

wettable-powder Karathane (standard rate dosage) at the 5% level, but not at the 1% level of significance.

Temperatures as high as 106°F occurred during the application of materials. A slight toxicity developed on the plants treated with the high dosage of liquid Karathane. Affected plants showed some browning, but it was only severe where plants were weak and unthrifty. No toxicity was noted where the standard dosage, wettable-powder Karathane was used.

Plants in untreated plots had many dead leaves, and were collapsing by June 26. These plots could be easily identified by their brown appearance. Karathane-treated plots still had an overall green appearance on this date, with very little mildew.

Samples of cantaloupes were obtained on June 20 from the standard Karathane wettable powder and Ortho V-G plots for analysis of fungicide residues. No residues were found in the fruit rind or pulp from plants treated with these materials.

This test indicates that  $\frac{3}{4}$  pound of 25% wettable powder Karathane per acre applied as a spray on three successive occasions, at intervals of seven days after mildew first appears, gives excellent control of powdery mildew of cantaloupe. Using an excessive dosage of liquid Karathane did not appreciably improve control from a practical economic standpoint.

The remainder of the test plot field was treated by the grower with 1% Karathane dust, using 30 to 40 pounds per acre. The dust formulation was applied by a ground duster. Notes taken in this part of the field indicated that Karathane dust, applied by a ground rig, appeared to be equal in mildew control to the spray application of Karathane. It should be emphasized, however, that this was not a replicated plot, but only a rating of leaf samples in a randomly selected area of the grower's field.

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*Valley Sprayer and Duster Service, Inc., Glendale, Arizona, assisted by applying the materials; John Norton Farms, Inc., cooperated by supplying land and melon plants for spraying; California Chemical Company supplied the V-G fungicide; and Rohm and Haas Company supplied the Karathane fungicide.*



Overall quality of poinsettia plants fertilized with liquid fertilizer, Magamp, or a combination of both (center). Note clay pot on the right, fertilized with Magamp, has no algae, whereas pot on left (liquid fertilizer only) is almost completely covered with algae. Center pot supplied with both fertilizers showed only a moderate amount of algae.

## SLOW RELEASE FERTILIZERS for Poinsettia Pot Plants

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**P**OINSETTIA pot plants must be grown under relatively moist conditions and with a relatively high supply of nutrients to produce a quality flower. Growers start plants in July or August for sale during the Christmas season. During this four- or five-month period, the plants may be irrigated with as much as 100 inches of water, making the maintenance of fertility levels difficult. Irrigation water is sometimes used to maintain fertility, but not all growers have liquid fertilizer equipment. Newly developed slow-release fertilizers are especially adaptable for high value ornamental crops, such as poinsettias, to provide the mineral nutrients over a prolonged period of time.

In experiments with two slow-release fertilizers, a single application at planting supplied the total nutrient requirements for poinsettia plants. The two fertilizers used were magnesium ammonium phosphate and coated, granulated fertilizers—both discussed in previous issues of *California Agriculture*. Results of the experiments, conducted simultaneously at University of California, Los Angeles, and at commercial flower establishments in the San Francisco area, were essentially the same and are reported together.

In the experiment where magnesium ammonium phosphate, "Magamp" (8-40-0), was used, highest quality plants were those given between 2 and 3.5 grams of nitrogen on the soil surface. The bracts

were larger, the leaves greener and the plants better proportioned than those grown entirely on a liquid fertilizer program (see photograph). If one gram of nitrogen from Magamp was surface applied, and used in combination with the liquid feed program, the plants which resulted were also of very high quality. When Magamp was incorporated into the soil prior to planting, the amounts necessary for good growth were less than when the materials were surface applied. One to two grams incorporated into the soil gave good results, but plant quality was not quite equal to those surfaced dressed with 3 to 3.5 grams of nitrogen. When 3 grams of nitrogen were mixed into the soil prior to planting, injury to the plant resulted, whereas up to 5.5 grams N could be safely applied to the surface before the first signs of plant injury were evident. The margin of safety is greater when Magamp is surface dressed than when it is mixed into the soil. In all cases where "Magamp" was applied, four grams of heavy coated muriate of potash was used to supply the necessary potassium.

Coated fertilizers like Magamp are also a very effective means of supplying nutrients to poinsettia pot plants over long periods of time, as results in the table indicate. A split application of 3 grams at planting and a similar amount as a top dressing at a later date resulted in plants equal to or better than those on a liquid

fertilizer program alone (treatments 3, 4, and 7). Second applications of coated fertilizer were better applied in mid-September before flower bud formation than late October after flower development.

Best quality plants came from the treatment supplying 3 or 6 grams of 20-10-10 prior to planting followed by maintenance on the same liquid fertilizer program as the control plants. These plants were medium height with large bracts and dark green leaves. Mixing 6 or 3 grams of heavy coated 20-10-10 fertilizer with the soil prior to planting, as in treatments 1 and 2, was not sufficient to carry the plants to maturity. The leaves were light green and the bracts very small. Later experiments revealed that it was necessary to incorporate 2½ to 3 times as much of this analysis fertilizer to produce a good marketable plant at maturity.

It was concluded that these coated fertilizers can be used in conjunction with a liquid fertilizer of mild strength, or they may be used alone if properly applied. If used alone for poinsettias, it is better to use them in a split application rather than trying to incorporate all the fertilizer at one time prior to planting.

All the experiments were conducted in

5-inch clay pots. Plants receiving only Magamp as a source of nitrogen were observed to have little or no algae on the outside walls of the pots at the end of the experiments, whereas the liquid-fed and the coated-fertilizer-treated plants had the usual amount of algae on the pots, as shown in the photograph. It is believed that the accumulation of magnesium in the pot walls inhibits the growth of algae.

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*Sunnyside Nursery of Hayward and Breitner Nursery of Colma cooperated in this research.*

#### SLOW RELEASE FERTILIZER TRIALS

Average Final Data Recorded December 12, 1961, for the Variety Barbara Ecke Supreme Grown in the U.C.I.A. Greenhouses. Rooted Cuttings Were Planted August 15 and Pinched September 5, 1961.

Amount of heavy coated 20-10-10 added per 5-inch pot	Average height (inches)	Average bract diameter (inches)	Average number of shoots per plant	Foliage color	Quality ratings†
1. 6 grams incorporated	16.6	10.3	3.4	Light	Poor
2. 3 grams incorporated	15.1	8.9	3.0	Light	Poor
3. 3 grams incorporated and 3 grams top dressed September 19	19.7	13.4	3.0	Medium	Good
4. 3 grams incorporated and 3 grams top dressed October 24	18.3	12.3	3.2	Medium	Fair
5. 3 grams incorporated plus liquid fertilizer*	17.8	12.6	3.3	Dark	Excellent
6. 6 grams incorporated plus liquid fertilizer*	17.7	13.6	3.6	Dark	Excellent
7. Liquid fertilizer* alone (control treatment)	14.8	11.1	3.4	Medium	Fair

\* The liquid fertilizer consisted of 5 oz. calcium nitrate, 5 oz. potassium nitrate and 16 oz. of ammonium nitrate in 100 gallons of water. This solution was used 3 times per week.

† Excellent rating considered to be above standard necessary for sale. Good rating is equal to a marketable plant. Fair rating is one which has submarketable standards. Poor rating is one that is not salable.

## FERTILIZATION AND RICE SEED WEIGHT

INCREASING NITROGEN FERTILIZATION up to 80 lbs per acre resulted in increased grain yields at the Rice Experiment Station, Biggs, during 1961. Above this rate, yields did not increase significantly. The addition of 36 lbs of phosphorus to increasing nitrogen rates did not affect total yield of grain per acre. There was a steady decrease in seed weight with increasing increments of nitrogen. A close correlation appears to exist between seed weight and quality for milling and seed rice. Decreasing seed weight gave a proportional deterioration of well-filled acceptable seed. With rates up to 80 lbs of nitrogen, the addition of phosphate did give some increase of seed weight and quality. However, above this rate, phosphate treatments were not appreciably better than the straight, nitrogen treatment.

Calrose seeds from the nitrogen-phosphorus test, weighed to the nearest 0.1 mg were placed in classes of increasing weight, separated by 1 mg each. The individual seeds ranged from approximately 4 mg to 32 mg in weight. Seeds from the group of greater than 16 mg to 30 mg were used for germination tests. In these tests, carried on with only limited seed,

it was observed that germination was above 98% in all weight groups above 21 mg. It was above 90% in all groups above 17 mg. Adequate seed was not available to determine seedling vigor of seed from each group.

Caloro showed the same trend as Calrose in seed analyzed from a similar test. In the analysis of Caloro only weights of 100 kernels were used rather than individual seed weights. When germination tests were conducted on these composite samples of Caloro seed, it was found that germination was usually greater than 95% with a weight of 2.90 grams or greater. A seed weight of 2.70 grams or greater usually showed germinations above 90%. Seed weights below 2.25 grams usually showed germinations below 80%.

Caloro and Colusa rice plants, analyzed as to spikelet distribution on the panicle, showed an average of 11 or 12 panicle branches. Variations of from 4 to 16 were found in the number of branches. Spikelets borne on the branches varied from 4 to 27 with an average of about 12 to 14. The heaviest seeds were borne as single spikelets at the terminal portion of each branch—usually six in number on a

normal branch. Additional seeds on the panicle branches were usually groups of spikelets borne as two's, three's, four's and occasionally five's. These seeds always averaged lower in weight than the single spikelet described, and if more than two seeds occurred on a sub-branch, the middle seeds were usually lower in weight than those borne on either end of the sub-branch. Singly borne seed make up 42% to 50% of the panicle; seed borne in two's, 3 to 10%; seed borne as three's 33 to 38%; seed borne as four's 10 to 20%; and seed borne in five's, from 0 to 3% of the panicle.

Increasing nitrogen in the 1962 tests by 30-lb increments from 0 to 120 lbs of nitrogen per acre resulted in a decrease in seed weight, as was observed in 1961 tests. Also, there was a marked increase in number of nonfertile, empty spikelets with increased nitrogen application. Increasing rates of nitrogen appears to increase the number of seed in each panicle by a slight but gradual increase in the number of branches and seed per branch.—*Kenneth E. Mueller is Associate Specialist, Department of Agronomy, University of California, Davis, and Superintendent, Rice Experiment Station, Biggs.*