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ANOTHER LOOK AT GROWING MEDIA

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Pot and bedding plant producers are constantly looking for a growing media that can be reproduced with little variability. With the advent of slow-release fertilizers and automatic fertilizer injection systems, new media can and should be surveyed.

The University of California (1) presented a system with adaptations for container growing in 1957. In 1963 Boodley and Sheldrake (3) proposed "peat-lite" mixes, and more recently Ball (2) presented additional peat-lite mixes.

One of the exercises conducted at Colorado State University by the floriculture class this spring dealt with bedding plant growing media and fertilizer treatments. The following summarizes the project.

Methods and Materials

Media: Four mixtures were formulated for use as bedding plant media (Table 1). The physical ingredients were washed river sand, Canadian peat, clay loam soil, and a lodgepole pine-spruce mix of sawdust. Clay loam was the only ingredient that was steamed.

Table 1. The formulation of ingredients by volume in four growing media.

Media	Ingredients
1	3/4 sand and 1/4 peat
2	1/4 sand, 1/4 peat, 1/2 soil
3	1/2 sawdust and 1/2 soil
4	1/2 sand and 1/2 sawdust

After the ingredients were mixed, samples were tested for nutritional values using the Spurway System (Table 2).

Table 2. Chemical analyses of 1, sand-peat; 2, sand-peat-soil; 3, sawdust-soil; and 4, sand-sawdust mixtures for growing media.

Media	pH	Soluble salts	NO_3	Phos.	Pot.	Cal.
1	4.0	105	10	1/2	10	150
2	6.9	180	25	1/2	25	150
3	6.7	200	10	1/2	10	200
4	6.9	138	5	1/2	5	100

Nutrients: The relationship of nutrients to media and plant growth was evaluated by establishing five fertilizer treatments (Table 3). Osmocote 18-9-9, Osmocote 14-14-14, and Loamite 1-0-0 were applied in dry form and mixed with the media before planting. Nutrient treated irrigation water was used on a fourth group and the fifth treatment (check) received untreated water. Nutrient treated water was supplied on a demand basis to all treatments except the check, when the majority of media needed water.

Table 3. Nutrient levels supplied bedding plants in special media.

Treatment	Low concentration	High concentration
A. Osmocote 18-9-9	1 level Tbs/6'' pot*	2 level Tbs/6'' pot*
B. Osmocote 14-14-14	1 heaping Tbs/ 6'' pot*	heaping Tbs/ 6'' pot*
C. Loamite 1-0-0	1-3'' pot/6'' pot*	1-6'' pot/6'' pot*
D. Treated water	per 1000 gal water: 3 lbs ammonium nitrate, 2 lbs muriate potash, 1/4 lb phosphoric acid, 52%	
E. Untreated water	No nutrients added	

*6'' pot of the different media

Seedlings of Honeybunch petunias, Blue Mink ageratum, and Petite marigolds were planted in the soil and nutrient treatments on April 2, 1965. Six seedlings of each plant were planted per No. 24 marketpak. The plants were grown in a 60-62F greenhouse in full sun.

Results

Media: The mixtures containing soil proved too heavy and not adapted to the ''luxury'' watering practices used. Figure 1 shows the response of marigolds and ageratum to the four media containing a low 14-14-14 Osmocote treatment. The soil combinations did not provide adequate drainage and remained too moist most of the time.

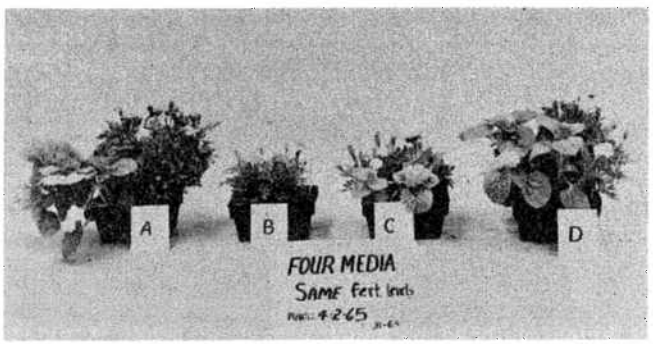

Fig. 1. Four media formulations (by volume) used to grow marigolds and ageratum.
A. 75% river sand, 25% peat
B. 25% sand, 25% peat, 50% soil
C. 50% sawdust, 50% soil
D. 50% sand, 50% sawdust

The sand-peat combination provided good drainage, but most of the lower petunia leaves in all nutrient treatments had slight interveinal chlorosis at planting time (Fig. 2). This may have been caused, by the water holding capacity of the peat and/or some phase of nutrition.

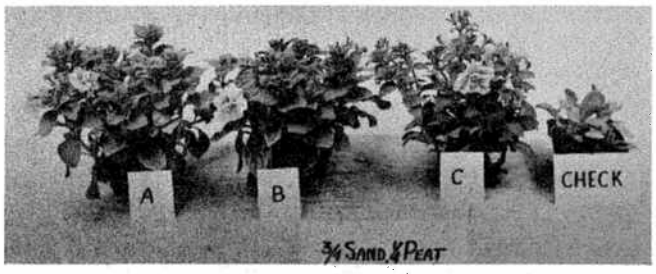

Fig. 2. Three fertilizer treatments on Honeybunch petunias in a 3/4 sand and 1/4 peat media (Osmocote treatments are per 6'' pot of media).
A. 1 heap. Tbs Osmocote 14-14-14 + treat. water
B. 2 heap. Tbs Osmocote 14-14-14 + treat. water
C. Nutrient treated water only
D. Untreated water, check.

The sand-sawdust appeared best in this evaluation. Plants in all fertilizer levels remained green and varied only with nutrient treatment (fig. 3).

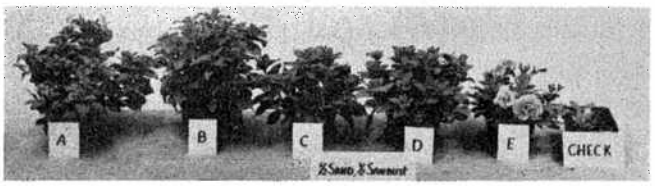

Fig. 3. Five fertilizer treatments used to grow Honeybunch petunia in a medium of 1/2 sand and 1/2 sawdust (Osmocote treatments are per 6'' pot of media).
A. 1 heap. Tbs Osmocote 14-14-14 + treat. water,
B. 2 heap. Tbs Osmocote 14-14-14 + treat. water,
C. 1 heap. Tbs Osmocote 18-9-9 + treat. water,
D. 2 heap. Tbs Osmocote 18-9-9 + treat. water,
E. Treated water only, and
F. Untreated water, check.

Nutrition: Most of the young seedlings were burned within one week from the Loamite treatments. Therefore, the nutrition phase of the exercise dealt only with the Osmocote and nutrient-treated water levels.

The Osmocote fertilizer with the 14-14-14 analysis produced better plants than with the 18-9-9 material. Figure 3 shows the difference in growth and the effects of increased concentrations of both fertilizers. All Osmocote treatments produced better plants than those grown only with treated water. The high level of Osmocote 14-14-14 produced a slightly larger and fuller pack of petunias. When each of the Osmocote treatments was increased by 1/2, there were no appreciable differences in growth (fig. 4).

Fig. 4. The effects of four levels of Osmocote 14-14-14 on Honeybunch petunia at 4 rates per 6" pot of a 1/2 sand, 1/2 sawdust medium.
A. 1 heap. Tbs
B. 1 heap. Tbs + 1 tsp
C. 2 heap. Tbs
D. 2 heap. Tbs + 1 tsp

The plants grown in sand-sawdust and sand-peat mixtures were planted outside for observation on June 7. They grew well with no apparent hunger signs.

Discussion

It was apparent that the sand-peat and sand-sawdust combinations produced the best plants when supplied with adequate fertilizer. Using these media will require altered management methods of feeding, watering, and possibly temperatures. The use of a well-drained medium such as sand and sawdust could be easily adapted to an over-head sprinkler system from the transplanting stage to sale time.

At this writing the ADM Company, producers of Osmocote, have terminated production. Even though better growth occurred with this product, another source of nutrients can be developed. Since each growing medium has different nutrient requirements, a study of nutrient concentrations for injection application is needed.

Ed. note: Work along this line is being expanded to cut flower crops.

Literature Cited

1. Baker, Kenneth F. 1957. The U. C. system of producing healthy container-grown plants. University of California Agr. Expt. Sta. Manual 23.
2. Ball, Vic. More peat-lite tests in Growers Talks, Geo. J. Ball, Inc., July, 1965.
3. Boodley, James W. and Raymond Sheldrake Jr. 1963. Artificial soils for commercial plant growing. Cornell Univ. Agr. Expt. Sta. Bul. 1104.