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UNIVERSITY OF WYOMING.
Agricultural College Department.

WYOMING EXPERIMENT STATION,
LARAMIE, WYOMING.

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PLANT LICE.

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Wyoming Agricultural Experiment Station.

University of Wyoming.

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PLANT LICE.

BY F. J. NISWANDER, ENTOMOLOGIST.

Perhaps there is no family of insects that is more widely distributed, does more damage to vegetation and is more generally known than plant lice (Aphidae). They are great pests in the greenhouse, in the garden, and do great damage to our forest, shade and fruit trees, causing the foliage to curl and drop from the trees. The members of this family not only feed upon the foliage of plants, but many species attack the branches and trunks of trees, while others live entirely upon the roots.

The small green insects (Fig. I.) that infest the foliage of the cottonwoods of this State are members of the family technically known as Aphidae. Not a cottonwood has escaped them, and the damage they are doing to the trees is considerable. Each louse is furnished with a sharp, hollow beak or rostrum. Those insects possessing beaks and taking their nourishment by piercing the tissue of the plant and then sucking up the juices are said to be haustellate. These lice exist in two forms, one apterous or wingless, the other having wings. Late in the fall the eggs are deposited upon the twigs and buds of the trees. Early in the spring, before the buds have fairly opened, the eggs hatch and the young
lice crowd upon the buds, eager to destroy the tender foliage. It is surprising how rapidly they increase. The first lice that hatch are females, and their reproduction is somewhat curious. They do not deposit eggs, but instead young lice are born. One female will within a comparatively short time produce enough lice to populate a tree. The young lice, as soon as they reach maturity, will in the same way continue the process of reproduction. Thus it is that by the time the tree has taken on its foliage the leaves will be covered by myriads of these small aphids, eagerly sapping the life-blood of the tree.

Each louse has on the sixth abdominal segment two small projecting tubes, called nectaries. From these exude the "honey dew," a sweet liquid much sought by ants, bees and flies. This liquid is often secreted so copiously that the leaves become coated with the sticky substance and large drops fall upon the ground beneath. I have noticed these drops, on the stone walks of Laramie, so thick that a casual observer would mistake them for drops of rain.

The two species of lice that are the most common in this locality on the cottonwoods are Pemphigus populimonilis? Riley and Chaitopherus viminalis? The former is less numerous than the latter. The first named species attacks the leaf near its margin. By the continual puncturing and irritation to the leaf the growth is retarded at that point. The growth on the opposite side of the leaf is so rapid that within a short time a pocket-like cavity is formed, in which the lice live. The other species differs in its habits from its relative. Instead of forming a gall or protective covering for themselves, they congregate upon both sides of the leaf near the mid vein, and by
their continued puncturing soon cause the foliage to curl, become brown and finally drop from the tree.

Nature has provided us with checks against the ravages of these pests. There are numerous small "four-winged flies" that deposit their eggs in these lice, by means of a sharp ovipositor. It was these little friends that saved the wheat crop two years ago in the East when its destruction was threatened by these lice. The larvae from the eggs of these "four-winged flies" live upon the vital organs of their hosts, use their skin for a pupal covering and eventually emerge ready to continue their warfare.

The small reddish yellow and brown "lady bugs" (coccinellidae) are great checks upon the increase of these plant lice. During a warm day these little beetles are seen busily depositing their eggs among the lice and upon the trunks and branches of the trees. These eggs hatch into a grub, which will within a short time destroy an entire colony of aphids.

Several species of flower flies, Fig. II., (Syrphidae) are great aids in destroying these lice. The larvae (Fig. III.) of these flies are maggots, and the number of lice one of these maggots will destroy in a day seems almost incredible.

In addition to Nature's checks upon the ravages of insects, artificial means are resorted to. Various remedies have been suggested for the destruction of plant lice, but none seems to be more effective than an emulsion of kerosene oil and soap. This emulsion is made as follows:
“Dissolve in two quarts of soft water one-fourth pound of hard soap by heating to the boiling point, then add one pint of kerosene oil and stir vigorously for from three to five minutes.”—(Cook). The best way to do the stirring is to pump the mixture from one vessel into another, or back into the same vessel, with a good force pump. This will form a thick creamy mass that may be diluted to any desired strength. To the mixture just formed we then add ten pints of water. This is the usual strength, although the emulsion will kill the lice if twelve pints of water are added. It is better to add the larger amount of water, as there is some damage done to the foliage when only ten pints of water are added. Throughout the State are numerous oil wells and springs which might be utilized. It is possible that where the crude oil is used a larger quantity of the material would be necessary. This emulsion should always be applied with a force pump.

Another excellent remedy for plant lice is Buhach or Pyrethrum. This is the yellow insect powder sold in the shops for the destruction of insects. If two tablespoonfuls of this be thoroughly stirred in a large pail full of water and sprayed upon the trees excellent results will follow the application. Too much care cannot be taken to make a thorough application, otherwise it will do no good.

In the application of insecticides there is nothing that will insure success like thoroughness. A dashing spray, one that will reach every leaf upon all portions of the tree, is one of the essentials of a good force pump. There are many pumps placed upon the market and all have certain features that are commendable.

A. I. Root, Medina, Ohio, sells a very convenient
plant lice.

Pump for $1. The Whitman Fountain pump, manufactured by J. A. Whitman, Providence, R. I., is excellent and will answer the purpose of a more expensive pump. It costs $6.50 at the factory. The Field Force Pump Co., of Lockport, N. Y., sell an excellent pump for $2.50. The Nixon pump, of Dayton, Ohio, is furnished with a zinc lined tank and can be moved from tree to tree on a wheelbarrow. It is also furnished with a superior nozzle, and is perhaps the best general purpose pump placed on the market. It sells for $15.

I desire to express my thanks to Prof. A. J. Cook, of the Michigan Agricultural College, for valuable suggestions and for the loan of the cuts for the Illustrations; also to Prof. L. O. Howard, of the Division of Entomology, Washington, D. C., for the identification of the lice sent him.
The Entomologist of the Wyoming Agricultural Experiment Station will be pleased to receive insects from the residents of the State, and will endeavor to answer any inquiries concerning their life history or the best means of destroying them, if injurious. Insects can be sent by mail for one cent per ounce. If the specimens are dead they should be packed in cotton or wool to insure safe transportation, and enclosed in a tight wooden or tin box. NEVER SEND INSECTS IN A LETTER, as they will be crushed beyond recognition. Whenever it is possible live insects should be sent. Caterpillars, grubs, maggots, etc., should be supplied with enough of their food plant to last them until they have reached their destination. It is unnecessary to cut air holes in the boxes, as the amount of air required by insects is very small. When sending insects the name of the sender should be written on the package. Anyone sending specimens for identification will confer a favor by giving as full particulars as possible concerning their habits; for example, what plant it infests; whether it infests the roots, stems, twigs, buds or leaves; how long you have known it to be injurious, and what amount of damage it has done. The Director, on his recent tour through the State, arranged for collections of insects to be made by the Superintendents of the Experiment Farms at Lander, Saratoga, Sheridan, Sundance and Wheatland. Insects may be sent through those gentlemen. All packages and communications should be addressed to F. J. NISWANDER, Entomologist, Agricultural Experiment Station, Laramie, Wyo.