"PINUS PINASTER IN WESTERN AUSTRALIA."

Some Notes on the Geographical Forms of the Tree

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by

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SOME NOTES ON THE GEOGRAPHICAL FORMS OF THE TREE

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To any forest service contemplating the establishment of plantations of Pinus pinaster, a sound knowledge and appreciation of the habits of growth of the various geographical forms of the species is vitally important. The South African Forest Service recognised this many years ago and sent C. E. Duff to Europe to investigate the matter. His report (1) is an authoritative and comprehensive treatise on the subject and experience gained in Western Australia during the last 30 years supports his findings.

In a paper contributed to the Australian Forestry Journal some years ago (2) the writer was largely guided by Duff in grouping the various strains to be recognised in Western Australia. At that time and since, however, the terms strain, form, race, type, etc., have been used rather loosely. Since writing in 1940 an attempt has been made to standardise the use of these terms. The following classification is now recognised:—

1. **ATLANTIC RACE.**
   - (a) Landes Strain.
   - (b) Portuguese or Leiria Strain.
   - (c) French Hoek (seed from French Hoek Plantation, South Africa).

2. **MEDITERRANEAN RACE.**
   - (a) Esterel Strain.
   - (b) Corsican Strain.
   - (c) Italian or Lucca Strain.

1. ATLANTIC RACE.

So called because the two strains comprising this race came from the Atlantic coast of France and Portugal and possess common characteristics. This race is a lighter green in colour than the Mediterranean race, has longer needles, faster rate of growth and produces its inflorescences earlier.

(a) Landes Strain.—In Western Australian plantations the needles of this strain are rather a pale green in colour and on occasion, but not consistently are paler than the Leiria strain. Extreme length of needle is about 10 inches and the average six inches to seven inches. Branches are set on at an angle of about 45 degrees with the stem and tend to curve upward at their extremities giving the crown a rather rounded outline. The staminate flowers begin to appear by the beginning of September and are fully mature by the beginning of October. By the end of October the pollen sacs are empty and the inflorescences are beginning to shed.

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This strain has been very largely planted in Western Australia in the past, the seed having been procured from seed merchants in France and is described by them as coming from the South of France. It is assumed however, that this seed was collected from the forests of the Landes in Gascony, that is in the South-West of France. This tree is usually of good form and has produced some fine stands. The height growth on the best sites is 55 feet in 22 years.

(b) Portuguese or Leiria Strain.—So called because the stands of this strain have been raised from seed supplied by the Portuguese Forest Service from the Forest of Leiria. This strain appears to be more erect than the Landes in its early years and has a smaller crown spread. The branches form an angle of 20 degrees to 45 degrees with the stem and are fairly straight, giving the tree an erect conical shape. The needles are a slate green, a shade darker usually than in the Landes strain but considerably lighter than any Mediterranean race tree. They reach an extreme length of 10 inches with an average of 6 inches to eight inches. On good sites the crowns are denser than the crowns of the Landes strain. The Leiria strain is faster growing than any other and develops a particularly good form. Approximately 20 per cent. of all trees in a healthy stand will produce forks, a characteristic confined to this strain. In Western Australia this tree has proved to be most adaptable and will produce more timber in a given time on any site than any other strain. The staminate inflorescences begin to appear by the middle of August and the pollen sacs are scattering their contents by the end of the first week in September. By the end of September all pollen has been shed and the flowers are beginning to fall. The major portion of the seed of this strain as mentioned earlier has been supplied by the Portuguese Forest Service, in answer to requests for seed, from the Forests of Leiria. This strain has proved so outstandingly satisfactory under Western Australian conditions that all plantings since 1945 have been exclusively of this tree. The height growth on good sites is 57 feet in 18 years.

(c) French Hoek.—Very little is known about this strain. It has been raised from seed supplied by the Forests Department of South Africa and was collected from trees growing at French Hoek Plantation. Our plantations of this strain are only young yet, but are recognisably different from the Landes and Portuguese strains as we know them. Generally the form is not good although some variation occurs. Trees of this strain are rather slower growing than Landes and an outstanding characteristic is the large quantity of cones which are borne from an early age. The pale green colour and general habit would appear to place this tree in the Atlantic race.

2. MEDITERRANEAN RACE.

So named because the strains comprising this race come from regions facing the Mediterranean Sea. They also have features in common which assist in grouping them. These are chiefly a dark green colour, considerably darker than the Atlantic race, very dense crowns, shorter and stiffer needles, horizontal arrangement of branches, slow rate of growth and later flowering times.

(a) Esterel Strain.—This strain is represented in Western Australia by several small stands. The seed for one of them was obtained from France, in answer to a request for seed of Pinus pinaster, from

the Esterel region. These trees answer very closely Duff's description of the Esterel strain. Another rather extensive stand has been established from seed supplied by a French seed merchant as coming from the Landes region, but which is obviously from the Esterel or from stands originally from that region. The needles are a dark green in colour, very stiff and coarse. Extreme length is six inches and average length about four inches. Staminate inflorescences are produced in profusion, and begin to appear about the middle of September and by the middle of October are fully out. All pollen has been shed and flowers are falling by early November. The tree is rather dome-shaped as a result of the upper branches curving up to nearly the same height as the leading shoot. Very noticeable features of this strain are its dense crown and the large persistent branches which at an early age form very prominent nodes on the main stem. Height growth is slow and general form very poor. This is an undesirable strain except for windbreak and shade purposes. The height growth on good sites is 38 feet in 18 years.

(b) Corsican Strain.—There are a number of small stands of this strain in Western Australian plantations, the trees having been raised from seed obtained from Rafn of Denmark and the French Forest Service, in answer to requests for seed of Pinus pinaster, from Corsica. This strain is very erect and straight and of excellent form and very closely resembles Pinus laricio in general habit at this age (20 years). The needles are fairly short and stiff, a dark green in colour, and carried at an angle of 90 degrees with the stem. This strain is quite distinct in its tendency to produce very few staminate inflorescences up to the age of 20 years and practically no cones. A few staminate flowers appear about the middle of October and are shedding pollen by the end of the month and are themselves falling by the end of November. This strain is a most desirable one and should produce timber of high quality, but unfortunately its slow rate of growth rather causes it to compare unfavourably with the Leirian strain. The rate of growth on average to good sites is 37 feet in 18 years.

(c) Italian or Lucca Strain.—This strain has been established in Western Australia from seed obtained in large quantities from Europe in 1917-1918. It is very slow growing, probably the slowest of all the strains, is a very dark or deep green in colour, carries a very dense crown of short stiff needles, and the form is extremely poor. Altogether a most undesirable tree and to be avoided at all costs. The rate of growth on average to good sites is 30 feet in 30 years.

GENERAL AND SUMMARY.

It should be borne in mind that the foregoing descriptions have all been made on trees of up to 20 years of age. None of the descriptions will fit the mature trees of these strains of Pinus pinaster.

It is important to stress the value of the flowering period as a means of assisting identification. This has proved a great help particularly with stands which are not in healthy condition. A poor site very often has the effect of reducing the various strains to much the same general appearance although the trained and practised observer can usually still differentiate between them.

Some years ago Mlle. V. Fieschi carried out an examination of the needles of several strains of Pinus pinaster. She succeeded in proving to her satisfaction that on the difference in resin duct counts

in the needles she was justified in making separate species of the two races, namely the Atlantic and Mediterranean. The first she named Pinus pinaster and the second Pinus mesogeensis. This work was considered to be worth following up in Western Australia as a possible means of differentiating between the two races of this tree and possibly between the strains of each race. The writer during the past 10 years has examined sections of many hundreds of needles from various strains of this species at different ages. Needles have been procured from Europe from known localities and are in the course of being examined. It is hoped to publish the results of this work at an early date as a further contribution to our knowledge of this tree.

Observations and measurements made of plantations established in Western Australia indicate beyond all doubt that the Leirian strain of Pinus pinaster is the most satisfactory and suitable for our conditions. It has been exclusively planted for some years now and will continue to form the bulk of our planting stock of this species in the future.

The Corsican strain shows promise on account of its splendid form, but loses on rate of growth.

The Esterel and Luccan strains are to be entirely avoided when establishing plantations owing to their poor form and slow rate of growth.

REFERENCE LITERATURE

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