

GREAT BARRINGTON HOUSATONIC RIVER WALK EXPERIMENTS: PROGRESS REPORT 2008

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INTRODUCTION

This year (2008) was our second year of monitoring plant growth and testing the effects of compost tea at four of our five experimental sites at River Walk. For the Rain Garden site, this is the third year of monitoring and tea treatment. Table 1 summarizes our data collection efforts at all five sites since August 2006.

We followed the same field methods as in 2007, with some minor changes. First, in April we installed deer fencing around the perimeter of each site, to exclude any predators. Second, in September, the herbaceous test plants were so robust (especially the *Helianthus*) that we did not count leaves and side branches, and we did not measure stem lengths. We did count every stem, flower, bud, and peduncle, and our end-of-season biomass methods remained the same. (See 2007 progress report for a full description of methods.)

Table 1. Schedule of data collection at River Walk's test sites, 2006-2008.

Site	No. of quadrats (no. individuals at planting)	Date planted	Growth measurements taken	Weed collection	Herbaceous plant collection
Rain Garden (RG)	8 (32)	9 Aug. 06	9 Aug. 06 20 Sept. 06 20-23 Jun. 07 12-18 Sept. 07 25-28 June 08 18 Sept. 08	27 Sept.-4 Oct. 06 25 Jun. 07 21 Sept. 07 18 June 08 11 Sept. 08	4 Oct. 06 28 Oct. 07 18 Sept. 08
Searles School (SS)	2 (8)	16 May 07	17 May 07 20-23 Jun. 07 12-18 Sept. 07 25-28 June 08 18 Sept. 08	9 Jul. 07 21 Sept. 07 18 June 08 11 Sept. 08	28 Oct. 07 18 Sept. 08
Stanley Overlook	4 (16)	16 May 07	17 May 07 20-23 Jun. 07	25 Jun. 07 21 Sept. 07	28 Oct. 07 18 Sept. 08

(SO)			12-18 Sept. 07 25-28 June 08 18 Sept. 08	18 June 08 11 Sept. 08	
Church Parking Lot (CPL)	4 (16)	16 May 07	17 May 07 20-23 Jun. 07 12-18 Sept. 07 25-28 June 08 18 Sept. 08	25 Jun. 07 21 Sept. 07 18 June 08 11 Sept. 08	28 Oct. 07 18 Sept. 08
Norway Slope (NS)	4 (16)	16 May 07	17 May 07 20-23 Jun. 07 12-18 Sept. 07 25-28 June 08 18 Sept. 08	25 Jun. 07 21 Sept. 07 18 June 08 11 Sept. 08	28 Oct. 07 18 Sept. 08

This is the first year that we have had two growing seasons (2007 and 2008) to compare across all quadrats, whereas last year’s analysis focused on the Rain Garden quadrats, the one site we established in 2006. We analyzed our data in several ways: by comparing growth in control quadrats to that in treatment quadrats; by comparing herbaceous plant biomass in control versus treatment quadrats; and by comparing the biomass of weeds in control versus treatment quadrats. To date, we have not found any significant positive effects of treating the quadrats with compost tea.

RESULTS TO DATE

Plant growth – Overall plant growth was positive across all species and all quadrats. For the herbaceous species (*Agrimony* and *Helianthus*), we examined the change in number of stems from 2007 to 2008 (Table 2). For the woody species, we examined numbers of leaves (Table 3). *Helianthus* showed by far the greatest increase in number of stems. *Lindera* showed a substantial increase in number of leaves.

Table 2. Comparison of numbers of herbaceous stems growing in all River Walk quadrats in September 2007 and September 2008.

Species	2007	2008	Increase
<i>Agrimony gryposepala</i>	46	52	6
<i>Helianthus decapetalus</i>	65	589	524

Table 3. Comparison of numbers of leaves growing on shrubs in all River Walk quadrats in September 2007 and September 2008.

Species	2007	2008	Increase
<i>Lindera benzoin</i>	385	1,093	708
<i>Viburnum acerifolium</i>	160	231	71

Effects of compost tea treatment – We conducted several t-tests using Excel, to test for significant differences between control and tea-treated quadrats. Using the September 2008 data, and excluding dead plants, we grouped each species into control and treatment groups. We tested for significant differences between:

1. Average herbaceous plant biomass per quadrat (*Agrimony* and *Helianthus* biomass combined)
2. Average number of stems of herbaceous plants per quadrat (*Agrimony* and *Helianthus* analyzed separately).
3. Average number of flowers, buds, and peduncles per stem in each quadrat (*Agrimony* and *Helianthus* analyzed separately).
4. Average length of new woody growth (distance from apical meristem to last terminal bud scar) in each quadrat (*Lindera* and *Viburnum* analyzed separately).
5. Average number of leaves on woody plants in each quadrat (*Lindera* and *Viburnum* analyzed separately).

There was no significant difference between control and treatment groups in most of the above measurements. However, two tests did show significant results at the 0.05 level. The average number of flowers and buds per stem on the *Helianthus* plants was significantly *lower* in treatment quadrats (N=14; control mean=8.6; tea mean=5.5; P=0.02). In addition, *Viburnum* plants had a *lower* average number of leaves in treated quadrats (N=10; control mean=31.4; tea mean=14.8; P=0.04). However, the sample size for *Viburnum* is small (5 plants per group).

We also compared weed biomass in all control and treatment quadrats from 2006 through 2008. We tested for a significant difference in the average weed biomass (by quadrat) in control versus treatment groups. These results were not significant (N=76; control mean=10.1; tea mean=8.8; P=0.33).

CONCLUSIONS

All four species of test plants are growing positively at our five study sites at River Walk. *Helianthus* and *Lindera* are growing at the fastest rates. By the end of 2009, we hope to have sufficient data to compare all four species' rates of growth.

From 2006 to 2007, *Viburnum* showed negative growth in the Rain Garden quadrats. The death of several plants resulted in net loss of leaves and stems. This year, we see that the remaining *Viburnum* increased in numbers of leaves from 2007. Our anti-predator fencing may explain this positive change. Another explanation may be that the plants that survived the first year after planting are more likely to survive in subsequent years, and the death rate thereby levels off.

Results from our compost tea experiments mostly show that the tea treatment is not having an obvious, positive effect on plant growth at River Walk. Our two significant results indicate reduced numbers of leaves (*Viburnum*), and fewer flowers and buds per stem (*Helianthus*) in treatment quadrats. However, these results do not necessarily indicate an adverse effect of compost tea. The treated test plants may be dedicating more resources to their roots than to their above-ground components. It may be necessary to measure biomass of roots at the end of the experiment, when we are no longer monitoring growth from year to year. This will help us truly determine whether compost tea positively, negatively, or non-significantly affects our four test species at River Walk.