GTI HILITES

Pesticide Persistence in Composted Turfgrass Clippings

A group of turfgrass researchers under the direction of Prof. Garry Stephenson of the Dept. of Environmental Biology at the Univ. of Guelph and the Guelph Turfgrass Institute have conducted an experiment to determine the persistence of three common turfgrass pesticides in compost generated from grass clippings.

Landscape maintenance personnel for parks or golf courses are composting turfgrass clippings and reusing the compost in compliance with the 3-R concepts of environmental correctness. If the turfgrass has been treated with herbicides or other pesticides there is concern about the persistence of the chemical in the composting process and the potential for damage to plants when the material is reused as a mulch.

Stephenson and his associates applied 2,4-D, Mecoprop and Dicamba at three rates to a large area of turf on a sod farm. One day later they harvested clippings from the blocks and mixed them with untreated tree leaves in a 60/40 ratio of clippings to leaves on a volume basis. The mixtures were composted in small, aerated plastic drums. Samples were removed initially and at weekly intervals over a ten week period for analysis

During the 10-week period 92% of the dry weight of the grass clippings was lost through the composting process. At the same time the weight of the 2,4-D decreased by 87%, the weight of Mecoprop by 85% and the weight of Dicamba by 78%. Thus the breakdown of the pesticide materials was not as rapid as the grass clippings. As a result during the composting operation the three herbicides had increased on a concentration basis by 1.7, 2.0 and 2.8 times, respectively, for 2,4-D, Mecoprop and Dicamba (Table 1).

Table 1: Dissipation of 2,4-D, Mecoprop, and Dicamba during the composting of treated turfgrass clippings.

	Herbicide Residues in the Compost (ppm on dry weight basis)		
Composting Time (weeks)	2,4-D	Mecoprop	Dicamba
0	14.2	45.3	24.1
1	23.8	58.8	27.8
2	30.3	77.1	38.8
3	23.6	69.9	39.4
4	30.7	88.1	52.9
5	25.9	78.3	49.5
6	25.2	91.0	52.1
7	13.8	80.7	52.0
8	29.5	103.1	58.2
9	23.8	107.3	66.4
10	23.9	92.3	67.8

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The concentrating effect of the more rapid rate of breakdown of the grass clippings relative to the herbicides would appear to have peaked with 2,4-D after two weeks. This would suggest the microbial population responsible for the degradation of this herbicide have built up to a level where they are removing the 2,4-D molecules as fast as the organic molecules in the grass clippings were being converted to CO_2. This equilibrium breakdown does not appear to be the case for Mecoprop and Dicamba whose concentration in the composting clippings continue to rise with time.

The next step in this research by Stephenson and his associates is to determine the phytotoxicity of the compost after the composting operation has stabilized. They also plan to determine the effect of the diluting of the compost where clippings are continually added to the system.

In the meantime sports turf managers should exercise some caution if they are using clipping-generated compost on sensitive areas such as flower beds on their properties.

ARTIFICIAL TURF - Is it Always No?

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One might be accused of heresy to write an article on artificial turf for a Sports Turf magazine. Yet sports turf facility managers must be aware of alternatives to natural turf for use in special situations.

One such situation occurred at Wilfred Laurier University in Waterloo, Ontario. The University was land locked, with only one undersized football field. Their Physical Education and Athletics program required the rental of off-campus space at a significant cost and with considerable inconvenience to the athletes. Natural turf did not appear to be a solution.

Their thought processes were guided by an article in "Athletic Business," Sept. '94, which stated - a single synthetic field provides the same utility as 12 to 18 natural fields. While the statement may be considered an exaggeration, it lead the administration at WLU to examine the cost and design factors of artificial turf. While costs were the major factor in choosing the design they also considered the base on which to lay the artificial turf, the shock absorbing pad and the type of fibre to use in the artificial turf.

The base of the field has many similarities to a sand based rooting system for natural turf such as tile drainage. Likewise the layering of different stone sizes with sand immediately below the artificial turf are concepts familiar to the design of natural sand-based fields. The materials were similar in size, but did not required the depth of a rooting zone. For example only 15 mm of sand was necessary under the shock absorbing layer. The choice of an aggregate layer in preference to concrete or asphalt would tend to add resilience to the system.