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### **The Myth of Phytotoxic Yard Waste**

*“Uncomposted yard waste mulch is harmful to plant life and negatively impacts water quality”*

#### **The Myth**

Recently I received a draft of a document addressing a “local problem: utilizing ground green waste as mulch.” In short, this document states that yard waste (defined as woody and green materials) is being used improperly as a mulch for streambed restoration, erosion control, weed and moisture control. The argument that this material “is likely causing harm to plant life and may be negatively impacting water quality and plant life” is followed by a bulleted list of specific problems attributed to use of immature composts. These include (1) oxygen reduction in the root zone; (2) nitrogen depletion of the soil; (3) “altering stable forms of nitrogen existing in the soil into mobile forms tending to runoff with moisture”; (4) introduction of plant disease; (5) introduction of phytotoxic compounds; (6) introduction of weed seeds; (7) introduction of pesticides; (8) contamination of surface waters by “organic acids, phenolic compounds, ammonia and ethylene”; and (9) “release of oxygen depleted water” into surface waters. The document ends by stating...“There are beneficial uses of mulch if the mulch is made from the proper materials, mainly woody debris devoid of nitrogen sources such as leaves, needles or grasses. To gain most of the attributes of mulch along with providing a nutrient source, greater moisture retention, biofiltration and disease suppression then cured compost should be utilized.”

#### **The Reality**

I’ve expounded on the joys of mulch before, so will not repeat the numerous and documented benefits that arborist wood chips and other coarse organic mulches can offer to a landscape. Instead, let’s address each of the problems outlined above and sort out fact from fiction.

First of all, we need to clarify the difference between yard waste and immature compost. There are a number of published studies that document the problems with using immature composts, many of which are listed above. However – these studies are focused on immature composts made from biosolids, municipal solid waste, manures, and other high nitrogen materials – not yard wastes. Yard wastes, even with significant amounts of green material, are not rich in nitrogen; in fact, they can cause nitrogen deficiencies if used as soil amendments rather as mulches. This distinction allows us to exempt yard waste mulch from many of the hazards of immature composts, specifically any type of runoff or toxicity associated with nitrogen (points 3 and 8). Likewise, the phytotoxic compounds referred to in points 5 and 8 – including salts, fatty acids, etc. – are associated with immature composts made from biosolids and municipal solid wastes, not plant materials. (It should be noted that ethylene is a gas and would not be a water contaminant.) There is no evidence that decomposing yard wastes generate any quantity of these substances or contribute to surface water contamination. Indeed, the presence of coarse mulch material will help reduce water runoff and increase immobilization of potentially harmful materials.

The second point in the list – nitrogen deficiency of the soil – will be a problem if yard wastes are incorporated into the soil. However, numerous observations and anecdotal evidence suggests that no such deficiency occurs when yard wastes are used as a mulch. My own belief is that a zone of nitrogen deficiency exists at the mulch/soil interface, inhibiting seed germination (weed control!), while established plant roots are unaffected below the surface. We will be researching this very question during the next year, and hope to banish point 2 above.

Next let’s consider the issue of oxygen depletion. With a coarse mulch, even applied to a depth of several inches, there is no zone of oxygen depletion. Water and gases move easily through the mulch to the soil,

and in fact can improve this movement by protecting the soil surface from compaction. Points 1 and 9 are therefore eliminated from consideration.

The issue of contaminated mulch has also been discussed in a previous column so I will briefly summarize the problem. Plant material treated with pesticides should NOT be used as mulch, nor should weeds with seed heads be added to the mix. This is an invitation to trouble; but I need to mention that aged composts are also subject to contamination, especially by pesticides (remember clopyralid-contaminated compost?). Therefore, points 6 and 7 can be easily avoided in yard waste mulch but may be harder to avoid in commercially available compost, whose origins are harder to identify.

Point 4 is the only possible area of concern and again has been addressed before in this column. There is conflicting evidence linking transmission of disease from mulch material to living plants in a landscape. Though we know healthy soils increase plant health and reduce susceptibility to disease, and it appears that use of mulch will promote these benefits, it still is wise not to use uncomposted, diseased plant materials as mulches until this relationship is better understood.

Finally, all one has to do to see what has worked as a mulch for eons is to visit any natural ecosystem; dead plant material settles on the soil surface without any prior composting and the landscape does just fine.

### **The Bottom Line**

- Uncomposted, clean yard waste is a natural mulch with demonstrated benefits to landscape plantings and soil health.
- If plant material has been treated with pesticides or contains weed seeds, it should not be used as mulch.
- Diseased plant material is best used as a mulch only after composting.
- Yard waste mulch may be a poor choice for use in annual flower beds and vegetable gardens where seedlings, rather than established plants, are present.

For more information, please visit Dr. Chalker-Scott's web page at <http://www.theinformedgardener.com>.