

## SPAWN &amp; SUPPLEMENT

# RAPID LEACHING OF SALTS

– *Key to Successful  
Plant Growth  
in Spent  
Mushroom  
Compost  
Potting Mixes*

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The mushroom industry generates a large amount of organic waste material. The U.S. discards annually an estimated one billion tons of spent mushroom compost; Canada discards one quarter as much. Because of increasing need to recycle organic wastes, the Ornamental Nursery Research Programme at this institute has been evaluating the use of various organic by-products, including spent composts, as part of the growing medium for container culture. Such products would substitute for traditional organic ingredients such as peat and animal manures.

In addition to being a source of organic matter, spent compost is rich in nutrients. However, the exploitation of this waste product as an amendment for large-scale crop production has been very limited. Although researchers have suggested its potential for use in crop culture, information on its use has been limited or not well defined; species response has been variable. The high salt content of spent composts, which can be toxic to plants, appears to be largely responsible for concern about its use as soil amendment or in potting mixes. In 1977, Eames (6) obtained reduced growth of containerized shrubs in mushroom-compost amended (25-50% by vol) media and concluded that there was little use for spent compost in this type of crop culture. Recent recommendations to flower growers suggested no more than 15% of fresh (Unweathered) spent mushroom compost in the growing medium (1). Rather (8) recommended up to 33% decomposed (but not fresh) mushroom compost in media for greenhouse production of chrysanthemums, bedding plants, and tomatoes. Wang et al. (10) reported increased growth of various vegetable crops after additions of up to 30% to 50% spent mushroom compost. Smith (9) recommended only 15% to 20% of spent mushroom compost for use in the nursery-landscape industry.

More recent studies at this institute showed that many ornamental shrub species grew well in containers amended with spent mushroom compost in proportions between 25 and 100% (2,3,4,5). Species included cotoneaster, deutzia, dogwood, forsythia, juniper, ninebark, potentilla, rose, and weigela. The results also demonstrated little difference among media with freshly spent (high salt level) composts. Although growth of some species was moderately reduced or was not affected, most species grew more as the proportion of compost was increased in the media.

Except for one species (privet) which developed chlorosis in all compost-amended media early in the growing season, and potentilla, which showed slight but temporary leaf discoloration in compost-amended media during late season, there was no other observed symptom due to nutrient toxicity or deficiency.

Plants were trickle-irrigated daily with 2 liters of water per 6 liter container and fertilized through the trickle system three times weekly at the rate of 200 ppm N in the form of 20-20-20. The elevated and toxic levels of salt in fresh spent compost media from 5 farms were quickly (days after planting) leached from the growing containers. A salt level of 1.0 mmhos/cm x 10<sup>-5</sup> is considered safe for plant culture.

Our studies demonstrated that (a) success in growing ornamental nursery crops in containers with spent mushroom compost media was related to rapid and early leaching of high salts from the media, and (b) fresh (high salt) compost yielded results equivalent to weathered or leached compost. Our

experiments included treatments with up to 100% compost, but under normal cultural conditions no more than two thirds by volume is recommended due to shrinkage of the compost. Furthermore, because of the potential for plant damage due to high salts, use of mushroom compost should always be accompanied by appropriate soil tests for salts. In our experiments, high pH (up to 8.2) found initially in many of the compost formulations tested did not seem to have any detrimental effect on plant growth.

With increasing demand for container-grown ornamental plants, there will be an increased need for growing media. Organic waste by-products such as spent mushroom compost will become more useful for this purpose. MN

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