

Constant Research on Use of Insecticides Necessary for the Control of Citrus Thrips

(Continued from page 1)

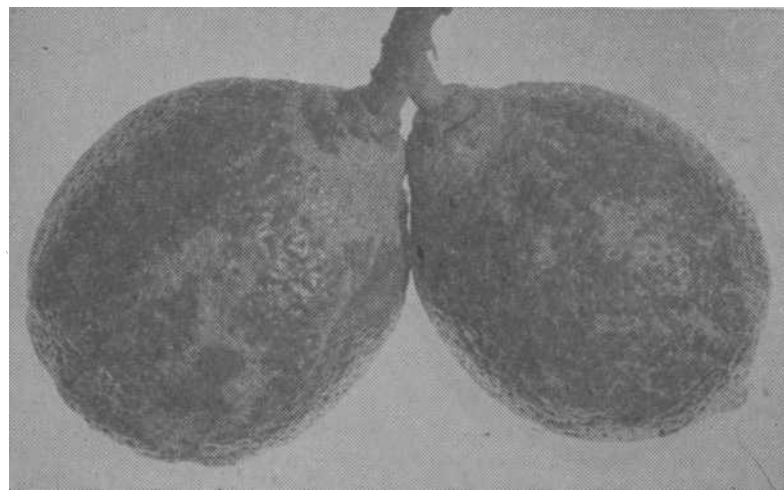
eggs and continues throughout the summer and fall.

Tartar Emetic-sugar Sprays Developed

Spray duster applications of tartar emetic-sugar sprays, developed by the University of California Citrus

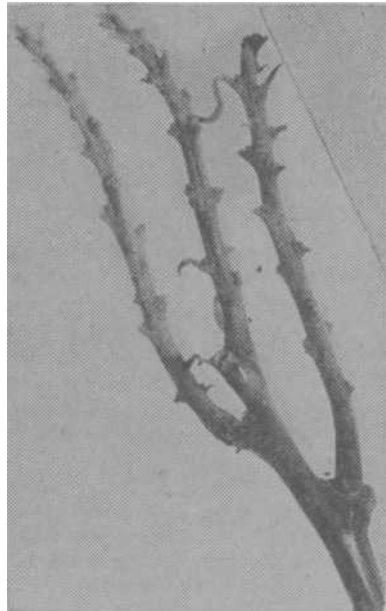
Since tartar emetic-sugar sprays could be applied without tree or fruit injury during the summer months in the San Joaquin Valley and at any time in the Coachella Valley, or in southern California on lemons, it appeared to be the perfect treatment

tain areas, which was demonstrated to be the result of the development of tolerant or resistant strains of thrips.



Experiment Station, largely replaced the lime-sulfur sprays or sulfur dusts in general use prior to 1939.

for thrips control. However, within three seasons unsatisfactory control occurred in cer-



Injury to fruit and new growth of lemons by citrus thrips. Note the scarring of the fruit, shown at the left.

Nicotine-sugar Sprays

Following the failure of tartar emetic-sugar sprays, further work by the University's Citrus Experiment Station showed that sprays containing commercial nicotine preparations remained effective against thrips for several days if sugar was added.

Results have been fairly satisfactory with spray-duster applications at the rate of 100 gallons per acre of a spray containing seven pounds of Blackleaf 155—or one quart of nicotine sulfate—plus four pounds of sugar for every 100 gallons of water.

There have been some failures with nicotine-sugar sprays and further work has been in progress in an effort to find a more satisfactory treatment.

DDT-Sulfur Dust or DDT Spray

The development of DDT as an insecticide has given the citrus industry another treatment which shows promise for the control of thrips.

Three years' experimental results have shown that a two per cent DDT-sulfur dust applied at the rate of 100 pounds per acre or a suspension of four pounds of 50% DDT wettable powder in 100 gallons of water per acre applied with a spray duster is very effective in controlling thrips to prevent fruit scarring in the San Joaquin Valley.

Spray-duster applications of DDT appear to be no more satisfactory in summer treatments for thrips in the San Joaquin Valley or on lemons in southern California or on grapefruit in the Coachella Valley than standard nicotine-sugar treatments.

Even at its best, DDT in either sprays or dusts has not shown the effectiveness of the tartar emetic-sugar spray at its best.

An outbreak of cotton cushion scale occurred in certain groves in the San Joaquin Valley following DDT applications in 1946, apparently the result of killing off the vedalia ladybird beetle. It is thus evident that DDT in its present formulations is not the perfect treatment for thrips control.

Constant Research Necessary

Many more of the newer insecticides have also been tested as thrips treatments and while several of them show promise in preliminary tests, further work is necessary before their value as thrips control measures can be established.

It is thus apparent that at the present time there is no control measure for citrus thrips that is entirely satisfactory in all areas where it is a serious pest.

It is evident from past experience that any treatment, no matter how efficient it may appear to be at first, will probably need revision or replacement sooner or later and that constant research is necessary for the development of new methods of control if losses from citrus thrips are to be prevented.

W. H. Ewart is Assistant Entomologist in the Experiment Station, Riverside.

Pear Production Problems Confronting Growers Receive Extensive Research Study

Warren P. Tufts

Probably more time and effort have been devoted to a study of the pear in California, than of any other deciduous tree fruit.

This has resulted not because of the size of the industry, which from the standpoint of the acreage involved is of less importance than the prune, walnut, peach, almond, or apricot, but because of the very definite and serious problems which have confronted the pear growers of the state.

Fire-blight

Undoubtedly fire-blight has been the most serious single menace to the success of the pear industry.

In cooperation with the United States Department of Agriculture, the Pomology Division has under way an extensive breeding program designed to combine blight resistance with fruit quality.

The use of Old Home and other resistant varieties for trunk and scaffolds has been adopted generally.

Black End

The use of the oriental stocks (*Pyrus serotina*, *P. ussuriensis*, *P. betulaeifolia*) in order to secure greater blight and aphid resistance in the root system introduced the problem of Black End which for many growers was more serious than blight.

A certain percentage of all varie-

ties of the commercial pear districts of the state.

This is also true of irrigation and cover crop experiments. The use of permanent covers, no cultivation with weeds controlled by oil sprays, and irrigation by sprinklers are now under investigation.

There have appeared from time to time and in different parts of the state baffling disorders which for lack of better terminology, were formerly classified as physiological diseases.

The cause for most of these has now been determined as due to the excess or deficiency of certain minor elements—boron, iron, zinc, and copper—so-called because of the extremely small amounts usable by the plant.

Tests for Determining Fruit Maturity

Definite minimum maturity standards based upon color changes, rate of softening and increase in soluble solids have been suggested after extensive field and laboratory study.

With the fall and winter varieties the pressure test used to determine the relative firmness of the flesh offers a definite means of measuring maturity, and pressures for harvesting the more important varieties have been published.

With the Bartlett, grown under a



Fruit on the tree on November 26, 1946 when this photograph was taken.

ties, with the exception of the Hardy, has shown susceptibility to this disorder when propagated on the above-mentioned stocks.

Investigations are continuing with pear rootstocks, not only from the standpoint of blight and pear root aphid resistance but also for better adaptation to various adverse soil conditions.

Delayed Foliation

Delayed foliation following relatively warm winters, is now recognized as often being responsible for blight epidemic years.

The absence of a sufficient amount of chilling weather (under 45 Deg. F) during the winter months results in a protracted bloom which in extreme cases may extend over a period of a month.

The Bartlett of all the varieties grown in California has the most profound rest.

The use of oil sprays has in certain winters been somewhat effective in breaking this rest, but present data are insufficient on which to base definite recommendations for the use of oil sprays for this purpose alone.

Pollination

The problem of pollination requirements of pear varieties still presents new angles and a study is being made of the feasibility of applying pollen artificially in water suspensions or in some inert dust as a carrier.

It has been demonstrated repeatedly that a heavier set of Bartlett pears will result from cross-pollination but such fruits have a higher seed count which results in a relatively short pear.

Fertilizer, Irrigation and Cover Trials

Intensive fertilizer trials with nitrogen, phosphorus, and potash have been and still are in progress in many

diversity of conditions, no single maturity test seemed adequate.

Sprays

Three years ago, with the advent of the almost universal use of hormone sprays for the preharvest drop of Bartlett pears, a new problem arose.

Not infrequently a considerable number of fruits in any one box would become soft and watery before the others were ripe.

Experimental trials have shown conclusively that this breakdown is caused by over-maturity due in large measure to the fact that sprays for the preharvest drop hold certain fruits on the tree beyond the proper time of harvest.

There seems little doubt but that the sprays have a direct effect in hastening ripening generally, and where used, the normal period of harvesting should be reduced.

In experimental trials little, if any, breakdown has occurred in pears picked during the first half of the harvest season.

The possible influence upon ripening of summer oil sprays and of some of the newer developments for the control of codling moth are also other problems under investigation.

Warren P. Tufts is Professor of Pomology and Pomologist in the Experiment Station, Davis.

Hybrid Vigor in Dairy Herds By Crossing Between Inbred Families Within a Breed

(Continued from page 1)

past fifteen years, according to the 1944-45 report of the Stanislaus County Cow Testing Association, averaged 486 pounds of butterfat—the lowest, 442 pounds, the highest, 535 pounds. When they began using our University bulls, their Cow Testing Association average was 324 pounds. These herds average 54 cows of milking age. No three-time milking or other high pressure methods were used.

Inbred Holsteins

About fifteen years ago we began inbreeding our purebred Holsteins. Marked loss of vigor resulted in lowered production, smaller size, and reduced efficiency. The third and fourth generations were a pretty sorry lot. We secured an inbred bull of another purebred Holstein family. His daughters out of our old inbred cows were larger at birth and have grown faster than did their dams.

range ewe, which in turn is bred to a Hampshire or Suffolk ram. The resulting lamb is superior in rapidity of growth and quality of carcass to the lamb of any of the pure breeds. Hybrid vigor annually puts millions of dollars into the pockets of the California sheepmen.

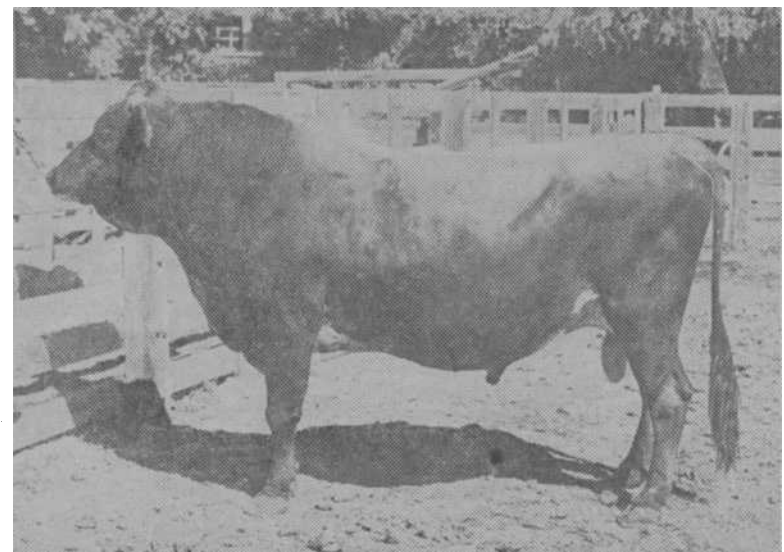
Lawrence M. Winters at the University of Minnesota reports maintenance of hybrid vigor in a three breed cross with swine, where the crossbred females were retained for breeding purposes.

It is theoretically plausible that like success would attend a three family crossing of inbred strains within a single breed of dairy cattle.

Protecting Hybrid Vigor

In a few years we will have two inbred families, our present California Napoleon Nick strain and our new California Romus Rex line.

One reason for establishing the



California Napoleon Nick, herd sire of the first inbred family of purebred Jerseys developed by the Division of Animal Husbandry for a high order transmitting ability for high milk and butterfat production.

The first nine to freshen—none was culled—averaged 557 pounds of butterfat on a mature, ten month, twice daily milking basis. This is a 226-pound increase over the record of their dams under identical feeding and management conditions. We are unable to say at this time how much, if any, of this increase is due to hybrid vigor. The experiment is so planned that we will be able to determine this with accuracy in a few years.

Supporting Experience

Acting on the results of long time research of the University of California sheepmen of the state are making use of hybrid vigor in a big way. Each year a half million spring lambs, most of them crossbreds, are shipped to eastern markets.

Usually a Corriedale ram is bred to a Ramboulet ewe to produce the

second inbred line is to "hedge" against the sudden appearance of vigor decline in our original inbred family. If such should transpire, it could be immediately corrected by using a bull from the other inbred line.

Large progressive breeding establishments might find it profitable to develop three or more inbred families, from which buyers could alternately select herd sires. The same thing might be accomplished by three small breeders in a community, if each developed a separate inbred strain.

Dairymen criss-crossing between these lines would profit by the hybrid vigor generated in their herds.

W. R. Regan is Professor of Animal Husbandry and Animal Husbandman in the Experiment Station, Davis.

CALIFORNIA AGRICULTURE

Established December 1946

Progress Reports of Agricultural Research, published monthly by the University of California College of Agriculture, Agricultural Experiment Station.

HAROLD ELLIS, Director, Agricultural Information
W. G. WILDE, Editor

California Agriculture, progress reports of agricultural research, will be sent free to any resident of the State in response to a request sent to the University of California College of Agriculture, 331 Hilgard Hall, Berkeley 4, California.

Any part or all of this material may be used with or without credit