

# USE OF LIME ON CAMELLIAS & AZALEAS

by J. Fowler – Western Australia



Every year it seems gardening writers say never put camellias and azaleas in concrete tubs and never place these plants near lime. This article is to basically disagree with these points of view.

## Concrete pots

Plants live happily in concrete tubs for the reason that once the concrete sets, the lime is locked in and does not escape very quickly.

Don Aspinall stated 'Concrete containers are sometimes questioned on the grounds that camellias are acid soil plants and the calcium in the pot will cause lime-induced chlorosis. This has not been my experience; either the calcium in the pot does not leach out fast enough to cause a problem or camellias are pretty tolerant of calcium'. I am sure he is right on both points.

Concrete tubs are most likely better than terracotta ones as they are stronger, do not breathe and so retain the water around the rootball for a longer period of time. This is an advantage in hot summer weather conditions. Terracotta pots can be sealed to help keep the moisture in them.

No matter what type of container is used you must ensure it has an adequate number of drainage holes in it, If the container is placed on an impervious surface it must be supported on shallow blocks so that excess water can drain from its base.

Professor Waterhouse was one of the pioneers in growing and promoting camellias and azaleas in Australia. At his house and gardens, called 'Eryldene', in Sydney, there are many camellias and azaleas that have thrived for many years in concrete pots, scattered throughout the property.

At Camellia Grove Nursery, in Sydney (especially during the 1970s and 1980s), there were lots of camellia and azalea plants growing happily in concrete tubs. Some of these plants were 15 years old, some were newly potted up plants and all grew and flowered the same as the plants in the ground. Each year hundreds of concrete pots are sold at this nursery to the public. The person who made these tubs had been supplying them for about 30 years. The tubs were not treated or lined with any chemicals and came unpainted. If concrete tubs are not good for camellias and azaleas, people would not continue to buy them year after year,

Don Burke has done a number of experiments with camellias and azaleas in concrete tubs over the years and could not find any faults with the plants. Don stated (1989) 'In fact most azalea potting mixes contain added lime'.

In conclusion, follow normal cultural practices with your azaleas and camellias in concrete tubs and they will thrive.

## Lime (calcium)

Plant cell walls are highly dependent upon calcium and without a proper supply the cells collapse and so does the plant. There is a layer of calcium pectate which surrounds the root hairs. This is vital to the production of and the repair of the plant's roots.

Calcium is not very mobile in plants and when deficient, the new growth is affected first. Deficiency symptoms occur in very acidic soils and include death of terminal buds, abnormally dark green foliage, premature dropping of buds and flowers, and weakened stems.

Ernest Pieri says lime is used in soils for three reasons. One, is to correct acidity in the soil. Two, is to improve the physical condition of the soil by granulating the fine soil particles and gypsum is used to do this. The third reason is to stimulate activity of microorganisms, thus improving the biological condition of the soil. Lime plays an important role in the availability of other elements, especially acid soils and a regular supply of lime is beneficial to camellias and azaleas.



It is not possible to mention lime without talking about pH levels as the two are linked together. The correct pH levels for azaleas and camellias is between 5.5 and 6.5 and should not go above 7.0 when the soil becomes alkaline.

Dr E. C. Snook states, 'If you are growing plants in containers, remember to check the pH level from time to time for most potting mixes will become more acidic as time goes on. They will be more acidic at the bottom of the pot than at the top of the pot.' So always take pH readings at the same level in the pot or the ground to get accurate readings over different periods of time. The continual use of chemical fertilisers also makes the soil more acidic and water repellent over time.

I know that adding large amounts of agricultural lime ( $\text{CaCO}_3$ ) and superphosphate to the potting mix, to raise the pH to an acceptable level, has had no detrimental effect on camellias and azaleas. Using agricultural lime at a rate of 100 g per square metre should raise the pH 0.5 of a point.

The Lancaster family in Sussex, England were having trouble getting their rhododendrons and magnolia tree to flower. The soil was sandy loam with a pH of 5.5 to 6.5 and was notably lacking in organic matter. One rhododendron was moved to a bed treated with mushroom compost, and the second rhododendron was moved to a bed once under a heap of bricks and mortar, (of the old fashioned type containing lime). The following year both plants flowered profusely while the rhododendrons that were not moved did not flower at all. The mushroom compost contained tests of the bricks and mortar area gave a calcium content of 2.9% and a pH level of 6.5 - 7.0. From this it has been shown that rhododendrons and camellias, which a similar root system, like a high level of calcium in the soil.

Lancaster's magnolia tree which had hardly flowered only grown a few centimetres in ten years. 'A trench exposing the growing root tips was dug around the plant and filled with a mixture of soil, mushroom compost and crushed limestone. The change was dramatic: within a few weeks the leaves had changed a sickly yellow to a pale green. The following year the camellia flowered and grew well and has done so ever since.'

The Lancaster's double flowered form of *Rhododendron indicum* one that has reacted unfavourably to lime treatment. The foliage turned yellow and growth ceased. This plant is the double flowered low growing azalea.

Camellia Grove Nursery in Sydney, (1980s), the double lowering azaleas grew best in concrete tubs and none were grown in the ground. This species is definitely harder to grow than other *Rhododendron* species. They are fed on a monthly basis with Aquasol, as occurred with all azaleas at the nursery, flowered profusely and put on lush growth each year.

I know that some of the tall-growing single and karume azalea stock plants in the ground at this nursery were unaffected by having some dolomite lime applied to them, in the middle of summer, one year. So with azaleas (and all plants), it is safer to use dolomite to increase calcium levels than other forms of lime.

There could be other *Rhododendron* species that do not like lime added to the soil. However, all the other rhododendrons the Lancasters treated with lime in one way or another, have either been unaffected or have responded with improved flowering and growth.

The following trial was done by Hanger, Bjarnson and Osborn, of the Plant Research Institute, Victoria, Australia. Containergrown plants of *Rhododendron* hybrid, 'Sir Robert Peel' were used. The plants were divided into four groups: one group was the control; the other three received limestone ( $\text{CaCO}_3$ ) lime ( $\text{Ca(OH)}_2$ ) and gypsum ( $\text{CaSO}_4$ ) respectively.

The tests were conducted over six growing seasons. For the first four years the doses were small, increasing substantially during the last two, raising the pH of the lime treated soil to more than 7. The only adverse reaction was chlorosis in the plants treated with gypsum and this coincided with an increase in total dissolved solids. The episode was temporary and new leaves were not affected. The general conclusion was that calcium (lime) is not toxic to rhododendrons unless there is a gross disturbance of the general nutrition, for instance by increasing the soil pH.

So to answer the question do rhododendrons hate lime, the answer is no, providing the pH level does not go above seven. So far I have not come across a study using lime on camellias, but predict results as those of rhododendrons.

Camellias have thicker and stronger roots than rhododendrons and therefore tolerate higher levels of lime (calcium).

I would not recommend the use of fresh chicken manure on camellias and azaleas but Dynamic Lifter is fine to use, as it is a slow release formulation. The rate to use is a handful for a 500 mm container and this lasts for three months.

The best camellias Terry Pierson saw when he lived in England, were at the Wisley Royal Horticultural Society Gardens. The soil has an alkaline pH and the area is known as 'Bone Hill' not because of 'bones' but because the ground is made of decomposed marl. This gives the appearance of lots of bone fragments. The definition of marl in the Encyclopedic World Dictionary is, 'A soil or earthy deposit consisting of clay and calcium carbonate used esp. as a fertiliser. Other names for calcium carbonate are agricultural lime and limestone.'

Later, looking at pictures of natural stands of wild camellias in China (slides of *C. saluenensis* by Bob Cherry), and the hillsides of species rhododendrons, in the publications, *Rhododendrons of China* Volumes I and 11, Terry noticed that the country is virtually hillsides of bare limestone rock with small thin pockets of poor soil. Terry says this gives rise to the deduction that it is not calcium that camellias totally abhor, but rather an excess of free soluble calcium that they cannot take, and this is what we have when garden or slaked lime is used.

Terry Pierson (1998) over many years, has biannually, as a fertilising regime, been giving dolomite, together with Mood and bone, to the following calcifuges: camellias, magnolias, rhododendrons, kalmia, daphne and gardenia, with as little as a teaspoon and up to a handful depending on the size of the plant. Growth of the plants has been vigorous, colour of the foliage good, they have been free flowering, and are thriving.

## Dolomite

Clyde Copeland states, "Agricultural orgarden lime is about 80% calcium carbonate. Dolomite is about 45% magnesium carbonate and 50% calcium carbonate. Where plants are grown in containers, a level teaspoon of dolomite is used in the so-called three gallon (7.5 litre) container every spring."



Dr E.C. Snooks states "Dolomite is a mixture of magnesium and calcium carbonates. The calcium portion leaches out of the soil first. This allows the magnesium concentration to rise and this turns right around and reduces the excess of calcium that may exist. Overliming of the soil is not likely to occur when dolomite is used."

In the ACRS, NSW Foundation Branch Newsletter, September 1981, the following was noted after applying dolomite to camellias on a monthly basis. There was better growth, larger and greener leaves and an increase in the number and size of flowers on the plants.

Gerald Smith in an article 'Container Mix Additives', recommends the use of 6oz or 75g dolomite be added per cubic foot of mix, in addition to other additives, as being beneficial to camellia plants.

The Camellia Journal, November 1984, says, 'Lime once thought to be anathema to camellia culture is now recommended as a friend. Dolomite lime is the only recommended form and provides both calcium and magnesium. Light applications annually or as indicated by a check of the pH are recommended in areas of acidic soil.'

I know that putting dolomite, at the rate of a handful for each 300 mm of height on an annual basis in summer, on camellias in the ground works well. On some large old camellias, 15 handfuls of dolomite were applied with no detrimental effects. Make sure you scatter it around the drip zone and water it in well straightaway.

Dolomite is definitely beneficial to your camellias but as to how often depends on your soil type, climate, what fertilisers you use and pH levels. Applying dolomite in spring will keep the leaves greener in summer and applying it in Autumn will improve the colour and quality of the flowers.

Some say apply it annually, some say once a month, so experiment and find out what works best for your camellia and azalea plants. As mentioned earlier do not use lime on the double-flowering Rhododendron (*Azalea indicum*) species.

### Webmaster's Footnote

In the past, I have had difficulty with small leaved hybrids such as Spring Festival and Alpen Glo annually dropping their foliage. I have rectified this phenomenon by applying an annual dressing of Dolomite after the flowering cycle with no detrimental affect on my plants, or flowers.

#### References

Lancaster, John (1991). Rhododendrons Hate Lime. 'The Garden'. Journal of the Royal Horticultural Society, November 1981.

Pierson, T.E. (1998). Horticultural Calcifuges. 'Camellia News', March 1998.

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