PROTEOID ROOTS

Proteoid roots are very special adaptations specific to the Proteaceae family and it is well worth understanding how they work so that you can make the most of these wonderful plants in your garden**.

With the exception of the rainforest genera in subtropical climates, most *Proteaceae* usually occur on infertile, sandy soils or low-nutrient gravels where there are deficiencies particularly in Phosphorus, but also in Nitrogen and Sulphur. These soils are usually acidic and well-drained and being impoverished, they do not promote tall tree growth. In fact, *Proteaceae* vegetation usually varies from low heath to tall shrubs/shrubland, scattered small trees or mallee. As a rule of thumb, the lower the vegetation, the greater the contribution of *Proteaceous* species to the flora, so that they invariably dominate scrub (0 to 8 metres) and heath (0 to 2 metres). In this type of vegetation, there is a high exposure of the plants to sunlight, soil heat, and winds.

There are many and varied plant adaptations to these infertile soils. An important adaptation of the *Proteaceae* family is the clumps of short roots called 'proteoid roots'. (Unlike many Australian native plants, the *Proteaceae* family does seem to have a symbiotic relationship with **mycorrhizal fungi** whereby the fungi makes nutrients more available to the plant.)

Proteoid roots are dense clusters of short lateral roots, which develop, only in the growing season, when the plant particularly needs nutrients, and usually in response to increased soil moisture. They have a huge surface area - each proteoid root is made up of hundreds, even thousands of rootlets. Each rootlet in turn is covered with hundreds of root hairs. The sheer volume of them means that they are very much more efficient at absorbing whatever nutrients are available. This efficiency is why they can 'overdose' so easily if high Phosphorus fertiliser is added to the soil around them.

Proteoid roots are found in the uppermost soil horizon of decomposing litter, where the nutrients are highest. You can see mat of proteoid roots in pots you buy from a nursery in spring. They are short lived, developing with the growth flush, and then withering, as they are no longer needed. They may also help protect soil from erosion after bushfire. You can look for the telltale mats protruding from bare burnt soil surface after fire.

In your garden, one of the safest and most beneficial additions to Proteaceous plants is a surface mulch of humus, leaf litter, peat and bark. This duplicates what happens in nature, providing a medium where both proteoid and normal roots can grow vigorously.

**For reasons not fully understood, Persoonia and a few other minor genus' within the family do NOT have proteoid roots

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