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The Agricultural Experiment Station

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WESTERN SLOPE FRUIT INVESTIGATION

Condensed Report of Field Entomologist*

SEASON OF 1906

E. P. TAYLOR, GRAND JUNCTION, COLORADO

CODLING MOTH.

The number of sprays required to control the codling moth in an orchard will depend principally upon (1) previous infestation of orchard; (2) proximity to other infested orchards; (3) efficiency of earlier sprays, and (4) variety of fruit.

Time to Spray—The time to apply the first spray is determined by the condition of the calyx of the bloom. This time is following the dropping of the petals but before the closing of the calyx. A period not to exceed from five to seven days for any one variety would cover the time when this first spraying should be done. The center blossoms are invariably the first to open their petals and first to drop them. They are first to close their calyces and most likely to set fruit which will remain without dropping from the tree. It is therefore evident that this first spraying should be done with these blossoms in mind. Sixty per cent. or more of the first generation worms, according to this summer's observations, entered at the calyx. For the remaining forty per cent. or less, entering at the side or stem end of the apple, a second spray must be applied early enough to coat the surface of the small apple with poison before the hatching worms make their appearance, and this coating must be maintained upon the fruit until the first generation eggs have hatched.

(This press bulletin is abstracted from Bulletin No. 119, which contained the general report of the Field Entomologist, Western Slope Fruit Investigation for 1906.)

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Other conditions being right, one spraying with an adhesive arsenical will perform this end, making two sprays required to destroy the first generation. There being but two full generations of the insect through the season, if the first be destroyed there should be no second left with which to contend. In common practice there will be cases where more than two sprays are necessary, and these additional ones should be directed against the second generation.

It is possible that a general rule may be made for common use, based upon the blooming of the fruit in spring. Such a general rule is herewith presented. Observations upon the time of appearance of the insect in any of its stages could be made to supplement the general rule. The efficiency of the first two sprays suggested will largely determine the necessity of the later ones.

General Rule—(1) Petals off; calyces open; (2) (a) One month from full bloom. (b) Three weeks from center calyces closing. (c) When apples are about three-fourths of an inch in diameter; (3) one month from (2); (4) two weeks from (3); (5) two weeks from (4).

Kind of Spray—The experiments of the year showed Swift's arsenate of lead slightly superior to the arsenite of lime, so far as killing effect upon worms was concerned. It is more convenient and less likely to injure foliage. Arsenate of lead when improperly made may cause injury to foliage and fruit from an excess of free arsenic contained. Injury to trees from arsenical sprays is more or less dependent upon variety of fruit and meteorological conditions at time of spraying. A practice among some orchardmen has been to use arsenate of lead for the first and second sprays, and if further spraying is found necessary, the cheaper arsenite of lime is substituted.

Swift's arsenate of lead is commonly used at the rate of twelve pounds of paste per 200 gallons of water. Arsenite of lime is used at the rate of one pound arsenic, four pounds sal soda, thirty pounds lime per 200 gallons of spray, the arsenic and sal soda being boiled together in a small quantity of water for fifteen minutes until dissolved, after which the lime slacked with water to form a milk was added.

Method or Way to Spray—In the experiments of the year it was shown that the method of application had more to do with success than a difference in insecticides used.

For the early spraying a coarser spray of liquid is desirable. At this spraying the tree should be drenched with a strong, driving spray. It should be directed straight into the calyx cups. At spraying time an average apple tree has two-thirds of its blossoms pointing upward and one-third downward. It is, then, apparent that spray must be directed in both these directions. It was found necessary with full-bearing trees, in order to insure thorough work, that spraying be directed downward from the top of a tower constructed over the spray wagon. Spray poles eight to twelve feet long should be used by both ground and tower men.

Dr. John R. Fain Collection

For the later sprays, a nozzle producing a fine mist is desirable. A nozzle of the double-vermorel type, arranged in such a way that the direction of the nozzle can be placed at any angle with the spray pole, is wanted. The size of the aperture wanted in the nozzle cap will depend upon the pressure maintained. Higher pressures economize upon material and time, and under ordinary conditions are most desirable.

The complete details of the summer's experiments and observations upon the codling moth will be available in a special bulletin issued by the Colorado Agricultural Experiment station, which bulletin is now under preparation.

HOWARD SCALE.

This pest is one of greatest importance to the pear growers of parts of Colorado. Besides the pear, it is known to infest prune, plum, apple, almond and certain shade and forest trees.

Experiments conducted showed the insect to be possible of cheap and complete control by spring applications of the lime and sulphur wash.

Bulletin No. 122 and Press Bulletin No. 30 upon this pest have been recently issued, based principally upon this season's investigations, and may be had upon application.

PEACH TWIG BORER.

The peach twig borer is one of the most important pests to the peach growers of western Colorado.

The injury is caused by a small pinkish brown worm, with black head, measuring, when fully grown, about one-half inch long. The worm is the immature stage of a small grayish moth. The winter is passed by the worm, still very minute, in small chambers hollowed out within the spongy tissue of the bark at the crotches of small limbs. Early in the spring, at about the same time the foliage of the peach shows as small green tufts upon the tips, the worms leave their burrows and attack the tender twigs, boring into them near their tips. This injury to the terminal tips constitutes an important injury to the tree. Young peach trees are usually worst infested.

The second generation of worms brings about another injury to the peach crop by making their way directly into the forming fruit, producing the "gummy" peach.

Former recommendations for the control of this insect have been for spring applications of lime and sulphur washes. This has, in fact, been a most successful treatment, but the use of lead arsenate against the twig borer of peach is destined to meet with equal popularity when its efficiency, cost and convenience of preparation and application are considered.

The arsenate of lead is recommended at the rate of three pounds of the paste to fifty gallons of water. The lime and sulphur wash

should be used at the rate of fifteen pounds lump lime and fifteen pounds flowers of sulphur per fifty gallons of water, the two ingredients being boiled together in a small amount of water, for forty-five minutes, then diluted with enough cold water to make fifty gallons of spray. The two sprays, as applied, are of about equal cost—each a trifle over one cent per gallon, exclusive of cost of preparation. The arsenate of lead spray is far more convenient, quicker in preparation and more pleasant to apply.

The spraying should be done at the time when the majority of the blossom buds are first showing their pink tips and as a rule while they are unopened.

Any arsenate of lead spray applied to peach trees must not contain free arsenic, as they are easily damaged by impure lead or lead diluted with water to contain too high a per cent. of the poison, though pure.

OTHER OBSERVATIONS.

The peach tree borer was found doing considerable damage to peach trees in parts of the Grand Valley, having evidently been brought to the county upon nursery stock imported from eastern states. The green aphid and the woolly aphid of the apple were both unusually abundant and destructive. The importance of all of the above mentioned pests to the fruit growers made careful and exhaustive experiments of control imperative and such are now being conducted against them.

Other insect observations made during the season were upon a small grayish brown beetle, doing injury to buds on grafted pear and young apple trees; a pink or salmon colored aphid infesting the buds of peach; aphids infesting plums and elms; the green fruit worm gouging holes into the forming fruit, of apple mites infesting pear; buffalo tree-hopper, tent caterpillar, hawk-moths, grasshoppers, thrips, brown mite, pear and cherry slug, terrapin scale, Putnam scale, as well as numerous parasitic or predaceous insects doing beneficial service in the orchards.