

Planting Spacings.

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FORESTRY, an applied science, is not an exact one, insofar as seemingly identical conditions or actions do not always produce the same results, and all silvicultural treatments are best discussed with this in mind.

Planting spacings usually vary with species, types of soil, rotations and markets, that is to say, the governing considerations are either silvicultural or financial. While these aspects are not necessarily in conflict what is advantageous to one may be disastrous for the other, and the task of the forester when laying down a plantation is to determine which consideration will predominate or to what extent both may be reconciled. Actual practice, therefore, may pay homage to both, and be, in the words of the well-known British forester, Mr. H. L. Edlin, "a working compromise."

Close spacing has in its favour:

- (1) Less replacement of failures will be necessary.
- (2) There will be more thinnings for sale.
- (3) Earlier closing of canopy, better suppression of weeds and, possibly, greater height growth.
- (4) Better soil protection, and improvement of soil conditions through greater humus accumulation.
- (5) Lighter side branches, earlier suppression of these, and, possibly, more natural pruning.
- (6) Greater number of stems from which to select final crop.

Arguments against close planting:

- (1) The greater cost of plants and planting.
- (2) The greater cost of maintenance in early stages of the rotation.
- (3) More intense root and crown competition, with greater danger of windthrow and snow damage, insect or fungoid attack.
- (4) The greater cost of thinning, particularly earlier thinnings.
- (5) Less diameter growth, longer rotation and lower rate of interest.

The arguments in favour of open spacing—distances of six feet upwards to a limit compatible with good management are :

- (1) Plants and planting cost less.
- (2) Silvicultural and maintenance operations will cost less.
- (3) Higher increment per stem, shorter rotation and higher financial return.
- (4) Better root development, more stable crop, less danger of windthrow and snow damage.
- (5) Less suppression and, consequently, less danger of insect or fungoid attack.
- (6) More rapid decay of leaf-fall, with increased food supplies and less danger of over accumulation of raw humus.

Open spacing has the disadvantages that :

- (1) More replacement of failures may be required.
- (2) Live pruning may be necessary.
- (3) Later closing of canopy resulting in, possibly, a lower rate of height growth, heavier branches and later suppression of weeds.
- (4) Poorer quality timber—possibly.
- (5) Less thinnings for sale.

The silvicultural effects of the planting spacing will be most apparent in the earlier stages of the rotation—in the formative and competitive stages. The cash expenditure at these stages could have a decisive effect on the ultimate financial yield and hold the balance between the success and failure of the investment.

Close planting is more suitable for poorer soils, with their greater risk of failures and greater need for soil improvement. Soil improvement through humus accumulation is, however, negligible unless the plantation is opened up soon enough to permit the entry of sufficient air and light to accelerate the decay of the accumulation. It may be necessary for the suppression of heavy vegetation on good ground.

Close spacings are desirable where there is likely to be a profitable market for earlier, small sized thinnings, and are, therefore, suitable for short rotations which as a rule imply a convenient market for such material. With such rotations the financial return will not be so adversely affected by the expenses incurred early in the rotation. With slow growing species such as scots pine close spacing is essential for the production of clean timber.

Where there is undue root or crown competition the dangers of windthrow and snow damage are always present, and silvicultural treatments to reduce and remove them are not always successful and are invariably tedious and costly. This competition will also encourage insect attack and will create conditions ideal for the spread of fungi.

In passing one wonders if there may not be a connection here with "group-dying" in vigorously growing species such as sitka spruce and *Pinus contorta*.

Where it is silviculturally feasible, open spacing with its early savings in costs is suitable for long rotations. It is also suitable for the faster growing, high volume producing species. Most of these seem to produce coarse branches irrespective of spacing.

Open spacing is financially desirable where there is no prospect of a market for small size thinnings. When thinning is carried out the amount of poles available for sale will be much less than that which would be available from the same area of closely-spaced trees. This does not, however, imply that the volume will be less. It will be handled at a much lower unit cost, and be of more saleable size.

Open spacing may be resorted to in order to achieve a saving in the cost of preparing for planting areas with heavy weed growth which later will provide the competition desirable or necessary for securing clean stems.

It can be argued that live pruning is not altogether disadvantageous. True, it may cause a temporary but rarely serious loss in increment, but this danger is remote when the pruning is carried out in moderation. On the other hand the live knots are incorporated in the growing wood, thereby eliminating the risk of "fall-out" after sawing.

The fact that open spacings will allow the establishment and handling of plantations with smaller labour staffs is a matter well worthy of consideration in any area where there is, or may be in the future, an insufficiency of suitable man-power.
