial surfaces of the leaf. There is no differentiation as pallisade and spongy parenchyma at mesophyl. Mesophyl cells are oval, rounded and rectangular in shaped. Aerenchyma is present in the mesophile. Thick sclerenchyma groups are present above vascular bundles as in the scape. Median vein of leaf is bigger than other veins and 6-8 layered collenchyma is present under the abaxial epidermis at median part of the leaf (Fig. 6, 7, 8, Tab. 2).



**Fig. 6.** Cross section of leaf of *H. tuberosus* var. *tuberosus*, a;aerenchyma, ab: abaxial epidermis, ad: adaxial epidermis, cu: cuticle, m:mesophile, vb: vascular bundle



**Fig. 7.** Cross section of leaf of *H. tuberosus* var. *tuberosus*, ab: abaxial epidermis, ad: adaxial epidermis, cu: cuticle, m:mesophile, vb: vascular bundle



**Fig. 8.** Cross section of vascular bundle of leaf of *H. tuberosus* var. *tuberosus*, ab: abaxial epidermis, ad: adaxial epidermis, cu: cuticle, m:mesophile, ph: phloem, s: sclerenchyma, x: xyle

**Tab. 2.** Anatomical Measurements of *H. tuberosus* var. *tuberosus*

	Width (µm)		Length (µm)	
	Min.-Max	Mean ±S.D	Min.-Max	Mean ±S.D
<b>Root</b>				
Epidermis cell	25-37.5	31.2±4.5	35-42.5	39.3±2.7
Cortex cell	35-55	41.8±7.7	60-72	64.8±4.4
Endodermis cell	11-15	13.2±1.5	15-27	21.2±4.3
Perisikl	9.2-10.5	9.8±0.4	15-17	15.6±0.7
Metxylem (Diameter)	30-42	35.5±4.6		
<b>Scape</b>				
Cuticle	6.7-7.5	7±0.3		
Epidermis cell	25-32	28.6±3	30-52	39±8
Cortex cell	27.5-37.5	32± 7.2	32.5-52.5	47±7.5
Trachae (Diameter )	5.3-12.2	8.2±2		
Pith cell (Diameter)	50-92.5	67.5±18.1		
<b>Leaf</b>				
Adaxial cuticle	7-10	8.1±1.3		
Adaxial epidermis cell	27-51	38.4±7.7	39-60	48.2±9.2
Mesophile	31-52	40.4±8.4	41-70	52.4± 9.5
Abaxial epidermis cell	19-31	24.4±5	21-42	32.8±7.5
Abaxial cuticle	3.2-5.3	3.7±0.8		

## Discussion

In this study, taxon of *Hermodactylus* namely *H. tuberosus* var. *tuberosus* were investigated. There was no morphological and anatomical study about this taxon in literature. Our findings about this taxon were firstly reported in Turkey. The findings were compared with other variety *Hermodactylus tuberosus* var. *longifolius* in the Flora of Turkey and it was determined that there are some differences between this variety given in the Flora of Turkey. These are given in Table 1. Almost all morphological characters of these two taxa were different such as the height of the plant and spathe valve number.

In anatomical studies we have determined that roots of the investigated taxon were typical as monocotyledon root. It is emphasized that wall thickening of endodermal cells was common in the roots of monocotyledons (Fahn, 1982). The wall thickening of endodermal cells was very clear and adjacent to cortex in the investigated variety. *H. tuberosus* var. *tuberosus* has 1-2 metaxylem in the root centre. The number of protoxylem groups was 4-5 in the roots of investigated taxon. The same feature was observed in the root of *Crocus pulchellus* Herbert, *C. fleischeri* Gay, *C. danforiae* Maw which belong to Iridaceae family (Özyurt, 1978, Özdemir *et al.*, 2004 a,b).

According to the results in this study, shape of scape cross-section was very special. Rectangular scape's corners were protruding outward. This type stem shape is characteristic for Labiatae family members but in this study it was observed firstly for monocotyledon plant. 4 big vascular bundles were located at the corners of scape and other little vascular bundles were arranged a ring in the scape. It has been determined that there is a clear sclerenchyma group on phloem in the scape of *H. tuberosus* var. *tuberosus*.

Leaf epidermis of the investigated taxon had a well developed cuticle on the adaxial surface. There was no differentiation as palisade and spongy parenchyma at mesophile of the leaf. Aerenchyma was present at abaxial side of the leaf and vascular bundles of the leaf were similar to in the scape.

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