

Vermiculite For Rooting Cuttings*

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What is the best grade of vermiculite for rooting cuttings with overhead watering and constant water level? How deep should I stick the cuttings? These are frequent questions from the commercial florist.

During the past season various types of cuttings have been stuck in coarse white silica sand (18 Mesh), Coarse Terralite #1 ($\frac{1}{4}$ inch size), medium Terralite #2 ($\frac{1}{8}$ inch), coarse Mica-Gro B-2 ($\frac{1}{4}$ inch), medium Mica-Gro B-3 ($\frac{1}{8}$ inch) and a mixture of half sand and half medium Terralite.

One plot of each of these six rooting media was watered by the constant water level method (New York State Flower Growers Bulletin #7), and one plot was watered overhead every day in bright weather and every other day in cloudy weather. All of the plots were thoroughly soaked before sticking the cuttings.

SUMMARY OF RESULTS

1. Good rooting of geranium, Saint-paulia and rose cuttings was obtained with coarse sand, coarse and medium grades of Terralite and Mica-Gro vermiculite automatically watered (constant water level) and overhead watered.
2. In general, cuttings rooted more rapidly in vermiculite than in sand.
3. Saintpaulias one or two inches deep in vermiculite watered every one or two days rooted faster than those in constant water level. Best rooting in automatically watered vermiculite was obtained with the base of the cuttings one inch above the water level.
4. Automatically watered rose cuttings in vermiculite rooted better with the base of the cuttings $1\frac{1}{2}$ - $3\frac{1}{4}$ inches above the water than when 1 - $1\frac{1}{2}$ inches above the water. With surface watering, cuttings stuck 2 - $2\frac{1}{2}$ inches deep were better than those 1 - $1\frac{1}{2}$ inches deep.
5. Geraniums rooted well at several depths in all treatments except in sand 1 - $1\frac{1}{2}$ inches above the water table. The sand was too fine for this depth and remained too wet.
6. Apparently geraniums root satisfactorily under a greater variety of moisture conditions than roses. Roses require a higher moisture content of the media.
7. Both grades of Mica-Gro and Terralite rooted cuttings well.
8. Coarse and medium vermiculite may be watered overhead every 1 or 2 days if proper drainage is provided and the vermiculite is not packed.

EXPERIMENTS

In all experiments large cuttings were used. The geranium and rose cuttings were about 4-5 inches long. The leaves were not trimmed. Cuttings were dipped in Fermate suspension. No root inducing chemicals or bottom heat were used. The plots were in a raised bench on the north side of the house with a night temperature of 60° . Cuttings were shaded from direct sunlight on bright days by a vertical black cloth hung in the aisle on the south side of the propagating bench.

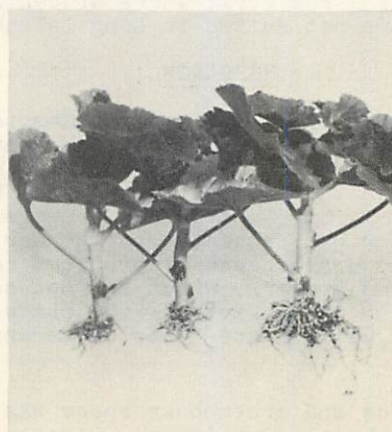
The rooting materials were about 4 inches deep on top of 1 inch of pea gravel. The base of the cuttings in the constant level plots were approximately 1 - $1\frac{1}{2}$, 2 - $2\frac{1}{2}$ inches or $2\frac{1}{2}$ -3 inches deep.

When removed from the bench, the cuttings were graded as excellent, good, fair or no rooting. The picture shows examples of 1 "excellent" and 2 "good" rooted geranium cuttings. The "fair" cuttings had roots up to $\frac{3}{8}$ inch long and at a later date probably would have developed into good and excellent cuttings.

Cuttings of Better Times, Mrs. Eashum, and Radio Red geraniums were donated by William Stimming of Newark Valley. Better Times rose cuttings were supplied by the Elmira Floral Products Company, Elmira, New York.

GERANIUMS

Experiment 1 -- Twelve Better Times cuttings were stuck to two depths in the twelve plots on November 1, 1948. About 3 weeks later on November 23, the cuttings were removed and graded. All of the cuttings were rooted.



Two cuttings on left graded as good, one on the right graded as excellent rooting.

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EXPERIMENT 1 ROOTING OF BETTER TIMES GERANIUMS

Rooting Medium	Height Above Water (INCHES)	Constant Water Level			Depth of Cuttings (inches)	Overhead Watering		
		Amount of Rooting				Amount of Rooting		
		Excellent	Good	Fair		Excellent	Good	Fair
Sand	1-1½	5	5	2	2½-3	1	9	2
	2-2½	5	4	3	1½-2	5	4	3
Coarse Terralite #1	1-1½	7	4	1	2½-3	10	2	0
	2-2½	6	6	0	1½-2	9	1	2
Medium Terralite #2	1-1½	8	4	0	2½-3	8	4	0
	2-2½	8	3	1	1½-2	9	2	1
Coarse Mica-Gro#B2	1-1½	7	4	1	2½-3	9	2	1
	2-2½	10	2	0	1½-2	7	3	2
Medium Mica-Gro#B3	1-1½	7	4	1	2½-3	7	4	1
	2-2½	7	4	1	1½-2	6	4	2
Medium Terralite & Sand	1-1½	7	5	0	2½-3	10	2	0
	2-2½	6	4	2	1½-2	7	3	2
Total		83	49	12		88	40	16

The rooting was good in all treatments. When the number of excellent and good cuttings are combined, there is practically no difference between the various rooting materials with the two methods of watering. Cuttings in sand did not root quite as rapidly as those in vermiculite.

Experiment 2. Twelve Mrs. Eashum cuttings were stuck on February 12, removed and graded on March 11. The base of automatically watered cuttings was about 1½ inches above the

water and 2½ inches below the surface of the rooting material. Overhead watered cuttings were stuck to the same depth 2½ inches.

The number of excellent cuttings was greater with overhead watering than with constant water level except for the coarse Terralite. As in the previous experiment, the combined number of good and excellent cuttings was nearly the same for all treatments except the constant water level sand, which appeared to be too wet.

EXPERIMENT 2 ROOTING OF MRS. EASHUM GERANIUMS

Rooting Medium	Height above water (inches)	Constant Water Level				Depth of Cuttings (inches)	Overhead Watering			
		Amount of Rooting					Amount of Rooting			
		Excellent	Good	Fair	None		Excellent	Good	Fair	None
Sand	1½	4	3	3	2	2½	9	1	1	1
Coarse Terralite	1½	9	3	0	0	2½	7	2	2	1
Medium Terralite	1½	5	5	1	1	2½	9	1	1	1
Coarse Mica-Gro	1½	6	3	2	1	2½	10	0	2	0
Medium Mica-Gro	1½	6	3	1	2	2½	8	0	1	3
Terralite & Sand	1½	7	2	1	2	2½	9	2	1	0
Total		37	19	8	8		52	6	8	6

Experiment 3. Fourteen Radio Red Cuttings were stuck to two depths in each of the twelve

plots on February 12; the cuttings were removed and graded a month later on March 11.

EXPERIMENT 3 ROOTING OF RADIO RED GERANIUMS

Rooting Medium	Height above water (inches)	<u>Constant Water Level</u>				Depth of Cuttings (inches)	<u>Overhead Watering</u>			
		Amount of Rooting					Amount of Rooting			
		Excellent	Good	Fair	None		Excellent	Good	Fair	None
Sand	1-1½	1	3	4	6	2-2½	6	3	2	3
	2-2½	10	1	1	2	1-1½	9	1	2	2
Coarse Terralite	1-1½	6	2	3	3	2-2½	6	3	4	1
	2-2½	7	2	3	2	1-1½	8	3	1	2
Medium Terralite	1-1½	10	2	2	0	2-2½	7	3	1	3
	2-2½	9	3	2	0	1-1½	12	2	0	0
Coarse Mica-Gro	1-1½	5	4	4	1	2-2½	5	4	3	2
	2-2½	6	5	2	1	1-1½	7	3	3	1
Medium Mica-Gro	1-1½	8	4	2	0	2-2½	8	2	2	2
	2-2½	8	2	3	1	1-1½	8	2	4	0
Terralite & Sand	1-1½	3	4	6	1	2-2½	3	2	6	3
	2-2½	9	1	2	2	1-1½	8	4	2	0
Total		82	33	34	19		87	32	30	19

The poorest rooting was in sand with cuttings only an inch from the water table, due probably to poor aeration in the wet sand. Cuttings in sand with the base 2½ inches above the water table rooted well. The sand 2½ inches from the water would not be as wet as sand 1 inch above the water and should have a better oxygen supply. In addition, the higher cuttings would be nearer the surface of the sand and probably better aerated. The results with the mixture of sand and Terralite were similar to those in sand.

There was not much difference between the automatically watered vermiculites. The

medium grades gave slightly better rooting than the coarser grades.

Most of the overhead watered vermiculite plots were good with the medium grade terralite having the best rooting.

Experiment 4. Saintpaulia leaf petiole cuttings were stuck to two depths December 1, 1948, and removed January 25. In each treatment there were 20 cuttings of the variety Pink Beauty, 20 White Lady, 10 Blue Boy, and 10 Orchid Queen.

EXPERIMENT 4 ROOTING OF SAINTPAULIAS

Rooting Medium	Height above water (inches)	<u>Constant Water Level</u>				Depth of Cutting (inches)	<u>Overhead Watering</u>			
		Amount of Rooting					Amount of Rooting			
		Excellent	Good	Fair	None		Excellent	Good	Fair	None
Sand	1-1½	0	24	31	5	2-2½	11	11	28	10
	2-2½	0	8	41	11	1-1½	6	20	27	7
Coarse Terralite	1-1½	31	25	3	1	2-2½	50	8	0	2
	2-2½	16	28	10	6	1-1½	43	9	3	5
Medium Terralite	1-1½	35	17	1	7	2-2½	54	4	2	0
	2-2½	13	23	16	8	1-1½	49	7	3	1
Coarse Mica-Gro	1-1½	27	22	9	2	2-2½	55	5	0	0
	2-2½	13	22	17	8	1-1½	51	7	0	2
Medium Mica-Gro	1-1½	12	23	14	11	2-2½	52	2	1	5
	2-2½	3	26	23	8	1-1½	40	5	8	7
Terralite & Sand	1-1½	7	17	19	17	2-2½	58	2	0	0
	2-2½	5	18	16	21	1-1½	48	5	4	3
Total		162	253	200	105		517	85	76	42

The poorest rooting occurred in the sand plots with both methods of watering and the automatically watered Terralite-sand mixture. In general, the overhead watered cuttings rooted much faster than those with a constant water level. The best rooting was obtained with surface watered cuttings 1 and 2 inches deep in medium Terralite and coarse Mica-Gro, 1 inch deep in the Terralite-sand mixture, and

2 inches deep in coarse Terralite. With constant water level the best results were obtained 1 inch above the water in coarse and medium Terralite.

Experiment 5. Eighteen Better Times 2 leaf rose cuttings with the lower cut just above a node were stuck February 10 and graded March 14.

EXPERIMENT 5 ROOTING OF BETTER TIMES ROSES

Rooting Medium	Height above water (inches)	Constant Water Level				Depth of Cutting (inches)	Overhead Watering			
		Amount of Rooting					Amount of Rooting			
		Excellent	Good	Fair	Callus-No Roots		Excellent	Good	Fair	Callus-No Roots
Sand	1/2-3/4	6	4	5	3	2-2 1/2	10	0	5	3
	1-1 1/2	10	3	2	3	1-1 1/2	4	5	2	7
Coarse Terralite	1/2-3/4	7	5	2	4	2-2 1/2	12	2	2	2
	1-1 1/2	6	3	4	5	1-1 1/2	6	3	6	3
Medium Terralite	1/2-3/4	14	4	0	0	2-2 1/2	13	0	3	2
	1-1 1/2	7	4	3	4	1-1 1/2	12	1	2	3
Coarse Mica-Gro	1/2-3/4	18	0	0	0	2-2 1/2	13	0	1	4
	1-1 1/2	10	3	3	2	1-1 1/2	9	2	3	4
Medium Mica-Gro	1/2-3/4	12	4	1	1	2-2 1/2	14	2	2	0
	1-1 1/2	11	3	2	2	1-1 1/2	5	5	4	4
Terralite & Sand	1/2-3/4	7	2	5	4	2-2 1/2	15	0	2	1
	1-1 1/2	16	1	1	0	1-1 1/2	14	0	2	2
Total		124	36	28	28		127	20	34	35

Roses rooted well with both methods of watering. Cuttings in vermiculite with constant water level rooted better when 1/2-3/4 inches above the water than when 1-1 1/2 inches above the water. In the finer media such as sand and the sand-Terralite mixture the reverse was true.

The best rooting was obtained with cuttings in medium Terralite and coarse Mica-Gro with the base of the cuttings 1/2-3/4 inches above the water. With the automatically

watered sand-Terralite mixture, excellent results were obtained when the cuttings were farther from the water table.

With surface watering, rose cuttings stuck 2-2 1/2 inches deep were better than those 1-1 1/2 inches deep. The rooting in vermiculite was somewhat better than in sand with practically no difference between the different sizes of the two commercial vermiculites.

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A FEW SIMPLE PROPAGATION RULES

1. Use good size cuttings. Do not trim leaves. The greater the leaf area, the quicker the rooting, if handled properly to prevent excessive wilting.
2. Stick in sterilized sand or vermiculite. New vermiculite need not be sterilized the first time it is used.
3. Wet the vermiculite thoroughly before sticking the cuttings.
4. For automatic watering with a constant water level, stick cuttings 2 inches deep in medium (1/8 inch size) or coarse vermiculite (1/4 inch size) with the base of the cuttings about one inch above the water. Some cuttings, like roses, may be closer to the water.
5. For surface watering, stick cuttings 2 inches deep in sand or medium vermiculite, which is kept moist by frequent watering.
6. Don't pack the vermiculite.
7. Use no shade or a light shade; only enough to prevent excessive wilting.
8. Remove cuttings when roots are 1/2-3/4 inches long.

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