Soils are Alive Newsletter

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Welcome...

The *Soils are Alive* Newsletter is produced by: Soil Biology Group at The University of Western Australia

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This is the fourth issue of our *Soils are Alive* Newsletter for 2001 and it examines some aspects of composting.

With government and societal pressure to reduce landfill and promote environmentally sustainable practices, compost production is increasing as a means of re-cycling organic materials.

After correct composting, a fully mature compost will smell almost sweet and stable flies will not breed in stored piles. Hence, some of the problems associated with organic materials of the past are avoided.

Scientific experiments and commercial users have had promising results in development and use of composts.

Composts have been found to increase marketable yields in vegetable, fruit and flower crops and these increases have been attributed to changes in soil properties and weed and pathogen suppresion.

Composts have vital role to play in sustainable use of soils both for commercial and backyard growers.

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Compost

By Tamara Flavel

What is Compost

Compost is the semi-stabilised product obtained after organic constituents have undergone biological degradation under controlled conditions. Basically, compost is organic matter.

Any organic-based material such as garden waste, food-scraps, manure, sewage effluent, sawmill waste, leaves and cardboard can, and do, go into compost.

Composts vary greatly depending on their maturity, the material they where initially composed of and the type (aerobic/anaerobic) and length of the composting process (see Wilkinson *et al.,* 1998).

The composting process relies upon a variety of organisms that feed on the organic matter.

Methods of composting

By understanding the biology of composting, it is possible to manipulate processes, maximise rates of decomposition and meet quality specifications for final products.

'Look after the 'bugs' and they will look after the composting'.
(Wilkinson *et al.* 1998)

Many composting 'bugs' need aerobic conditions. Factors such as such as moisture, temperature, frequency of turning and size of pile all affect aeration.

The quality of the microbial food source (the organic matter at start of process) especially carbon:nitrogen ratios and pH also affect biological activities and influence compost quality.

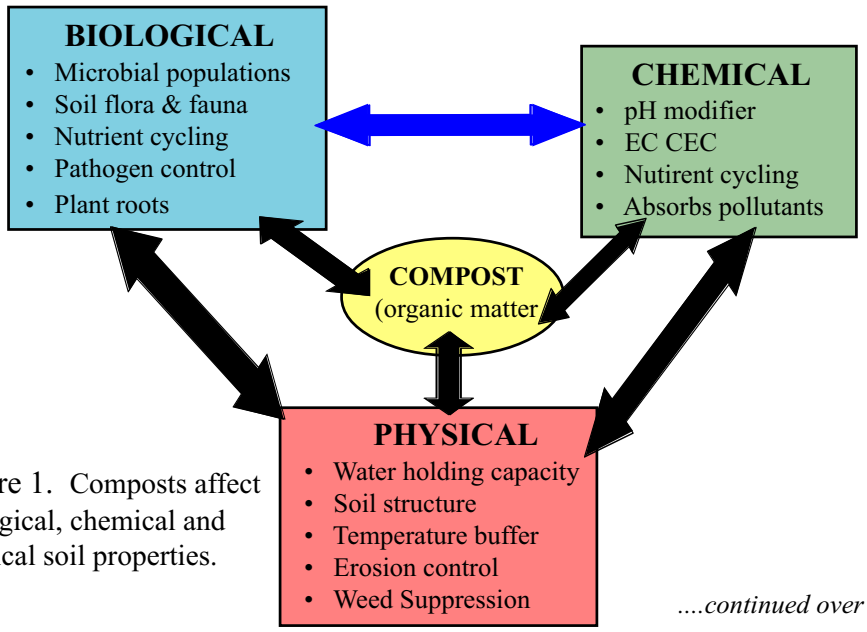

Figure 1. Composts affect biological, chemical and physical soil properties.

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During aerobic composting the material undergoes several phases each involving a separate set of organisms. The initial mesophilic phase involves microbial bacteria consuming readily available compounds.

Heat is produced as a by-product of this activity, the amount of which will depend on the size of the pile and food available. This heat is important for the elimination of pathogens and weed seeds. In smaller piles (less than 1-2m^3), much of the heat is lost to the atmosphere hence the required temperatures may not be reached.

The thermophylic phase begins around 45°C and it is during this stage that rate of decomposition is highest. Above 65-70°C, many organisms die off and the pile will require turning and maybe watering to encourage organisms to build up again.

One way in which to test the maturity of compost is to test temperatures, a fully composted material will not readily reheat.

Uses for Compost

Just as there are different types of fertilisers for different situations so there are different types of composts.

Composts can be used as mulches spread on the soil surface or they may be incorporated into the soil. They are used to modify pH, to absorb pollutants and excess nutrients, for erosion control, temperature buffering, weed suppression and as a source of essential nutrients (major and trace).

Compost mulch products help to reduce irrigation needs because the soil water-holding capacity is increased. This also reduces evaporation. Composted material also helps buffer soil temperatures and can keep weeds down and reduce wind/water erosion.

Mulch composts tend to have larger particle sizes than compost that is suitable for incorporation into soil. The mulch composts also contain more woody material. They have proven benficial in commercial vinyards and orchids, at rehabilitation sites and in gardens.

Composts for incorporation into soil can vary greatly in their qualities. Some are high in nutrient values and can be used to supply plant nutrients. However, immature composts can lead to problems such as nitrogen draw-down. Therefore, it is important to be careful where and when you apply them. Incorporated composts build organic matter within the soil bringing with them improvements to soil quality (see Figure 1).

A new set of Australian standards for composts has been produced. Most compost producers should be able to advise you on the maturity and qualities of their products and which ones are best for mulching or incorporation.

Current Compost Research

Compost producers, scientist and growers are involved in studies around Australia and overseas into compost use and quality issues.

Tamara Flavel is a PhD student at The University of Western Australia (School of Earth and Geographical Sciences) investigating the impact of incorporation of compost in horticultural sandy soils in south-western Australia in collaboration with the Department of Agriculture, WA. If you are interested in knowing more about compost research, contact Tamara Flavel:

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