ANOTHER POSSIBLE SOURCE OF SOIL CONTAMINATION

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Recent issues of Colorado Flower Growers Association Bulletin (Goldsberry, 1976 and 1978) have pointed out the dangers of herbicide contaminants in greenhouse soil mixes. Instances of contamination from atmospheric sources, direct soil contamination, contaminated fertilizer and water contamination, have been discussed, but a new source must also be considered. It may be necessary to check some soil amendments.

Difficulty with bedding plant seedlings being grown for the City of Denver park system at the city greenhouses, was encountered during the spring of 1978. Thousands of seedlings were lost and, in some cases, others were set back a considerable amount of time. Symptoms on most seedlings were stunting of new growth, loss of the growing point and extreme distortion of the root system. The roots tended to be clubby and failed to develop the normal root hairs.

When the plants were grown in a shaded location the symptoms were reduced and the plants seemed to show signs of recovery. When moved back in a sunny location, they would rapidly deteriorate. This led to suspicion of an herbicide contaminant in the growing medium.

After eliminating other possible sources such as extreme temperature, soluble salts, shading compound used on the greenhouse roof and watering practices, it was decided to conduct tests of the soil with samples analyzed by the Colorado Department of Agriculture. Results of the soil mix tests are shown in Table 1.

TABLE 1. Effects of 2,4-D Contaminated Soil Mixes on Seedling Bedding Plants.

Growing Medium	2,4-D Residue (p.p.m.)	Plants Grown and How Affected
Soil + Compost + Peat	0.007	Begonias and snapdragons. All perished despite repeated leaching.
*Soil + Compost + Canadian Peat + Perlite + Sawdust. (New Soil source in 1978)	0.005	Salvia, Verbena, Dusty Miller. Severe injury, especially to roots. Celosia - O.K. following heavy leaching. No damage to petunia, basil and ageratum.
*Soil + Compost + Canadian Peat + Perlite + Sawdust. (Soil from two-year old source kept in greenhouse)	0.002	Several bedding plant types planted showing no injury including Marigold and Alyssum.
Soil (new source) + Compost	0.01	Severe damage to roots and tops of Dracena.

*Mixtures were: Soil, 40%; Compost, 20%; Peat, 10%; Perlite, 10% and Sawdust, 20%.

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It is interesting to note that soils with a 2,4-D residue of 0.002 p.p.m. did not result in damage to Marigolds or Alyssum, but a residue of 0.005 p.p.m. was sufficient to cause severe damage to roots in Salvia, Verbena and Dusty Miller. No damage occurred to Petunias, Basil and Ageratum. These tests, however, were run following a heavy leaching of the soil when herbicides were suspected.

Begonias and snapdragons all perished despite repeated leaching. They were grown in a different mix than the other bedding plants. The mix contained soil, compost and Canadian peat. A residue of 0.007 p.p.m. was sufficient to kill them.

Tests on unamended soil showed a 2,4-D residue of 0.0077. Sawdust alone showed no presence of 2,4-D. It is suspected, however, that even though the soil showed a residue, there is a possibility that the addition of compost from leaves collected in the park could also be a source of contamination. The compost is suspected because Dracenas grown in soil with only compost added had a much higher 2,4-D residue (0.01 p.p.m.). Tests are currently being conducted on the compost including both a bean germination test and a laboratory analysis.

References

Goldsberry, Kenneth L. 1976. The Herbicide Era. Colo. Flo. Growers Bull. 316.

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