

Production of Christmas Trees and Saplings on Power Transmission Lines From Uludag Fir (*Abies nordmanniana* subsp. *bornmülleriana* (Mattf.) Coode&Cullen)

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Abstract

There are areas like power transmission lines or roadsides that remain out of use inside the woodlands. There will be acres of land if we add up all the areas like these. These areas can be used for various purposes other than industrial wood products. One can obtain positive effects by using fir stands that has very small share in woodlands and unused power transmission lines for production of Christmas (New Year) trees or saplings. Not too much effort is required for that. Due to the invasive properties of fir, seedlings come naturally and spontaneously therefore the only thing do to is to cut the saplings or move them to pots. Spacing of the seedlings from these areas also reduces the risk of fire. Saplings that grow over time in these areas must be removed in order to avoid damage to the power lines.

Keywords: Christmas tree, production, power transmission lines, seedling

Introduction

Fir tree species grow at high mountain elevations in northern and southern Anatolia. *Abies nordmanniana* (Stev.) Spach. is distributed in the north while *Abies cilicica* (Ant. & Kotschy) Carr. in the south. *Abies nordmanniana* is divided into three subspecies in three different geographical ranges:

- *A. nordmanniana* subsp. *nordmanniana* (Eastern Black Sea fir) is distributed throughout the Eastern Black Sea Mountains east of Samsun province.
- *A. nordmanniana* subsp. *bornmülleriana* (Uludag fir) is found from Uludag to Samsun throughout the Marmara Black Sea Mountains.
- *A. nordmanniana* subsp. *equi-trojani* (Kazdagi fir) is only distributed in a small area of Kazdagi.

Uludag Fir has the widest range among fir genus in our country. It can be said that it spreads in the sum of all other areas of the range of fir genus. It is the fir species with the largest altitude range. Although not in the form of stand, it may move downwards to the Western Black Sea coast or may climb up to 2,300 m elevation.

Although usually a dominant species, it can form mixed forests especially with beech and Scots pine, black pine, oak, hornbeam, ash, maple, yew, juniper, nuts, hop-hornbeam, linden, mountain ash, and even with pine.

Shade tolerance of fir and shelter pressure can reach up to 150 years in good sites. 2 m length (I can not understand this!) and 100-year old individuals can be found in the forest. However, they can reach 2 m height in a sunny environment in 10–15 years.

Materials and Methods

Uludag fir is distributed in Bursa, Adapazarı, Zonguldak, Kastamonu (+Sinop), Amasya and Ankara Regional Directorate of Forestry. Regional Directorate of Forestry in Sinop was closed in 2011, and connected to the Regional Directorate of Forestry in Kastamonu, although they are evaluated separately in this paper.

Table 1 shows the distribution of Uludag fir according to the regional directorates. Fir-dominated stands have been taken into account in this table; the mixed stands that are not the first type are not taken into consideration.

Table 1: Territorial distribution of Uludag fir by the regional directorates

Regional Directorates	Damaged (ha)	Storied (ha)	Productive (ha)	Total (ha)
Adapazarı	97.8		5148.8	5246.6
Amasya	63.9		6738.8	6802.6
Ankara	468.4	239.3	14521.2	15228.9
Bolu	405.4	1700.4	50098.3	52204.1
Bursa	141.1		6363.0	6504.1
Kastamonu	5197.3	1872.0	63599.6	70668.9
Sinop	735.3	147.0	26629.2	27511.5
Zonguldak	17.6	302.1	31435.4	31755.1
Total	7126.8	4260.8	204534.2	215921.8

As shown in the table, Uludag fir is concentrated in Bolu, Kastamonu, Sinop, Zonguldak and Ankara Regional Directorates.

Due to its shade tolerance and invasive nature, fir has increased its range by driving other species away from the area; where it has established mixed stands with light-demanding tree species such as yellow pine or larch, it had also increased its growth. This is easily understood by comparing the previous forest management plans with the new ones. Stands are considered as storied in the table above. Stands considered as layered are Çsd1/Gab3 or Çkd/GÇkab3. The area is dominated by fir when old individuals have moved away from there.

Findings

There are different-sized transmission lines from power plants to consumers in almost every part of our country. These transmission lines frequently pass through woodlands therefore they are permitted.

Depending on the size of the transmission lines, all trees within the lines of 5-50 m wide are cut down during construction and re-growths are cut down again on a regular basis. Seedlings constantly established by side seeding on these lines are then removed from the area because of the fire risk and line losses. As a result of these transactions wood products that may be economical cannot be produced.

Fir seed can easily fly 50 m away therefore lots of seedlings come to the power lines. Without any shelter pressure saplings grow faster than the ones within the stand. In addition, because the stands provide much light, preponderance of saplings can be seen up to 10-15 m deep from the stand boundary.

Power transmission lines (10, 25 and 50 m wide) within the Uludag fir's areas are scanned through Google Satellite images then shown in the table 2 separately. Google images are dated 2004-2010. Because of the lines created after this period, recent numbers have reached wider areas.

Table 2: Table of distribution of line lengths and areas by the Regional Directorates

Regional Directorates	10 (m)	Area (ha)	25 (m)	Area (ha)	50 (m)	Area (ha)	Total Area (ha)
Adapazarı							
Amasya	3450	3.5					3.5
Ankara			375	0.9			0.9
Bolu	10090	10.1	1006	2.5	14971	74.9	87.5
Bursa	3520	3.5	3957	9.9			13.4
Kastamonu	55653	55.7	17242	43.1	10917	54.6	153.3
Sinop	21199	21.2	1303	3.3			24.5
Zonguldak	795	0.8	5118	12.8			13.6
Total	94707	94.7	29001	72.5	25888	129.4	296.6

According to the table the total area of line areas is 2,966,000 m². Considering that saplings can reach the desired height

(approximately 2 m) in 20 years and should be 1 sapling/2 sq.m:
 2,966,000/20 = 148,300 sq.m annual benefit

148,300/2 = 74,150 individuals annual sapling production.

Fir's sapling count can reach five in good site index and areas with none shelter pressure. Due to the adverse effects of fast growth on branching the outlook is calculated as one sapling/2 sq.m.

For smaller-sized requests it should be calculated as two saplings for each sq.m. In addition there will be many saplings of different sizes. These saplings can be used in plantation and regeneration areas as bare-root seedlings and pot planting.

In addition individuals along roadsides are cleaned for maintenance of roads at certain intervals. The same purpose can be used in such areas. Along with requests for rooted seedlings and Christmas (New Year) trees, rootless but newly cut therefore fresh looking Christmas (New Year) trees formed with base planks can also be used in many places.

In our Internet search on the free market 25.33 TL for a 1.5 m length sapling, 25.42 TL for 1.2 m length sapling, and 15.90 TL for 0.60 m length sapling was asked for. An article was found about 28 million Christmas trees annually sold and about € 450 million spend for it in Germany. According to the same article a Christmas tree should be 1.8 to 2.0 m tall. The average price/tree is 16 Euro. Assuming that in natural conditions a sapling can reach 2 m length in 20 years, needs 2 sq.m to grow and is sold for 10 TL per unit it creates an annual return of 0.25 TL/sq.m/year.

Considering that GDF sales income for the year 2010 was 0.139 TL/sq.m and for the year 2011 was 0.172 TL/sq.m, 50% more income earned from an area which appears cannot be used.

Discussion

Fir often grows at the altitude of 1,000 m and possibility of these areas of being snowy will bring challenges to the production. In this case, saplings should be removed to bags or pots and stored somewhere easy to transfer during New Year time. If these transactions are considered as exhaustive and costly, sales should be considered on-site and borne by the buyer in all transactions.

Conclusion

Forests are natural and self-regenerating assets without being connected to us. All kinds of forest destruction by us are just the beginning of the forest to renew itself. What we should do is to know how to benefit from forest's actions. Using each area in different and versatile way is a must for Forest Engineering.

Evaluation of power transmission lines that appears to be impossible to use is an environmental approach.

Such studies will contribute to the economy and increase carbon sequestration and oxygen production.

Works Cited

URL1: <http://www.dw.de/dw/article/0,,15597128,00.html>