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EFFECT OF GROWTH MEDIUM ON LEAF AND CROWN ROT OF LIRIOPE

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SUMMARY: Liriope bibs were propagated from a population of diseased 'Evergreen Giant' plants and transplanted into 1-gallon pots containing several types and mixtures of growth media. Significant levels of leaf and crown rot caused by *Phytophthora palmivora* developed in these pots. In one experiment using artificially-inoculated plants, there were differences in the levels of disease among the treatments. Builders' sand had the lowest level of leaf and crown rot. In the second experiment, using a larger number of naturally-infected plants, there were no significant differences in the incidence or severity of leaf and crown rot between any of the growth media treatments.

INTRODUCTION: The purpose of this test was to evaluate the effect of growth media on the incidence and damage by *Phytophthora palmivora* to *Liriope muscari* cv 'Evergreen Giant'. Preliminary work and observations in nurseries had indicated that the growth medium might have a significant effect on infection by *Phytophthora palmivora* and the development of the leaf and crown rot disease.

METHODS:

Experiment 1. Bibs of Liriope cv 'Evergreen Giant' were obtained from nursery-grown plants that were not severely damaged by the leaf and crown rot disease as follows: Plants were separated and leaves and roots were trimmed as in commercial propagation. Before transplanting, the roots were dipped in a suspension of zoospores of *P. palmivora*. Zoospores were prepared by flooding 5-day-old V-8 plates of *P. palmivora* for 15 min at 4 C. Zoospores were suspended in 100 ml/plate of de-ionized water. Roots of Liriope bibs were dipped just prior to transplanting into 1-gallon plastic pots containing growth media comprised of various mixtures of pine bark, ground peat, composted hardwood bark, and builder's sand as specified in Table 1. There were ten plants in each treatment. Plants were placed within a shade structure covered with 70%

shade fabric and watered with overhead sprinkler irrigation as needed. Each pot was fertilized with 6g/pot of Osmocote 14-14-14 fertilizer. Bibs were transplanted on April 3 and plants were evaluated on July 2, 2001.

Experiment 2. This experiment was similar to Experiment 1, but differed in some important aspects. Bibs of Liriope cv 'Evergreen Giant' were obtained from 3-gallon pots of nursery-grown plants that, as a group, were severely damaged by the leaf and crown rot disease. However, the obviously-diseased plants were discarded and were not propagated. As the bibs originated from containers that already contained diseased plants, they were likely to be infected or contaminated, so inoculation was not needed. The bibs were transplanted on December 12, 2001 into 1-gallon plastic pots containing various mixtures of pine bark, ground peat, composted hardwood bark, and builder's sand as listed in Table 2. The plants were placed outdoors within a shade structure covered with 70% shade fabric and watered with overhead sprinkler irrigation as needed. Each pot was fertilized with 6g/pot of Osmocote 14-14-14 fertilizer. The plants received freeze protection from overhead sprinklers on two nights and were not damaged by low temperatures. Ten plants were closely grouped together for each replicate. There were four replicates per treatment arranged in a complete block design. Plants were evaluated for leaf and crown rot symptoms at 63, 75, and 90 days after transplanting. At 90 days after transplanting, only small numbers of additional plants were infected, so the experiment was terminated.

RESULTS AND DISCUSSION

Experiment 1. In this experiment, only 10 plants per treatment were used and the plants were artificially inoculated with *P. palmivora* zoospores. Builders' sand had no diseased plants and this value was significantly different than the other treatments (Table 1). Although this result indicated that builders' sand was less conducive to leaf and crown rot than other the growth media which contained peat or composted hardwood bark, the results were not easy to interpret because of the small number of plants and the experimental design. Moreover, the inoculation methods were questionable. Either they were not very effective or the experiment was complicated by the presence naturally-infected plants, because many of the uninoculated control plants also became diseased. This indicated that some of the nursery-grown bibs were already infected or contaminated with *P. palmivora*. Regardless, the absence of diseased plants in the builder's sand treatment indicated that this medium suppressed disease infection, development, or both.

Experiment 2. When sufficiently large numbers of naturally-infected (or contaminated) bibs, obtained from pots containing diseased plants were used, results indicated that there were no significant differences in disease development among the growth media treatments (Table 2). Builders' sand and growth media containing 30% sand appeared to be least conducive to disease development, as in experiment 1, but these values

were not significantly different from those for other treatments (Table 2). However, the results indicate that there might be a moderate effect of growth medium on disease development and that some media are more conducive to disease development than others. This result might be useful in a developing a disease management program for leaf and crown rot. Further work will be required to more clearly elucidate the effects of growth medium on the development of leaf and crown rot of Liriope. The effects of growth media, if they exist, appear to be moderate, but even moderate suppression of infection or disease development could be useful in a disease management program.

Table 1. Effect of growth medium on leaf and crown rot development in "Evergreen Giant' Liriope plants at 90 days after transplanting. Summer, 2001.

Growth medium or components	Ratio	Percent infected plants 90 days DAT[1]
Nursery mix (peat- pine bark- sand Un-inoculated Control	30 : 40 : 30	14.0 b
Builder's sand (Inoculated)	100 %	0.0 a
Nursery mix + Composted hardwood bark (Inoculated)	30 : 40 : 30	15.0 b
Nursery mix + Composted hardwood bark (Inoculated)	10 % 90 %	13.0 b
Nursery mix + Composted hardwood bark (Inoculated)	20 % 80 %	2.0 b
Builder's sand + Composted hardwood bark (Inoculated)	30 % 70 %	8.0 b
Fafard 3B Mix Peat, pine bark, vermiculite, and perlite	45% peat	4.0 b
		F = 2.563 P =0.028

[1]Average for ten pots evaluated at 90 days after transplanting. One-way ANOVA. Values followed by the same letter are not significantly different. Student-Newman-Keuls method where $P <= 0.05$.

Table 2. Effect of growth medium on leaf and crown rot development in "Evergreen Giant' Liriope plants. Winter 2001-2002.

Growth medium or components	Ratio	Percent infected plants[1] at days after transplanting		
		63	75	90
Nursery mix = peat - pine bark - sand	30 : 40 : 30	25.0	32.5	32.5
Builder's sand	100 %	20.0	30.0	30.0
Nursery mix + Composted hardwood bark	50 % 50 %	30.0	35.0	40.0
Nursery mix + Composted hardwood bark	30 % 70 %	22.5	37.5	37.5
Nursery mix + Composted hardwood bark	10 % 90 %	20.0	37.5	37.5
Builder's sand + Composted hardwood bark	50 % 50 %	32.5	42.5	47.5
Nursery mix + Composted hardwood bark	30 % 70 %	45.0	50.0	50.0
Fafard 3B Mix. Peat, pine bark, vermiculite, and perlite	100%	20.0	42.5	42.5
	F value	1.611	0.627	0.580
	P =	0.180	0.729	0.765

[1]Average for ten pots per replicate and 4 replicates per treatment in a randomized complete block design. None of the values are significantly different *P* = 0.05 level.