plots and of commercial orchards in Ventura and in Santa Barbara counties. One hundred and seventy bark samples were taken for microscopic examinations and analysis of the findings.—*Henry Schneider, Dept. of Plant Pathology, Riverside.*

Studies of nutrition of

The Corn Earworm

for development of resistant plants

The corn earworm, which attacks tomatoes, cotton, tobacco, corn, sorghum, and other crops, was rated the number one insect pest in the United States during 1958. Because of the difficulties encountered in efficient insecticidal control, a search is underway for plants that inherently resist the earworm. At the present, this search is being conducted among sweet corn varieties, both commercial and experimental ones, as well as several inbreds.

Remarkably little is known concerning the nutrition of the corn earworm. Its amino acid, fat, vitamin and carbohydrate requirements are not known. Insect nutrition studies frequently augment plant resistance studies; thus, a knowledge of the corn earworm's necessary diet may yield some valuable leads in the search for resistant plants. The feasibility of this approach has been amply demonstrated in the case of the European corn borer and the pink boll worm, which attacks cotton.

An initial phase of the study will be an attempt to develop an artificial diet on which the earworm can be reared readily because, at the present, mass rearing of the corn earworms is difficult, as fresh plant material must be used.—*Frank E. Strong, Dept. of Entomology and Parasitology, Davis.*

Aphid pests of field and orchard crops

Biological Control

A reduction of about $11 million a year in spotted alfalfa aphid damage to California's alfalfa crop has been achieved. Importation and colonization of three species of wasp parasites, conservation of native natural enemies of the aphid, and use of effective insecticides reduced the $13 million problem of 1955 to about $2 million in 1958.

Recent colonization of an imported European parasite of the walnut aphid may aid in the biological control of the walnut aphid because the only parasite occurring naturally in California has never appeared common enough to be of much value.

At least one species among several parasites of the pea aphid, imported from Europe and India, has been established in California and evaluation studies are continuing.

Recent studies of parasitism of the green citrus aphid have shown that no native parasite is capable of complete development in this host.—*E. I. Schlinger, Dept. of Biological Control, Riverside.*

Studies on

Rooting of Grape

cuttings

Whether, when grown under irrigation, the top bud of cuttings of grape rootstocks and fruiting varieties planted in the nursery row should be exposed to the air or covered with a mound of loose soil has been under investigation at Davis. In the San Joaquin Valley such cuttings are commonly left uncovered; in the central part of the valley and in the coast counties they are commonly covered by 2″–3″ of loose soil. Three years of experiments indicate that fruiting varieties root better when the top bud is left exposed, but the common rootstocks varied with the year: covered buds rooted best in 1957, and exposed buds in 1956 and in 1958.

Two years of research at Davis indicated that rootstock cuttings with only a top bud rooted as well as or slightly better than rootstock cuttings with a top and bottom bud.

One year's experiments show that the rootstock St. George and the table varieties Thompson Seedless and Tokay are severely injured when cuttings are allowed to dry out eight hours on the open ground. Injury through drying is greatest during the daylight hours. French Colombard and Petite Sirah are not injured in this way until after 24 hours, and can still be rooted after 72 hours. Tests are now underway to determine the minimum time of desiccation which will injure grape cuttings.—*C. J. Alley, Dept. of Viticulture, Davis.*

Bacterial disease of the

Cabbage Looper

may aid natural control of pest

The cabbage looper—*Trichoplusia ni* (Hbn.)—is a serious pest of many vegetable crops in California. High populations of this insect occur on celery in late summer and fall, and heavy insecticide applications are necessary to control it. Most of the effective chemicals for the control of loopers are long lasting, which often results in serious residue problems at the time of harvest.

The use of *Bacillus thuringiensis* Berliner for control of the cabbage looper on celery is currently being investigated. Trials with this bacterial disease during 1958 yielded promising results when it was applied as a dust.

To determine whether economic control is possible and practical, future work is planned to establish dosage levels, best methods, and proper timing of applications.

Since aphids also can be serious pests of celery, and since the bacillus is not effective against aphids, it may be necessary to investigate bacillus-aphicide combination treatments to adequately protect the crop. However, natural enemies of the celery pests may build up in the bacillus-treated fields so that chemical insecticides may not be needed.—*Albert A. Grigarick and Y. Tanada, Dept. of Entomology and Parasitology, Davis.*

Rootstocks

for peaches, plums, prunes, apricots and almonds

The development of fruit and nut tree rootstocks that will resist certain diseases and pests and will tolerate adverse soil conditions is the main concern of trials at Davis.

There is a need for a rootstock that may be used to adapt the peach to wet areas in orchards. Preliminary trials indicate that certain plum stocks may be suitable for this purpose, so a considerable number of trees are now being tested in commercial orchards. If these trees prove satisfactory in large plantings, they can also be used in home orchards in areas where the soil is too wet and heavy for peach roots.

Several kinds of peach rootstocks that may be used as stocks for peaches and almonds have been found to be resistant to one species of root-knot nematode. The object of the present tests is to determine which one of the various rootstocks under trial has the most resistance to the other root-knot nematode species found in California orchards. The ultimate goal is to find a peach rootstock that is completely resistant to both species of root-knot nematodes. Most apricots, plums, and prunes may be grown on the resistant apricot and Marianna 2624 rootstocks.

Marianna 2624 plum rootstock has shown considerable resistance to oak root fungus, but a number of trees have been killed. Other possible rootstocks are now being tested in oak root fungus infected soil to see if they are better than Marianna 2624.—*Carl J. Hansen, Dept. of Pomology, Davis.*