



## Benefits of CMZ in Potting Mixes

### Introduction

In the latter part of 2016 Gordon Heath, proprietor of CMZ, & myself met with & corresponded with professional pot plant growers in an attempt to understand why CMZ media of a particular size gave a disproportionate benefit to the growth of potted plants including but not limited to seedlings, succulents & orchids.

There is substantial evidence both from observations & digital images that document enhanced root & plant growth in the presence of granular CMZ media even down to the level of 10% w/w of total media.

This has made me rethink my schema of features & benefits of CMZ granular media in potting mixes. Nature is a hard task master & anything therein which has an apparent relationship to pure & applied mathematics (ie physics) gives me a clue that there is an underlying "truth".

In this case there is a relationship of particle sizes of media in potting mixes that approximate the natural or Napierian logarithm  $e=2.7(181818\dots)$  in optimal particle size in mms.

Functionalities which appear to be related to this particle size include:

Internal capillary? movement of liquid water & more surprisingly cationic nutrients; &, AFP, air filled porosity, (which is also related to the blocky shape of the CMZ granules.)

It is also of specific interest that the liquid wetter from New Technology Products P/L also affects liquid water binding & release as well as the provision & delivery of soluble mineral salts. This product, which has recurring domains that are hydrophobic & hydrophilic, works best when there is a mix of hydrophilic media like CMZ & hydrophobic inclusion eg composted pine bark.

Thanks go to Neville Schaefer & Mal Morgan for detailed observations, digital images & helpful lengthy discussions.

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NB these are not in any priority order:

1. Moisture retention & subsequent release to plant root hairs.
2. Less water required, & more tolerance to dehydration.
3. Binds hydrated cations in reverse order to particle size, which cannot be washed out.
4. Releases hydrated cations in the same order, but heavy metal ions bound irreversibly.
5. Less nutrient required, & reduced costs in production.
6. Homes microbes inside structure.
7. Takes up & retains gases of low molecular mass.
8. Stimulates fungal growth & proliferation. (Fungi are obligate aerobes.)
9. Does not break down over time due to inherent hardness. (mho's index>5)
10. "Blocky" 3 dimensional shapes of CMZ granules leave air voids.
11. "Blocky" 3 dimensional shapes of CMZ granules hold up smaller organic particles.
12. Binds positively charged organic molecules of low molecular mass
13. Heat is captured & retained in the cold due to CMZ's high capacity for heat retention.
14. Evaporative cooling can be affected in the cold by addition of a high surface area silica, like perlite on the surface of the pot, with consistent watering.
15. Retains cationic nutrients
16. Increases CEC in the mix.
17. Can be loaded with cationic nutrients, including soluble Calcium as nitrate.
18. Works well (synergistically?) with wetter with recurring hydrophilic & hydrophobic domains.
19. Works well (synergistically?) with other components of the same particle size.
20. Consistent quality of the mineral deposit assures minimal batch to batch variation.
21. High quality mineral deposit ensures functional performance in mixes.
22. Unique processing assures maximal functionality.

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