

Journal of Scientific Perspectives

Volume 4, Issue 4, Year 2020, pp. 281-288

E - ISSN: 2587-3008

URL: <https://journals.gen.tr/jsp>

DOI: <https://doi.org/10.26900/jsp.4.025>

Research Article

**AN ENDEMIC PLANT GROWING IN KAZDAĞI IMPORTANCE AND
USAGE AREAS OF *Euphorbia anacampseros* Boiss. var. *anacampseros*
TAXON**

Gizem TUTGUN* & Ahmet GÖNÜZ**

*PhD Student Çanakkale Onsekiz Mart University,
Graduate School of Natural and Applied Sciences, TURKEY,
e-mail: gizemtutgun@gmail.com
ORCID: <https://orcid.org/0000-0001-7726-9655>

**Prof. Dr., Çanakkale Onsekiz Mart University,
Faculty of Science and Arts, Department of Biology,
Subdivision of General Biology, TURKEY, e-mail: ahmetgonuz3@gmail.com
ORCID: <https://orcid.org/0000-0002-4571-0378>

Received: 30 September 2020, Accepted: 5 November 2020

ABSTRACT

*Morphological and anatomical characteristics of *Euphorbia anacampseros* Boiss. var. *anacampseros* taxa which is an endemic member of Euphorbiaceae family were investigated. Morphological characteristics and dimensions of these specimens were collected from Kazdağı National Park. Anatomical features (like cross-sections of the root and stem, cross and superficial sections of the leaf) of taxon were investigated.*

Keywords: *Euphorbia anacampseros*, Boiss. var., *anacampseros*, endemic, morphology, anatomy, laticifer, usage areas, cancer

1. INTRODUCTION

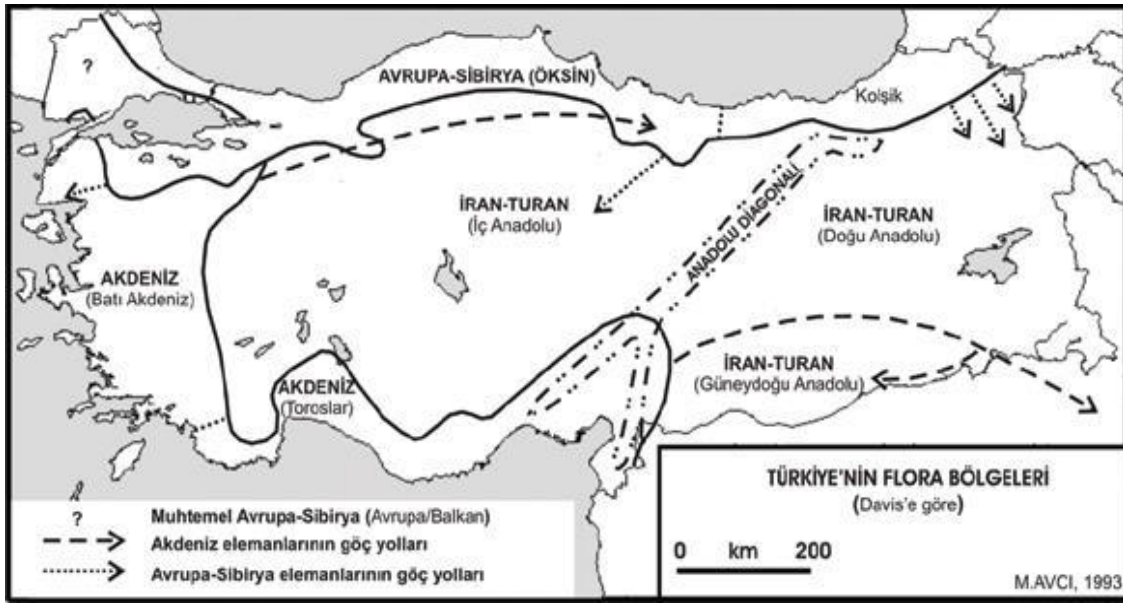
There is biological diversity on earth in the food chain. Many living species are connected each other in terms of the continuity of life and need to exist in the same process. Nowadays, Euphorbiaceae family which is increasingly importance and popularity in researches for cancer treatment, consists of succulent milky plants with mostly herbaceous forms and single or perennial species.

It is known that the Euphorbiaceae family is represented by approximately 8910 species in the world (Bercu and Popoviciu, 2015). The cosmopolitan of this family includes 300 genera and 102 species (Seçmen et al., 2004), but endemic ones are kept its importance, too. It has been recorded in our country are in the LC category (widely distributed and abundant species are placed in this category (Eken et al., 2006), according to the International Union for Conservation of Nature (IUCN) (Özgişi et al., 2017; Çalışkan, 2010; Yeşilyurt and Akaydın, 2017).

1.1. Study Areas

It constitutes the border between the Euxine Region of the European-Sibirian Region and the Eastern Mediterranean Region (Ayaşlıgil, 2006), when Kazdağı is examined phytogeographically. The fact that Kazdağı is where the climatic characteristics and the three floristic regions (Özhatay et al., 2005; Gemici and Özel, 2001) meet increases the biodiversity in the region and its importance accordingly.

Fig 1: Floristic regions of Turkey (Avcı, 1993)



1.2. Usage Areas

It is known that some species of the *Euphorbia anacampseros* taxon are used for hunting by poisoning fish in rivers and lakes, and also causes poisoning by being given directly against some species such as malaria and jaundice and the risks posed by warts in terms of human health. In addition, it has been reported that the unconscious use of family members in medicine, raw materials in industry, and among the public causes an increase in cancer due to the risk factor of diterpenester (a chemical compounds) (Hecker, 1986). When the recent sources are examined (Luz et al., 2015; Mali and Jadhav, 2015; Erbay et al., 2018; Schippmann, 2018; Aylward et al., 2016; Avcı, 1993) in cytotoxicity studies, especially in cancer, would healing, dental and acne treatment, industry and pharmaceutical industry, rubber extraction from latex

material, dye raw material, cultivation as ornamental plant and wax making, again, it seems that the latex material has a positive effect on the application of the chemical ‘Ingenol angelate’ used to suppress the growth of melanoma cells.

2. MATERIAL AND METHODS

In our study, *E. anacampseros* Boiss. var. *anacampseros* taxon has been chosen as the research subject. As a method, in the areas where the study taxon naturally grows in the Kazdağı National Park (from a weight of 600-700 m on 30.05.2019, its locality was determined on 10.07.2019), considering that the taxon is endemic, a sufficient number of herbarium name, morphological measurements and anatomical cross-sectional studies, and alcohol materials of the specimens were prepared.

Plant specimens don’t have locality and herbarium number. were brought to the laboratory under suitable conditions and morphological measurements such as plant height and width, leaf height and width were taken and comparisons were made with the size details defined in the work named ‘Flora of Turkey and East Aegean Islands’ (Davis, 1982) (Table 1).

Table 1. Comparison of the morphological measurements of *Euphorbia anacampseros* Boiss. var. *anacampseros*

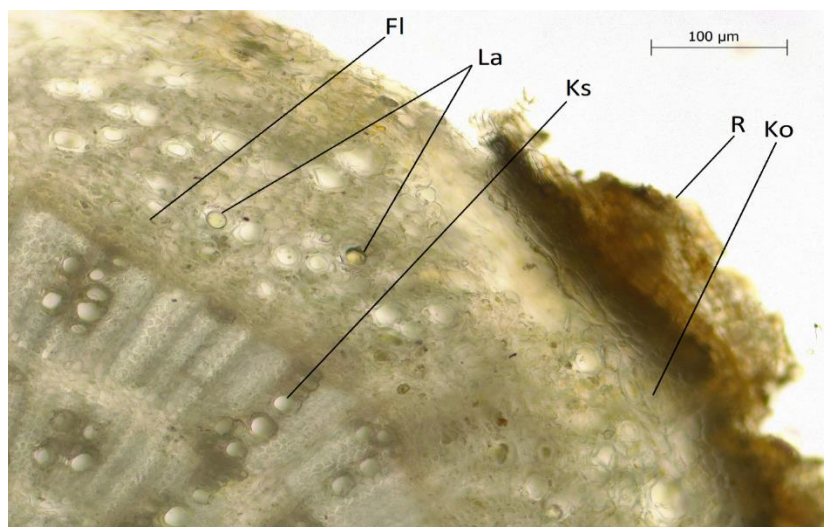
Davis (1982)	Genç (1989)	Tutgun (2020)
Root; decumbent and rarely exceed 20 mm.	Root; branched out.	Root; branched out and 1-5,5 cm.
It has been defined as perennial plants that are glabrous, drooping and rising from below at family level.	The umbella structure at the top of the body is rarely 3-5 beams, rays 2-2.5 cm.	Stem length 16.5-25 cm., width 0.4 cm.
Cauline leaves 20 mm., raylet leaves; 17 mm. and its dimentionions (5-)10-35(-40) x (3-) 10-35(-40) mm.	Cauline leaves; leathery, fleshy, sessile, frequently alternating (0,9-1,6 cm.), ovate-rhombic, obovate, mukronate at the top, acute-acuminate, very fine toothed edges, side veins indistinct, leaf color mostly reddish pink, branching dichotomous up to 1 or 2 times.	Leaves; length 2.2, 2.4 and between 2.5 cm., width 1.3, 1.4 and between 1.5 cm., shape suborbiculate, margin entire, apex large and mucronate, color generally purplish.

Specimens were taken into a 70% ethyl alcohol solution prepared on the same day and fixed for 24 hours. The fixed specimens were protected at +4 °C in the refrigerator. The cross and superficial section were taken for stem, body and leaf tissue examinations.

2.1. Anatomical Features of the Root

In cross-sectional examinations, there is suberized and ligninized rhizoderm tissue on the outermost part and cannot be observed since the epiderma cells are crushed. Just below is the parenchymal cortex tissue consisting of an average of 10 cell lines. In the cortex tissue, there are secretory cells that carry latex. Under the cortex tissue, there is a conduction tissue showing a collateral structure. Phloem tissue occupies less space in general than xylem tissue cells, and cambium is not very prominent. There is a sclerenchymal pith under the conduction issue and in the inner most region (Fig 2).

Fig 2. Root cross-section of *Euphorbia anacamperos* Boiss. var. *anacamperos*:
R:Rhizoderm, Ko: Kortex, Fl: Phloem, Ks: Xylem, La: Laticifer



2.2. Anatomical Features of the Stem

There are papillose structures in the cuticular tissue from the outside to the inside. Collencymatic tissue is located just below the single-row epidermic cells. The cortex tissue is composed of 12-16 rows of parenchymal cells in places and contains a number of latex-bearing cells that can be evaluated densely. In addition, milk pipers are located in the cortex tissue in places. From the end of the cortex cells, phloem tissue and xylem tissue just below respectively, form the collateral bundles. Cambium is not obvious. There are pith rays between the vascular bundle. Under the vascular tissue and in the innermost region there is the parenchymal pith. There are milk tubes containing latex between the pith tissue and the parenchyma cells. In cross-sections taken from well developed roots, it was observed that the pith regions were fragmented (Fig 3, 4).

284

Fig 3: Stem cross-section of *Euphorbia anacamperos* Boiss. var. *anacamperos*: P:
Papillose E: Epidermis Ko: Cortex, La: Laticifer, Fl: Phloem, Ks: Xylem Ö: Pith region

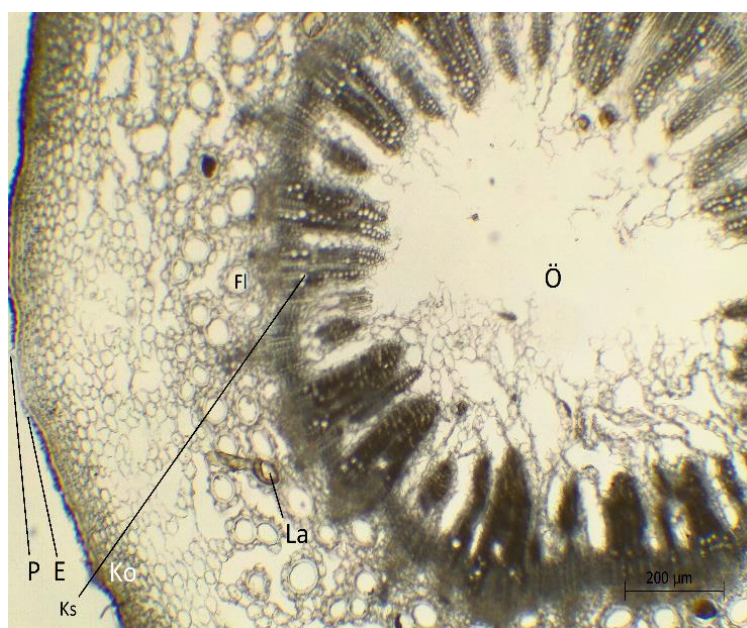
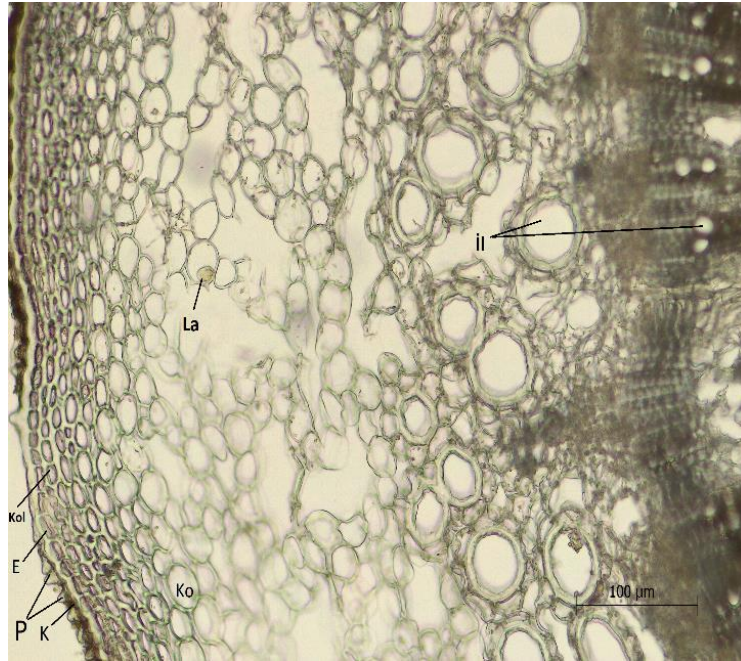


Fig 4: Stem cross-section of *Euphorbia anacampseros* Boiss. var. *anacampseros*: P: Papillose, K: Cuticle, E: Epidermis, Kol: Collenchyma, Ko: Cortex, La: Laticifer, İl: Vascular bundle, Ö: Pith region



2.3. Anatomical Features of the Leaf

The leaf is bifacial. From the outside to the inside, there are papillose structures in both the upper and lower tissue. Epidermis cells are in a single row under a thick cuticle layer. In the upper epidermal structure, there are 2-4 rows of palisade parenchyma cells with dense chloroplasts, sponge parenchyma cells with large intercellular areas just below. Vascular bundles are in collateral type. There are latex-bearing secretory cells throughout the mesophyll tissue. Stomas are of amphistomatic type. Stomata were observed to be anomocytic in the superficial sections taken from the leaves (Fig 5, 6).

Fig 5: Leaf cross-section of *Euphorbia anacampseros* Boiss. var. *anacampseros*: P: Papillose, K: Cuticle, E: Epidermis, Pa: Palisade parenchyma, Sü: Sponge parenchyma

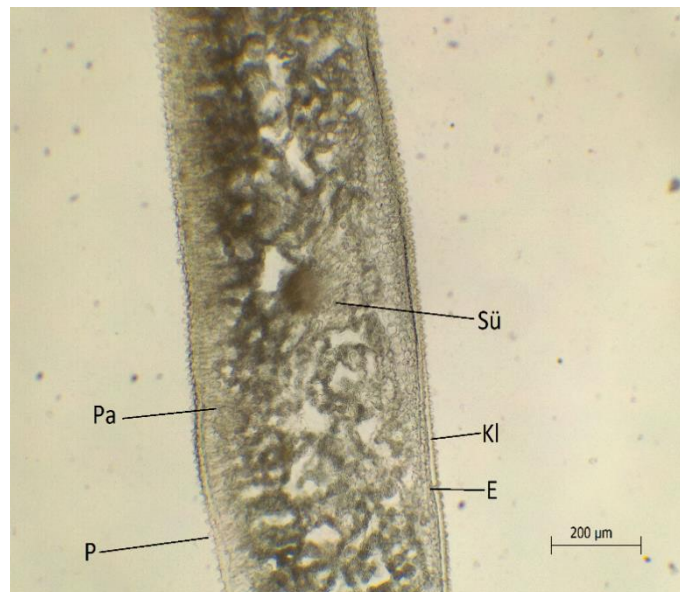
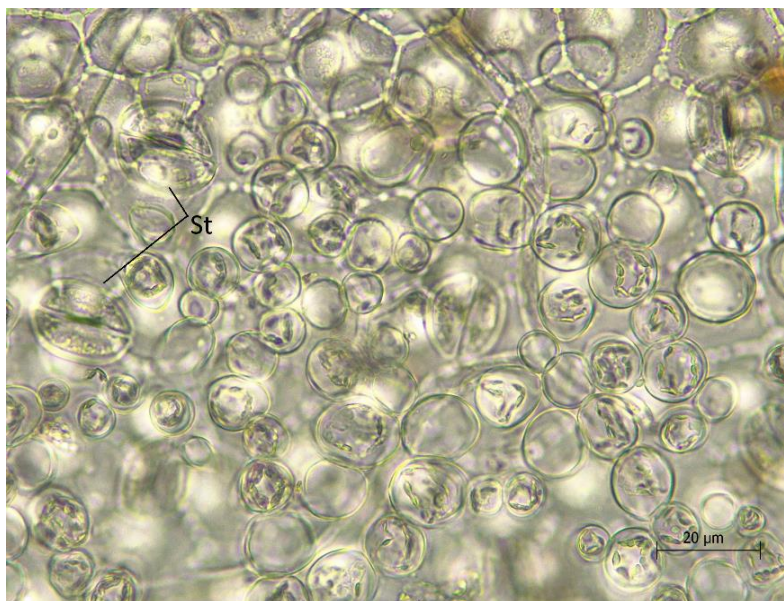


Fig 6: The appearance of stoma cells in leaf superficial section of *Euphorbia anacampseros* Boiss. var. *anacampseros*



3. DISCUSSION

In our study, the morphological and anatomical features of *Euphorbia anacampseros* Boiss. var. *anacampseros* taxon were examined.

The systematic of *Euphorbia anacampseros* Boiss. var. *anacampseros* taxon:

Regnum: Plantae

Phylum: Magnoliophyta

Classis: Magnoliopsida

Ordo: Malpighiales (Euphorbiales)

Family: Euphorbiaceae

Genus: *Euphorbia*

Species: *anacampseros*

Variety: *anacampseros*

Synonymous: *Euphorbia anacampseros* Boiss. var. *minor*

Euphorbia anacampseros Boiss. var. *minor* Boiss. in DC., Prodr., 15 (2): 174 (1862) was determined by Davis (1862).

As a result of limited research, Gökçen et al. (2018), in their morpho-anatomical study on *Euphorbia anacampseros* Boiss. var. *anacampseros* taxon observed anomocytic type stomata between leaf lower and upper surface epidermis cells.

4. CONCLUSION

In our study, some botanical features of *E. anacampseros* Boiss. var. *anacampseros* taxon such as morphological and anatomical structure. Besides this specimens were prepared for identification studies, especially in the herbarium symbol.

Due to the fact that *E. anacampseros* Boiss. var. *anacampseros* taxon, which has a natural distribution in the Kazdağı ecosystem, which is important in the field of biodiversity on a world scale, is included in 122 Important Plant Areas (IPA) of our country, is especially endemic, is in the LC category and is of great economic importance, negative effects of possible climate changes are in particular. It's must to take the necessary precautions within the scope of protecting all biotic factors from harmful factors by in-situ or ex-situ methods of Kazdağı National Park.

REFERENCES

- AVCI, M., 1993. Türkiye'nin Flora Bölgeleri ve 'Anadolu Diyagonalı'ne Coğrafi Bir Yaklaşım. Türk Coğrafya Dergisi, 225-248.
- AYLWARD, J.H., PARSONS, P.G., SUHRBIER, A., TURNER, K.A., 2016. Topical Use of Ingenol-3-Angelate or A Salt Thereof to Treat Skin Cancer. United States Patent. US 9,314.458 B2 Apr. 19, 2016.
- BERCU, R., POPOVICIU, D.R., 2015. Comparative Anatomical Study on Leaves of Three *Euphorbia* L. Species. *Wulfenia* 22 (2015): 271-276.
- DAVIS, P.H., 1982. Flora of Turkey and East Eagean Islands Vol 7 p: 611-612.
- EKEN, G., BOZDOĞAN, M., İSFENDİYAROĞLU, S., KILIÇ, D.T., LİSE, Y. 2006. Önemli Doğa Alanları Kitabı. Cilt: II s: 583.
- AYAŞLIGİL, T., 2006. Kazdağları'nın Korunması ve Natura 2000 / Ekolojik Ağı. Kazdağları II. Ulusal Sempozyumu Bildirileri 22-25 Haziran 2006 s: 219-229.
- ÖZHATAY, N., BYFIELD, A., ATAY, S., 2005. Türkiye'nin 122 Önemli Bitki Alanı Kitabı No: 18 s: 73-76.
- GEMİCİ, Y., ÖZEL, N., 2001. Kazdağları'nda Flora ve Vegetasyon. Kazdağları I. Ulusal Sempozyumu Bildirileri. 20-22 Eylül 2001 s: 26-40.
- GENÇ, Z., 1989. Bursa Çevresi ve Uludağ'ın *Euphorbia* Türleri. (Doktora Tezi). Uludağ Üniversitesi Fen Bilimleri Enstitüsü Biyoloji Anabilim Dalı. Erişim adresi: <https://tez.yok.gov.tr/UlusalTezMerkezi>
- GÖKÇEN, Ü., KOYUNCU, O., SEZER, O., 2018. *Euphorbia anacampseros* Boiss. var. *anacampseros* Üzerine Morfo-Anatomik Araştırmalar. *Research Journal of Biology Sciences* 11(2): 11-13.
- HECKER, E., 1986. Tumours Promoters of the Irritant Diterpene Ester Type as Risk Factors of Cancer in Man. International Symposium on Chemistry - 'Taxonomy and Economic Botany of Euphorbiales'. Botanical Journal of the Linnean Society London 1986.
- LUZ, L.E.C., PALUDO, K.S., SANTOS, V.L.P., FRANCO, C.R.C., KLEIN, T., SILVA, R.Z., BELTRAME, F.L., BUDEL, J.M., 2015. Cytotoxicity of Latex and Pharmacobotanical Study of Leaves and Stem of *Euphorbia umbellata* (Janaúba). *Revista Brasileira de Farmacognosia* 25 (2015) 344-352.
- MALI, P.Y., JADHAV, A.G., 2015. Assessment of Cytotoxicity of Aqueous Extract of *Euphorbia hirta* Against Human Lung Carcinoma and Vero Cell Line. *Informatics Journals* Volume 22 Issue 3 September - December 2015.
- ERBAY, M.Ş., ANIL, S., MELİKOĞLU, G., 2018. Plants Used as Painkillers in Folk Medicine in Turkey IV - TOOTHACHE. *İstanbul J. Pharm* 48 (2): 49-54.
- ÖZGİŞİ, K., YAYLACI, Ö.K., SEZER, O., ÖZTÜRK, D., KOYUNCU, O., OCAK, A., 2017. Yunussemre Beldesi (Eskişehir) ve Çevresinin Florası. Süleyman Demirel Üniversitesi Fen Bilimleri Enstitüsü Dergisi Cilt 21, Sayı 1, 64-78, 2017.
- ÇALIŞKAN V., 2010. Çanakkale İlindeki Bitkisel Kaynaklı Sağlık Risklerinin Değerlendirilmesi. *Fırat Üniversitesi Sosyal Bilimler Dergisi*. 20(1): 55-82.

- SCHIPPMANN, U., 2018. Plant Annotations in the CITES Appendices – An Illustrated Manuel. Convention on International Trade in Endangered Species of Wild Fauna and Flora. Twenty-fourth meeting of the Plants Committee Geneva (Switzerland), 20, 21 and 23-26 July 2018.
- SEÇMEN, Ö., GEMİCİ, Y., GÖRK, G., BERAT, L., LEBLEBİCİ, E., 2004. Tohumlu Bitkiler Sistematığı Ders Kitabı. Ege Üniversitesi Fen Fakültesi Kitaplar Serisi No: 110 s: 25-40.
- YEŞİLYURT, E.B., AKAYDIN, G., 2012. Endemic Plants and Their Treat Categories of Muğla Province (Turkey). Hacettepe J. Biol. & Chem., 2012, 40 (2), 195-212.