BRIEFS

short reports on current agricultural research

MOVEMENT OF WATER IN SOIL

The increased use of agricultural sprays, household detergents, radioactive materials for research and industry, and other cumulative materials has created increased contamination of ground-water strata. Prevention of further contamination, correction of existing problems and information on safe disposal of unwanted materials may be based on knowledge of the manner in which water moves through soil and of the interactions of dissolved material, soil and water during percolation. This brief concerns the description of water movement without regard to solute transfer.

Available mathematical equations, based on physical assumptions, are used to describe water movement through unsaturated soils under given conditions. Water-content changes in soil columns are being measured nondestructively in the laboratory by means of a specially constructed gamma radiation apparatus. The equation can then be solved, to yield information describing rates of flow, temporary storage, and amounts of water percolating through already wet profiles.

Laboratory analyses have been made for several field soils, including samples from depths of 200 to 300 feet. There appears to be good agreement between calculated and measured values of water movement for the shallow levels, but high-speed computers will be necessary for the calculations involving greater depths.—*D. R. Nielsen, Dept. of Irrigation, Davis.*

WINE GRAPE IRRIGATION

Three different irrigation treatments were tested on Chenin blanc grapevines during 1959 and 1960. The driest treatment received no irrigation; the wettest received three irrigations in 1959 and four in 1960, between late May and early August. Measurements made throughout the season included soil moisture depletion, water use, shoot elongation, berry growth, total soluble solids and total acidity of berries, and petiole analysis. Other measurements were weight of prunings, trunk diameter, carbohydrate levels of canes during the winter, and complete must and wine analyses, including tasting tests.

Significant differences between treatments were observed in yield, berry growth, shoot elongation, weights of prunings, and potassium levels in petioles at harvest. There was a tendency for sugars to be lower and acid higher in the wetter treatments at any given time during the season. No significant differences were observed for the wines except in acidity, which was lowest in wine produced from the wet treatment. Shoot elongation was most sensitive to water deficits and shows promise as a criterion for timing irrigations. The experiments are being continued.—*Yoash Vaadia, Dept. of Irrigation, Davis.*

CLING PEACH REPLACEMENT

To determine at what age cling peach trees should be replaced to obtain maximum net revenue from an orchard, yield curves were constructed, by age of tree and variety, using both actual and anticipated yields. Production costs were tabulated in detail, and replacement patterns were determined. The effects on the replacement pattern of changes in prices received, in factor costs, and in anticipated yields were considered. The study can be applied to other problems of replacing fixed assets.—*J. E. Faris, Dept. of Agricultural Economics, Davis.*

MOSAIC RESISTANCE OF TOMATOES

Tobacco mosaic virus, especially troublesome on trellis-grown market tomatoes, often reduces plant vigor, fruit set, and size, and causes a mottled appearance of the ripe fruit.

Resistance from two sources is being utilized for tomato breeding. One source is a small-fruited wild tomato from Peru, highly resistant to some strains or types of mosaic but ineffective against others. When finally incorporated into commercially acceptable varieties, this resistance probably will provide good protection most but not all of the time.

The second source of resistance is a wild nightshade, also from Peru. Surprisingly, this could be crossed with the cultivated tomato, giving resistance of a different kind. The hybrids appear to be resistant to most if not all strains of mosaic. They may harbor a small amount of virus but grow vigorously and show few symptoms or none.

In both sources, resistance factors in the chromosomes are linked to certain wild characters, such as small fruit size or weedy vine growth. The wild characters must be eliminated before acceptable resistant varieties can be released.—*P. G. Smith, Dept. of Vegetable Crops, Davis.*

MALTING BARLEY VARIETIES

Supplying the California demand for malting barley would require the production from an additional 200,000 acres. This market is now being filled with midwest barley imported primarily from the states of North Dakota and Minnesota. Although a considerable quantity of California grown barley is malted at the present time, local varieties do not possess all of the chemical properties required by the malting and brewing industries. Midwestern varieties, while acceptable to the industry, cannot be grown locally because of their extreme susceptibility to shattering.

A breeding program was initiated a number of years ago in an attempt to combine the malting qualities of midwestern varieties with the growing characteristics of local varieties. Although selections are now available which approach this desired combination, they do not appear to be acceptable in their present form. However, these selections are now being used as parental material in additional crosses, from which it is hoped that varieties can be selected which will meet the requirements of both the brewing industry and local growers.—*C. W. Schaller, Dept. of Agronomy, Davis.*