

Effect of Wood Chips and Rice Hulls on Water Holding Capacity of a Peat-based Substrate

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Materials and Methods

The study included 13 substrates with different ratios of four media components. Four species of plants were grown (Vinca, Verbena, Impatiens, and Petunia), each with two replicate plants of each of the 13 substrates.

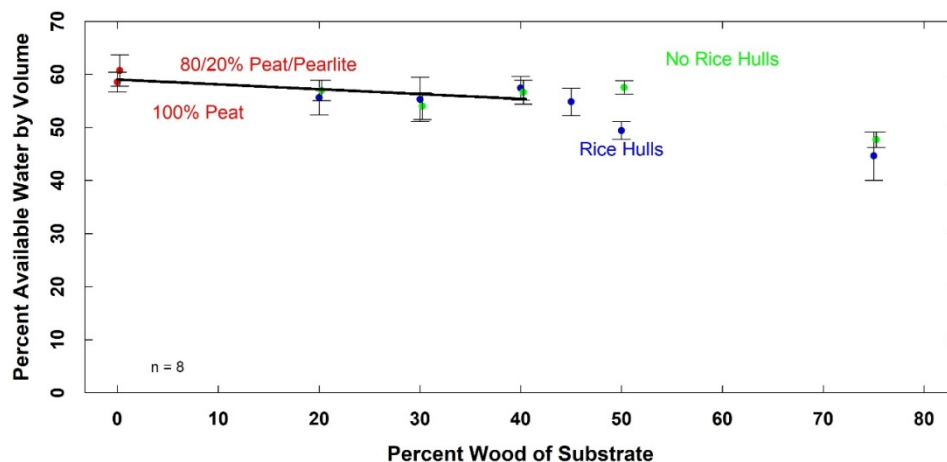
Each 1 Liter container, with approximately 850 mL of media volume, was fully hydrated and weighed to determine a maximum mass. Plants were then grown for three days until they wilted. Wilting was visually quantified on each pot. When the plant wilted, the container was weighed again to determine the minimum mass. The container was then re-hydrated to determine a second replicate maximum mass. The two fully-hydrated, maximum masses were averages. The difference between the maximum and minimum masses was used to calculate the water holding capacity (Percent Available Water, PAW; assuming a constant 850 mL substrate volume) for each container.



used in the study. Impatiens not pictured.

Results

Plant size and transpiration rate were similar among species and substrates. There was no significant interaction between percent available water and plant species, so the four species were grouped in the figure below to provide 8 replicate containers per treatment. The addition of rice hulls had no significant effect on the water holding capacity of the substrate with 40% or less wood. Water holding capacity tended to decrease as the percent wood in the substrate increased up to 40% wood. Can you share the slope of the line below from 0 to 40% wood? Would indicate the decrease in water holding per percent increase in wood.



The cause of the difference in treatments with and without rice hulls at 50 % wood is not known (treatments 6 and 11).

Some of the difference in water holding capacity is likely due to differences in settling of the substrate, which was not measured. A decrease of only 0.2 cm height would result in a 2 % change in volume and a 1 % change in water holding capacity.

The typical transpiration rate of these plants was about 20 mL (g) per hour. A 5% increase in plant available water translates to 43 mL (g) of water, which would be used in about 2 hours at the typical transpiration rate.

Treatment Code	% Peat	% Perlite	% Wood	% Rice Hulls	Maximum Mass	Minimum Mass	Percent Available Water
No Rice Hulls							
1	100	0	0	0	658	160	59
2	80	20	0	0	705	179	62
3	80	0	20	0	653	169	57
4	70	0	30	0	631	172	54
5	60	0	40	0	669	187	57
6	50	0	50	0	676	188	58
7	25	0	75	0	598	193	48
Rice Hulls							
8	70	0	20	10	647	175	56
9	60	0	30	10	661	191	56
10	50	0	40	10	693	205	57
11	40	0	50	10	603	183	49
12	15	0	75	10	563	188	44
13	50	0	45	5	658	192	55

