BRIEFS

Short reports on current agricultural research

Perplexing problem of

PEACH TREE REPLANTS

Three facts are perplexing in the peach replant problem: *1*, as a rule, affected replants are symptomless except for their reduced growth rate; *2*, although the effect is highly specific, it does not always occur in a replanting, and when it does, it varies in severity; *3*, the mechanism has not been demonstrated, nor has the effect been modified experimentally.

For over 20 years the peach replant problem has been studied in Sutter County, where it is serious. One finding is that where peaches are replanted in old Armillaria spots that have been treated with carbon bisulfide, they often grow better than surrounding replants.

It was formerly thought that the carbon bisulfide treatment was the beneficial agent for the replant. However, work in the past 10 years indicates it is the Armillaria which modifies the influence of the old planting on the new.

If a similar action can be shown for other, nonpathogenic organisms, the specificity coupled with irregular occurrence and variability may be explained. —*A. E. Gilmore, Dept. of Pomology, Davis.*

The manufacturing of

FATS IN PLANTS

A comprehensive program is being carried out to explore the basic biochemical processes which synthesize or degrade fats in plants. It has been discovered that TPN—a nicotinamide-vitamin derivative—and biotin are intimately connected with the process of fat synthesis in plants. Once the biochemical steps have been developed, research can turn to the explanation of the physiological factors that control the biosynthesis of fats. Problems under exploration in the research program include the questions whether hormones regulate synthesis, why certain plants—such as avocados, peanut seeds, and cotton—have high fat contents while others—such as peas, beans, and lupines—have low fat contents. Also under investigation are the questions what initiates or triggers fat synthesis and breakdown, and how the plant balances these opposing sequences. —*Paul K. Stumpf, Dept. of Biochemistry, Davis.*

Disease resistance in

PEPPERS

Because little is known about the types and distribution of peppers in western South America, a collection has been made of 425 peppers from the north coast of Colombia, along its main highway and through Ecuador, and from Peru and Bolivia.

Considerable information has been gained on kinds of peppers grown, and where each is found. Since the peppers were collected from many different locations, they should prove adaptable to a wide range of climates. Some may have commercial value in their present form.

These peppers are of interest to the plant breeder, particularly as potential sources of disease resistance. They are now being tested for resistance to cucumber mosaic virus. Certain species from northern Colombia that can be hybridized with the common pepper appear to be less susceptible to this disease than do the peppers from Mexico.—*P. G. Smith, Dept. of Vegetable Crops, Davis.*

Effects of sodium in water on

INFILTRATION RATES

Irrigation water containing a high sodium percentage may cause a soil to disperse and markedly reduce infiltration rates so that the subsoil will not be wetted following a normal irrigation.

However, the changing from a high-sodium to a low-sodium water may also reduce infiltration rates. In these cases, the low infiltration from the new water is usually attributed to the sodium in the soil from the previous water. Recent observations and experiments have shown that under some conditions low-salt and low-sodium water from the Sierra Mountains resulted in a marked reduction in infiltration rates when applied to soil previously irrigated with good-quality water of low-sodium percentage. Cotton plots at the U.S.D.A. Cotton Station at Shafter were irrigated with good-quality well water and with water from the Friant-Kern Canal. In July and August, the plots receiving canal water were irrigated seven times, while those receiving well water were irrigated four times. The infiltration rate for the canal water was approximately one-third that of the well water, and the yields were significantly reduced because of drought, even though the water was held in the furrows for 24 hours for each irrigation. Investigation of this problem was started a year ago at the Cotton Station and recently expanded to the West Side Field Station and in the laboratory at Davis.

Application of gypsum to the soil or irrigation water at the Cotton Station increased the total salt concentration of the Friant-Kern Canal water and improved infiltration. The laboratory work indicates that this relationship becomes critical with soils of high volume weight or density. The present studies on this problem are designed to predict when infiltration rates will be impaired and the procedure necessary for their improvement or prevention.—*L. D. Doneen, Dept. of Irrigation, Davis.*

Proper depths for

DRAINAGE TILE

Present drainage theories were developed for homogeneous isotropic soils which are seldom, if ever, encountered in the field. The most general soil is one in which the hydraulic conductivity decreases with depth either due to layering or to natural development.

The drainage of such soils is being investigated by means of the electrical analog. Several typical soil profiles have been analyzed. Flow patterns have been determined and the rate of water table drawdown calculated. The proper depth of tile drains in such soils is clearly shown by the analysis.—*James N. Luthin, Dept. of Irrigation, Davis.*

Water interaction with

PLANT CARBOHYDRATES

Plant carbohydrates—pectic substances—play an important role in ripening of fruits and vegetables and in processing of certain food products—for example, the manufacture of jelly. Their properties and uses depend largely on the way they interact with water.

The interaction of water vapor with various plant carbohydrates has been studied by means of surface chemistry. The thermodynamic properties of the sorption of water vapor by various