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ALABAMA

# Agricultural Experiment Station

OF THE

AGRICULTURAL AND MECHANICAL COLLEGE,

AUBURN.

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OF ALABAMA.
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C. F. BAKER.

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 The Bulletins of this Station will be sent free to any citizen of the State on application to the Agricultural Experiment Station, Auburn, Alabama.

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## I. THE SAN JOSE SCALE,\*

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C. F. BAKER.

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That this terrible pest of the orchard has gained a foothold in Alabama is now an assured fact. Specimens have been examined from orchards and nurseries in the northern, central and eastern portions of the State. It will also probably be found in other sections, as it occurs in several of the Southern States, and no steps have been taken to prevent its free distribution. Not only is the occurrence a matter of vital importance to every orchardist and nurseryman at home, on account of its destructiveness, but late laws (passed and pending) in several States, relative to this insect, will make it impossible to ship from infested localities to those States. This bulletin is published for the purpose of informing fruit-growers regarding the very serious nature of this pest, and warning them that unless its appearance is carefully watched for, and *immediate* steps taken to destroy it, the destruction of infested trees—perhaps whole orchards—*will surely follow*.

### KINDS OF TREES ATTACKED.

This scale has been found on most of the fruit trees grown in the United States. It will also attack currant and gooseberry, and even the pecan and English walnut. Some of its most destructive occurrences have been in orchards of apple, peach, pear, plum, and cherry.

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\* Those desiring a very much fuller descriptive account of this insect should apply to the U. S. Department of Agriculture at Washington for Division of Entomology Bulletin No. 3—new series. Several bulletins on the subject have also been sent out from various State Experiment Stations.

### APPEARANCE, AND PART OF TREE ATTACKED.

The congregated scales produce a dirty whitish, fly-specked appearance, usually on the bark—in bad cases also on leaves and fruit. Although the scale is a very small one, yet the greyish, scurfy appearance of the bark will call attention to its presence.

### HOW IT IS DISSEMINATED.

Probably the principal agent in the distribution of the San Jose Scale over the United States has been nursery stock. There should be laws in this State, as there are already in some others, not only compelling owners of orchards to do all possible towards eradicating the pest where it occurs, but prohibiting the transportation or sale of infested nursery stock or fruit in the State. Such a law should certainly be put into effect at once, before the insect has spread beyond all hope of control. Some other States now have abundant cause for extreme regret that they did not enact the necessary laws in time, for as in New Jersey and Ohio the laws come too late to act as a *preventive*. Prevention in this case is comparatively cheap—cure very costly. This matter is most earnestly recommended to the careful attention of orchardists and legislators.

### ITS DESTRUCTIVENESS.

Relative to the unusual destructiveness of this insect, we cannot do better than quote Mr. L. O. Howard, Government Entomologist, under whose direction it has been carefully investigated. He says: "There is perhaps no insect capable of causing greater damage to fruit interests in the United States, or perhaps the world, than the San Jose, or pernicious, scale. It is not striking in appearance, and might often remain unrecognized, or at least misunderstood, and yet so steadily and relentlessly does it spread over practically all deciduous fruit trees—trunk, limbs, foliage, and fruit—

that it is only a question of two or three years before the death of the plant attached is brought about, and the possibility of injury, which, from experience with other scale enemies of deciduous plants, might be easily ignored or thought insignificant, is soon startlingly demonstrated. Its importance from an economic standpoint, is vastly increased by the ease with which it is distributed over wide districts through the agency of nursery stock and the marketing of fruit, and the extreme difficulty of exterminating it where once introduced, presenting, as it does in the last regard, difficulties not found with any other scale insect. \* \* \*

The Los Angeles Horticultural Commission reported in 1890 that if this pest be not speedily destroyed it will utterly ruin the deciduous fruit interests of the Pacific Coast. Its capacity for evil has been more than demonstrated since its appearance in the east, and it has been, if anything, more disastrous to the peach and pear orchards of Maryland, New Jersey, and other Eastern and Southern States than in California and the West.

We are therefore, justified in the assertion, that no more serious menace to the deciduous fruit interests of this country has ever been known. There is no intention here to arouse unnecessary alarm, but merely to emphasize the importance of taking the utmost precautions to prevent its introduction into new localities, and to point out the extreme necessity of earnest effort to stamp it out where it has already gained a foothold."

#### WHAT TO DO ABOUT IT.

If scales of any sort whatsoever are found in the orchard, send samples to this office at once (see last page) for identification. There are several scales in the east which very closely resemble the San Jose scale, but which are not so destructive in character. This point should be determined at once. The orchard should be kept free from all scales,

but in no case is the necessity for immediate action so urgent as with the San Jose scale.

If a tree is very badly affected, cut it down at once and burn. If the top only is affected, cut off and burn, treat the trunk remaining with whale-oil soap, and re-top by grafting (Webster). Otherwise the best and simplest remedy in the east is probably a winter wash of whale-oil soap. This should be *thoroughly* applied at the rate of two pounds dissolved in one gallon water, with a spray pump, brush or swab, once or twice during the winter and again before the buds begin to swell in the spring (Webster and Smith).

The whale-oil soap can be ordered from Leggett & Brother, 301 Pearl St., New York City. "It is sold in barrels of about 450 pounds at 4 cents per pound, in boxes of 100 pounds at 6 cents per pound, and in 50 pound lots at 6½ cents per pound. In each case the material will be delivered free on board of cars or to express."

Mr. Howard gives the following

#### SUMMARY OF RECOMMENDATIONS

which embodies the best advice that can be given fruit growers and which it behooves our orchardists and nurserymen in the east to heed:—

"(1) In all cases of recent or slight attack the affected stock should be promptly uprooted and burned. No measure is so sure as this, and the danger of spread is so great that this course seems fully warranted.

(2) In cases of long standing and wide extent the affected stock should be cut back severely and treated with winter soap wash, stock badly incrustated with scale should be cut out at once and burned. The lessening of the vitality, together with the poisoning of the sapwood already effected by the scale in such cases, will usually prevent the plant from ever again becoming healthy, and generally it is beyond help. We wish particularly to impress upon the minds of

fruitgrowers that as soon as this insect is found to occur in an orchard the most strenuous measures must be taken to stamp it out. No half-way steps will suffice. The individual must remember that not only are his own interests vitally at stake but those of the entire community in which he resides. He may think that he can not bear the loss, but the loss in consequence of the slightest neglect will be much greater. The fact, too, that there is a community of interests among fruit growers in this matter must not be lost sight of. Fruit growers must be mutually helpful in an emergency like this.

(3) As precautionary measures to prevent the introduction of the scale into new districts, the following considerations are important: No orchardist should admit a single young fruit tree or a single cutting from a distance into his orchard without first carefully examining it and satisfying himself conclusively that it does not carry a single specimen of the San Jose scale; he should insist, also, on a guaranty from the nurseryman of such freedom. In addition, no fruit should be brought upon the premises without previous careful inspection. If this course is adopted by everyone interested, without exception, the rate of spread of the species may be limited to the comparatively slight natural extension by crawling, by winds, and by the aid of other insects and birds."

## II. SOME OTHER INSECT PESTS.

### A. THE TOMATO WORM.

Probably no other enemy of the tomato can do so much damage in so short a time, as the Tomato Worm. This immense green worm, with a "horn on his tail," is familiar to every grower of tomatoes. Its voraciousness is unequalled. Within a very few days two of them have been known to entirely defoliate a good sized tomato plant. It very closely resembles the Tobacco Worm which works in

a similar manner. When the worm becomes full grown it leaves the plant, goes down into the ground and transforms into a large oval dark brown chrysalis, which eventually gives forth one of the large "humming bird" or "hawk moths." After mating the moths lay eggs which produce more worms. In the south there may be several broods in a season.

As the worm and its work are very conspicuous, it is an easy matter to keep the plants clear of them by hand-picking. A sharp-eyed small boy armed with a stick, can knock them off the vines and crush them very rapidly, and is much surer and more economical than any insecticide. Where the worms are abundant this process should be repeated at least once a week. In spite of the ease with which they may be kept under control, several patches of tomatoes were visited last fall in which these worms were working great havoc unmolested, because the owners "didn't know any remedy" for the trouble.

Often individuals are found covered with numerous little white silky bodies. These are the cocoons of beneficial parasites which kill the worms. On this account, they *should never be destroyed*.

#### b. GRAPE LEAF-HOPPERS.

During the summer in almost any vineyard, when the foliage of the vines is disturbed, great numbers of very minute insects are seen flying and jumping about. These insects, though usually occurring in myriads and often doing great damage to the vines, are so inconspicuous that they are rarely noticed. Still more rarely is anything done to remedy the evil. They gain their sustenance by sucking the juice of the vine, thus sapping its life and producing injurious effects, for which the grower can usually see no cause.

The leaf-hoppers hibernate over winter under the leaves and rubbish in the vineyard. Hence the first move indica-



ted is keeping the ground entirely clear of litter of any sort during the winter. During the summer, as soon as they appear on the vines apply kerosene emulsion in a fine spray all over the vines. Apply it very early in the morning, while still cool, for at this time they are most inactive and hence most readily reached with the emulsion.

Kerosene emulsion is made of water, soap and kerosene in the following proportions: one gallon water, one-half pound soap, and two gallons kerosene. Heat the water boiling hot, dissolve in it the soap, add the kerosene and churn the mixture forcibly, or pump back into the same vessel, until it becomes a creamy, white, frothy emulsion, from which the kerosene will not separate. Dilute with nine times the amount of water.

#### c. CABBAGE WORMS.

Every one is acquainted with the disgusting green worms in cabbages. They are not only an unmitigated nuisance to those who raise the cabbage for home use, but they often ruin the plant for market purposes. As soon as they appear in the cabbages, the plants should be thoroughly dusted with pyrethrum. The pyrethrum should be a *fresh* article and can be ordered from Leggett & Bro., 301 Pearl St., N. Y. City. Mix one part of this with six parts of wheat or rye flour and allow to stand in a closed vessel over night. It may be dusted into the cabbages by means of a powder gun made for the purpose, or through cloth bags as is done in the case of Paris green on cotton.

Or two tablespoons of the pyrethrum may be stirred into a gallon of water, and this after standing for a time, sprayed into the plants.

Kerosene emulsion is sometimes used for these worms and for the lice which are so often abundant in cabbages, but it should not be used within several weeks of the time

of harvesting as there is a possibility of some odor or taste of kerosene remaining.

There is no danger from the pyrethrum and it leaves no taste, so can be used with impunity. Its active principle is a volatile oil, which escapes rapidly when the powder is left uncovered. A fruit jar with a tight top is a good thing to store it in. It is a very good plan to keep a small supply of it on hand, for it is a very efficient remedy for many troublesome insects, especially some of the household pests like cockroaches, bedbugs, ants, etc. Dusted into the fur of dogs and cats it will kill fleas and lice and can be similarly used on domestic fowls. Small portions melted and made up into little cones, then dried, lit at the top and allowed to smoulder, will rapidly clear a room of flies or mosquitoes.

#### WHENEVER YOU ARE TROUBLED BY INSECTS

of any kind whatever, in the house or barn, on the farm or garden, in the orchard, in the store, warehouse or mill, or anywhere else, send specimens at once, safely packed in a small wooden box with the facts concerning them, to The Entomologist, Agricultural College, Auburn, Ala. He is stationed here at your service, and will give prompt attention to all communications, furnishing you with information regarding the insects and remedies for them, free of all charge. He is just now engaged in a special study of all insects injuring cotton, and would be very glad to receive notices of any such from all portions of the State.