In his retirement, David Maher is a gardening writer, broadcaster, judge and adviser from Tamworth in N.S.W. and an active member of the Tamworth Cottage Gardeners Inc. and the Garden Clubs of Australia.

From 2004-'09, he was the guest gardening presenter at the Rotary Club of Tamworth's Annual Garden Expo. He delivers a weekly gardening radio programme on 2 UFM 88.9 and is the ABC's New England North-West gardening presenter on every third Saturday.

Presently, he also prepares the seasonal tips for the Garden Club's of Australia's web site and for the same organization's quarterly magazine and he writes the weekly column for the Kootingal newspaper.

Recently, David's garden was featured in the Northern Daily Leader.

Some readers will remember him as the gardening writer for many years for the THE TRADING POST. In 2004, he was awarded the Eleanor McCleod Award for services to gardening by the Garden Clubs of Australia Inc.

USES OF ZEOLITE FOR GARDENING PURPOSES BASED ON DAVID MAHER'S PERSONAL EXPERIENCES

Natural zeolite is a brittle, naturally occurring, inorganic volcanic rock that is comprised of tiny, hollow crystals. Hence, it has an open internal structure and can hold moisture in its honeycomb crystal cavities. Its active constituent is the inorganic mineral, zeolite; its mineral composition includes calcium, magnesium and potassium in small quantities.

The deposits of natural zeolite on the North West Slopes of N.S.W. at Quirindi and Werris Creek were formed about 300 million years ago in consequence of a series of volcanic eruptions along the nearby Liverpool Ranges. These deposits occur in a seam that stretches from the south coast of N.S.W. to Emerald in northern Queensland. The deposit at Quirindi occurs to the east of the town in the Castle Rock Mountain area.

Zeolite rock is crushed and refined into several sizes. It is available commercially in powder form, in crystals and in mulch-sized chips. The latter is available in coarse chips of varying sizes.

In gardening, it is a very valuable **soil conditioner** because it has the capacity to absorb odours, water and chemical nutrients from the soil and from the air, and to store the nutrients and the water in plants' root zones. Chemical nutrients such as nitrogen and potassium are stored within the particles, holding them in the soil, and ensuring their availability in the root zone of the soil. Zeolite is hard and does not degrade readily. Hence, it remains within the soil for many years. A further advantage is that the particles do not prevent the capacity of the soil to drain.

Research shows that zeolite products are marginally alkaline – a pH of 7.6 has been documented in research reports - but my soil tests with a C.S.I.R.O.testing kit show that it is marginally acidic. Variations in pH readings are attributable, in my opinion, to the differences in the mix of parent materials and of the volcanic ash originating from the volcano. These differences are manifested, for example, in the slight variations in the colour of the zeolite deposits. My experiences show that it is safe to use on acid loving plants such as azaleas and camellias. Camellia sasanquas, in particular, seem to benefit from its presence in their root zones. (See images attached of a twig of Camellia sasanqua 'Weroona' and the potted Camellia sasanqua 'Hiryu' that had a liberal amount of zeolite powder placed in their root zones prior to planting.)

ZEOLITE PRODUCTS AND THEIR APPLICATION

PRODUCT	PRODUCT SIZES	EXAMPLES OF USES
high grade powder and sand-sized crystals	Powder	Composting Coating of lawns at the time fertilizer is added Vegetable production Odour reduction over fresh animal manure
Mulch – small	0.25 to 2.0 m.m.	Vegetable production

Grit		Orchid mixes Mulching of potted plants
Medium Coarse Chips	2.0 to 4 mms	Orchid mixes Mulching of potted plants
Mulch- Large Pebble-sized chips	6 to 12.00 mms	Drainage material in the base of pots Pathways Orchid mixes

COMPOST

I use the powder and/or crystals at the rate of 250 grams per square metre to assist with the decomposition of the raw materials, to absorb odours from the atmosphere and to improve nutrient and moisture storage. If fresh manure is used in the compost heap, I cap the heap with either powder or crystals. If the manure is particularly fresh and the odour offensive, I increase the rate of capping. When turning the compost, I usually add more powder, again to reduce any odour release.

When dumping heaps of fresh horse manure on garden beds, I top it with a generous capping of zeolite powder.

A mask is used when handling the powder.

USES FOR GARDENING PURPOSES

CYMBIDIUM ORCHIDS

I use a self-made potting mix recipe that contains half a kilo of the smallest grit that is 1 m.m. to 2.0 size to every 2 1/2 kgs of orchid potting mix.

MULCH

I use the small mulching chips or grit as mulch around potted camellias, cymbidium orchids, bulbs and a range of garden plants including succulents. Aesthetically, it has a pleasing look with its red colour, but more importantly it conserves the moisture and minimizes the splashing of fungal spores onto foliage from the bare soil and hence it reduces the incidence of fungal conditions.

PROPAGATION

I now use equal parts of the small chips or grit and peat moss when propagating tip cuttings. Previously, I used sand instead of the grit.

POTTING MIXES FOR CONTAINERS INCLUDING HANGING BASKETS

Research has shown that zeolite products assist nutrient retention in potting mixes.

I recommend the addition of the small grit or the crystals into potting mixes that do not contain zeolite. This assists drainage and improves and extends the water-holding capacity of the mix. It also extends the life of the potting mixes by storing plant nutrients.

As a general rule, mix one-third of the crystals into two-thirds of the potting mixes which do not have the product pre-added. For small containers, I use 25 grams of the crystals to 1 litre of potting mix.

VEGETABLES

I use the high-grade powder or the grit at the rate of 250 grams per square metre. Splendid results have been achieved especially with bean production because of the extended storage of plant nutrients in the soil. The crystals can be banded into the seed or plant rows or drills with the fertilizer.

PLANTING OF BULBS

When planting bulbs, I place the chips under the bulbs to minimize any chance of the bulb becoming too moist and rotting. The chips provide a buffer zone between the soil and the bulb. In my garden, this practice has eliminated bulb rot completely.

LAWNS
The crystals have been researched extensively for turf applications. Trials show a significant improvement in the root development of turf.
New lawns: Spread 2 cms of the crystals where the turf is to be laid and mix into the top 10 cms of the soil before laying the turf. It improves the wettability of the soil, assists with the storage of moisture and plant nutrients.
Existing Lawns: After aerating a lawn, apply crystals in the aerated section along with the chosen lawn fertilizer.

THE PLANTING OF SHRUBS AND TREES
Mix some crystals in with the gypsum and place in the bottom of the hole. In addition, mix the crystals into the soil used as back fill so that its water holding capacity and nutrient retention will be enhanced. Medium sized chips can also be used as mulch for shrubs and trees.

GARDEN BEDS USED FOR PERENNIALS AND ANNUALS
Mix crystals into the top 10 to 15 cms of the soil simultaneously with any organic manure that is applied. Soil structure will be improved along with water holding capacity and nutrient storage.

STABILIZING A CHRISTMAS TREE
If using a limb from a pine tree or from an Albany Woolly Bush for a Christmas tree, place the limb in a container filled with any one of the zeolite products. Saturate with water. The absorbent nature of the zeolite will ensure that the tree will remain green and not discard its pine needles for the duration of Festive Season and for at least three weeks afterwards.

In summary, zeolite products:

- Reduce the loss of chemical nutrients, e.g. nitrogen, from the soil;
- Retain chemical nutrients for use by plants in times of need;
- Improve long term soil quality and moisture levels for plants;
- Improve fertilizer efficiency;
- Result in better plant growth and yields;
- Improve the yields available from plants;
- Economize on the use of resources including water ; and
- Reduce offensive odours in composting and hence is environmentally friendly.

David Maher,
Tamworth, N.S.W.
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Sources of Supply: Armidale: Purkiss' Nursery; Gunnedah: Gordon Barry & Co. Pty Ltd. 12 Chandos St., Gunnedah; Quirindi: Quirindi Grain and Produce and Castle Mountain Zeolites, Station St., Quirindi; Tamworth: Tamworth Landscaping Supplies for Castle Mountain Zeolites grit in the size 1-3 mm; and The Tamworth Co-op for Red Roc Zeolite products.
Selected products only are available from each retailer.