BRIEFS

Short reports on current agricultural research

Water yield from

MOUNTAIN WATERSHEDS

Groundwater can be an important component of the total water yield from mountain watersheds because it is groundwater that sustains the flow of streams during the dry season.

To evaluate the water yield effects of watershed management practices requires knowledge of the magnitudes and directions of groundwater flow. Therefore, drilling equipment is being employed in watershed studies. Deep wells are drilled into the fractured rock mantle underlying the drainage area to provide access for measuring groundwater levels and to provide a means of introducing tracer materials for the study of the directions and amounts of groundwater flow.

Core samples obtained during the drilling operation, supplemented by geological surveys, provide estimates of the depth, density and fracture pattern of the rock mantle.

In the groundwater study areas, rainfall, surface runoff, and soil moisture storage, are measured to evaluate the total water yield under changing watershed conditions.—*W. D. McMillan, Dept. of Irrigation, Davis.*

Soil moisture in

SOIL COMPACTION

Soil moisture and air space relationships associated with different levels of soil bulk density are being evaluated in terms of their effects on plant growth and nutrient absorption by plants.

Experiments are being conducted in the fields and in controlled environment chambers with various soils compacted to several different bulk densities. One objective of the experiments is to determine whether soil moisture can play a part in overcoming the ill effects of reduced air space and permeability brought about by increased soil density. Soil moisture levels are controlled, and water contents, suctions and air spaces are determined. Early studies indicated that changes in soil moisture suction, brought about by changes in soil bulk density, influence growth of some crops to a greater degree than does the actual increased soil density. Current experiments include studies on the relationship between soil moisture suction—with increased soil density—and nutrient absorption to improve fertilizer application and irrigation practices. Field studies indicate that, if adequate soil moisture can be maintained, the ill effect caused by compacted soils can be reduced in such crops as tomatoes.—*W. J. Flocker, Dept. of Vegetable Crops, Davis.*

Carbon dioxide in

FRUIT RIPENING

Carbon dioxide, an essential component of photosynthesis, is also one of the products of respiration in green plant tissues.

How carbon dioxide behaves in developing and ripening fruits of tomato and pepper is under investigation. During the ripening of tomato and pepper fruits, the color changes from green to red; and, as the green chlorophyll is slowly destroyed, photosynthesis decreases correspondingly. By the use of gas chromatography, concentrations of carbon dioxide, oxygen and nitrogen in the fruits are determined; and with radioactive carbon dioxide, the fate of the tagged carbon dioxide can be traced during periods of daylight and darkness. The results of the study may aid in the explanation of the climacteric rise in the respiration rate of fruit during ripening and also, may be of practical value in modified atmosphere storages.—*M. Yamaguchi and F. D. Howard, Dept. of Vegetable Crops, Davis.*

Defect of the inner ear due to

MANGANESE DEFICIENCY

Female rats receiving a manganese deficient diet during gestation produce offspring which suffer ataxia—a condition characterized by muscular incoordination, lack of equilibrium, and abnormal position of the head. Ataxia has been found in poultry, in swine, and in guinea pigs, as well as in rats.

One of the important structures of the body necessary for normal maintenance of equilibrium is the inner ear, consisting of the organ of hearing and the organ of balance, with its three semicircular canals. The entire inner ear is completely surrounded by a bony covering called the otic capsule.

Recent studies of the otic capsule in newborn young of manganese-deficient rats showed that development of the capsule is even less than the incomplete development in normal newborns. More than half of the deficient young showed less development of this structure than was seen in any of the normal young. Besides the retardation of development, malformations of the otic capsule were also seen in the manganese-deficient young.—*Lucille S. Hurley and Gladys J. Everson, Dept. of Home Economics, Davis.*

PLASTIC LEVEES

for rice fields

Many problems are associated with the use of soil levees in rice production in California. These problems include levee construction by large expensive machines, levee maintenance, seedbed preparation and harvesting between levees, weed growth, and land removed from production by the use of wide soil levees.

Studies are under way on a new approach to reducing or eliminating these problems by using a plastic film supported by stakes as a levee. Preliminary results obtained from a field scale installation indicate that plastic levees may have several advantages including seedbed preparation of the field as a unit before the levees are constructed, harvesting the field in larger units because the plastic rice levee can be removed prior to harvest; reduction in weed population, and minimum land area for levees, therefore more land available for production of rice.

Research is in progress to determine methods of mechanically installing plastic film levees, techniques of removing the film from the field, desirable stake spacing and film thickness, methods of fastening the film to supporting stakes, and durability during high velocity winds.—*Verne H. Scott, Dept. of Irrigation, Davis,* and *Dwight C. Finfrock, Rice Experiment Station, Biggs.*