New projects:

Development of pest pathogens

Development of resistance to pesticides in many insect and mite populations makes it imperative that alternative control methods be found. The goal of a new project by B. A. Federici, U.C., Riverside, is to discover new pathogens and develop these and other known pathogens for use in pest management programs. Fungi, bacteria, microsporidia, rickettsia, and viruses will be studied and evaluated for use against medically and agriculturally important pests. Development of insect viruses as pesticides will be emphasized. (BIC 3800)

Genetic insect control

To overcome drawbacks of conventional control methods, researchers are focusing on genetic techniques for the suppression of insects. The use of temperature-sensitive mutants probably offers the best method of control to date, because it relies solely on the climatic environment of the insect population and eliminates the need for any chemical. The objective of a new project by L. E. Kelly, U.C., Berkeley, is to find a way to isolate temperature-sensitive paralysis mutants in the fruitfly, with future application to other insect pests. (GEN 3807)

Interaction of wool with sodium hypochlorite

An economical bleach commonly used in laundering, sodium hypochlorite can also severely damage protein fibers, especially wool. This project by H. P. Lundgren, U.C., Davis, is designed to find conditions and treatments that will permit the advantages of hypochlorite to be realized while minimizing fiber damage. (TXC 3423)

Tomato cell genetics

Studies of tomato genetics are conducted principally with whole plants. With its economic importance as a crop plant, tomato is an obvious choice for cell genetic techniques, which permit much larger numbers of cells to be handled and screened for genetic variability. Objectives of this study by D. Pratt, U.C., Davis, are to isolate haploid tomato plants, establish suspension cell cultures, and regenerate plants from mutant cells to obtain herbicide-resistant plants and study "whole plant" genetics of the mutations. (BAC 3422)

Drip application of nitrogen is efficient

Robert J. Miller ▪ Dennis E. Rolston ▪ Roy S. Rauschkolb ▪ David W. Wolfe

Fertilizer uptake by irrigated plants is influenced considerably by fertilizer placement and timing and by water application methods. Because some fertilizer elements move with water in the soil, these plant nutrients must remain or arrive within the sphere of the plant roots after fertilizer and water are applied. The goal is to develop cultural practices by which crop nutrient needs are satisfied by maximum uptake from a minimum quantity of applied fertilizer.

To determine the percentage of nitrogen uptake from fertilizer applied by drip irrigation, an experiment was conducted in 1975 with tomatoes on Panoche clay loam at the West Side Field Station. Methods of applying fertilizer nitrogen through a drip irrigation system were compared with other methods of application and irrigation. Soil tests before planting showed 19 to 24 ppm of nitrate-nitrogen in the surface 30 cm of soil and only trace amounts below.

Experimental methods

Fresh-market tomatoes (Cal Ace) were planted April 10 on about $^1/_3$ hectare. The experimental plots were 4.57 meters (15 feet) wide and 9.14 meters (30 feet) long, with three planted beds (one row per bed) per plot. Six treatments, replicated six times, consisted of selected combinations of furrow and drip irrigation plus varied placement and timing of nitrogen as ammonium sulfate. Eighty kilograms of nitrogen per hectare (71 pounds per acre) were applied to all plots except the check plots, which received no nitrogen. All plots received a uniform application of P_2O_5 at 80 kg per hectare at planting time.

The differences in the nitrogen treatments were in application method and distribution (timing). Some plots received nitrogen banded 10 cm (4 inches) deep and 20 cm (8 inches) to the side of the row at planting and then were furrow or drip irrigated. The remainder received nitrogen through the drip irrigation system at specified times during the growing season.

Although both treatments 1 and 2 received nitrogen in bands at planting time, treatment 1 was furrow irrigated, and treatment 2 was drip irrigated throughout the growing season. Treatments 3, 4, and 5 all received a total of 80 kg per hectare of nitrogen solution pumped directly through emitters about 1 meter apart within the plant row, but differed from each other in the time and amount of each application. Treatment 3 received all the nitrogen through the emitters at planting time. Treatment 4 received 30 kg per hectare at planting time and 50 kg at flowering. Treatment 5 received 10 kg per hectare at planting, 20 kg at thinning, 40 kg at flowering, and 10 kg at first fruiting. All fertilizer applications were made immediately after plant samples were taken.

Nitrogen-15-depleted nitrogen fer-

MEAN YIELD OF TOMATOES UNDER VARIOUS FERTILIZATION AND IRRIGATION TREATMENTS

Treatment	Irrigation method	N placement	Timing	Mean tomato yield* Ripe	Mean tomato yield* Ripe + green
				metric tons per hectare	
0	Furrow	—	—	52.0	82.0
1	Furrow	Band†	Planting	58.9	86.0
2	Drip	Band†	Planting	55.1	69.0
3	Drip	Drip	Planting	68.1	84.4
4	Drip	Drip (split)	Planting Flowering	65.2	80.6
5	Drip	Drip (split)	Planting Thinning Flowering Fruiting	65.0	77.1

* Values are calculated from mean plot weights based on six replications.

† Banded 10 cm deep and 20 cm to the side of the row.