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Entomological Series
CIRCULAR 4

THE CORN ROOT-APHIS

BY W. P. FLINT
Chief Field Entomologist



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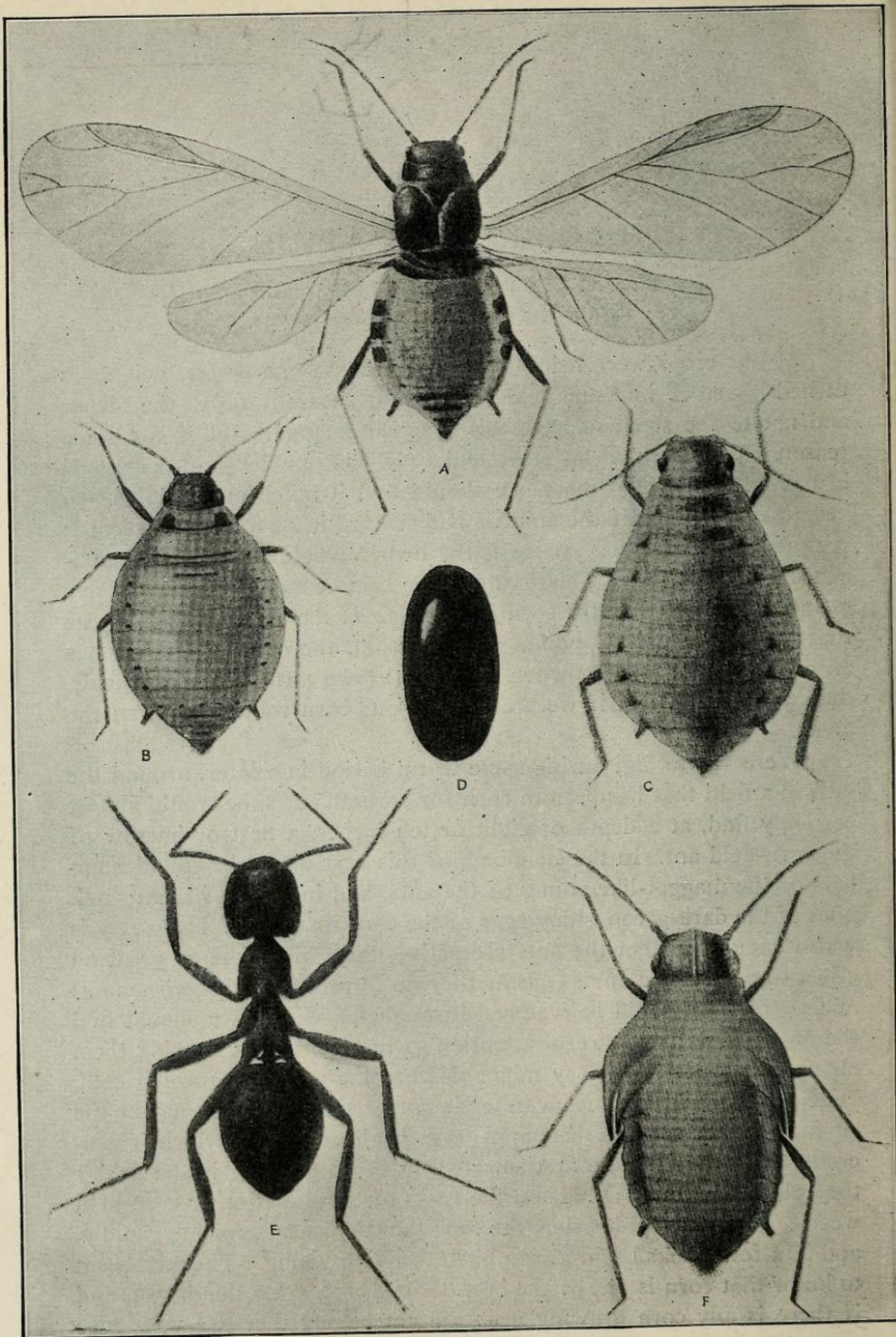
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THE CORN ROOT-APHIS

By W. P. FLINT, Chief Field Entomologist
State Natural History Survey

If our crops were being destroyed because one of our neighbors turned his stock into our fields, we would naturally go to the owner and not to the stock to have this practice stopped. But if for some reason he claimed that his stock had a right in our fields and persisted in trying to get them there, we should find it much more difficult to keep them out than if the animals had strayed in of their own accord; for, generally speaking, at least, the owner would have more intelligence than his stock. This is much the same condition that we have to face in dealing with the corn root-aphis. If the old adage holds true that possession is nine points of ownership, the corn root-aphis has an owner, and it is this owner, the little brown ant of the corn fields, that we must combat if we are to keep our corn roots free from the aphis.

Were one to dig, during some warm period in winter, around the hills in a field that has been in corn for several years, he would almost certainly find, at a depth of eight or ten inches, a nest or burrow of the corn-field ant. In the chambers of this nest would be found numbers of the maggot-like young of the ants, and in some of them small piles of the dark-green, shiny eggs of the corn root-aphis. If the day is warm enough so that the ants are active, they will make as great an effort to protect the aphis eggs as they do to protect their own young; and if this nest could be watched through the winter we should find the ants giving most careful attention to the aphis eggs, moving them about in the nest that they might not become too damp or too cold. When the ground becomes warmer in spring the ants move nearer the surface, and as soon as their aphis eggs begin to hatch (which is generally about the time the first smartweeds begin growing in the fields) they place the young aphids on the roots of these and other corn-field weeds. Here the aphids suck the sap from the roots, growing rapidly, and in a few weeks begin giving birth to living young. The ants seem to know that corn is one of the best of food plants for this insect, and if there is any corn growing near the ant colony they are very sure to find it and to place the aphids on its roots. There they remain through the summer, attended by the ants and reproducing at a very



The Corn Root-Louse (*Aphis maidiradicis*). B, the common wingless, and A, the winged viviparous female; F, the pupa of the winged female; C, the oviparous female, occurring in autumn, and D, its egg; E, the root-louse ant (*Lasius niger*).

rapid rate by giving birth to living young. These young are all wingless at first, but some of them develop wings and, making their way to the surface of the ground, take flight. When they settle to the ground they wander aimlessly about until found by some ant which at once takes them to its burrow and places them on the roots of a food-plant. It is mainly in this way that new colonies of the aphids are started. On the approach of cold weather a change takes place in the manner in which the aphids reproduce, and they then deposit eggs which are gathered by the ants and cared for during the winter.

It is not to be supposed that the ants give all this care to the root-aphids and receive nothing in return. The root-aphid gives off a fluid which we call honeydew, and it is to get this substance as food that the ant cares for the aphid.

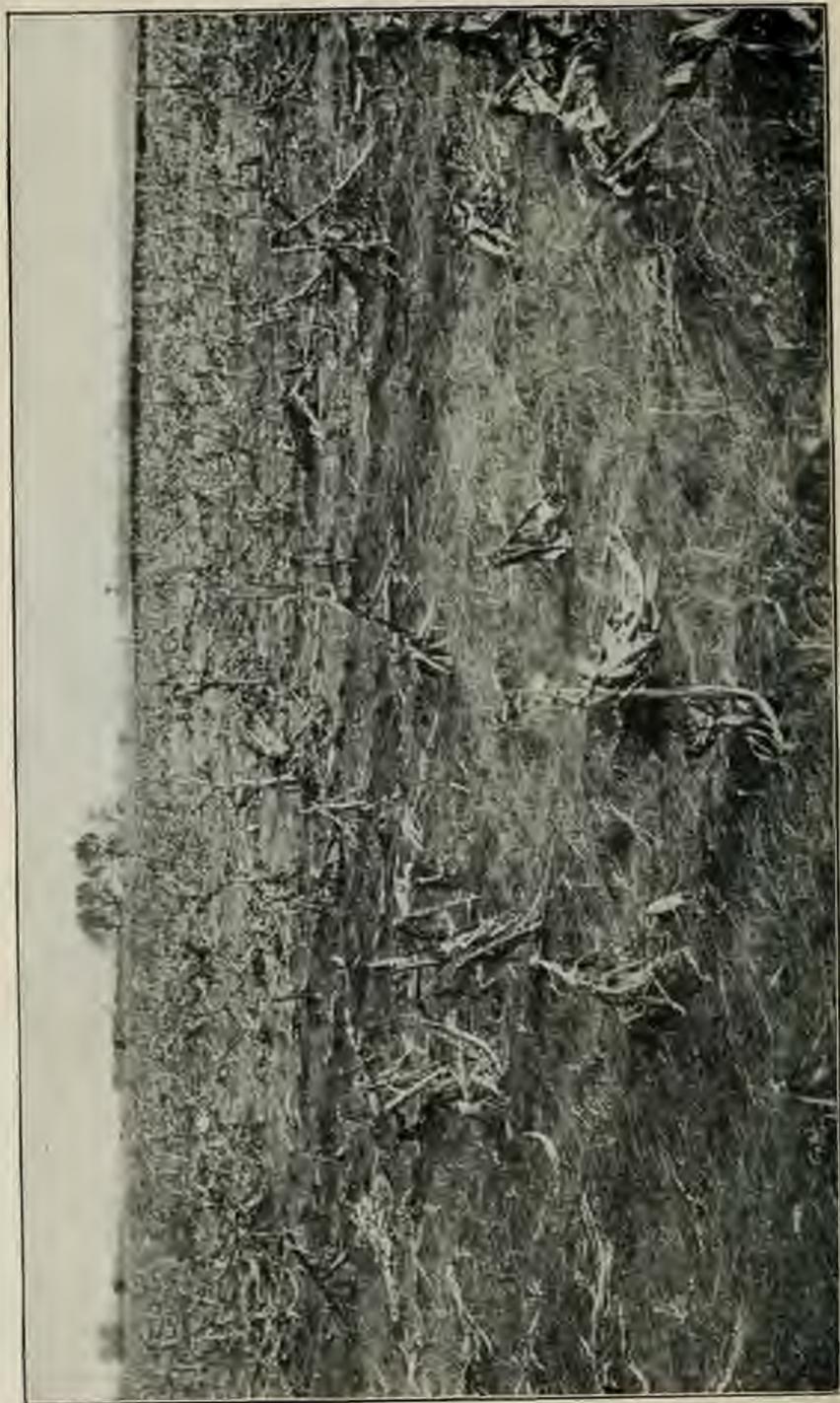
So our fight to prevent injury by the corn root-aphid must be made against its owner—the corn-field ant.

The best means we have found for destroying ants' nests in an infested field is to break them up and scatter them through the soil by thorough and repeated deep cultivation before the corn is planted. If a heavily infested field is plowed four and a half to five inches deep and the plow is followed through the field, it will be found that a large number of the ants' nests have been split in two, a part turned out in the furrow slice and a part remaining undisturbed in the bottom of the furrow. The ants will soon reestablish their nest about the unbroken part, and as we can not hope to break this up by later work with the disk but little has been accomplished towards clearing the ants from this field. If the field is plowed six and a half inches deep, nearly all the ants' nests will have been turned out entire in the furrow slice, and if this sort of plowing is followed by three deep diskings at intervals of two or three days, the ants' nests will have been very thoroughly broken up, and their young, eggs, and aphids scattered through the soil and lost or destroyed.

Field experiments with this method have repeatedly proved this to be the most effective practical method we know of for destroying the aphid and reducing the numbers of the corn-field ant.

Where the land dries out slowly or the spring is so late that the corn must be planted as soon as possible after the ground is broken, ants may be kept from the corn for a time by the use of some substance which is repellent to them. These substances are best applied by mixing them with some finely ground material or fertilizer and dropping in the hills with a fertilizer attachment on the corn-planter. The best substances for this purpose are, in the order named, oil of tansy, oil of lemon, anise oil, and tincture of asafetida. The results

PLATE II



Corn field infested by Root-aphis, Ford county, Illinois.

from the use of these will not be as good as from the deep cultivation.

By following the plow for a short distance when the ground is being broken in spring, one can easily determine how abundant the colonies of the corn-field ant are in the field. If their nests average over twenty to the mile of furrow, give as thorough and deep cultivation as possible before planting the land to corn.

Rotation of crops is one of the best methods of dealing with the corn root-aphis problem, but in some cases injury to corn will follow the first year after some other crop, where this crop was foul with some of the weeds or grasses on the roots of which the corn root-aphis lives.

Urbana, Illinois, March 7, 1919.

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