# Bursa, Uludag and Fir

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**Abstract**
Bursa, the 4th biggest city of Turkey, located in a prominent position in terms of the buildings reflecting the Ottoman history, baths, bazaars, natural beauty and the winter tourism. The most remarkable place of Bursa, Uludag (2,543 m asl), the most significant elevation of the Marmara Region, has another importance owing to the plant species that are rare for that region. Uludag is also very rich because of its plant diversity. Here, *Abies bornmulleriana* (Uludag Fir) which belongs to Bursa has formed forests. Bursa is the only area where this *Abies* species grow naturally. Along with its economic importance, Uludag fir is also a preferred taxon in the landscape designs because of its decorative feature. In this study, some information about Bursa, which is an industrial and cultural city, and its most important mountain, Uludag has been shown. The importance of Uludag Fir has also been emphasized and its native deployed areas, botanical characteristics and the usage opportunities in the landscape designs have been explained.

**Key words:** Uludag Fir, *Abies bornmulleriana*, landscaping, plant material, conifer

## Introduction

Bursa is one of the leading cities of Turkey by its natural and historical richness. It is on the southern part of Marmara Region, in the Susurluk basin and situated between 39°35' and 40°40' north latitude and 28°10' and 30°00' east longitude. Bursa which has an area of 1,104,301 ha is surrounded by Yalova and Kocaeli from the north, Bilecik from the east, Kütahya from the south and Balıkesir from the west.

As Bursa province is located on the coastline of Marmara Sea, Mediterranean climate with hot and dry summers and mild and rainy winters is dominant. Semi-continental climate is characteristic to the inlands, away from the sea. Although the general characteristics of Mediterranean climate is present in Bursa plain, the average temperature of the region is low, the total yearly precipitation is high and the monthly distribution of precipitation is partially regular. According to the drought equality index of De Martonne summer months are arid while autumn and spring months show a less humid climate. During the last 65 year, the mean annual temperature has been 14.4 °C, the average annual relative humidity 68.6 % while the mean annual rainfall was 691.9 mm (Zencirkıran, 2004; Zencirkiran, 2009; Seyidoğlu et al., 2010).

The surface pattern of the city is comprised by the mountains and the subsidence areas separated from each other by the borders. Those subsidence areas are formed by the Iznik Lake, Ulubat Lake as well as the Yenişehir Plain, Bursa Plain and Inegol Plain.

35 % of the Bursa lands are covered by mountains ranges extending east-west. These are: the Samanlı Mountains extending from the east of Orhangazi to the Bozburun, on the west side of Gemlik Gulf; the Mudanya Mountains which cover the south part of Gemlik Gulf and separates the Bursa Plain from the sea; Katırlı Mountains located between the south of Iznik Lake and north parts of Bursa Plain; Karadağ which is an extension of Mudanya Mountains and the Uludag, which is the highest mountain of Marmara Region.

Uludag (in Bursa province), with the elevation of 2,543 m is the largest nature and winter sports center. Uludag is extending in the northwest-southeast direction and has a length of 40 km and a width of 15-20 km. Uludagtepe is located in the highest point (2,543 m elevation). On the north side of the mountain there are Sarıalan, Kirazlı, Kadı and Sobra Plateaus (Anonim, 2012).

## Flora of Bursa

Bursa has an important place in terms of plant diversity. Uludag is one of the important winter tourism centers. Owing especially to the rich variety of plant vegetation zones and plant diversity, it has one of the highest rates of mountain

endemism. On the lowest mountain altitudes there are *Lauretum, Castanetum, Fagetum* and *Abietum* vegetation zones while Alpinetum vegetation zone is found on the highest altitudes.

*Lauretum* zone (up to 350 m) is composed of *maquis* formation including species such as *Laurus nobilis, Erica arborea, Olea europea, Ligustrum vulgare, Arbutus unedo, Cistus creticus, Juniperus oxycedrus, Quercus sp.* and *Coryllus avellana.*

*Castanetum* zone (350-700 m) is composed of species such as *Castanea sativa, Juniperus oxycedrus, Cercis siliquastrum, Phillyrea latifolia, Spartium junceum, Quercus* sp., *Crataegus monogyna, Coryllus avellana, Cistus creticus, Cornus mas* and *Rosa canina.*

*Fagetum* zone (700-1,500 m) consists of mixed species such as *Fagus orientalis, Pinus nigra* subsp. *nigra* var. *caramanica, Quercus* sp., *Castanea sativa, Carpinus betulus, Populus tremula*, and in some place it consists of pure *Fagus* forests.

*Abietum* zone (1,500-2,100 m): On the eastern and southern slopes of Uludag Mountain, fir (*Abies bornmulleriana*) forms pure forests. In some places there are mixed forests with *Pinus nigra* subsp. *nigra* var. *caramanica, Carpinus betulus, Juniperus communis* var. *saxatilis, Vaccinium myrtillus, Prunus divaricata* and *Sorbus aucuparia.*

*Alpinetum* zone (1900-2543 m): *Juniperus communis saxatilis* and *Vaccinium myrtillus* communities cover a wide range of area. Some small plants such as *Astragalus* sp., *Acanthalimon ulucium, Festuca* sp., *Viola althaica* subsp. *oreades* appear in this zone. In this zone there are also peat areas which are rare for our country as well as humid meadows with a rich diversity of plants (Regel, 1963; Koç, 1977; Karahan, 1998; Kaynak et.al., 2005; Anonymous 2012).

**Firs and Uludag Fir**

Firs often grow in the northern hemisphere. They also grow in Africa and Asia (Himalayas). *Abies* genus has approximately 50 species, with many subspecies and varieties and nearly 150 cultivars. Firs are evergreen forest trees with a pyramidal feature at young ages and a conical crown at later ages. Young individuals have light grey, thin barks, and the elder ones have a thick and cracked appearance. Some species have resinous buds and some of them not. The shoots are long and the needles are spirally arranged. However, because of the light, sometimes they have a two-sequence appearance. Needle in rosette shape is generally flat and two-sided. The needles in the crown are pointed and the ones on the side shoots and branches are mostly blunt or notched. The upper surfaces of the needles are slightly grooved. There are stoma stripes on the lower surface of the needles. When the leaves are picked, a circle-shaped dip scar remains. The cones stand upright and mature in one year. After maturation the seeds are dispersed. There are no natural resin canals in the wood.

*Abies* genus has lots of species with a good development in the lit areas and under shade conditions. They have a high soil and moisture requirements. However, some species may be damaged by spring frosts. They have a good development in the nutrient-rich and deep sandy soils. Some species such as *A. alba, A. cephalonica, A. pinsapo,* and *A. cilicica* can also grow on calcareous soils. Only *A. concolor* (Silver-Colorado Fir) is drought-resistant. They are resistant to strong winds because of the taproot structure. Some fir species can not withstand the city weather conditions and climate.

In our country there are four fir species growing naturally. These are *A. bornmulleriana, A. nordmanniana, A. equi-trojani* and *Abies cilicica.*

*Abies bormuelleriana* (Mattf.) Coode & Cullen is a fir species typical for our country and for Uludag. This endemic species grows in north Anatolia (on the West Black Sea Mountains, between Uludag and Kızılırmak, at an elevation of 1,000-2,000 m), either together with *Fagus* and *Pinus sylvestris* or pure. It grows up to 30-40 m height and its d.b.h. is up to 1.40 m. It makes a narrow and pyramidal crown with 4-6 m diameter. The bark is grey and the young shoots are brown in color. The buds are resinous but featherless. The 2-3 cm long needles are glossy dark-green on the upper sides and double White stomata stripes are on the lower sides. Cylindrical and vertical standing

cones are 15-20 cm long, 4-5 cm in diameter and their outer scales are back curved.

The wood of the Uludag Fir is odourless and white or yellowish colored. Heartwood and sapwood are not so clear. The wood is soft and easily processed. When it is harvested, it creates a smooth surface. It can be easily polished and painted. It is used in furniture, sheet, fibre, maths, and construction industry.

In landscape architecture, *Abies bornmulleriana* is important because of its decorative structure and aspect as a shade tree. It is used in the parks and gardens and on the grass areas, solitary or within group plantings (Kayacık, 1980; Pamay, 1992; Dirr, 1998; Mamıkoğlu, 2007).

**Results**

Bursa is one of the biggest cities of Turkey, with an important place in terms of plant diversity. Uludag is one of the important winter tourism centers and owing especially to the rich variety of plant vegetation zones and plant diversity, it has one of the highest rates of mountain endemism. *Abies bornmulleriana* is a fir species endemic to our country and naturally grown in Uludag Mountain. It has a very high ornamental value and is also very valuable when used as Christmas tree. Along with its economic value, Uludag fir is also the preferred taxon in the landscape designs because of its decorative structure.

The usage and propagation of *Abies bornmulleriana* should be increased. It should be exported to foreign countries.

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