BRIEFS

Short reports on current agricultural research

Soil moisture and Phytophthora

ROOT-ROT OF TOMATOES

Field studies of a root-rot of tomatoes caused by the soil-borne fungus Phytophthora show that the disease is most severe under water-logged soil conditions. Water-logging may occur because of tight subsoils or a high water table, since both these conditions slow down the drainage of excess water out of the upper root zone.

Cooperative field investigations indicate that careful control of irrigation water will minimize water-logging of the soil and markedly reduce loss of plants by the disease on a soil which can be water-logged rather easily. At the same time, the carefully irrigated treatment supplied adequate moisture for good yields of fruit.

Phytophthora root-rot does not always occur on water-logged soils, even where the disease has been present in previous seasons. Marked reduction of disease where tomatoes follow barley as compared to tomatoes following tomatoes has been observed. Because the surface soil frequently becomes very dry under barley, and the fungus is severely affected by extremely dry soils, the influence of soil moisture on survival of the fungus is being investigated in the greenhouse.

Data on duration of water-logging in field soils are being collected as a means of predicting where special water management practices are necessary in preventing severe Phytophthora infection. *—D. W. Henderson, Dept. of Irrigation, Davis.*

Control of fruiting by

PLANT REGULATORS

Long-term studies are being made concerning the role of growth regulators—hormones—in fruit setting, fruit growth and maturation. Recent results of gibberellin application to almonds, apricots and peaches have led to the challenging of the widely accepted hypothesis that auxins are the only limiting factors in the setting and growth of fruits. Although auxins have been shown to be effective in setting multi-seeded fruits such as the fig, grape and pear, they have been ineffective in this respect on single-seeded fruits like the almond, apricot, cherry and peach.

One application of gibberellin to emasculated peach blossoms at the time of full bloom brought about a 22% increase in fruit set over that obtained by pollination. The fruits produced with gibberellin contained normal pits but no seeds. Average size of these fruits was not greatly different from pollinated fruits even though they matured about 10 days earlier. Similar results were obtained with the almond and apricot.

This evidence suggests modification of the original hypothesis to include gibberellin or gibberellin-like substances as also being essential for stimulating fruit growth.—*Julian C. Crane, Dept. of Pomology, Davis.*

Strong winds, dry air and

WATER USE BY CROPS

Results obtained during the first year's operation of a 20′ diameter lysimeter show that strong north winds at Davis have an even more drastic effect on water use by crops than was previously suspected. These winds in the Sacramento Valley are always very dry, with relative humidity averaging 10%–30% day and night. Under such conditions, water use by grass at Davis on October 12, 1959 was 0.28″, almost three times the normal use for clear and calmer days in October and almost equal to the average daily use for July. On February 23, 1960, water use for the same crop was 0.17″, or about double the normal.—*W. O. Pruitt, Dept. of Irrigation, Davis.*

Double cross hybrid varieties in

LADINO CLOVER

The development of an experimental double cross hybrid variety of ladino clover which would be comparable to double cross hybrid corn is underway. Heretofore a barrier to development of hybrids in such crops as clover has been the inability to control crossing between plants. If two randomly selected plants are crossed, there will be crossing between sister plants of their offspring which results in reduced vigor. This difficulty can be circumvented by use of the built-in incompatibility system of clover, a system of genes determining which plants will or will not cross. Using enforced self-pollination it is possible to secure plants homozygous for different incompatibility genes. When these plants are crossed, there is no crossing between sister plants of their offspring. By utilizing these plants it is possible to produce a true double cross hybrid.

To produce double cross hybrid seed, four plants homozygous for different incompatibility genes are selected. Cuttings from two of the selected plants are planted alternately in one isolation field, and cuttings from the other two plants established alternately in another isolation field. The seed harvested from the two isolation fields are mixed and planted in a third isolation field for the production of commercial double cross seed comparable to double cross hybrid corn seed. Whether or not such seed has the same advantage as commercial hybrid corn has not yet been established.—*W. E. Nyquist and E. H. Stanford, Dept. of Agronomy, Davis.*

Chemotherapy of

BEE DISEASES

During the past three years, approximately 200 colonies of bees have been treated successfully for the eradication of American foulbrood in a research apiary established in Imperial County. The infected colonies were treated with either terramycin or sodium sulfathiazole, or both, after all poor combs were eliminated and the colonies strengthened by the addition of brood, more bees and young queens. Each colony was reduced to a one-story hive and treated with medicated honey or sugar syrup, or with powdered sugar and antibiotics, to stimulate brood rearing and to enable the bees to eliminate all evidence of the disease. Combs were rotated in the brood chambers to cause brood to be reared in all combs.

The colonies were fed only sufficient medicated syrup to stimulate brood rearing or to carry the bees over the winter period, or during the spring buildup. The colonies used up the feed before they began storing surplus honey and were not treated during the honeyflow if they