The Effect of Organic Soil Amendments on the Growth and Development of *Kalmia latifolia*

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INTRODUCTION

As recently as 20 years ago horticulturists generally agreed that the addition of organic soil amendments to the planting hole would improve both the survival and subsequent growth of shrubs and trees transplanted into the landscape. However, about fifteen years ago evidence started to accumulate that has prompted re-evaluation

Research using peat and/or pine bark to amend backfill when planting woody plants as diverse as *Rhododendron* 'English Roseum' and *R* 'Hino-Degiri', shore juniper, *Ilex crenata* 'Helleri', flowering dogwood, sweet gum and silver maple in mineral soils (Corley, 1984; Schulte and Whitcomb, 1975) indicated that not only were we wasting our time when recommending organic matter but also wasting our customer's money (Hummel and Johnson, 1985). However, all of this research was done with individual planting holes. Other research showed that some cultivars of roses and evergreen azaleas did benefit from the addition of organic matter to an entire planting bed (Banko, 1986; Corley, 1983).

Mountain laurel, *Kalmia latifolia*, has long been recognized as one of the most desirable of landscape plants. However, producing a consistent crop of top quality field grown plants has been difficult. Initial survival of transplants had been disappointing, crop growth was often slow, and the quality of the crop was inconsistent. Recent advances in nutritional research have helped (Bir, 1987), but these problems remained so we decided to investigate the effect of pine bark or Canadian sphagnum peat as a soil amendment in field bed culture of mountain laurel seedlings.

MATERIALS AND METHODS TEST 1

One-year-old seedling *Kalmia latifolia* were transplanted into 5 × 60 ft beds at the Mountain Horticultural Crops Research Station in August 1986. Each of the 3 beds constituted a complete block. Amendment plots, 5 × 10 ft, were randomized within the beds. Seedling plants had been selected for uniformity from a crop grown from the same seed source. Plants were initially grown in a pine bark and peat medium (3:1,v/v) which had been amended with 7 lb of dolomitic limestone and 3 lb of Esmigran per cu yd. Peters 15-45-5 Rhododendron Special fertilizer was used throughout the production of these transplants

The seedlings were planted 2 ft apart in rows beginning 1 ft in from the edge of the plots with 15 plants per treatment Only the middle 9 plants were measured. Rows on the beds were 2 feet apart starting 1 1/2 ft in from the edge of the bed.

Amendment treatments were spread on top of beds to the depth indicated then tilled in to a depth of 8 in. Treatments were as follows:

- Control no amendment
- 2 in. of pine bark
- 4 in of pine bark
- 1 in. of Canadian sphagnum peat
- 2 in. of Canadian sphagnum peat
- 1 in. of Canadian sphagnum peat + 2 in. of pine bark

Pine bark used was the least expensive grade sold bagged as "mulch."

Prior to planting, soil fertility was corrected to N. C. Agricultural Extension Service (NCAES) suggestions. During the course of the experiment, plants were irrigated as necessary and fertilized according to NCAES suggestions. Before the 1987 and 1988 growing seasons, plants were pruned uniformity to induce the branching habit preferred by the nursery industry

RESULTS

Growth measurements reported are in the form of a Growth Index (GI) which was determined by measuring the maximum height of the plant and adding this figure to a representative width determined by measuring the maximum and minimum width, adding the figures together and dividing by two. This sum of height and width is then divided by two

Any amendment treatment was found to be beneficial in both survival and growth (Table 1). At the end of the third year, plants in the greater amounts of peat and pine bark had produced significantly more growth than the controls and those in two inches of pine bark.

Table 1. Growth and survival of *Kalmia latifolia* as affected by selected organic soil amendments

Treatment	Alive	Growth index	
	%	2 yr	3 yr
Control	78 a[1]	11 9 a	14 3 a
2 in bark	96 b	17 0 b	19.2 b
1 in. peat	96 b	18 0 b	20.8 bc
4 in bark	100 b	18.5 b	21 1 bcd
2 in peat	96 b	20.0 b	23 0 cd
1 in peat + 2 in bark	96 b	20.2 b	24 4 d

[1] Duncan's new multiple range test Numbers followed by the same letters are not significantly different from each other at the 5% level.

Despite the significant differences, some visitors were not convinced. One repeated question concerned the performance of these plants once they were planted into mineral soils in a typical landscape. Had they been pampered too much to be able to withstand the rigors of the average landscape?

To test landscape survival, we transplanted from each of the amendment treatments to tilled clay-loam soil in a south facing full sun location in mid May. There

was 3 to 4 in. of new vegetative growth when the plants were moved. Plants were not irrigated but they were given a scant one inch pine bark mulch The new vegetative growth wilted each day and recovered each night for about a week. Fortunately, we got rain four days after transplanting.

All of the transplanted plants are still alive. They bloomed beautifully the year following transplanting. However, they are not thriving Mountain laurels in clay loam soils on south facing slopes in the full sun usually don't thrive in our area.

MATERIALS AND METHODS TEST 2

As with most research, questions remained. How much amendment was enough and how much was too much? Would named cultivars respond as well?

With support from the North Carolina Association of Nurserymen and plants provided by Briggs Nursery, Olympia, WA, we set up another test. Our treatments were:

- 2 in. of Canadian sphagnum peat
- 4 in. of Canadian sphagnum peat
- 3 in of pine bark
- 6 in. of pine bark.

All of our plants were propagated from tissue culture, grown on in quart pots, then selected for uniformity before planting—all in an attempt to minimize experimental error. Our test plants were *Rhododendron catawbiense* 'Gomer Waterer' and *R.* 'Gibraltar', and *K. latifolia* 'Ostbo Red'.

RESULTS

After two years of growth, there is a lot of variation in growth response which has translated into statistically significant differences for only the *R.* 'Gibraltar' growth index (Table 2).

Table 2. Growth of *Rhododendron* 'Gibraltar' as affected by selected soil amendments

Treatment	Growth index
Control	7.6 d[1]
2 in peat	12 3 ab
3 in pine bark	11.4 bc
4 in peat	14.6 a
6 in pine bark	9 6 cd

[1] Duncan's new multiple range test Numbers followed by the same letters are not significantly different from each other at the 5% level.

Applying peat or the lesser amount of pine bark significantly enhanced growth of rhododendron 'Gibraltar'. However, 6 in. of pine bark did not significantly enhance growth over no soil amendment This may have been due to excessive drying of soil since this plot required more frequent irrigation during the first 2 months of the test, i.e., until plants became established.

LITERATURE CITED

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DAVE THOMPSON: We found that when we power rotovated we destroyed the soil structure and the addition of organic matter did not help So we went back to plowing and disking My question to you is did you try any treatments with out power rotovating?

DICK BIR. Not in this experiment. I suspect you are working with better raw material than we are. I have not seen that in our clay soils. This is an example of doing what works best for you

RAY MALEIKE: Did you use the same amount of fertilizer per plant in your treatments?

DICK BIR: Yes, our standard recommendation in North Carolina is 1/4 oz of nitrogen per plant after planting; 1/2 oz the second year, and 1 oz the third year before bud break in the spring We use ammonium nitrate in this case.