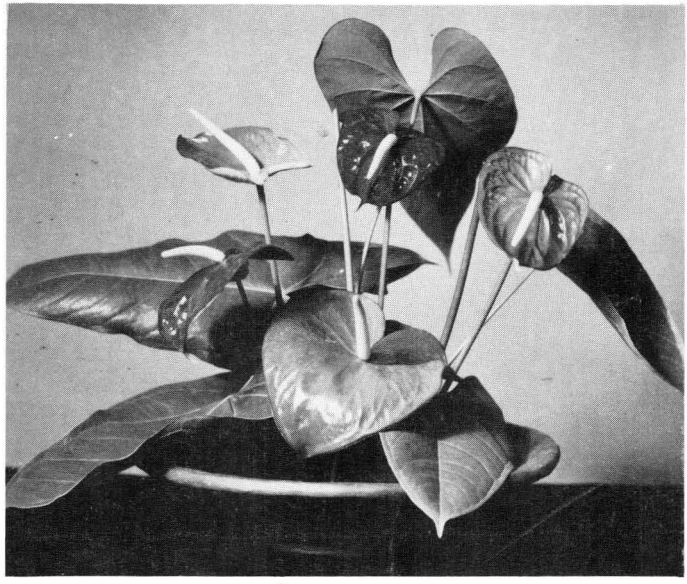
Wood Shavings as a Medium for Anthuriums

H. Y. Nakasone • H. Kamemoto



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INTRODUCTION

Previous studies (*1*) on the effect of several types of media on the production of anthurium flowers have shown that anthuriums can be grown quite successfully in a number of materials, alone or in mixture. Among the more promising media were coffee parchment, bagasse, macadamia nut hulls, and wood shavings. Coffee parchment and macadamia nut hulls are limited in quantity and highly localized. Bagasse can be found on all the major islands where sugar cane is grown, but with plantations finding additional uses for this material, supply can become a limiting factor. Wood shavings showed relatively poor results when used alone, but showed some promise when used in combination with other materials.

Since wood shavings are readily available in large quantities especially in areas lacking in other materials and are inexpensive, their proper use should prove highly beneficial to anthurium growers. This circular reports the study of the effects of several combinations of wood shavings with other materials upon the production of anthurium flowers.

MATERIALS AND METHODS

Materials

Wood shavings. This material is a waste product of the planing mills and consists largely of Yellow Pine (*Pinus ponderosa*), Douglas Fir (*Pseudotsuga taxifolia*), and Redwood (*Sequoia sempervirens*). Shavings of hardwood, mostly species of *Quercus*, may also be found in small quantities. Wood shavings possess good water-retaining capacity and provide good drainage but lack nutrient supply.

Soil. Although soil is the universal medium for most plants, it has never been considered desirable for anthuriums. However, when mixed with other materials, it has shown some promise (*1*). The soil type used in this experiment may be classified as silted clay loam. The texture is relatively fine and slightly sticky.

Tree fern fiber. Coarse, partially shredded tree fern fibers (*Cibotium chamissoi*) were used as a means of comparing the effects of the other media. This material is relatively expensive and limited to the island of Hawaii. Nevertheless, it has become accepted as a standard medium for anthurium growing.

Mixtures. Wood shavings were used alone and in several combinations. The combinations of wood shavings and soil were 1:1, 3:1, and 5:1, respectively. A 5:1 mixture of wood shavings and cow manure was also used in the test.

Plant material. Clonal material of the Suehiro White, a pink-tinged white variety, was used in this study (fig. 1).

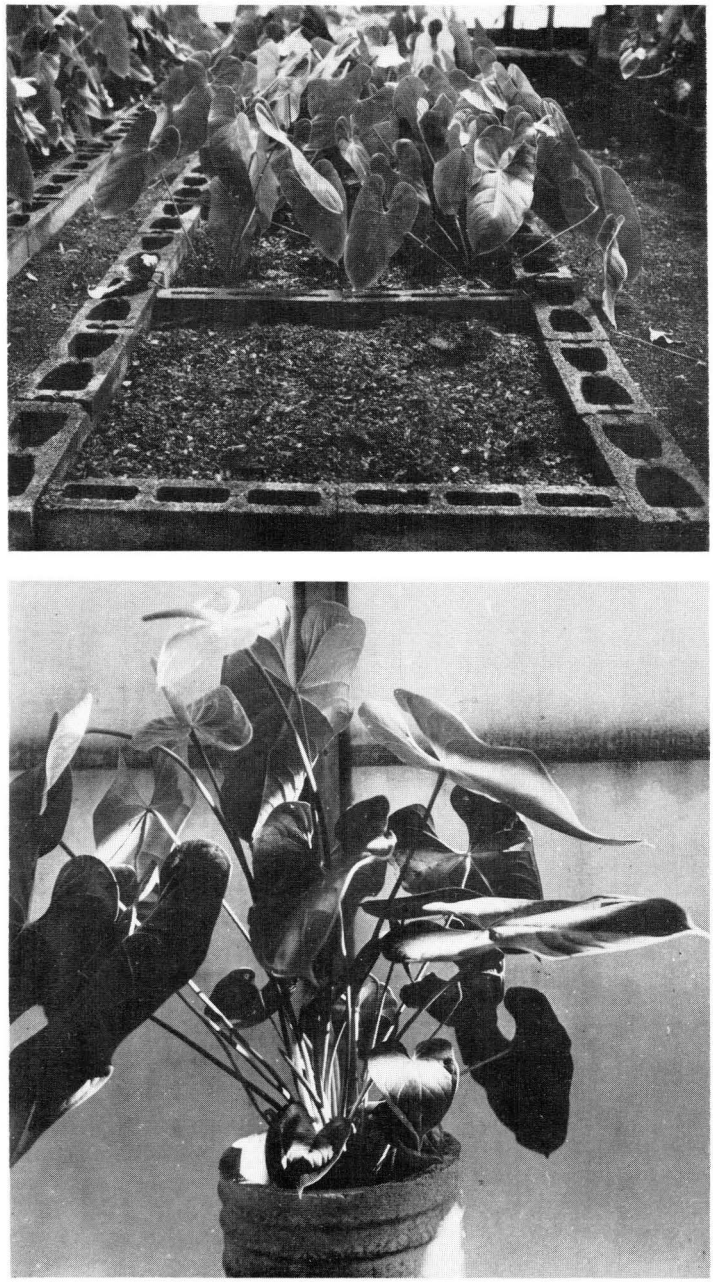

FIGURE 1. Two methods of culture used in this experiment. *Top*, ground culture showing plots. Each bed is constructed by laying two parallel rows of 8-inch hollow tile blocks 3 feet apart and 28 feet long. This long bed is partitioned into six 3 × 3 plots with 4-inch hollow tile blocks. Each plot contained 5 plants. *Bottom*, pot culture. This cement pot is 10 inches wide and 11 inches deep.

Method

The plants were grown in a lathhouse at two shade levels, 67 and 75 percent during midday.[1] Six media were randomized four times in each shade level with each plot containing five plants. The plots were 3 feet square and constructed by laying 8-inch hollow tile blocks on the soil surface and filling the area with the prescribed medium (fig. 1).

In addition, the ground culture method was compared with plants grown in pots. These pots were constructed of cement and were approximately 10 inches in diameter and 11 inches deep (fig. 1). Each pot contained one plant, four pots constituted a plot, and the treatments were replicated four times. Pots were placed in the 67 percent shade and growth comparisons were made with the ground culture method in the same shade level.

Since the plant materials were not uniform in size, the plants were distributed to provide each plot with five plants ranging from large to small. For final analysis three of the largest plants were selected from each plot. Plants were set into the plots in July, 1953, and recording was initiated from January, 1954, until the termination of the experiments in January, 1955. Data, which consisted of flowering dates, size of spathe (expressed as length × width) and length of flower stem (expressed in inches), were taken at weekly intervals and treated statistically by the variance analysis method.

The plants were fertilized once every three months with one tablespoon anthurium fertilizer (6–14–7.5) per plant. Plots were replenished with fresh media as they became depleted. Irrigation was done daily with an overhead sprinkling system.

RESULTS

In table 1 data are presented for the mean yield of flowers per plant per plot per year, mean spathe size expressed as a product of length times width, and mean stem length of flowers in two shade levels and six media. Variance analysis showed no block differences in the three categories analyzed, indicating negligible environmental effects throughout the experiment. On the other hand, highly significant differences were obtained with media and shade. The interaction between media and shade was also negligible except for spathe size in which a 5 percent significance was exhibited.

Effect of media and shade upon flower production

For flower production the 5:1 wood shavings:cow manure mixture and the 1:1 wood shavings:soil mixture gave the best results in the 75 percent shade. Tree fern, the standard medium used in anthurium production, gave significantly poor results under 75 percent shade but performed equally well with the former mixtures in the 67 percent shade. The remaining media showed poor results in both shade levels.

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[1] Actinometer reading during period of highest light intensity at Mid-Pacific Experimental Farm area, Manoa Valley. (Period of highest light intensity approximates midday.)

Summer = mean daily max. gm. cal. per sq. cm. per minute = 1.49

Winter = mean daily max. gm. cal. per sq. cm. per minute = 1.01

No data were available during the course of the experiment. Hence, readings given above are for the year 1956.

TABLE 1. Average yield of anthurium flowers per plant per plot per year, average spathe size, and stem length in two shade levels and six combinations of media

Media	Yield		Spathe Size in Square Inches		Stem Length in Inches	
	75% shade	67% shade	75% shade	67% shade	75% shade	67% shade
Wood shavings	3.60	3.98	15.64	12.71	15.5	12.5
Wood shavings:soil (1:1)	3.75	4.18	17.11	12.53	15.9	12.6
Wood shavings:soil (3:1)	3.23	3.93	12.18	11.87	13.3	12.3
Wood shavings:soil (5:1)	3.05	3.70	12.50	12.54	13.6	12.2
Wood shavings:cow manure (5:1)	4.23	4.80	16.49	18.64	15.9	14.8
Tree fern fiber	3.50	4.48	16.74	23.06	13.9	16.0
Average per plant, per spathe, per stem for shade	3.56	4.18	15.11	15.23	14.68	13.40
LSD at p = .05 for media	.54 flowers		4.64 sq. in.		no significance	
Between shade * = sig. at p = .05 ** = sig. at p = .01	shade**		no significance		shade*	

Inasmuch as soil itself has been considered a poor medium for anthurium growing, a 1:1 mixture has given remarkable results. Furthermore, there was a significant decline in flower production as the proportion of wood shavings to soil was increased. The same relationship existed under the two shade levels tested. Several factors may be considered in an attempt to explain the effect of soil and soil mixtures upon yielding ability of anthuriums. The pH of the medium may influence the growth and yielding ability of anthurium plants. However, in previous experiments (*1*) anthuriums were shown to grow very well in coffee parchment (pH of 4.8 to 5.0) and bagasse (pH of 7.0 to 7.2). Fresh tree fern has a pH of about 4.3 and wood shavings around 6.5 to 6.8. Although the pH of the soil used in this experiment is not known, it is highly conceivable that the pH of the soil and soil:wood shavings mixtures were within the pH range of 4.8 to 7.2.

Nutrition and aeration are probably the two factors of greater importance than pH in explaining the effects of soil and soil mixtures upon anthurium growth. Soil alone in all probability contains adequate nutrition and by its relatively poor drainage capacity is able to hold the fertilizer longer than the other media, but it lacks aeration. When mixed with wood shavings in equal proportions, adequate aeration is provided to effect good growth. A further increase in the proportion of wood shavings to soil, probably lowers the nutritive capacity of the mixture.

The fact that anthuriums require certain amount of shade for optimum growth and flower production is well known. However, to determine the optimum sunlight requirement is difficult because of its variability from season to season, between localities and even from day to day. In this experiment only two shade levels were tested and the difference found between them was highly significant as far as flower production was concerned. The 67 percent shade yielded an average of .62 flowers per plant more than the 75 percent shade, indicating that the optimum amount of light for anthuriums at the location of the experiment is greater than 25 percent light at midday.

Effect of media and shade upon spathe size

The effects of media upon size of spathe were found to be quite variable in the two shade levels. In the 75 percent shade the 1:1 wood shavings:soil mixture gave the best results but was not significantly better than the other media, with the exception of the 3:1 wood shavings:soil mixture. Tree fern and 5:1 wood shavings:cow manure mixture performed equally well. In the 67 percent shade tree fern fiber and wood shavings:cow manure mixture gave significantly better results than the other four media.

Variance analysis showed significant interactions between media and shade. This interaction is evident in the differential performance exhibited by the media in the two levels of shade. As pointed out, wood shavings:soil (1:1) gave better performance in the 75 percent shade than in the 67 percent shade. Tree fern and wood shavings:cow manure mixture, on the other hand, had a greater influence upon flower size in the 67 percent shade.

The difference between the average spathe size for the two levels of shade was not significant, indicating that the eight percent difference in sunlight intensity did not affect the size of flowers on the average.

TABLE 2. Average yield of anthurium flowers per plant per plot per year, average spathe size, and stem length in two cultural methods and four combinations of media

Media	Yield		Spathe Size in Square Inches		Stem Length in Inches	
	Pot culture	Ground culture	Pot culture	Ground culture	Pot culture	Ground culture
Tree fern fiber	4.30	4.48	22.74	23.06	15.95	15.95
Wood shavings	3.62	3.98	17.45	12.71	14.63	12.50
Wood shavings:soil (3:1)	3.90	3.93	12.60	11.87	12.65	12.25
Wood shavings:cow manure (5:1)	4.68	4.80	19.73	18.64	16.95	14.83
Average per plant, per spathe, per stem for culture	4.13	4.30	18.13	16.57	15.05	13.88
Between culture * = sig. at p = .05 ** = sig. at p = .01	no significance		culture*		culture**	
LSD at p = .05 for media	.44 flowers		3.11 sq. in.		1.58 inches	

Effect of media and shade upon length of flower stem

The differences found in the average stem length as influenced by media were not statistically significant in both shade levels. But the data presented in table 1 again indicate that the 1:1 wood shavings:soil mixture, wood shavings:cow manure and wood shavings only produced slightly longer stems than the mixtures in the 75 percent shade. Tree fern repeated its high influence in the 67 percent shade. The wood shavings:soil mixtures other than the 1:1 mixture consistently gave poor results.

The difference of 1.28 inches per stem between the two shade levels was significant at the 5 percent level, indicating that denser shade influences the production of longer stems.

Ground culture versus pot culture

This experiment was conducted to ascertain whether there were appreciable differences in flower production, flower size, and stem length by these two methods of culture, using four of the media used in the previous experiment. Both cultural methods were conducted under the 67 percent shade level.

The two cultural methods tested made no apparent difference in flower production (table 2). However, in spathe size and stem length, the pot culture method produced significant increases. There was an average increase in spathe size of 1.56 square inches per flower and 1.17 inches per flower stem.

Media effected significant differences in all phases of plant growth. Wood shavings:cow manure mixture and tree fern fiber gave consistently better results than the 3:1 wood shavings:soil mixture and wood shavings alone under both cultural methods. Of the two top media, wood shavings:cow manure mixture gave slightly better results in flower production under both cultural methods and also in stem length production under pot culture. On the other hand tree fern fiber showed better results in spathe size production under the two cultural methods and also in stem length production under pot culture. These differences were not significant except for the differences in flower size between tree fern and wood shavings:cow manure under ground culture which showed significance at the 5 percent level of probability.

SUMMARY AND CONCLUSIONS

The effects of six different media, two shade levels, and two methods of culture upon anthurium flower production, spathe size, and stem length were investigated. It was found that a 1:1 mixture of wood shavings and soil, a 5:1 mixture of wood shavings and cow manure, and tree fern fiber consistently gave the best results in all categories of plant growth in the two shade levels. In pot culture wood shavings: cow manure and tree fern fiber were the best in all phases of plant growth. It is interesting to note that tree fern was consistently better in the 67 percent shade than in the 75 percent shade.

Among the various mixtures of soil with wood shavings, the heaviest soil mixture (1:1) gave the best results. This appears to be contradictory to expectation since soil alone has been found to be extremely poor as a medium for anthuriums. One

would ordinarily expect the lighter soil mixture to be better than a heavier one. Wood shavings alone were found to be undesirable as a medium but when mixed with manure or with equal proportions of soil, they provided a good medium for anthurium production.

The two shade levels used in this experiment were 67 and 75 percent. Plants produced significantly more flowers in the 67 percent shade than in the 75 percent shade, indicating the need for more sunlight than the 25 percent sunlight allowed by the deeper shade level. Size of spathe was not affected by the shade levels, but was completely dependent upon media. Stem length, on the other hand, was significantly affected by shade. The 75 percent shade influenced the production of longer stems than the 67 percent shade.

The two cultural methods did not produce any differential effect upon flower production, but in spathe size and stem length production the pot culture method demonstrated its superiority over ground culture method. These two beneficial effects indicate that plants are grown more efficiently in pots than in the ground.

Thus the role of proper wood shavings mixtures as media for anthurium culture has been clearly demonstrated and these mixtures can be used in place of the more expensive standard medium without loss of efficiency.

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