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Chasing consistent disease suppression in potting media

By Dr Peter Fahy¹

Peter Fahy and his team aimed to develop standards to assist the production, formulation and use of mixes that maintain disease suppression over time. The most consistent mixes performed well in a 12 month trial in different climate zones.

They were looking for disease suppression against *Pythium* and *Rhizoctonia* diseases in surveys of potting mixes and potting mix components over time and at a range of composters and nurseries. This helped them to define more closely the best standards to maintain consistent disease suppression. Presence and duration of suppression varied with mix components and formulations. Some of the major factors necessary to maintain consistent suppression were determined.

How well tuned is your viola?

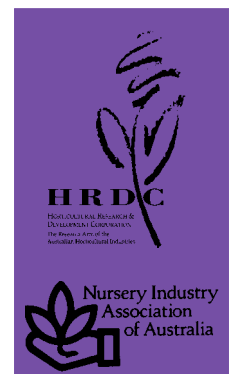
Lets consider disease suppression as a well tuned orchestra. Everyone has to play in tune and in time. Maintaining disease suppression requires keeping our physical, chemical and biological components in tune over time. This fine tuning (or process control) applies

both to the composting of components as well as the formulation of media and **most importantly the use or abuse of the mix during growing.**

Back to our orchestra and keeping in balance. Playing the tune 'Pythium suppression' is different from the tune 'Rhizoctonia suppression'. We need to play two tunes in harmony! Pythium suppression (as Professor Harry Hoitink has described) is a general suppression associated with microbial activity. Not too much and not too little. It has a broad action on a number of soil borne diseases in which competition for space and nutrients plays a role: a mini version of a jungle. *Rhizoctonia* and similar fungi thrive in fresh organic matter and only when cellulose is in short supply do the attacking control micro organisms work: a mini version of a microbial semi desert.

Silk purse or sow's ear - let's know our components

We cannot make all components suppressive to both diseases. For example we found light sphagnum peat moss was suppressive to *Pythium* for up to three months but never suppressive to *Rhizoctonia*. In contrast Coir was suppressive to both diseases for six months. Composted hardwood sawdusts had the potential to be suppressive to both diseases. Composted pine bark fines being suppressive to *Pythium* for six months, but showing a lower level of suppression to *Rhizoctonia*. Sunpeat performed





Commercial composting processes include regular mixing

well against both diseases over the nine month test period. Australian sedge peat performed well against Rhizoctonia over the 9 month trial: became suppressive and maintained suppression to Pythium after an initial non suppression.

Keeping the orchestra in tune

When components were mixed and formulated in potting media they did not always endow their properties to the mix. The combinations were not always in harmony! We surveyed fifteen mixes from nurseries for their performance over up to 12 months and then selected the most consistent mixes.

Surprisingly they were very different formulations. Major components being composted pine bark fractions, none or a low level of composted hardwood sawdust and all with a mix of sand fractions. The most unusual mix was 67% pine sawdust composted for 12 months, plus sand fractions. These composts were duplicated for us by the nurseries or compost suppliers and subjected to a 12 month trial in different climatic zones. They all performed well.

Improving our standards

Analysis of all our potting mix data revealed some parameters that could be improved and here they are.

- Rhizoctonia suppression was often lost at EC levels over 1.0 mScm/cm
- pH below 5.5 generally enhanced Rhizoctonia suppression and high pH repeatedly destroyed suppression.
- The nitrogen drawdown index should have an upper limit of 1.5 and a lower limit of 0.6. Outside this range Pythium suppression was generally lost.
- The best performing media paid close attention to air filled porosity - using graded sand mixes and often bark fractions.

- Pythium suppression was frequently correlated with high microbial activity and air filled porosity.

Acknowledgements

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Further Reading

- *Field composting procedures to develop consistent disease suppression in potting mix components*, Fahy, P, (1997) HRDC Final Report NY217 (available later this year).
- *Recent developments in chemical and biological disease control in ornamentals*, Hoitink, H, (1997) Technical Proceedings of 1997 NIAA Conference, Perth. (booklet).

¹Organic Waste Recycling Unit, NSW Agriculture, LMB 4, Richmond NSW 2753. Ph. (045) 782 666 fax (045) 782 528

