

Nutritional considerations when using new substrates for container grown plants

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Plant nutrient requirements

- We know there are at least 16 essential elements:
 - C,H,O – Air and water- assimilated via photosynthesis
 - N, P, K – Fertilisers and ‘N’ fixation in some plants from the air
 - Ca, Mg – water, limestone in peat mixes, little in many fertilisers
 - B, Cu, Fe, Mn, Mo, Zn,- Raw materials and fertilisers,
 - Na, Cl, - Raw materials and fertilisers
- In producing peat-based mixes, the provision of the elements is by the addition of fertilisers and liming agents. (**Established over 60 years of use**)

Nutrient availability in non-peat based mixes

- K, Na, & Cl are often at higher than expected levels, either from the fresh organic material and or the source area of the raw material.
- Calcium and Magnesium – not coming from liming agents,
 - Mains and Borehole water, if very alkaline can help, acidification with Nitric acid will make available the Ca & Mg and also give extra Nitrate N
 - Rainwater storage, very low in both elements.
 - Alternative sources needed – Gypsum (CaSO_4), Epsom salts (MgSO_4) and some new compound fertilisers.
- Trace elements: Generally available from the raw materials- extra Fe may be needed.

Fertiliser selection and needs

- We require higher available 'N' sources
 - Nitrate 'N' most easily assimilated by plants,
 - Ammonium 'N' good to bring the pH down in the substrate,
 - Urea 'N' slow and needs mineralisation processes to convert to $\text{NH}_4 - \text{N}$ and $\text{NO}_3 - \text{N}$, before the plants can uptake,
- Where practical liquid feeding with available 'N' should be applied at low levels from within 2 weeks of potting up,
 - This will help to deal with Nitrogen draw down effects- and can always be withdrawn later.

Fertilisers contd:

- Many of the new raw materials naturally have higher levels of Potassium (K):
 - So, we need to look for supplementary fertilisers which are low in K,
 - There are specific base fertilisers and water-soluble fertilisers which meet these requirements,

Calcium and Magnesium

- It is essential to look at the supply of the two elements Ca & Mg,
- Some WS fertilisers have extra Mg , but few supply Ca, mainly to avoid ppt in stock tanks,
- There are specific WS fertilisers which can be used
 - Calcium can be supplied via Calcium Nitrate and similarly Magnesium can be supplied via Magnesium Nitrate. These fertilisers are used in hydroponics.
 - Note Calcium rich fertilisers cannot be mixed with Phosphate or Sulphate containing fertilisers in stock tanks, it leads to precipitation.

Examples of fertilisers that may be used:

- Yara Kristalon 'Lilac' 20-8-8 +te's
- Osmocote Cal-Mag (CRF 3-4m) 10-0-0 17CaO, 5MgO
 - (This may temporarily not be available- issues in production)
- Universol 'Green' 23-6-10 + 2MgO
- Cal Max Ultra 22CaO 3MgO 14.5 N

Important considerations:

- Establish the ingredients in the new substrate mix you are using:
 - -([RSS website may help](#))
- Select supplementary fertilisers with Higher N- Low K
- Start feeding within two weeks of potting,
- Monitor the substrate regularly for nutrient levels,

- Attention to detail is the key to success.

Any Questions?