

JOHN'S CORNER

MULCH CORNER - Toxic Mulch Syndrome Part 3

By John Ferguson

It appears that the issue of toxic (sour) mulch has reappeared. This past weekend I heard Randy Lemon of Garden Line fame talking about sour mulches. I have talked with a couple new customers over the last few days that have had plants dying that appear to be from the toxic mulch (cheap) they used, and a colleague (a professional landscaper) e-mailed me about plants dying from toxic mulch.

Last year we discussed this issue in length and the articles can be found on our website and in the archive of back newsletters. This past week I read a new study published last year by the Woods End Laboratories on "Killer Mulches" that has found another mechanism for creating toxic mulch.

The researchers at Woods End found 37,000 ppm of formic acid amongst other acids! Formic acid is one of the most plant-toxic forms of organic acids. This type of acid is produced during the conditions of pyrolysis (similar to making biochar).

Mulch producers create very large piles of raw woody mulch often over 20 feet tall (I have seen 50 foot tall piles in driving around Houston at some mulch producers).

These piles become wet in some areas of the pile (wetting from summer downpours) which allows microbes to start the decomposition process releasing large amount of heat. The pile becomes very hot and the oxygen is quickly used up, allowing some pyrolysis to occur inside the pile.

These conditions for partial pyrolysis allow pyruvic acid found in wood to be split into formic acid in addition to methanol and acetic acid. Methanol is an alcohol and it only takes a few parts per million (ppm) to kill a



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plants roots, and acetic acid is essentially vinegar (often used as a herbicide). Hence the mulch was extremely toxic to plants.

The researchers found that even the vapors coming off the mulch caused extreme foliage damage. They diluted the mulch 100:1 and it was still inhibited the growth of plants. The mulch was so acidic (pH = 2.2) that even microbes could not live in it, hence it was not being biodegraded.

The question my colleague had was, " How can one area of a garden be affected and another are not affected?"

There are a couple possible reasons: 1) First when a dump truck is being loaded, large front end loaders are used that can easily hold 5 cubic yards in one scoop of mulch. The first scoop will come from the outside of the pile which has a lot more aeration (less problems) while the second scoop comes from deep inside the pile where it is hotter and no oxygen (lots of problems). When the material is dumped much of the toxic material is still together and when applied it would go into one area of the garden and the less affected mulch applied in another area.

2) It is possible that after the toxic mulch was applied the sprinklers were turned on and some of the toxic chemicals were diluted and washed away before it had a chance to damage plants.

So why do mulch producers stack mulch into large piles? You probably guessed the answer "It is cheaper". Land around Houston is expensive and one can store several times as much mulch in the same space by piling it higher. If a consumer sees very tall piles (over 10 feet) of mulch at a vendors location it is an indicator that they do not care about the customer. Just like the vendors that sell dyed mulch they do not care about the customer and only want your money.

As the old gardening proverb states:

I have no quarrel with a man whom has a lower price, whom better knows what his product is really worth.



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Another way that mulch can become toxic is by the landscaper themselves. Often landscapers will fill their trailer (metal sides) with mulch and cover with a plastic tarp. If it is allowed to sit for a couple days (over a weekend or a couple days of rainy weather) the microbes will quickly use up all the dissolved oxygen. The mulch will become anaerobic and the microbes start producing acids, alcohols and other toxic compounds that contaminate the mulch. Then when it is applied it will stunt or even kill the plants.