Potted chrysanthemums may be grown to maturity from a single pre-plant application of metal ammonium phosphate. The plant on the left above received 0.8 gr. nitrogen from urea-formaldehyde plus an application of single superphosphate and was maintained with liquid fertilization—a fertility program considered to be essentially perfect. The center plant received 2 gr. of nitrogen from ferrous ammonium phosphate plus other essential minerals in long-lasting form. It was maintained only with tap water after planting. The plant on the right was treated similarly except manganese ammonium phosphate was used. This treatment required chelated iron to overcome chlorosis induced by excess manganese. The two plants grown with single application of metal ammonium phosphate were judged to be comparable in quality to the plant on the left. The metal ammonium phosphates have been observed to reduce stem length in several plants. This effect is usually desirable for potted flowering plants.

soils removes the ammonium ion from solution, more mineral dissolves as nitrification takes place. Thus if no leaching occurs, moderate levels of soluble salts in soils may develop after large incorporations, especially of powder. In general, however, the hazard of fertilizer burn from a large application is low. As much as 2,000 pounds of nitrogen per acre from powdered magnesium ammonium phosphate was applied to turfgrass prior to planting without injury.

As indicated above, the duration of a supply of nitrogen from metal ammonium phosphate will depend on particle size and amount supplied. When 175 pounds per acre of nitrogen from powdered magnesium phosphate was used in sand to produce corn, under heavy irrigation, the mineral was essentially all consumed in about three months time. Under similar conditions, large granules have lasted in excess of six months.

By using golf-ball size pellets in the holes made for planting woody landscape materials or trees, it appears reasonable that substantial amounts of nitrogen could be supplied for periods of a year or two or more—offering a practical use for these materials. Freeway landscaping, for example, is often done in soils of low fertility with high labor costs for fertilization after planting. Fertilizer materials of exceptionally long duration would be advantageous in such cases.

Several soil conditions affect the rate or extent to which the metal ammonium phosphates will "dissolve." Incubation studies have shown that soil moisture levels have an effect on the amount of nitrogen dissolving. In the range from the permanent wilting percentage to the field capacity, there is a tendency for increased solution with an increase in moisture content of the soil. In a given period of time the amount of magnesium ammonium phosphate dissolving at field capacity in a soil was about twice that going into solution when soil moisture was near the permanent wilting percentage. This is probably due to more rapid diffusion of soluble products at higher moisture levels which means the fertilizer is equilibrating with a larger volume of water.

As previously mentioned, nitrification permits more of the metal ammonium phosphate to dissolve. As soils become more acid there is a tendency for an increase in the amount of nitrogen dissolving but the effect is not large. Increasing temperature accelerates the rate at which solution takes place, but in the temperature range in which plants grow the total solubility is not influenced very much.

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COTTON BREEDING PROGRESS CONTINUES

San Joaquin cotton production records show outstanding progress during the past decade. Lint yield in this one-variety district averaged 625 pounds per acre for the first three years of the decade (1951–53) compared with 1020 pounds for the last three years (1958–60). This gain of 63 per cent in yield is attributed to a combination of (a) varietal improvements in Acala 4-42, and (b) the better "know-how" employed by the grower. Textile mills have recognized improvements in spinning quality to the extent that the demand for California's Acala 4-42 far exceeds the supply.

The U. S. Cotton Field Station, in cooperation with the California Agricultural Experiment Station and the California Planting Cotton Seed Distributors have a well-rounded research program to maintain and improve the variety as well as to develop improved cultural practices.

Test plots

Strain and variety test plots are located throughout the valley. Acala 4-42 is compared with varieties from other states. Other experiments compare the many experimental strains from the breeding nursery. The yearly seed releases are determined from valley-wide performance of the experimental families and strains. In still another series of experiments, these "models" of Acala 4-42 planting seed have been double-checked for yield and quality over the past eight seasons. Yield data from these valley-wide tests indicate a genetic increase of 32 per cent for the 1960 and 1961 "models" over the "model" used for planting in 1953. Also, spinning tests with fiber from these plots indicate 10 per cent improvement in spinning quality.

The current breeding and testing program includes many types and strains. Several of the latest improvements are now in the advanced stage of testing. Indications are that increased yield, improved seed and fiber quality with features tending to reduce production cost could materialize in new Acala "models" of planting seed during the present decade.—*John H. Turner, Agronomist-in-Charge, U. S. Cotton Research Station, Shafter.*