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Root Deformation by Biodegradable Containers,

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Abstract

Experience with nursery stock grown in biodegradable containers suggests that on disturbed soil sites, at least, breakdown is not as rapid as is claimed, tree roots may not always be able to penetrate the containers. In order to avoid problems all containers should be removed at planting.

Root Deformation in Containers

1. It is well known that plants allowed to remain for long periods in containers develop encircling roots because lateral roots, which normally spread outwards, are deflected into the medium by the container walls. If the encircling roots are allowed to remain when trees are planted, they will continue to increase in diameter. The pressure exerted on the stem base by such roots may produce a weakness in the stem which could fracture in a strong wind. Alternatively there may be stability problems as the trees mature. Whether this deformity is a permanent feature or can be corrected by slashing vertically through the sides of the root ball has not been adequately researched. Although this note reports specific problems from only two sites it is clear from the literature that there are problems with the rooting of container grown material which is not uncommon and that many container types and sizes are involved.
2. Biodegradable containers have been developed and these are designed to be left on the undisturbed root ball at planting. Tree roots should be able to develop through these containers without risk of deformation.

Breakdown of Biodegradable Containers

3. Trees raised in biodegradable containers and then planted were examined on three separate sites and the results below indicate that even biodegradable containers should probably be removed at planting.
4. Beech (*Fagus sylvatica*) grown in containers and planted out 7 years previously were excavated on a private estate in Kent. The soil was undisturbed sandy loam over greensand. At planting the forester had removed the base of the pots. After 7 years large proportions of the pot material remained and rooting was invariably through the base of the container rather than out through the side walls.
5. Excavation of ash (*Fraxinus excelsior*), Scots pine (*Pinus sylvestris*), Field maple (*Acer campestre*), and hawthorn (*Crataegus* spp.) 2 years after planting on a recently constructed roadside verge at Wyllye, Wiltshire, revealed that in many cases the biodegradable containers had not broken down, and tree roots had not penetrated the pot wall. When exposed the root system

within the containers showed classic development of encircling roots. (There was shallow soil over chalk at this site and the area was covered by a dense *Festuca rubra* sward).

6. Plants from the same nursery batch as those planted at Wylde were used on the M42 in the West Midlands, but with the containers removed at planting. Subsequent excavation of a sample of these trees, which were growing on a sandy loam, showed no evidence of encircling roots.

Conclusions

7. On sites where the soil has been disturbed, for example by removal, stacking and respreading, or damaged by vehicle movements, it is likely that soil micro-organism populations will have been greatly reduced (O'Flanagan, *et al.* 1963, 1964). Drainage and soil structure will have been damaged so that the soil will be winter waterlogged and summer droughted. Under such conditions it is unlikely that any form of container which is designed to breakdown and disintegrate will do so quickly as it might in a normal soil. Since these conditions frequently apply to amenity planting sites it is recommended that all containers, and not just obviously impervious types, should be removed when planting container stock.

NOTE: The objective of planting trees is to establish young trees so that they will grow to healthy maturity. To achieve this it is important to ensure for all types of tree (bare root, container grown and ball and burlap) that the soil's physical conditions (i.e. water relations and aeration) are suitable for root activity at the time of planting. Failure to do so will result in delayed establishment, poor growth and precarious life.

Reference

O'Flanagan, N.C., Walker, G.J., Waller, W.M. and Murdoch, G. (1963, 1964). Changes taking place in top soil stored in heaps on open cast sites. *N.A.A.S. Quarterly Review* Nos. 61-66.

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