

A FEW INSECT ENEMIES OF THE ORCHARD.

Clarence P. Gillette, M. S.

SCALE LICE.

Colorado fruit growers may well congratulate themselves that no serious outbreak of scale insects has ever occurred in the orchards of the state, and also, that the San Jose scale has not yet been found in Colorado. But, while congratulating ourselves thus, we must not fail to take care of the few species of scale lice that are known to be present in limited localities and to take every precaution against introducing others from abroad.

HABITS AND APPEARANCE OF SCALE LICE IN GENERAL.

Scale lice are so called because they secrete over themselves, for protection, a thin, horny covering or scale. If one examines these scales in the fall or winter he usually finds them filled with minute eggs. These eggs hatch early in the spring, and the minute, wingless lice that come from them crawl about over the tree for a few days and then insert their beaks into the bark, fruit or leaves and begin to draw the sap and to grow. Once located, the lice of most species never move again. The scale soon begins to form for protection and increases in size with the growth of the louse underneath.

These scales usually imitate the bark of the tree very closely in color, so that they are often unnoticed until the tree is nearly or quite dead. A close observer will notice, however, that the bark of the tree appears rough and scaly, and that the tree lacks vigor.

HOW THE LICE ARE SPREAD.

It may seem strange that so minute a creature without wings, and one that is able to run only for a few days, can distribute itself so rapidly and be so difficult to exterminate.

These insects are scattered for the most part by being carried upon nursery stock or grafts, or even upon fruit, from place to place. They are also carried by winds and are undoubtedly carried long distances in many cases upon the feet of birds.

A FEW SCALE LICE FOUND OR REPORTED IN COLORADO.

THE SAN JOSE SCALE (*Aspidiotus perniciosus*).

This, the most destructive of all the scale lice that infest deciduous fruit trees, has been reported on a few occasions in

Fig. 2.



Figure II.—Piece of bark covered with San Jose scale, greatly magnified. (From United States Department of Agriculture, Division of Entomology, copied.)

Colorado, but I wish to assure the readers of this article that none of these reports have been corroborated. The recent reports of this scale in Mesa county were all a mistake, the scale in question being Putnam's scale, which is mentioned below.

After determining this to be Putnam's scale, I sent samples to Prof. Cockerell, of New Mexico, and to Dr. Howard, of the department of agriculture, at Washington, and both assured me that my determination was correct and that the species in question could not be San Jose scale.

This scale has been reported in no less than twenty states and territories, and is scattered from the Atlantic to the Pacific.

Fig. 3.

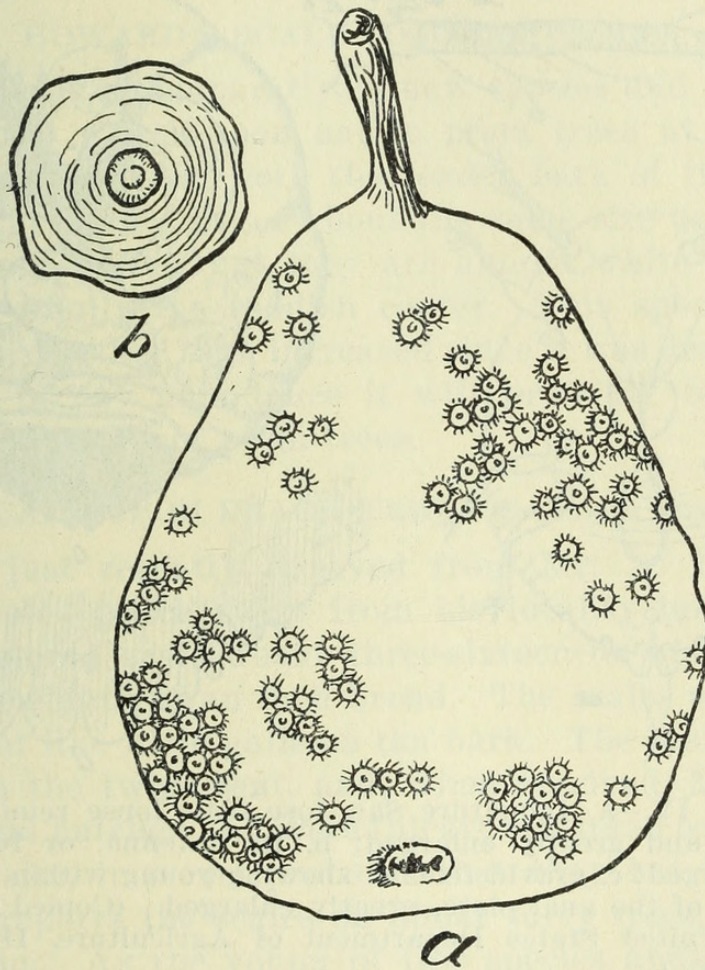


Figure III.—a, Pear infested with San Jose scales, natural size; b, a single scale greatly enlarged, showing the rust-colored spot at the center. (From the United States Department of Agriculture, Division of Entomology, copied.)

Our nearest neighbors reported as having it are New Mexico, Arizona, Idaho, Indiana and California.

The scales attack all parts of the tree above ground—bark, leaf and fruit. They are seldom over one-twenty-fifth of an inch in diameter, but may attain twice this size where there are only scattering individuals. Figure II. shows the appearance of

scales and young lice upon bark greatly magnified, and figure III. shows the scales on a pear, where they are represented of natural size.

PUTNAM'S SCALE (*Aspidiotus ancylus*).

This scale resembles the preceding very closely, but can usually be told from it by its darker color and the brighter or deeper rust-colored spots on the center of the scales. These two scales can only be distinguished with certainty by the use of

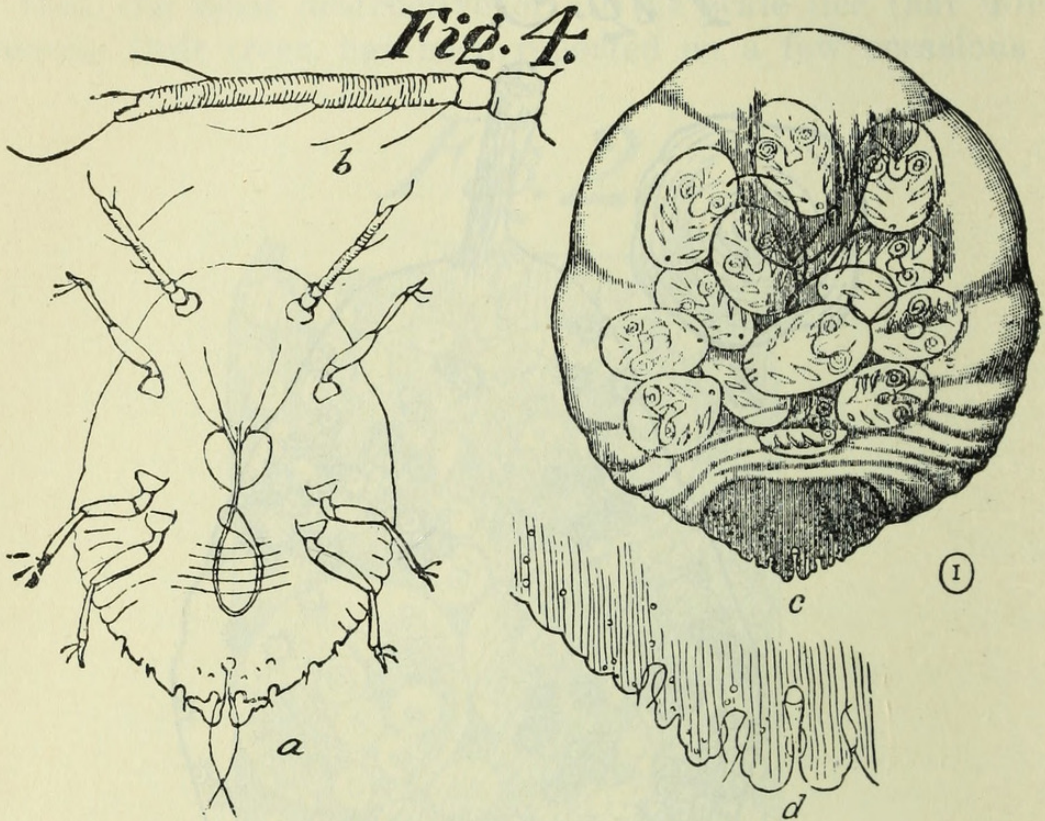


Figure IV.—a, Immature San Jose scale louse removed from the scale and greatly enlarged; b, its antenna, or feeler, still more enlarged; c, gravid female, showing young within her body; d, outline of the anal plate, greatly enlarged. (Copied from bulletin of United States Department of Agriculture, Division of Entomology.)

a compound microscope in the hands of a specialist. It is important, therefore, if either of these scales are suspected, that samples be forwarded at once to the experiment station for determination. So far as I can learn, Putnam's scale has never been a very serious pest in any part of the United States, but there is always a possibility that an insect that has formerly attracted little attention may suddenly become very abundant and injurious when introduced into a new locality. This has been known to be present in a few places in Colorado for several years. I know of one small plum orchard in Cañon City

where this scale is very abundant and is probably the cause of several trees dying. Mr. Oyler, of Grand Junction, has sent me twigs from pear and plum trees in Mesa county containing this scale in large numbers. He reports the scale to be scattered over a large territory and in many orchards, but seemingly doing but little harm, except to a single plum tree. Prof. Cockerell, of New Mexico, tells me that this scale is found in that state on oak, box-elder and cottonwood, as well as on various fruit trees. It probably occurs in many orchards in this state where it is not suspected at present.

HOWARD'S SCALE (*Aspidiotus howardi*).

This scale is a comparatively new species and was first discovered by the writer upon native plum trees at Cañon City, Colo. The scales infest both the tender bark of the twigs and the fruit. The scales are of about the same size as those of the two preceding species, but they are almost white in color and lack almost wholly the reddish center. This species seems to have decreased rather than increased since it was first discovered. If it occurs in any abundance it will probably be found conspicuous on the fruit of plum trees.

A SCALE UPON PEACH TREES (*Lecanium persicae*).

I have just recently received from Mr. A. F. Reeves, of Montrose, Colo., peach twigs from his locality infested with a large rust-colored scale about three-sixteenths of an inch long by about one-eighth of an inch broad. The scales are prominent and stand out like little galls on the bark. The scales were very abundant on the twigs sent, and, when received, March 28, the young lice had hatched and were thickly scattered over the twigs. From their size, it seems probable that they hatched last fall. Mr. Reeves reports the scales on about forty trees, so far as he can determine. As the young of this species appear all within a short time, it is probable that this scale can be easily kept in check by the use of a strong kerosene emulsion, or a strong solution of fish-oil soap soon after hatching. It will be comparatively easy to treat them while the foliage is off the trees.

Whale-oil or fish-oil soap, lime, sulphur and salt washes, resin washes and kerosene emulsion are the most common remedies used against the scale insects.

THE BROWN OR CLOVER MITE (*Bryobia pratensis*).

This is one of the worst pests on fruit trees, especially pear, apple, plum and cherry, in the mountainous districts of Colorado.

Its presence in the summer time is best noticed by the pale, sickly appearance of the foliage of the trees, by the whitish, scurvy appearance on the under side of the limbs and about the small crotches of the trees, and by the minute spider-like objects, of a dark color running about upon the bark. On examination, it will be seen that the scurvy appearance of the limbs is due to the cast skins and empty egg shells of the mites.

Although the injury to the trees is chiefly manifested in the bleached foliage, the mites will seldom be found on the leaves.

REMEDIES.

The following are the results of experiments for the destruction of both eggs and mites that were conducted by myself one year ago. During the fall, the mites deposit enormous numbers of reddish eggs upon the limbs of the trees, chiefly about the crotches. The eggs are massed together, and are plainly seen as reddish or rusty patches upon the bark:

A number of small limbs of a pear tree that were almost covered with eggs were procured from Cañon City and set out in moist earth for the experiments. Some of these I took while in Cañon City, and others were sent me by Judge W. B. Felton:

Whale-Oil Soap, in the proportions of one pound to a gallon of water, and in one-half and one-fourth this strength, killed perfectly all the eggs that were treated with it, but in the proportion of one pound to eight gallons it did little good. The newly hatched mites were killed by whale-oil soap in all strengths down to one pound to eight gallons.

Kerosene Emulsion, used without diluting (in which the kerosene was two-thirds of the mixture) and diluted with water to one-half and one-fourth this strength, killed perfectly in every case. When diluted so that the kerosene was one-sixteenth of the mixture (or one-half of the last named strength) a very few of the mites hatched. This last strength did kill, perfectly, mites in all stages when thoroughly treated with it.

Leggett's Potash Lye, in the proportion of one pound to one gallon of water, did very little good in preventing the hatching of the eggs. As near as I could estimate, it killed one-third of the eggs.

Tobacco Decoction, made by steeping one pound of tobacco in three gallons of water, had no perceptible effect upon the eggs, all hatching perfectly.

Sulphur Spray, prepared by combining three pounds of sulphur and two pounds of caustic soda and diluting to 200 gallons in water, was also used against the eggs, but without effect.

The whale-oil soap and the kerosene emulsion, being entirely efficient, one or the other should be used against this pest. As it is much easier and cheaper to make the application during the winter season, while the foliage is off the trees, this is the season that should be chosen to destroy the brown mites.

THE CODLING MOTH, OR APPLE WORM (*Carpocapsa pomonella*).

This pest causes heavier annual loss to the apple crop than any other insect. It is found in nearly every part of the world where apples are grown. In the orchards of Delta county, Colorado, it was for a number of years unknown. It is now present in all the orchard regions of the state, unless it be in some very limited and isolated places. It is not a pest that we can hope to exterminate, and orchardists can not afford to let it go unchecked.

Life Habits of the Insect—There are two, and perhaps a partial third, brood of this insect in Colorado each year. The moths of the first brood begin to appear early in the spring, and are ready to deposit their eggs in the blossom ends of the small apples as soon as the blossoms fall. The moths do not all appear at once, so that the eggs of the first brood are distributed through several weeks. If the weather is warm, the eggs will hatch in about four or five days, and the young larvæ will begin to eat in the blossom end of the apple and to burrow their way to the core, about which they feed until mature. When mature, the larvæ or worms eat a large hole to the outside, and escape to go in search of a suitable place to spin a silken cocoon and change to a chrysalis, and, a little later, to come forth as moths. This second brood of moths begins to appear about the first week in July, and in a few days, like the first brood, fly to apples or other suitable fruit to deposit their eggs. This time the eggs are often laid in the stem end of the apple or upon any rough spot where they will readily adhere. The habits of this brood are like those of the first. The later individuals do not leave the apples until they have been barreled or put in winter quarters. The winter is spent in the worm state in some protected spot, as between barrel staves, under barrel hoops, under scales of bark on apple trees, etc. Early in the spring these worms change to chrysalids, and a little later appear as moths.

REMEDIES.

On account of the habit of the larva in feeding for a little time in the blossom of the apple before burrowing to the core,

it has been found that a thorough spraying with London purple or Paris green at the correct time will destroy about 70 per cent. of them.

The proper time for spraying is immediately after the blossoms fall and *never before*. To spray before the blossoms fall is not only waste of time and material, but will also be liable to poison honey bees that visit the flowers for honey and pollen. If the spraying is much delayed, many of the worms will have already eaten their way into the fruit and be out of the reach of the poison. A second application should be made in a week or ten days after the first. If heavy rains fall, it is well to make the second application as soon as possible afterward. Should there be much rain-fall following the first or second treatment within a few days, it would pay to make a third treatment, but otherwise not. Care should be taken to throw the spray so that it will strike the blossom ends of the apples, and the treatment should be thorough. It is best to stop as soon as the leaves begin to drip.

In the eastern states, it is usually recommended to make the application in the proportion of one pound of poison to 200 gallons of water. In the dry atmosphere of Colorado I have found it very safe to apply in the proportion of one pound to 160 gallons the first time. The weaker mixture will do for the second or third applications.

A great many worms may be caught and destroyed by tying bandages of burlap or other cheap cloth about the trunks of the trees, and removing these once in a week or ten days to kill the worms that collect beneath them. This work should begin about the last week in June, and be continued until fall.

Where apples are kept in cellars, the windows and doors should have screens to prevent the escape of the moths that hatch in the cellars. Care should be taken not to take fruit barrels or boxes from storehouses or fruit dealers to the farm unless they have been thoroughly disinfected, as they often contain the larvæ of the codling moth in great numbers.



Gillette, C. P. 1897. "A few insect enemies of the orchard." *Bulletin* 38, 33–40.

View This Item Online: <https://www.biodiversitylibrary.org/item/248665>

Permalink: <https://www.biodiversitylibrary.org/partpdf/267147>

Holding Institution

University Library, University of Illinois Urbana Champaign

Sponsored by

University of Illinois Urbana-Champaign Alternates

Copyright & Reuse

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.