

July 1 sampling. At no time during the active growing season did any sampled plants of the six treatments have a nitrogen content below the critical level for fresh-market tomatoes.

In treatments 1, 3 and 4, as total nitrogen in the plant increased, the percentage of nitrogen from fertilizer decreased between May 29 and July 1 and increased between July 1 and July 24 (fig. 1). Apparently, in some treatments the soil nitrogen was more available to the plant roots during the early part of the season than was the fertilizer nitrogen, and after July 1 nitrogen availability was influenced by time and placement of fertilizer applications. Had the initial concentration of soil nitrogen been smaller, a higher percentage of nitrogen probably would have been derived from the applied fertilizer.

Figure 2 shows the portions that can be attributed to the fertilizer source, given in percent of the total nitrogen (considered 100 percent at any one sampling date). The 80 kg per hectare of nitrogen applied at planting in treatment 3 resulted in the greatest amount of fertilizer nitrogen in the plants at first sampling (May 29).

Although nitrogen percentages from the added fertilizer for treatments 1 and 4 were about the same (20 percent) in May, they rapidly decreased by July 1, as in treatment 3. The fertilizer-nitrogen percentage in treatment 1 plants thereafter remained at about 10 percent. Treatment 4, which received an added 50 kg per hectare of nitrogen on July 1, increased to the 20 percent level again after July 1. Because of the placement of the banded fertilizer in relation to the drip lines, fertilizer nitrogen in treatment 2 plants remained at a relatively low level throughout the season. Although fertilizer nitrogen in the tomato plants of treatment 5 was low initially, the fertilizer nitrogen rapidly increased as more fertilizer was applied through the drip system during the growing season.

All treatments receiving fertilizer nitrogen through the drip system gave a higher percentage of fertilizer nitrogen in plants—except treatment 3 at harvest—regardless of time of fertilizer application (fig. 2). This indicates nitrogen is used more efficiently when applied through the drip system than when banded and furrow irrigated or banded and drip irrigated.

## Summary

Application of nitrogen fertilizer through a drip irrigation system is efficient regardless of timing. Nevertheless, when nitrogen fertilizer is banded beside the plant row, furrow irrigation is the superior method of irrigation. Fertilizer use is more efficient when nitrogen is applied through the drip system than when banded and furrow irrigated or banded and drip irrigated.

For high efficiency, fertilizer nitrogen should be placed carefully with respect to the plant roots, taking into consideration the direction of water movement during irrigations. When soil-nitrogen levels are relatively high, fertilizer use efficiencies are expected to be relatively low, with negligible crop yield increases from applied nitrogen fertilizer.

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## Research briefs

### Extending storage life

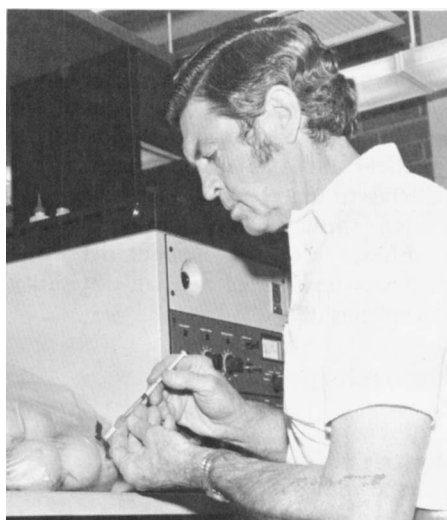
University of California plant physiologists are investigating new techniques of temperature management, modified atmospheres, and special packaging to extend the storage life of commodities, such as oranges.

Studies to evaluate the effects of low temperatures during storage and after transfer to a warmer atmosphere showed that oranges lost little quality when they were washed, waxed, held at 41° F for 12 weeks, and then transferred to 68° F. Fruit stored at lower temperatures (32° F), however, suffered chilling injury, manifested by increased volatile content, rind breakdown, and development of off-flavors.

Plant physiologists also found that Valencia oranges stored in polyethylene bags for four months at 41° were in excellent condition and had lost an average of only 1.7 percent weight compared with 9.5 percent lost by fruit in paper

bags. Other crops have been successfully stored by enclosing entire pallets of boxes in polyethylene. Researchers are now attempting to extend the technique to

citrus on a commercial scale to maintain fruit quality over long periods. (BCH 2771)



**Research by plant physiologist I. L. Eaks of U.C., Riverside, shows that quality of citrus fruit can be maintained for long periods by storage in polyethylene bags.**

### Genetic advising program

The rapid expansion of knowledge about human genetic disease and the advances in the technology for recognition, therapy, and prenatal diagnosis have led to public demands for service. Birth defect centers have tripled in the last five years. Afflicted persons and their families require skilled counseling in addition to medical diagnosis and therapy in order to cope with emotional, social, and economic problems.

The Genetic Advising Program initiated at the University of California in an attempt to meet these needs is currently the only training program of this kind in California. The program has three components: diagnostic (by a medical doctor at the U.C. School of Medicine in San Francisco); counseling (including in-

# Air pollution and the forest ecosystem

University forestry and conservation researchers have conducted extensive studies to determine the long-term impact of continued photochemical air pollutant exposure on the San Bernardino National Forest. Preliminary results have projected an 80 percent reduction in the growth of tree volume over a 30-year period, with Ponderosa and Jeffrey pine showing the most acute damage. Loss of these trees to pollution sets off a chain reaction that affects the entire forest ecosystem—destroying vegetation, wildlife, and birds, and opening the way for diseases and insect infestation. (FRU 2913)



Smog drifting into San Gabriel Mountains.  
(Photo by Jack K. Clark)

formation about a disease—such as Down's syndrome, commonly called mongolism); and public education. Genetic program trainees deal with counseling and public education.

Trained genetic advisors can provide a range of services including explaining the diagnosis and risk factors established for a family by a physician, advising the family on alternative courses of action to manage a potential or real genetic disorder, assisting the family in obtaining services from public or private agencies, and providing referral to other professionals.

## Causes and effects of obesity

Obesity is a major nutritional problem in the United States and most other affluent societies. The amount of time, energy, and money invested in prevention and treatment of this disease is overwhelming. The long-term effectiveness of obesity treatment is disastrously poor—

almost all patients return to their prior weight after one or two years. Nutritional researchers under the direction of S. Margen, U.C., Berkeley, are attacking the problem through a multi-faceted project that includes dietary modifications, attempts to change biases and attitudes toward foods, and increasing body awareness and movements. So far, this approach in working with groups of adults shows promise.

In related work by R. L. Huenemann, also at Berkeley, studies of environmental factors associated with the development of obesity in preschool children show that children who are obese at six years of age are likely to have been obese earlier in life, particularly between the ages of one and two years. Despite some earlier reports, breast feeding did not protect the six-year-olds from getting fat, nor did the time of introduction of solid foods into the baby's diet influence obesity development.

Children who regularly cleaned their plates were more likely to be fat than those whose intake varied from time

to time. This may indicate that children who follow their physiological demands are less likely to be fat than those who respond to environmental stimuli. Nevertheless, children who ate three structured meals a day, with or without snacks, were leaner than those with no meal patterns and continuous unplanned snacking. (NTS 3752-3778)

## Irrigation return flow and water pollution

The San Joaquin River is of tremendous importance to California's Central Valley. Extension specialists and other researchers have chosen that river to investigate in detail the influence of regional or adjacent soils and cultural practices on water quality.

The trend of increasing use of available water supplies continues. At the same time, more and more restrictions are made to protect water quality, and the spectrum of water use is broadening so