# Some Camellia Fallacies!

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Quelques erreurs sur les camélias!

Algunos conceptos erròneoos sobre las camelias

Alcune false nozioni sulle Camelie

Fehlannahmen über Kamelien

There is probably no other subject on which more is written and published, than on gardening and horticulture in general. The never ending stream of books shows no signs of diminishing and, since one rarely hears of publishers going broke, presumably they are all sold. A recent catalogue, issued by the R.H.S. Bookshop at Wisley, lists over 2,000 titles currently available. While it includes some serious historical, scientific, and technical works, many are better described as popular; to be read as entertainment, rather than as sources of reliable information. In researching literature on almost any subject, it quickly becomes apparent that errors and misquotations are repeated by subsequent authors until, eventually, they are accepted as established fact, and become increasingly difficult to refute. In this way something which may have been mere speculation on the part of the original writer, acquires the status of revealed truth! Unfortunately, popular camellia literature has plenty of examples of this.

In China and Japan camellias have been written about for centuries, and a great canon of specialist literature has emerged in the Western World; starting, it would seem, with 'A Monograph of the Genus Camellia', written by Samuel Curtis, and published in London in 1819. In almost all European, 19th century writing, cultural directions are concerned solely with greenhouse cultivation since, with the exception of the Atlantic coasts of Spain & Portugal, parts of Italy, and a few favoured areas such as Devon & Cornwall, conditions for camellia survival in Europe were considered marginal. The 20th century revival of interest has inspired an enormous quantity of specialist literature. The late Ralph S. Peer once wrote to me; 'Next to growing them, camellia lovers like reading about them'; - he was certainly right. In 1946, Dr. H. Harold Hume published his 'Camellias in America', which achieved a second edition in 1955 and, together with his shorter 'Camellias' (1951), has long been regarded as a standard, scholarly work on the subject.

Since 1946 there has been a continuous stream of camellia writing: the American Camellia Society has contributed no less than 41 volumes; other specialist societies have produced yearbooks, journals, and periodicals to an immense total, and many camellia books have appeared in Japan, China, U.S.A., Britain, Australia, New Zealand and more recently in France. As in the 19th century, much of the writing has been done by authors whose experience is confined to areas where conditions are marginal, and a great deal of attention is given to container cultivation. This is more or less essential in areas with alkaline soil and water supplies; where temperature ranges are extreme; and

where periods of very low humidity occur. It is well to understand that cultural directions given under these conditions, do not necessarily have universal application; and qualities attributed to various species and cultivars, may be no more than the plants' reaction to the marginal conditions, in which they may be struggling to survive.

Throughout popular literature, certainly since 1959, one finds the constantly repeated statement that camellias are surface rooting plants, and all the cultural directions given are based on this quite incorrect assumption. Here are some of the things which are said:

'The roots of the camellia are fine, fibrous, and densely crowded; they are neither adapted to, nor is there any need for them to grow far from the plant and deep into the subsoil. For like rhododendrons ... camellias are among those plants which form a rootball, a dense and stable mass of top soil, held together by the system of fibrous roots; this makes it easy to transplant them at any age ...'

'Camellia roots probe for yards just below the soil surface, seeking out food, and because the roots are close to the surface, they are vulnerable to all sorts of abuse from spades, forks, hoes, fertiliser, and weedkiller. Spare a thought for your camellia roots.'

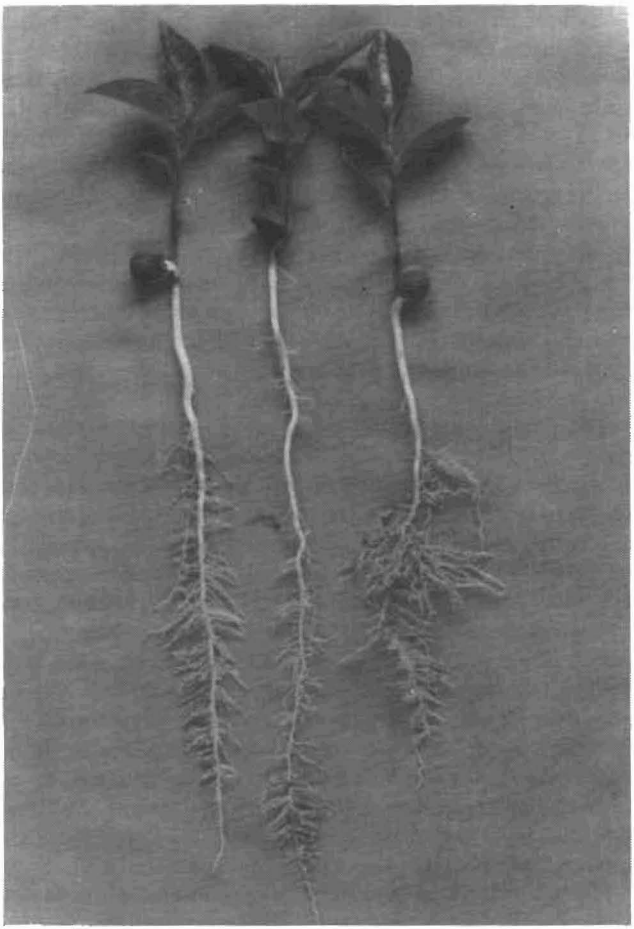
'Deeper tree roots are rarely a problem, for camellias are essentially surface rooters. They do, however, resent undue competition from heavy plantings of ground cover.'

'... they have developed a wide network of fibrous, surface roots, which gather moisture and nourishment almost entirely from the airy layers of forest mold which blanket them. That is why camellias are easily killed by deep planting ... Exposed roots can always be covered with a natural mulch of leaves, but deeply buried roots must always be lifted and reset, before they suffocate.'

The late Dr. B. W. Doak, a soil scientist of international reputation, and one of New Zealand's earlier, successful camellia hybridists, wrote the following in the New Zealand Camellia Bulletin Vol. I., No. 6., dated July 1960:

A fallacy that has gained considerable credence in recent years, is that camellias are by nature surface rooters. Some writers have even gone so far as to say that camellias do not form taproots, even when grown from seed. This is quite untrue. Even with cutting grown plants, heavy secondary taproots are formed, provided that drainage is good, and the subsoil is not virtually impenetrable by roots. Even in quite heavy, clay subsoils, camellia roots will go down to a considerable depth, when drainage conditions permit.

An unqualified statement that 'camellias are surface rooters' is simply not true, and there is no resemblance whatever between camellia and rhododendron root systems, as anyone who has grown seedlings of both genera will be aware. Camellia seedlings, of all species, put down long taproots, as shown in illustration on page 63. Eric Bodley grew these reticulata seedlings for us in sand, so that the roots could be extracted without damage. They were photographed 4 months after germination, when the height of the top growth averaged 8 cms., and the taproots (left to right) were 30, 34 & 28 cms. respectively. Seedlings of all species have similar root systems. When germinating camellia seeds, it is customary to pinch off the tip of the radicle, or taproot to encourage



*Camellia taproots*
*Photo: T. E. Bodley*

a branched root system, and this is usually successful, if only to a limited degree. In our experience, however, once the seedlings are in the open ground, they quickly develop strong, secondary taproots which may penetrate to a considerable distance. Cutting grown plants do the same, as Dr. Doak claimed.

Some general comment on root systems is, perhaps, advisable. They must be able to provide adequate moisture and nutrients, to enable the leaves to carry out their vital function of photosynthesis; they must provide a firm anchorage in the ground, against very considerable wind pressures; and their growth must keep pace with the developing size of the plants they support. Some genera may have highly specialised root systems, such as do the epiphytes which occur in rainforests, but those with a wide range of geographic distribution, need to be able to adapt to the almost infinite variety of soil and subsoil conditions in which they may find themselves. Unlike deciduous trees, which have long dormant periods, the roots of evergreen plants have to provide moisture for leaf transpiration throughout the year, and this imposes severe restrictions on what can be done when moving them.

Some trees and shrubs can adapt themselves so quickly to exploit a casual advantage which offers itself, that one could be forgiven for thinking that they are capable of making informed decisions! In 1965 we repotted some dozen or so camellias into 1 gallon cans, and placed them in a shadehouse which had concrete base walls, and some 10-12 cm of fine gravel on the floor. Two months later, when attempting to move them, they were found firmly fixed to the floor. Camellias in containers which are left standing on the ground, frequently send tap roots down into the soil below, and we assumed that this had happened, even though it was surprising that it had occurred so quickly. Investigation showed that the reverse was the case, and the containers had been invaded from below. About 15 metres away, there was an *Acer saccharinum*: roots from it had penetrated beneath the concrete footings of the shadehouse walls, and homed into the drainage holes of the containers, coming up through the gravel layer on the way. This happened during a prolonged dry spell, when the overhead sprinklers in the shadehouse had provided an area which had ample moisture.

There is some scientific evidence which demonstrates that camellia seedlings are genetically programmed to penetrate deeply into the earth, since they are positively geotropic. (The Shorter Oxford Dictionary describes positive geotropism, as the tendency of some roots to grow towards the centre of the earth.) On germination, the emerging radicle, or taproot, travels vertically downwards (see photo, page 63), and we have had a quite remarkable example of the extraordinary strength of this tendency. A number of reticulata seeds had been layered in wet sphagnum moss in a large glass jar, which was then placed in the family hot water cupboard, and left to germinate. After a period of several weeks, the jar was found to have fallen on its side. The seeds had germinated, the radicles had grown vertically downwards, and travelled some 8-10 cm before the jar fell over. At this point, all the growing tips turned sharply through 90°, and continued their journey towards the centre of the earth! Somewhat startled by this phenomenon, we restored the jar to its upright position, and within a few days, the growing tips again turned through 90°, to resume their original direction. We have repeated this experimentally on a number of occasions, and with different camellia species - the result is always the same.

Plants which are deeply rooted have a considerable advantage over those with shallow roots. The latter can suffer rapid changes of temperature: in extreme cold conditions, roots can be frozen with fatal effects, and in dry periods, they are the first to suffer from drought.

It is interesting to note that many writers comment on the fact that camellias appear to be drought resistant - the reason is obvious - they have deep roots which are capable of fetching up the necessary moisture from below. Our experience shows that, during prolonged dry periods, when rhododendrons, and other shrubs, obviously need watering, our established camellias continue to make secondary new growth, which they certainly could not do, if they were short of moisture.

And how deeply can camellia roots penetrate into the ground? The answer is, of course, that this depends entirely on the situation. Camellia roots are highly adaptable: in containers, they quickly fill the available space with a dense mass of roots; and in situations where the water table is high, or where the soil overlays rock or other impenetrable material, roots may travel horizontally for considerable distances. Roots can only take up nutrients in solution, and it follows that free drainage must result in a constant, downward leaching of plant food. The extent to which this occurs, depends on

the depth and porosity of the soil, and the amount and distribution of the rainfall. In many parts of New Zealand, the soil is of volcanic origin; much of it pumice, which provides sharp drainage down for many metres. Our experience in these conditions, is that all camellias, which have been in the open ground for 4 or more years, will have formed heavy, secondary taproots, and will have no feeding roots anywhere near the surface. Recently, our local District Council, in its wisdom, decided to run a main sewage feeder line across our garden. The trench was 2.2 metres deep, and passed within a metre of the trunk of a large camellia, which had been in position for 17 years. Camellia roots were clearly visible at that depth.

Whether or not camellias are basically surface or deep rooting, is not merely of academic interest, since, in much popular literature, cultural directions are based on the former assumption, and may be quite incorrect in many situations. So far from being 'easy to move at any age', attempts to move established plants may result in the loss of most, if not all, feeding roots. It is then absolutely essential that the plant be pruned back to compensate for the missing roots. In extreme cases, this may involve cutting back almost to ground level. Fortunately, camellias are blessed with an extraordinary will to live, and survive even such severe treatment.

Popular writers warn us against surface cultivation, ground cover plants, and surface rooting trees, such as silver birches, maples, and magnolias. In areas where soil and subsoil conditions compel camellias to keep their roots close to the surface, these warnings may have some validity - otherwise they do not. We grow established camellias very successfully, in close association with all three of the trees mentioned, and ground cover is used as a matter of course. In many recent books one finds the statement, usually attributed to an anonymous expert, that more camellias die from deep planting, than from any other cause. The reason given is that that the roots will suffocate, but nowhere is one told how deep is deep, or in what soil type this comment is valid. It seems logical that, when transplanting, original soil levels should be maintained, and we always do this, but the camellia roots at the bottom of our 2.2 metre trench showed no signs of suffocation, and were supporting a fine, prosperous camellia! The recent English edition of 'The Yunnan Camellias of China' goes into considerable detail about cultivation, and not only do the Chinese omit any reference to camellias being 'surface rooters', they recommend that planting holes should be prepared to a depth of 1 metre.

Another camellia fallacy which, undoubtedly, owes its origin to the behaviour of plants struggling to exist, is the often repeated warning about the risks of pruning *Camellia reticulata*. One is told that reticulatas will not grow away again if they are pruned back beyond a developed growth bud; some writers even assert that the plant will die if heavily pruned. This is entirely contrary to our experience in an area where reticulatas thrive. When plants outgrow their allotted space, or begin to deprive others of light, we customarily cut them back to a bare framework: leaving no leaves, and no growth buds. This is done before new growth begins to appear in the early Spring, and it may be necessary to do it while the plant is still in flower. Adventitious buds appear within a few weeks, and growth from them, throughout the season, is usually extremely vigorous. We have recorded single shoots which have grown over 120 cms in a single season, and developed growth buds in every leaf axil.

The following season, again just before growth commences, surplus shoots are removed, to avoid overcrowding, and the very long ones shortened back to a developed growth bud, pointing in the right direction. Some flower buds occur on the first season's