The forests of brutia pine in Cyprus

Pantelas V.

Le pin d'Alep et le pin brutia dans la sylviculture méditerranéenne

Paris : CIHEAM
Options Méditerranéennes : Série Etudes; n. 1986-I

1986
pages 43-46

The forests of brutia pine in cyprus

V. Pantelas

Senior Conservator of Forests
Ministry of Agriculture and
Natural Resources
Nicosia (CYPRUS)

Key words : Brutia Pine. Cyprus. Forestry.

ABSTRACT

Brutia Pine is the main forest species in Cyprus growing from sea level up to the 1,600 m altitude. Its forests represent about 90 % of the Island's forest area which totals at about 175,000 ha.

Most of these forests were classified as currently unexploitable after a recently carried out inventory whilst some 44,000 ha were classified as currently exploitable. Fellings are confined in the latter, with an annual wood output of 57,000 cubic meters round over bark. This wood is utilized locally for the production of sawn timber, chipboard, box-shooks, charcoal and other minor wood products.

About 6,000 ha. of the Pinus brutia forests have been selected and preliminarily classified either as National Forests Parks to provide amenities to the public, or as Nature Reserves for nature conservation.

The main enemy of the Pinus brutia forests in Cyprus is forests fire and much resources are yearly spent by the Forestry Department for fire prevention and fighting.

Damages from biotic agents such as insects and fungi are less significant.

INTRODUCTION

Brutia pine (*Pinus brutia*, Tenore) is the main forest species in Cyprus, covering more than 90 % of the forest area of the Island (174,500 ha).

The forests are of great importance for the Island, in relation to social, protection and economic (production of forest goods–tourism) aspects.

BIOLOGY

Brutia pine grows all over the Island from sea level to about 1,600 m. elevation. Above this level it is replaced by the *Black pine* (*Pinus nigra* var. *caramanica*) which is found growing up to the highest point of Cyprus, the summit of Chionistra (1,952 m). Between 1,300 and 1,600 m. it forms mixed stands with the Black pine.

Brutia pine shows an admirable power of withstanding the two trying features of the Cyprus climate, the drought and the high temperature range.

Average annual precipitation in the altitudinal zone occupied by *Brutia pine*, ranges from 350 mm to a maximum of 1,000 mm at highest altitudes. The main bulk of precipitation (about 80 % of the total) falls during November and March ; the period from May to September is a biologically dry period, as mean monthly air temperature exceeds mean monthly precipitation.

Brutia pine is growing on all types of rock formations. Its optimum development however, is observed on slightly acid soils originating from igneous rocks, on altitudes between 600 and 1,300 m where average annual precipitation ranges from 500 to 900 mm.

On alkaline soils which are usually found on lower altitudes originating mainly from sedimentary rocks, there is a marked falling off in maximum height and in form.

On good sites at an age of about 80 years it reaches 25 m in height and 70 cm in diameter where on best sites mature trees, attain the height of 40 m and a diameter of over 100 cm.

On poor sites, however, mature trees hardly attain the height of 12 m and the diameter of 40 cm.

Pollination starts in mid-April and is extended up to the end of May on highest altitudes. Seeds ripen in June-July two years later and are shed between mid-August and mid-September of the same year.

Seeds have a high germinative capacity, reaching the 85 per cent under laboratory conditions and seedlings exhibit also a satisfactory viability.

After germination the seedlings are small, usually with 9 tender light-green cotyledons ; the primary leaves are only slightly paler than the mature needles.

The pine is extremely deep-rooted and this is one reason for being very windfast and remarkably drought resistant.

However, in cases of extremely strong winds breaking off leading shoots and uprootings are not unusual phenomena.

During very dry years and especially in summers, when extremely high temperature values occur, many trees may die especially when growing on shallow soils of windsuffering sites.

MANAGEMENT

Past Management

During the last 50 years and until recently the Brutia pine forests have been managed with the Group Selection System.

It has been a long time since it was realized that the above System is not suitable for *Brutia pine* but its replacement has been delayed for different reasons. This System proved to be unsuitable mainly because *Brutia pine* is a strong light demanding species and besides, the exhausting root competition for moisture which is a critical factor in Cyprus, leads to insufficient development of natural regeneration.

The application of the above Silvicultural System together with some other reasons has resulted in the degradation of the Brutia pine forests.

Present Management

The State Forests of Cyprus are classified into two main categories, the Main State and Minor State Forests. The latter may be Communal or Municipal Forests, Grazing areas, Nursery Gardens or Multiple Use Forests. The Main State Forests are further classified into three categories as follows :

a) Permanent Forest Reserves, managed primarily for production of timber and other forest products ;
b) National Forest Parks, managed to provide recreation and amenities to the general public and
c) Nature Reserve Areas, managed for the complete and permanent protection of the flora and fauna.

A Forest Inventory carried out recently by the Forestry Department of Cyprus, in the *Brutia pine* currently exploitable forests which are managed as Permanent Forest Reserves and National Parks areas, showed that :

a) The forests are understocked (70 m^3/ha) with a large proportion of mature and overmature (60 %) standing trees.

b) The mean annual Volume Increment is about 1.9 %, i.e., 1.4 m^3 per year, per hectare, and
c) Natural regeneration is not sufficient to replace the removals of trees from the annual cut.

The Growing Stock of the enumerated area was estimated at about 3,130,000 m^3 ROB where the expected Periodic Volume Increment for the decade 1982-1991, at 585,000 m^3 ROB.

The annual yield was fixed at 57,000 m^3 ROB, a little smaller than the corresponding increment.

The rotation is about 110 years and a tree is considered mature for felling after attaining a diameter at breast height of 50 to 60 cm.

The Group Selection System is now replaced in certain areas and under certain conditions by heavier fellings which can be considered as Clearfellings. The main difference is that young trees under 30 years are retained in the felling coup. The new System is confined to mature and overmature, usually irregular stands growing in Permanent Forest Reserve areas, cultivable by machinery and found away from touristic roads, nature trails and popular paths.

The Group Selection System is still applied in National Forest Parks and in that areas of the Permanent Forest Reserves at which no Clearfellings are carried out.

No fellings are carried out in Nature Reserve areas.

With the introduction of the new System and the application of the new management recommendations derived from the mentioned inventory, the Growing Stock is expected to reach 200 m^3 per hectare and the annual increment to increase at 5 m^3 per year, per hectare within a period of a rotation.

REGENERATION

Clearfellings are usually followed by artificial regeneration where the natural one is not sufficient to replace the removals.

Artificial regeneration is carried out either by sowing or by planting on terraces that are constructed with heavy machinery. Terraces are constructed on hillsides with a ground inclination below 30 degrees. These may have an inward (catastrips) or an outward (cataslopes) inclination of about 10 % and a width ranging from 2.70 to a 3.5 m.

Before sowing or planting, the soil is cultivated. Planting is usually done in pits where sowing is performed by broad casting and covering the seeds with a thin layer of earth using a rake.

Terracing has been proved to be a very effective mean of protecting soils from erosion, improving the soil moisture conditions and tree growth in general.

PROTECTION

Protection against fire

Despite the fact that the prevailing arid conditions in Cyprus and the type of vegetation favor forest fires the annually burnt area is relatively small.

The mean forest area burnt in the last ten years was about 200 ha per year, i.e. 0.1 % of the total forest area. This is mainly due to the preventive and fighting measures taken by the Forestry Department the main of which are the following :

a) Organization of a Fire Fighting-Task Force during the dry season, whose members are employed in strategic points of the forest being ready for immediate action in case of a fire.
b) During summer months, a number of Fire Look-Out Stations established on high peaks in the forest is manned on a 24 hour basis, in order to detect and report forest fires.
c) The already existing dense forest road network is improved and extended every year. Besides, fire traces are opened where necessary and the existing are cleared of the vegetation cover every 2 or 3 years accordingly.
d) A considerable number of hydrants and water tanks have been constructed in several properly selected points of the forest, in order to supply with water the fire engines in cases of fires.
e) Daily mobile patrols are carried out during the dry season especially along the delimitation line, advising and warning villagers not to start a fire.
f) A very good Telecommunication system exists in the forest and the forest stations, consisting of 440 telephone instruments. In addition a large number of portable and mobile radiotelephone is available ; all Forest Officials working in the forest and all vehicles are equipped with these.
g) Forest Officials give lectures every year on the prevention and suppression of a forest fire to the National Guard, Police and the Public and Schools.
h) A significant number of fire vehicles and fire pumps have been recently acquired, making fire fighting task more effective.

Protection against Insects and fungi.
Insects

Many insects live in *Brutia pine* forests in Cyprus causing damages, which however, are not of significant economic importance. The main insects attacking Brutia pine in Cyprus are the following :

- **Defoliating and Shoot borers :**
- Thaumetopoea wilkinsoni Tams. (defoliating).
- Evetria buoliana var. thruficana, Led (Shoot borer).

- **Bark borers :**
- Myelophilus piniperda, L.
- Myelophilus minor, L.
- Ips erosus.
- Hylastes ater, Payk.

- **Wood borers :**
- Alaus Parrayssi, Ster.
- Melanotus fusciceps, Gyll.
- Chalcophora detrita, Kl.

The Forest Policy in Cyprus as regards the insect pest control, is the taking of preventive measures other than fighting ones.

The insect species that causes a noticeable damage to Brutia pine trees is that of T. wilkinsoni. Spraying against this insect is carried out by plane, using Bacillus thurigiensis, Ber. In addition to air spraying, smaller areas are treated by hand spraying. Control measures for this insect are confined to young plantations and popular forest areas.

Fungi

Amongst the various species attacking *Brutia pine* in Cyprus, only a few are of practical importance in Cyprus Forestry.

An important group of fungi causing severe damage to *Brutia pine* seedlings is that of the genera Fusarium, Pythium etc. These fungi cause the "Damping-off", of young seedlings. The control of this disease is done by taking some preventing measures such as, sowing at small depths, avoiding heavy soils with pH over 7, soaking of seeds prior to sowing with fungicide solutions, etc.

Another worth mentioning fungi which causes heart-rot in *Brutia pine* is Trametes pini. Other fungi species of less importance are Armillaria mellea and Fomes annosus which cause heart-rot near root collar of pine trees.

UTILIZATION

The annual cut in *Brutia pine* forests is about 57,000 m^3 over bark. Branchwood is not included in this volume.

From the above amount some 35,000 m^3 are sold to the Cyprus Forest Industries which is a public company, where the remaining 22,000 m^3 are sold to private ones.

The wood of *Brutia pine* is used in Cyprus for different purposes the main of which are the following :

a) Sawn Timber : This is produced by both Forest Industries and Private ones. It is used as constructional timber but also for furniture of traditional style which shows an increasing demand in local and foreign market.
b) Chipboard : It is exclusively produced by the Cyprus Forest Industries.
c) Box-shooks : For the production of wood-boxes sold to farmers for fruit storing and transportation. A proportion of these are exported.
d) Charcoal : Charcoal is produced by private companies in the tumulus or "bee hire" type of earth kilns or in metal ones. The yield of charcoals with metal kilns is higher than in earth kilns, varying from 25 to 30 % in the formers where in earth kilns is only about 15 %. The quality of charcoal produced is of good quality but of lower than this produced from hard wood species (e.g. Golden oak).
e) Fuelwood : Branchwood and defective wood that cannot be ortherwise used are sold to private individuals as fuelwood. Demand is high, and priority is given to villagers near forests.
f) Miscellaneous : The wood of *Brutia pine* is also for some other purposes of less importance such as tool handles, poles, etc.