

Do your weeds love fungi ?? – Michael Cashmore



I was talking with one my farm forester friends, Barry, he'd harvested an area of pines and he's telling me "There's weeds growing there that I've never seen on my farm before. Inkweed, woolly mullein and chamomiles. How did that happen?"

Weeds get a lot of bad press, surely they're just there to annoy us, create work we don't want or need to do and keep various companies in business. No, the purpose of a weed is to respond to soil signals and apply remedial action on behalf of nature. They're not a sign of lack of herbicide, the same as a headache is not a sign of lack of aspirin. Weeds are evidence of repair taking place.

Consider soil is an interaction between chemical, biological and physical factors. New or primitive soils are highly bacterial and will be dominated by moss, primitive grasses and small flat weeds. As soil builds, fungi begin to colonise and healthy pastures will thrive at a 1:1 by weight fungi to bacteria ratio. Orchards and gardens thrive in more fungal conditions (5:1) and mature forests are up to 1000:1 fungi to bacteria ratio. Hence the smell of a forest and the speed of decomposition of branches and whole trees is attributed in part to high fungal levels.

These forestry weeds are indicators of high fungal soils, not the natural biological conditions for pasture, which require more bacteria. Other examples of weeds indicating fungal conditions are below.

To shift a forested area to pasture, it is essential to wake up these sleepy fungal soils. Grazing large mobs, if practical, will achieve animal impact and trampling and evenly spread manure and urine. Bacteria live on simple carbon foods – like manure, seaweed and sugars. Applying these can help achieve pasture suitable conditions. Fungi need more complex carbons – which may be provided by wood chips, trampled litter, straw and fish oils. The most important of these fungi in forestry or grassland establishment are the essential mycorrhizal fungi. Plants

provide the fungi with its sole source of food (as liquid carbon sugars) and the fungus provides the plant with soil-derived nutrients.



Around 10% of all plant species have ecto-mycorrhizal relationships (fungi exist on the roots), particularly seed producing forest trees. This group includes many hardwoods and conifers, such as alders, spruce, oak, chestnuts, eucalyptus, pine, poplar and willow. Grasses require endo-mycorrhizae (fungi exist in the roots), this can mean grasses struggle following tree removal. This is one of the times to use a mycorrhizal inoculum.

Trees are recognised as an important carbon sink, the fact that mycorrhizal fungi also store large amounts of carbon means that they have a crucial role to play in removing CO₂ from the atmosphere.

Mycorrhizas will be damaged or destroyed by soil compaction and disturbance, as well as by the use of certain chemicals, all of which occur in intensive agriculture and forestry. Many foresters and farmers are developing an awareness of the importance of looking after our underground livestock and low impact forestry techniques will help to maintain the integrity of the soil.

So, Barry, these weeds are your friend and employee. They're ensuring continuation of the plant/fungal relationship. When re planting reduce herbicide rates by one third to half and buffer with fulvic acid to reduce damage to your new fungal friends

And please think diversity, think beyond the monoculture that *Pinus Radiata* has become.

Other fungal indicating weeds :Blackberry (*Rubus* spp), wild rose (*Rosa* spp), Poison Oak (*Toxicodendron diversilobum*), hemlock (*Conium maculatum*), Foxglove

(Digitalis), Hollyhock (*Alcea rosea*), Hawkweed (*Hieracium*), hemlock (*Conium maculatum*), Bloodroot (*Sanguinaria canadensis*), wormwood (*Artemisia absinthium*), mullein (*Verbascum* spp), St. Johnswort (*Hypericum perforatum*), houndstongue (*Cynoglossum officinal*), Matagouri (*Discaria toumatou*), bracken (*Pteridium* spp), gorse (*Ulex*), broom (*Cytisus scoparius*), rabbitbrush (*Chrysothamnus* spp), sagebrush (*Artemisia* spp), willow (*Salix* spp), sweet briar (*Rosa* spp), Leafy spurge, African Boxthorn (*Lycium ferocissimum*) or mesquite (*Prosopis* spp).