A COMPARISON BETWEEN SAND/POLYSTYRENE AND PEAT/POLYSTYRENE MIXES FOR ROOTING ORNAMENTAL SHRUB CUTTINGS

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Abstract. Cuttings of 8 woody shrub species were rooted under intermittent mist in mixes containing 0, 25, 50, and 75% (by vol) of polystyrene pellets with 100, 75, 50, and 25% of either sand or peat. Based on evaluation of rooting percentage and(or) on an index of root mass and quality, rooting performance of all species was better and(or) more uniform in sand/polystyrene than in corresponding peat/polystyrene mixes. Inhibition and greater variation in rooting in the peat/polystyrene mixes seem to be associated with low pH, non-uniformity, and excessive moisture in these mixes.

INTRODUCTION

The type and composition of the propagating medium is important for rooting cuttings of many woody plants. Although numerous combinations of rooting media have been developed and used by commercial nurseries, there is continuing need to evaluate and introduce new combinations.

Propagation media may often be improved by the addition of coarser materials (2,6). Polystyrene (PS) is presently being used by certain propagators as a supplement in rooting mixes (1,4). Due to its light weight, high porosity, ready availability, and low cost (4), it has the potential of becoming an important material in the nursery industry.

In this study, rooting of cuttings of eight woody shrub species was compared in media containing various proportions of PS mixed with sand (S) or peat (P).

MATERIALS AND METHODS

During the growing season of 1985, leafy cuttings of the current season's growth were removed from the following species (rooting period in brackets): *Deutzia scabra* (July 16 to August 9); *Euonymus fortunei* 'Coloratus' (July 24 to September 5); *Forsythia* × *intermedia* 'Lynwood Gold' (July 3 to 22); *Weigela florida* 'Variegata Nana' (July 23 to August 16); *Buxus microphylla* (July 10 to September 23); *Potentilla parvifolia* 'Gold Drop' (August 22 to September 6); *Spiraea* × *bumalda* 'Froebelii' (August 21 to September 6); *Cotoneaster dammeri* 'Coral Beauty' (July 3 to 22).

All cuttings were treated with Seradix No. 2 (0.3% indolebutyric acid) and inserted in mixes containing 0, 25, 50, and 75% (by vol) of PS pellets with 100, 75, 50, and 25% of either S or P. The PS

pellets were mostly 4 to 6 mm in diameter, ranging up to 15 mm as a maximum size.

Mixes were contained in plastic trays (46.0 × 46.0 × 18.5 cm) each with 2.5 cm of crushed stone at the bottom. Rooting occurred in a lathhouse under intermittent mist controlled during the daytime by a time clock (4 to 8 sec/8 min). Captan (2.5 g/liter) was applied at time of cutting insertion, followed by Captan or Benlate (0.5 g/liter) applied alternatively once per week.

The experimental design was a factorial with four levels of PS and two types of mixes (S- and P-based). Within a species, there were five replications, each with 12 or 15 cuttings per experimental treatment. Rooting percentage of each species was determined, and also a visual index of root mass and quality according to the scale: 0, no rooting; 1, callus but no roots; 2, poor rooting; 3, fair rooting; 4, good rooting; 5, excellent rooting.

RESULTS AND DISCUSSION

Data in Figures 1 and 2 show the rooting percentages and indices, respectively, for each of the 8 species evaluated; horizontal bars indicate data means.

Cotoneaster dammeri, 'Coral Beauty', with a rooting percentage of 98.5% (mean over all treatments), was the only species for which rooting percentage was not significantly influenced by any of the rooting mixes (Fig. 1). All other species in S/PS mixes had mean rooting percentages of 98%, except for *Euonymus fortunei* 'Coloratus' with 79%. Varying the proportions of PS in S resulted in little or no variation in rooting percentages of each of these species. However, corresponding mean rooting percentages were lower in P/PS mixes. Varying the proportions of PS in P resulted in wide variations in rooting percentages. There was a tendency for rooting percentage to increase with increasing proportions of PS with P (Fig. 1).

Mean rooting indices (Fig. 2) in all species except *Spiraea* × *bumaldi* 'Froebelii' were significantly higher in S/PS than in P/PS mixes, and also tended to increase with increasing proportions of PS in the mixes. Analysis of variance showed that for most species there were significant interactions between levels of PS and type of mix base for both rooting percentage and root index. This suggests a complex relationship between species rooting response and mix formulations.

In this investigation, the pH in P/PS mixes ranged from 3.7 to 3.9 and from 7.8 to 8.1 in S/PS mixes. Studies with a limited number of herbacous species indicated superior rooting at a pH near or slightly above neutrality (3,5); the addition of ground limestone to acidic media improved rooting (3). This evidence may explain the poorer rooting response in P/PS mixes but does not account for the

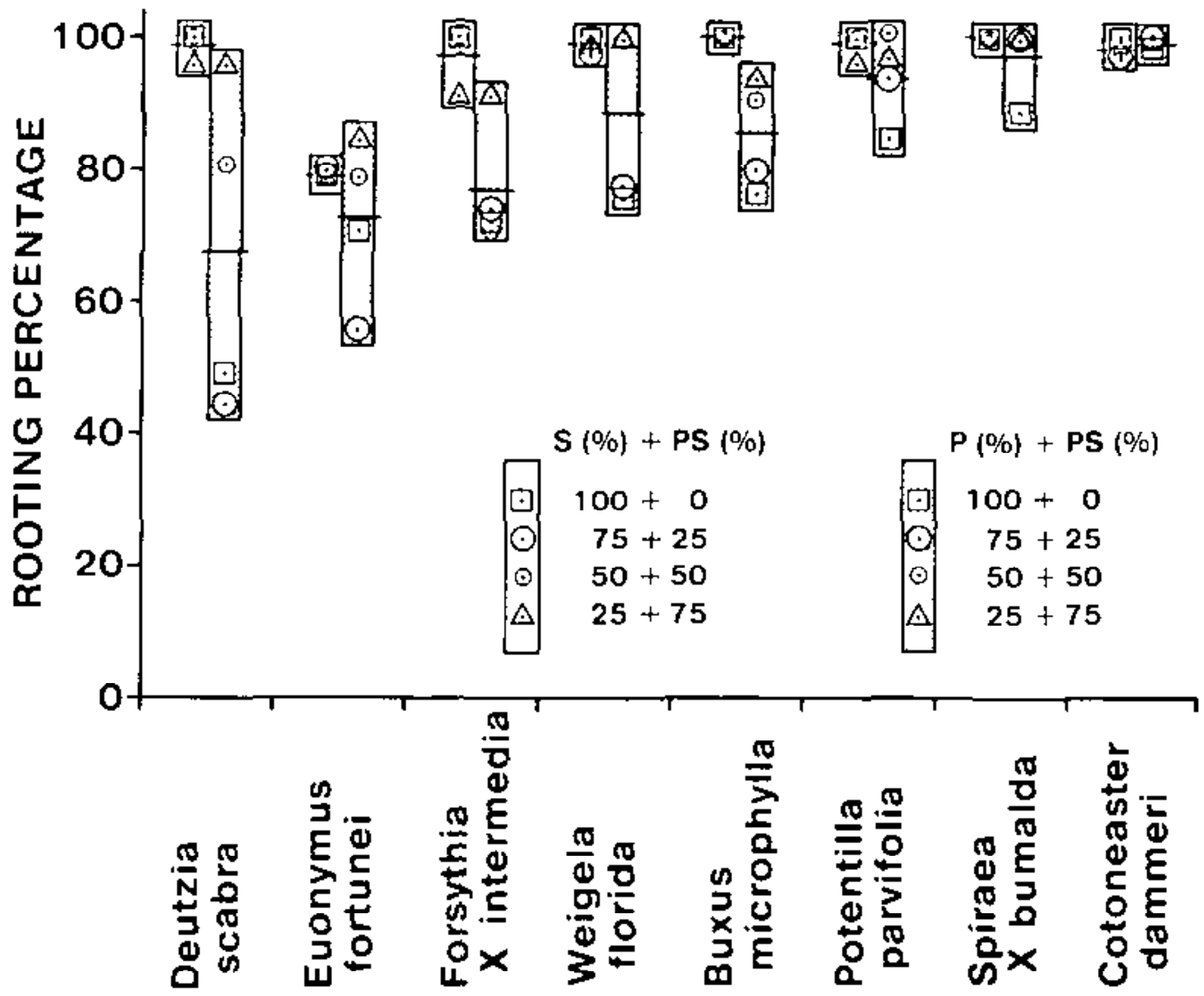

Figure 1. Rooting percentages of cuttings of eight shrub species in mixes containing various proportions of polystyrene (PS) with either sand (S) or peat (P). Horizontal bars indicate data means.

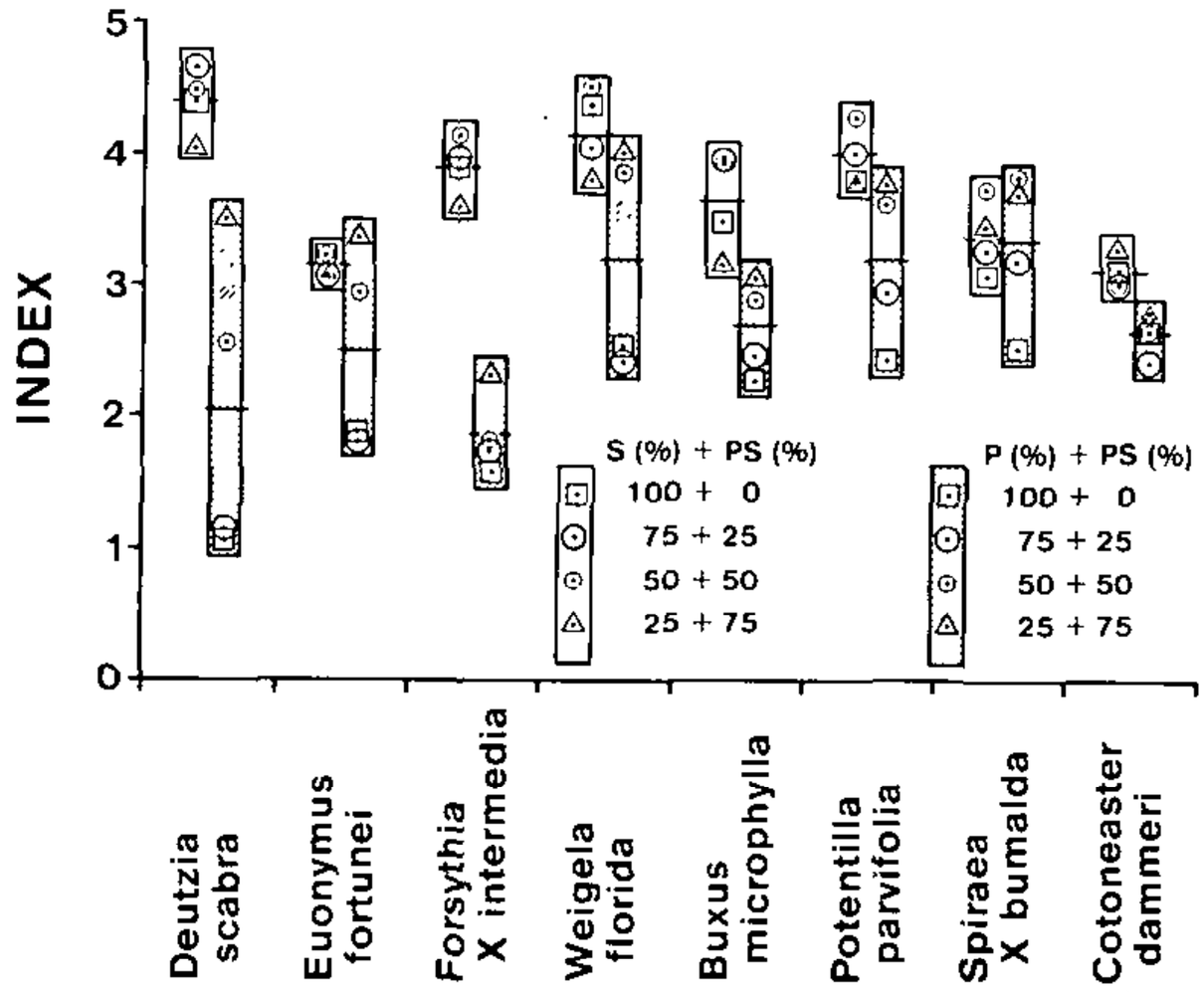

Figure 2. Rooting indices of cuttings of eight shrub species in mixes containing various proportions of polystyrene (PS) with sand (S) or peat (P). Horizontal bars indicate data means.

variability in rooting due to various proportions of PS with P. While pH adjustment of rooting media is a common practice in the production of ornamental floriculture crops, this is normally not the case within the Ontario nursery industry. Further studies designed to evaluate the influence of pH on rooting of woody species would be worthwhile.

Cook and Dunsby (1) and Matkin (4) indicated that problems of mixing PS with other media ingredients were due to the low density and water repelling property of PS. In this study, PS was difficult to

mix uniformly with S or P. There tended to be an excessive accumulation of PS on the surface of the mixes, which increased with increasing amounts of PS. Although not observed with S/PS mixes, the wide variance in rooting of most species in P/PS mixes seems to be associated with the non-uniformity of these mixes. It was also observed that the P/PS mixes tended to remain too wet. Since PS repels water (1,4), the excessive moisture in the P/PS mixes was due primarily to the moisture holding ability of P and also to the higher porosity in these mixes (4).

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JOE DALLON: Just a comment on the mixability of the polystyrene. If the materials to which it is mixed are wet you can easily mix sand and peat to 25% without any problems.

PETER VERMEULEN: Just a caution on the use of polystyrene, especially with the air movement ventilation that we are going to now. It floats in the air and may be getting it into your equipment.