

PINUS PINASTER ON GRAVEL

by A. L. Clifton

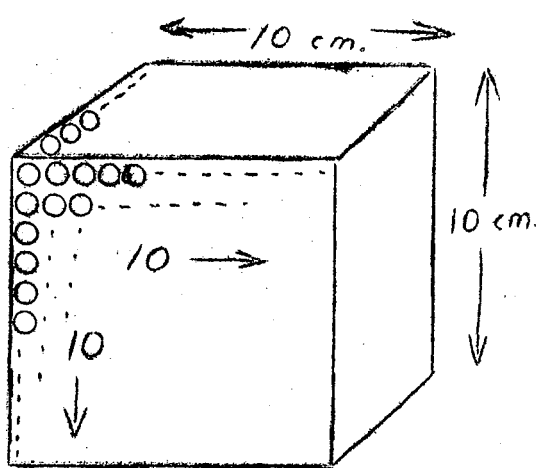
Think twice before you plant up that gravel deposit with *P. pinaster*. Chances are that it is an old jarrah die-back area. Maybe you have already probed the depth of it, and found 4 feet or more of easy penetration. But is this enough?

Experience at Gleneagle suggests that at least 4 feet of sand is needed to grow *P. pinaster* successfully, but does this depth-rule hold for gravels? - I think not.

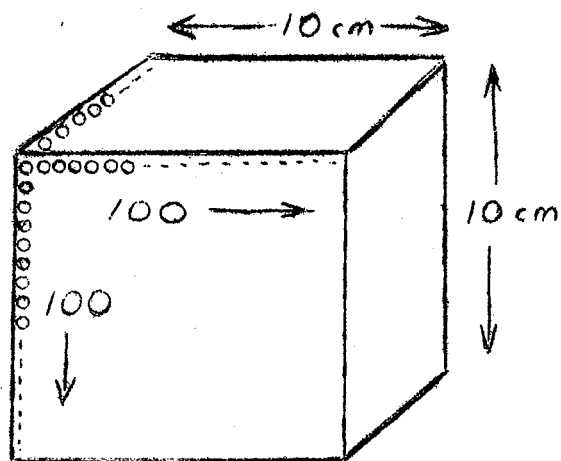
Gravels have very poor moisture retention - the result of having relatively small surface area to which a film of moisture can cling. The spaces between the gravels are of no value - free water in these spaces quickly drains away, either straight down, or even sideways through the deposit to feed springs and seepages downhill.

The following example oversimplifies the problem of "surface area" but serves to illustrate the relative ability of gravels and sands to hold moisture.

Let us assume a deposit of gravel composed of spheres all 1 cm in diameter and compare it with a hypothetical deposit of sand composed of cubes 1 mm square. Take a cubic decameter (1,000 cubic centimeters or one litre) of each.



= 1,000 gravel spheres.



= 1,000,000 sand grains (cubes).

Surface area of one gravel sphere

$$\begin{aligned} & (\text{area} = 4 r^2) \\ & = 4 \times \frac{22}{7} \times 0.5 \times 0.5 = \frac{22}{7} \\ & = 3.1416 \text{ sq.cm.} \end{aligned}$$

The cubic decameter will hold about 1,000 spheres (10 in each direction).

∴ Total surface area of gravels

$$\begin{aligned} & = 1,000 \times 3.1416 \\ & = 3141.6 \text{ sq.cm.} \end{aligned}$$

Take now the case of the sand grains; each sand grain has a surface area of $(0.1 \times 0.1) \times 6$

$$= 0.06 \text{ sq.cm.}$$

Now one cubic decameter will contain 1,000,000 sand grains with a total surface area of

$$60,000 \text{ sq.cm.}$$

which is roughly 20 times the surface area of the gravel.

Does this mean, then, that gravel deposits should be 20 x 4' = 80 feet deep before they are suitable for *P. pinaster*? - The answer is No.

Just for a start, the example does not take into account "closest packing" of the spheres, nor variation in size of the gravels, or the occurrence of finer particles such as sand, silt and clay between the gravels, the effect of evaporation, and many other factors. These would all tend to reduce the minimum depth requirement. Perhaps 8 feet of unconsolidated gravel would be nearer the mark for minimum depth to support a normal plantation.
