
BULLETIN NO. 15. - - - - NEW SERIES.

Agricultural Experiment Station,

OF THE

Agricultural and Mechanical College,

AUBURN, ALA. - - - - - APRIL, 1890.

INSECTICIDES.

 The Bulletins of this Station will be sent Free to any citizen of the State, on application to the Director.

THE BROWN PRINTING CO., STATE PRINTERS, MONTGOMERY, ALA.

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KEROSENE EMULSION; HOW TO MAKE AND APPLY IT.

BY GEO. F. ATKINSON.

This Bulletin is published with the special purpose of giving some useful information to those farmers of the State who may not have the opportunity of reading similar publications issued from other sources.

Formulas for the Kerosene Emulsion and methods of its application have been published from time to time in various reports of the U. S. Department of Agriculture, and of the Experiment Stations, but it is hoped that the publication at this season of the year, in connection with some personal experience, will stimulate efforts to destroy many of the enemies of plants, which this simple remedy will do if made and applied properly. This will serve as an apology to our friends in other States who are already flooded by law with similar papers.

The Kerosene Emulsion is one of the cheapest and best insecticides to apply to soft bodied insects which pierce the leaves or stems of plants with their beak and suck the juices. Plant lice (Aphides) are good examples of such insects. Poisons, like Paris Green or London Purple, upon the surface of the leaves, would not injure plant lice, while they are very serviceable in the case of insects like the cotton worm, because this worm bites off portions of the leaves and swallows them.

FORMULA.

The Kerosene Emulsion is made in the following way :

Boil $\frac{1}{2}$ lb. common bar soap in one gallon of water, and while hot add it to two gallons of kerosene oil. This mixture must now be very thoroughly agitated by forcing it, with the aid of a pump, through a nozzle which produces a

fine spray, of course directing the spray from the nozzle back into the vessel containing the mixture. This usually requires 10 or 15 minutes. If properly emulsified it will look like white, foamy cream, and will adhere to glass without oiliness.

In this proportion the emulsion is too strong and must be diluted. The proportion of the diluent must in many cases be decided by experiment, but a very good way is to mix one gallon of the strong emulsion with nine gallons of cold water. In diluting the emulsion it is not necessary to churn it again. It will be seen that two gallons of kerosene oil will make thirty gallons of the emulsion. So if a smaller quantity is wanted less oil and soapwater may be used, or the strong emulsion not used may be kept from one week to ten days for use.

TO APPLY THE KEROSENE EMULSION.

If one has never used the Kerosene Emulsion it might be well to try only a small quantity at first and observe the results, whether it injures the foliage ; if not, whether it is strong enough to kill the insects. After a few trials one can discover the exact strength of the emulsion necessary to kill the insects without injury to the plant, and can dilute or strengthen the emulsion accordingly.

In most cases it will be found necessary to apply the emulsion with a force pump which has a nozzle attached to produce a fine spray. The emulsion must come in contact with the bodies of the insects. Where the plants are not very large and the insects are on the upper surface of the leaves or on the stems of the plants, a common watering pot with a nozzle made to produce a fine spray will be found serviceable, or even an old broom can frequently be made quite effective to apply small quantities. But where a great number of plants are to be sprayed it will be cheaper to provide a good force pump suitable for the purpose.

Plant lice are easily killed with the Kerosene Emulsion. The writer used it with success to kill plant lice on cotton at Columbia, S. C., in the summer of 1889. The sprayer used was the "Eureka Sprayer," made by Adam Weaber & Son, Vineland, N. J. As the lice are found on the under

surface of the leaves it was necessary to throw the spray upward from near the ground. For this purpose I had constructed a long tube to take the place of the short one attached to the sprayer. A cyclone nozzle was attached on the side at one end so as to throw the spray at a right angle from the tube. The tube was long enough so that standing in an upright position the end with the nozzle could be held close to the ground under the plants. A row could be thoroughly sprayed by walking at a moderate pace. As the lice are usually not evenly distributed over the field, but appear in spots, a portable sprayer for one man would serve the purpose better than heavy machinery with horse power.

The appearance of a few lice on cotton is no cause for alarm, for in a majority of instances they do no appreciable harm. But some seasons they retard and stunt the growth of the plant to such a degree that it would pay to kill them. During the summer of 1889, in some places in Eastern South Carolina, considerable cotton in spots was very badly injured by the lice, so that the plants were said to "turn black and lose their leaves."

Very few plants are exempt from the attacks of one or another of the species of plant lice, and they are sometimes very injurious to garden crops, roses, flowers, fruit trees, etc.

Strong soap suds is sometimes used instead of the Kerosene Emulsion, and I would recommend it instead where a wash is to be applied to the roots of plants to kill those forms of plant lice sometimes found on the roots of such plants as do not extend very far into the ground, or where the lice are confined to the larger roots not far from the stem, as is often the case. I have used it with success to kill the root lice on melons, and I do not doubt that it would be serviceable in the case of the root lice of cabbages and turnips, which I see do some injury in this vicinity. Not only will the soap suds kill the lice, but it will act as a fertilizer.

The chinch bug (*Blissus leucopterus*) is easily killed by the Kerosene Emulsion when it attacks corn. While at the University of North Carolina the writer had the opportunity

of carrying out very successfully some experiments in killing the chinch bugs on corn which they attacked after leaving the wheat. The results of these experiments were issued by the State Department of Agriculture as a special Bulletin, which was reprinted in many of the State papers, for the chinch bug was very troublesome in the State that year. One gentleman at Raleigh, before these results were published, had made an application of Paris Green to a forty acre field of corn, and seeing no good results tried London Purple with the same effect. He was just on the point of permitting the bugs to take entire possession when he saw in the papers the results of my experiments. He immediately tried the Kerosene Emulsion and saved his corn.

It can be very easily applied to the chinch bug on corn with a common watering pot, for the bugs collect on the stalk within one or two feet of the ground in great numbers. The gentleman above referred to, not having a force pump at hand to mix the emulsion with and wanting it quickly, used a bundle of twigs with which he "whipped" the mixture until it was emulsified.

There are many other soft bodied injurious insects which do not bite the leaves of plants and therefore can not be killed by applications of arsenical poisons to the leaf that can successfully be controlled with the Kerosene Emulsion.

Many people, in their first attempt to use the Kerosene Emulsion, have been careless in not carefully following the directions for making and applying it. In such cases the oil is not well mixed or the emulsion is too strong and the plants will surely be injured when careless experimenters will condemn the use of a cheap and effective insecticide.

Other Bulletins, with instructions for applying Paris Green, London Purple, etc., will soon follow.