USE OF HARDWOOD BARK AS A ROOTING MEDIUM

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Abstract. Hardwood bark and hardwood bark-sand mixes were evaluated as rooting media for both herbaceous and woody plants. There was no difference in rooting with 3 or 4 of the herbaceous plants with respect to medium. Chrysanthemum rooted best in the all bark and the peat-perlite mix. Of the 7 woody plants tested only *Cornus florida* and *Ilex cornuta* 'Burfordii' rooted better in non--hardwood bark media. There was no difference due to medium with the other 5 species.

REVIEW OF LITERATURE

Increasing cost of propagation media components has led many propagators to look for substitutes. Hardwood bark has been gaining increasing favor as an amendment or a growing medium for container-grown nursery stock. The advantages of hardwood bark may be summed up as follows (1): 1) excellent water holding capacity and the ability to release water for easy uptake; 2) well-drained and aerated; 3) economical in both initial cost and handling cost (lightweight); and 4) a fairly high CEC. Hardwood bark and hardwood bark-sand mixes also contain most of the other qualities which have been considered necessary for a good propagation medium (2).

There are certain aspects of hardwood bark culture which have to be taken into consideration. Lunt and Clark (3) have determined that hardwood bark is not as stable as sphagnum peat moss and when it decomposes it ties up nitrogen. Hardwood bark may have toxic quantities of other materials which may impede plant growth (4). Finally hardwood bark has been shown to increase in pH with time.

N deficiency and toxicity symptoms may be avoided by the addition of sufficient N and composting for a period of time (4). The pH problem may be avoided by the addition of elemental sulfur and iron sulfate (1).

There has been little evidence to support the use of hardwood bark as a propagation media. It has most of the characteristics of a good propagation medium and the bad characteristics can be avoided.

MATERIALS AND METHODS

Two separate experiments were conducted. One tested the effect of hardwood bark on the rooting of four herbaceous cultivars and the second used seven woody species as greenwood cuttings.

Herbaceous plants[1]. The plant material included *Chrysanthemum morifolium* 'Nob Hill'; *Dianthus caryophyllus* 'Scania'; *Pelargonium hortorum* 'Quest'; and *Euphorbia pulcherrima* 'Annette Hegg Diva.' The cuttings were placed in flats under intermittent mist.

The five rooting media on a volume basis were: 1) all sand; 2) 1 peat moss: 1 perlite; 3) all hardwood bark[2]; 4) 1 hardwood bark: 1 sand; and 5) 2 hardwood bark: 1 sand. All hardwood bark media were supplemented with the following chemical amendments per cubic meter: 597 g elemental sulfur (1 lb./yd^3); 597 g iron sulfate; 2.96 kg 20% superphosphate (5 lb./yd^3); 297 g potassium nitrate (½ lb. /yd^3); 5.37 kg ammonium nitrate (9 lb./yd^3). All hardwood bark media were stockpiled for 1 month, then steam treated at 180°F for ½ hr.

A randomized complete block design with five replications was used. Each replication consisted of ten cuttings. The rooting period for the poinsettias and geraniums was from June 28 to July 18, 1974. The rooting period for the chrysanthemums was July 22 to August 8, 1974 and the carnations from July 22 to August 27, 1974. At harvest each cutting was evaluated on a rooting index from 1 to 7 with 1 being *no roots* and 7 having a root ball diameter of greater than 4 cm.

Table 1. Influence of medium on rooting of *Chrysanthemum morifolium* 'Nob Hill'.

	Rooting index means[y]	
	Exp.1	Exp. 2
Medium	7/22 - 8/9/74	9/4 - 10/1/74
1 Bark - 1 Sand	5.46a[z]	5.30a
2 Bark - 1 Sand	5.64b	5.33a
1 Peat - 1 Perlite	5.68b	6.23d
Sand	5.76b	5.66b
Bark	6.58c	6.06c

[y]Rooting index, 1-dead, 7-excellent rooting.

[z]Treatment means followed by a different letter in one column are significantly different at the 5% level.

Woody plants[3]. The plant materials used for this part of the study included *Cornus florida, Spiraea vanhouttei, Juniperus chinensis* 'Hetzii', *Ilex cornuta* 'Burfordii', *Forsythia x intermedia, Magnolia x soulangeana,* and *Ilex decidua.* The rooting media on a volume basis were 1 bark: 1 sand, 2 bark : 1 sand, 1 peat : 1 sand, 1

[1]Sample, Anne B. 1975. The evaluation of hardwood bark as a propagation media for some selected herbaceous ornamental plants. Unpublished Master's Thesis. Southern Illinois University, Carbondale, Illinois 62901. 29 p.

[2]Weston Paper Co. Terre Haute, Indiana. Fine grade of hardwood bark.

[3]Zaeske, Alan D. 1975. The use of hardwood bark in the propagation of woody ornamental plants from cuttings. Unpublished Master's Thesis, Southern Illinois University, Carbondale, Illinois, 62901 30 p.

peat : 1 perlite and all sand. The bark media were chemically amended, composted and steamed as described for herbaceous plants. The cuttings were inserted into flats after the appropriate hormone treatments on July 3 and 4, 1974. Intermittent mist was used and the plants were harvested July 29 and September 13, 1974.

A randomized complete block design was used. There were four replications of ten cuttings of each cultivar. At the end of the experiment each cutting was given a rating of one (dead) to five (well) rooted.

RESULTS

Geraniums. There was no difference in the rooting index among any of the media. The rooting percentage was above 90 in all media.

Poinsettias. There was no difference in any of the media in rooting index. The rooting percentage was above 90 in all except the all-bark medium which was only 86%.

Carnations. There was no difference in rooting index for any media, except the rooting percentage was 86% and 84%, respectively for the all bark, and all sand media.

Chrysanthemum. The chrysanthemum rooted significantly better in the all-bark medium. The worst medium was equal parts of sand and bark. The other media were intermediate (Table 1).

This portion of the experiment was rerun in September, 1974. Peat-perlite proved to be the best medium followed by the all-bark medium; the two bark-sand mixes were poorest (Table 1).

Only the chrysanthemum showed any significant differences in rooting index due to medium. Root quality was not quantitized; however, root quality appeared to be better in media containing bark.

Only the dogwood and the Burford holly showed any significant differences due to medium (Table 2). Both of these plants rooted better in the sand-peat and perlite-peat media. The tendency of the others was generally to have a lower rooting index and percentage rooting in the bark media.

Table 2. The effect of medium on the rooting index and percentage rooting of cuttings of seven woody plants.

Medium	*Spiraea vanhouttei* index[y]	%	*Forsythia x intermedia* index	%	*Ilex cornuta* 'Burfordii' index	%	*Juniperus chinensis* 'Hetzii' index	%	*Cornus florida* index	%	*Magnolia x soulangeana* index	%	*Ilex decidua* index	%
Bark/Sand (1:1)	3.30	80	3.63	80	1.98a[z]	20	2.15	25	2.25a	35	1.38	28	1.73	5
Bark/Sand (2:1)	3.35	70	4.23	90	1.93a	13	2.25	15	2.10a	18	1.05	20	1.98	8
Sand	3.00	70	4.38	95	1.95a	8	2.53	40	2.65b	38	1.95	45	2.23	20
Peat/ Perlite (1:1)	3.33	73	4.50	100	3.23b	65	3.60	73	3.98b	83	1.38	25	2.15	38
Peat/Sand (1:1)	3.13	68	4.73	100	3.55b	58	2.95	58	3.35b	68	2.18	50	2.10	15

[y]Root indices are 0 for dead plant, 5 for well-rooted plants.

[z]Treatment means followed by a different letter in one column are significantly different at the 5% level.

CONCLUSIONS

Hardwood bark and hardwood bark-sand mixes are worthy of a trial as propagation media, and have in some cases proved to be as good as other mixes. Bark mixes may be excellent for propagation in situations where plants are propagated directly in containers.

LITERATURE CITED

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