

Connecticut Agricultural Experiment Station
New Haven, Connecticut

The Control of the Asiatic Beetle in Lawns

R. B. FRIEND

The Asiatic beetle (*Anomala orientalis* Waterhouse) in its grub stages is a serious enemy of lawns. In the Westville section of New Haven and

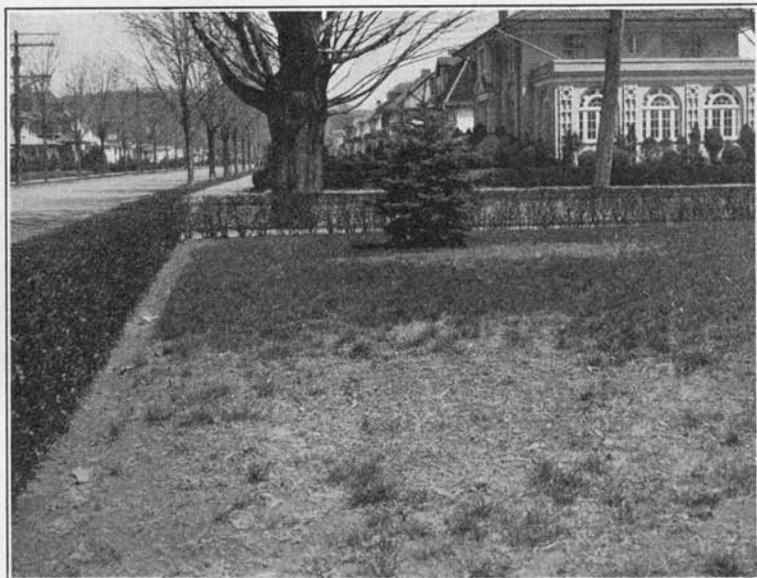


FIGURE 1. Lawn on McKinley Avenue, showing injury by grubs.

in a small region of West Haven upwards of 200 lawns have been injured to such an extent that the grass has been killed over all or part of the property. In certain instances, the owners have remade their lawns two or three times at great expense. The larvae of this insect are probably

present in greater or less numbers in all lawns in the infested territory, whether the grass is killed or not, and the best means of control as yet known entail the use of the right insecticides applied in the proper manner. It is the purpose of this bulletin to give brief information regarding the pest and directions for treating the lawns to protect them against future attack by the larvae according to the best methods devised thus far.

LIFE HISTORY AND HABITS

The eggs are laid in the soil, from three to nine inches below the surface, during July and August (Fig. 2). They hatch in 24 to 28 days, and the

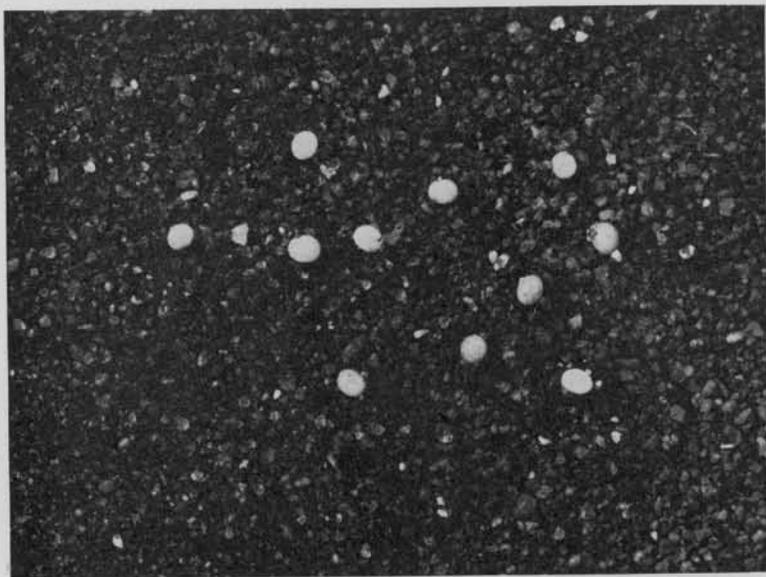


FIGURE 2. Eggs. Enlarged four times.

young larvae come close to the surface of the ground to feed on the dead organic matter and living grass roots found there. These larvae are about one-sixth of an inch in length when first hatched, but they grow to a length of about one inch before pupating. In appearance they are very similar to the larvae of the May beetle, called white grubs, but are smaller (Fig. 3). If at all numerous, they eat the grass roots to such an extent that the plants are killed and a large part or all of the lawn may turn brown in September (Fig. 1). An examination of the lawn at this time will reveal the partly grown larvae in the top inch of soil. About the middle of October the larvae begin to go more deeply into the soil to hibernate, and by the middle of December there are none to be found near the surface. Hibernation usually occurs at a depth of between ten

and fifteen inches. About the last of April, the larvae come up close to the surface and resume feeding, but at this time of the year the grass is usually in a vigorously growing condition and the feeding of the larvae is not so extensive as during the previous fall; hence, the spring injury to the lawns is not so great. During the first part of June the larvae go down into the soil to a depth of three to nine inches and remain quiescent about a week. During this time they do not move about in the soil, but remain in one place and by moving the abdomen back and forth hollow out a cell in which pupation takes place (Fig. 4). The pupal period which follows immediately lasts about two weeks, and adult beetles begin to emerge from the soil the last of June.



FIGURE 3. Fully grown grubs. Enlarged twice.



FIGURE 4. Pupa in cell in earth. Natural size.

Most of the adults are found during the month of July, although they occur during August and a few may be found the first part of September. They feed to a slight extent on the petals of various flowers and are quite common on roses, although the injury they cause is negligible. Much of the adult life is spent in the ground, and the beetles are frequently found occupying burrows about an inch deep. They fly very little and then for short distances only. This may account for the slowness with which the insect is spreading from the original center of infestation. These beetles are about three-eighths of an inch in length and vary in color from pure black to almost entirely straw (Fig. 5). Most of them have black marks on the thorax and wing covers, the ground color being straw, and the marks on the wing covers characteristically U-shaped.

TREATMENT OF LAWNS

In order to prevent injury to lawns when this insect is present, it is necessary to kill the larvae before they reach the destructive stage in August and September. This may be accomplished by the use of arsenate of lead or carbon disulfide emulsion without injury to the grass, if the proper precautions are taken. The arsenate of lead gives better results and is more safely handled, for the carbon disulfide emulsion is not only very explosive, but will injure the grass if carelessly applied.

Lawns may be treated with arsenate of lead any time except during the cold winter months when there is frost in the ground, but if the treatment is delayed until after the first of August the grass may be severely

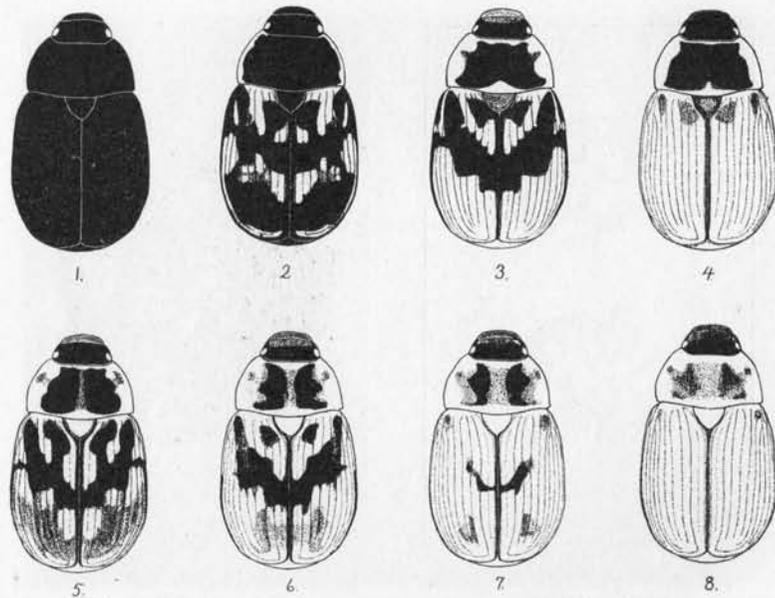


FIGURE 5. Color variation of the adults. Enlarged about three times.

injured by the insects. It is essential, therefore, that all treatment be completed by this time if arsenate of lead is used.

PROTECTION OF LAWNS NOT SEVERELY INJURED

If the grass in the lawn is in good condition and it is desired to protect it against future injury, arsenate of lead should be applied before August 1. Mix three pounds of arsenate in about twelve gallons of water for each 100 square feet. Put the necessary amount of water in a barrel or other suitable container and stir in the required amount of lead arsenate. As this material settles fairly rapidly in water, the mixture should be thoroughly stirred frequently to keep it uniform. Sprinkle this over the lawn slowly and evenly so that it soaks in without running off or collecting in pools. Before the poison dries on the surface of the ground or the grass, the area should

be sprinkled in the same manner with about the same amount of water in order to wash the poison into the soil. This treatment may be conveniently made with a garden watering can.

If the lawn slopes so that water runs off or collects in pools, the arsenate of lead should be mixed with a small amount of very slightly moist (not wet) earth and this should be spread evenly over the surface. Use the same amount of arsenate for the same area as above.

RE-MAKING OF LAWNS IN WHICH GRASS IS KILLED

If the grass has been killed by the larvae, it is advisable to turn over the soil in order to get rid of weeds and ensure a good turf. After this is done, smooth the ground with a rake and apply two pounds of lead arsenate evenly over each 100 square feet. In order to get an even distribution of poison, the arsenate should be applied by sifting through a 14-mesh screen, but if a wind is blowing, it is best to mix it with a small amount of very slightly moist earth and spread this mixture over the ground. After the poison is spread, it should be worked into the soil to the depth of one inch with an iron rake. The ground may then be smoothed and seeded.

Where the infestation of larvae is not too heavy, a good control might be effected by raking over the infested area in the spring, seeding it and then, after the grass is growing well, applying lead arsenate in water in the manner described above. There is, however, the likelihood that the larvae will kill off the grass before it gets a good start and that weeds will crowd out the lawn grasses.

The lawn should be treated with lead arsenate in water as above described for a distance of about five or six feet around the area in which the grass was killed. One treatment with arsenate of lead should last several years, according to the experience of Federal entomologists in controlling the Japanese beetle which has similar habits, although experiments with the Asiatic beetle have covered one season only. If the lawn slopes very steeply, so that it must be re-turfed with sod, the sod should be treated with a suspension of lead arsenate in water in the manner described above a few weeks before being used. Cut the poisoned sod into sections and lay in the usual manner.

USE OF TOP-DRESSINGS

When it is desirable to top-dress the lawn with loam, enough arsenate of lead should be mixed with the top-dressing to be equivalent to two pounds for each inch of loam covering an area of one hundred square feet. If one-fifth of one inch of top-dressing is applied, the appearance of the lawn will not be marred, and this may be repeated as often as the growth of the grass will permit, about once every seven or eight weeks, until a total of five applications has been made. The result will be about one inch of poisoned soil on the surface of the lawn at the end of the treatments. Each of these five applications will require six ounces of lead arsenate in 2,880 cubic inches (= 12.5 gallons or 1.34 bushels) of loam. If the entire inch of loam is to be placed on the lawn at once, two pounds of lead arse-

nate should be mixed with 8.3 cubic feet of loam for each 100 square feet of lawn surface. This is slightly less than one-third of one cubic yard of loam. The arsenate and loam may be conveniently mixed by placing the latter on a smooth wood or concrete floor in a layer about six inches deep, spreading the arsenate evenly over the top of this layer, and then shoveling the whole over four or five times. The arsenate should be sifted through a fine screen (such as used for windows) before using.

USE OF CARBON DISULFIDE

Carbon disulfide emulsion may be obtained in the concentrated form which contains 70 per cent carbon disulfide. There has lately been placed on the market a miscible carbon disulfide of the same strength but with superior keeping qualities, not being injured by cold weather or long storage, to both of which the emulsion is very susceptible. Both of these insecticides are very explosive and must be kept away from hot pipes, fires and so forth. Both must be diluted 200 times with water and applied to the infested area at the rate of three pints of diluted material per square foot of surface. This should kill all larvae which are within two or three inches of the surface when the treatment is made. The soil should not be extremely dry nor yet full of water. The application should be made the latter part of August. The material must be applied to the lawn so slowly that it does not run off and does not collect in pools. The former condition will result in a poor kill of larvae and the latter condition will kill the grass. Since the carbon disulfide tends to evaporate rapidly from the diluted material, the nozzle of the sprinkling device must be held close to the ground. A common garden watering can may be used for small areas. For large areas special apparatus is desirable. The use of this material requires some experience if good results are to be attained, and its effect is but temporary, since no poisonous material remains in the ground after a few days.

FERTILIZING AND SEEDING

Fertilizer should be applied to the lawn after the arsenate has been on at least a week and after the grass is growing well if the area has been reseeded. There is some danger of injury to the grass if the fertilizer and arsenate are applied at the same time. Any good lawn fertilizer not too high in phosphoric acid is suitable. Ammonium sulfate is also safe. This, as well as a complete fertilizer, has been used in our experiments.

The grass mixtures commonly sold in New Haven for seeding lawns give a good turf on arsenated soils if the soil is fertile. It is best to seed rather heavily. The germination of the seeds may be retarded somewhat by the insecticide, but no other effect has been noted.

IDENTIFICATION OF LARVAE

There are many species of white grubs which very closely resemble the larvae of the Asiatic beetle in appearance. If any doubt exists as to the identity of beetle larvae found in a lawn, specimens may be sent to the Connecticut Agricultural Experiment Station for determination.