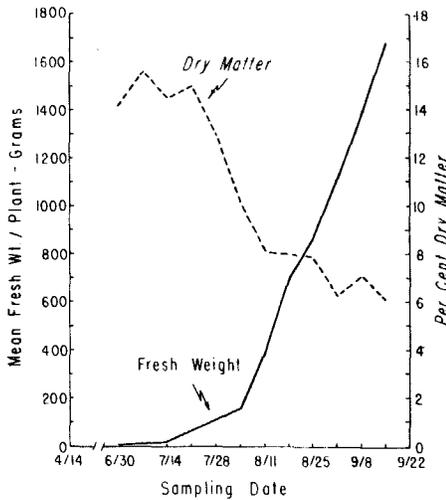


# CELERY GROWTH AND NUTRIENT ABSORPTION STUDIES

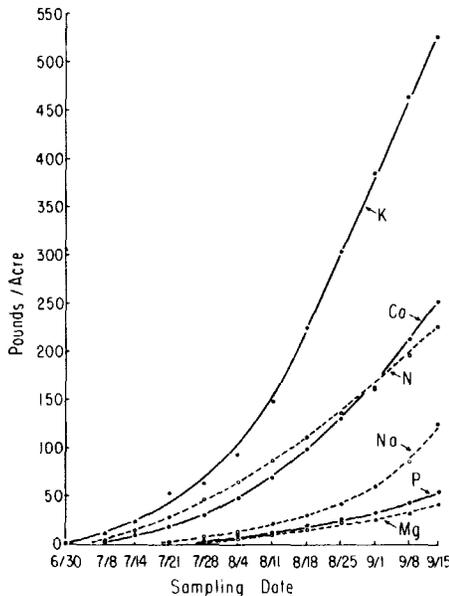
F. W. ZINK

Celery is the vegetable crop with the highest total nutrient removal and also gives large returns on the investment in fertilizer. A direct-seeded crop in the central-coastal district of California requires approximately six months to mature. Only 2% of the growth and subsequent nutrient removal occurs during the first half of the growth period, while more than 42% of the nutrients were removed during the last month of growth. Good crops of celery grown in this area remove an average of 280 lb of nitrogen (N), 72 lb of phosphorus (P), and 635 lb potassium (K) per acre.

GROWTH CURVES FOR A SUMMER CROP OF CELERY SHOWING MEAN FRESH WEIGHT PER PLANT (GRAMS), AND PER CENT DRY MATTER



MINERAL ABSORPTION OF CELERY DURING THE GROWTH OF A SUMMER CROP



**T**HE INTENSIVE CULTURAL PRACTICES necessary to produce high yields of quality celery, as well as the competitive market condition, stress the importance of selecting the proper fertilizer program for this crop. An understanding of the development of celery from seedling through market maturity, and of the nutrient uptake pattern, is essential to the development of sound management practices, particularly in irrigation and fertilizer application.

Celery in the Santa Maria, Salinas, and Pajaro valleys is direct-seeded in the field and requires five to six months to mature. Harvesting starts in July and extends through December. The crop is grown on mineral soils, two rows on a 40-inch bed. Plants are thinned to a 6- to 8-inch spacing in the row.

A spring, summer, and fall crop in the Salinas Valley were selected for study. Growth and nutrient absorption curves for the three crops were similar. Therefore, only the results of the summer crop will be presented. The summer crop was planted to Tall Utah 52-70 on April 14, on a Salinas silty clay loam and harvested 154 days later on September 15. The crop received the following fertilizer program: preplant: nitrogen (N) 36 lb, phosphorus (P) 63 lb, and potassium (K) 119 lb per acre; sidedressings at the rate of 80, 50, 60, 100, and 80 lb N per acre were applied June 7, June 28, July 29, August 23, and September 9, respectively. Applications totaled 406 lb N, 63 lb P, and 119 lb K per acre.

## Growth patterns

Plant fresh weight increased quite slowly during the early phase of growth. Less than 2% of the ultimate fresh weight of the plant was produced during the first 80 days of the crop. Plants in these studies produced approximately 50% of their fresh weight in the 21 days before harvest and 13 to 20% in the week immediately preceding harvest. Fresh plant material

produced by the aboveground portion of the crops averaged 76 tons per acre. Per cent dry matter decreased as the plant approached market maturity.

## Nutrient uptake

The nutrients removed from the soil by the crop were calculated from plant analyses and growth rates based on an average of 41,800 plants per acre. The rate of nutrient removal was very slow during the early phase of growth. Approximately 80 days after planting, each of the 3 crops studied had removed less than 9 lb N, 1.5 lb P, and 11.5 lb K per acre. Maximum rate of growth during the 28 days before harvest was accompanied by maximum rate of mineral uptake. During this period more than 42% of the nitrogen, phosphorus, and potassium was removed. The average nutrient absorption in lb per acre for the 3 crops studied was: N, 280; P, 72; K, 635; calcium (Ca), 264; sodium (Na), 155; and magnesium (Mg), 35.

## Timing important

Phosphorus and potassium fertilizer should be applied preplant to get maximum benefit from their use. These fertilizers do not move appreciably in heavy soils by irrigation, but remain in the area where applied until used by plants. It is desirable to use split applications of nitrogen fertilizer. Celery is irrigated heavily, which undoubtedly results in some leaching of nitrogen. Part of the nitrogen should be put on preplant and the remainder in applications during the growth of the crop. For best results, the fertilizer program should be evaluated on the basis of residual fertilizer in the soil and nutrient requirements, as indicated by the growth pattern of the crop.

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