

***Abies* Taxa of Turkey and Their Visual Characteristics**

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Abstract

Plants that are an indispensable element of landscape designs are also an important integral part owing to their operational and aesthetic functions to the environment. The most important issue when performing the planting design is the knowledge of the plants. Otherwise, by using the plant in a wrong site, it is unavoidable to have a failure in landscape design.

In Turkey, there are totally four *Abies* species growing naturally. These are *Abies bornmulleriana* in Uludag, *Abies nordmanniana* in Eastern Black Sea region, *Abies equi-trojani* in Gallipoli and *Abies cilicica* in Taurus Mountains. It was observed that, except for the native ones, exotic species belonging to the *Abies* genus have been widely used in the big cities of the country in recent years. In the landscape designs of Istanbul, which is the biggest metropolitan city of Turkey, there are many native and exotic species of *Abies* taxa. In this study, based on literature data and observations and assessing the ecological, dendrological and visual characteristics of *Abies*, a simple identification key has been created. Photograph data of leaves, cones, habitus and form characteristics of those taxa has been given for the scope of this study.

Key words: Turkey, native, *Abies* taxa, exotic, identification key

General Characteristics of Firs

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*. The distribution of these four native taxa can be seen in Figure 1.

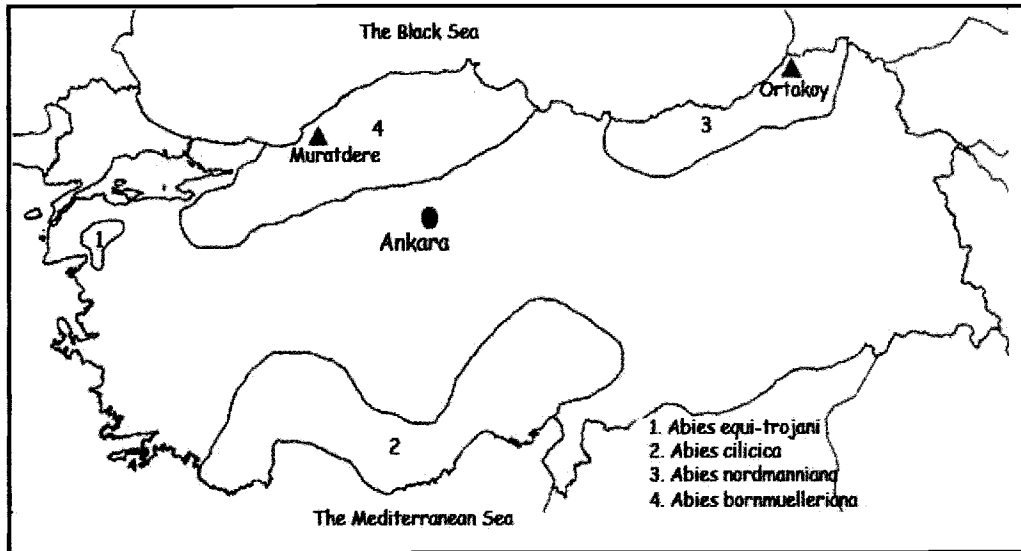


Figure 1. The distribution of native *Abies* taxa in Turkey (Kaya et. al., 2008)

The Native *Abies* Taxa of Turkey

Abies nordmanniana

Abies nordmanniana is perhaps the most ornamental fir species. It has almost black-green needles and may grow 40-50 m tall. Leaves are directed forward and densely covering the branches, 2-3.5 cm long. Apex rounded and notched, lustrous dark green above, midrib sunken, 2 white stripes below. Gray-coloured young shoots are usually covered with dark black and short hairs. The egg-shaped buds do not have resin. The male flowers are yellow-green. Cones are 15-20 cm long and 5 cm diameter, cylindrical or tapered to apex, reddish brown, with prominent exerted bracts. The outer scales of the cones are longer than the inner ones. The cones are resinous (Dirr, 1998).

Abies bornmuelleriana

Abies bornmuelleriana (Mattf.) Coode & Cullen is a fir species typical for our country and for Uludag. This endemic species grow in North Anatolia (on the West Black Sea Mountains, between Uludag and Kızılırmak, at the elevation of 1,000-2,000 m), either together with *Fagus* and *Pinus sylvestris* or in pure stands. 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 colour. The buds are resinous but featherless. The 2-3 cm long needles are glossy dark-green on the upper

side 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 (Kayacık, 1998).

The wood of *Abies bornmuelleriana* is odourless and white or yellowish coloured. 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 bornmuelleriana* 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; Mamikoğlu, 2007).

Abies equi-trojani

Abies equi-trojani is narrow endemic fir taxa to Turkey. It grows naturally only in Kazdagi (north-west side of Turkey). Its leaves are blunt and notched only the light leaves are pointed. Their buds are resinous. The number of buds on the side shoots is 5, sometimes 6-7. Cones are 15-20 cm long. The outer scales of the cones are longer than the inner ones (Kayacık, 1980; Pamay, 1992).

Abies cilicica

Abies cilicica is distinctly columnar-spire like, varying very little from base to apex in width. It may grow 25-30 m tall. The needles are spreading upwards and forwards, 20-30 mm long, rounded or acute and slightly 2-notched at apex, shining bright green above, with narrow whitish stripes beneath. From a distance the foliage is more grey-green than

the other dark green of most firs. It has the largest cone among the other native fir species. The 15-25 cm long cones are resinous, cylindrical and reddish brown. Unlike the other three native fir species, the outer scales of the cones are shorter than the inner ones (Dirr, 1998).

Simple Identification Key for Native *Abies* Species

It can grow up to 30-40 m tall *A. bornmulleriana*

It can grow up to 25-30 m tall *A. cilicica*

It can grow up to 20-30 m tall *A. equi-trojani*

It can grow up to 40-50 m tall *A. nordmanniana*

Leaves are 2-3 cm long *A. bornmulleriana/A. cilicica/ A. equi-trojani*

Leaves are 2.5-3.5 cm long *A. nordmanniana*

Young shoots are featherless *A. bornmulleriana*

Young shoots have dark black short hairs *A. nordmanniana*

The buds are resinous *A. bornmulleriana*

The buds do not have resin *A. nordmanniana*

Endemic species to Turkey *A. bornmulleriana/A. equi-trojani*

Non endemic species to Turkey *A. cilicica/A. nordmanniana*

The needles are black-green *A. bornmulleriana/ A. equi-trojani/ A. nordmanniana*

The needles are grey-green from a distance *A. cilicica*

Cones are 15-20 cm long *A. bornmulleriana/ A. equi-trojani/ A. nordmanniana*

Cones are 15-25 cm long (the longest) *A. cilicica*

The outer scales of the cones are longer than the inner scales *A. bornmulleriana/A. equi-trojani/ A. nordmanniana*

The inner scales of the cones are longer than the outer scales *A. cilicica*

This simple identification key for native *Abies* taxa has been prepared by the help of these references: Dirr, 1998; Fitschen, 1994; Krüsmann, 1985; Yaltırık, 1988; Pamay, 1992; Kayacık, 1980.

Results

Turkey is an important country in terms of plant diversity. There are four *Abies* species growing naturally in Turkey: *Abies bornmulleriana* in Uludag, *Abies nordmanniana* in Eastern Black Sea region, *Abies equi-trojani* in Gallipoli and *Abies cilicica* in Taurus Mountains. They have a very ornamental feature and they are also

very valuable when used as Christmas trees. Along with their economic value, fir species are also preferred taxa in the landscape designs because of their decorative structure.

It was observed that, except for the native ones, exotic species belonging to the *Abies* genus have been widely used in the big cities of Turkey in recent years.

The usage of exotic *Abies* species in the country should be reduced as the most valuable *Abies* species grow naturally. The usage and propagation of native taxa should be increased and they should be exported to foreign countries.

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