BARTLETT TREE RESEARCH LABORATORIES
CHARLOTTE, NC
Technical Report

Japanese Beetle

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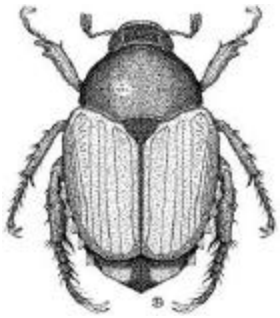
The Japanese beetle, Popillia japonica Newman, was first found in this country in 1916 in southern New Jersey. In North America the beetle found a suitable climate, large areas of turf for development of the immatures, and more than 350 plant species as hosts for the adult beetle. These favorable conditions and an absence of natural enemies allowed the Japanese beetle to become established in twenty-six states, ranging north to Ontario, west to Illinois and south to Georgia. At this time there is also a population in California.

DAMAGE

The adult Japanese beetle is a serious pest of shade trees, ornamental shrubs and vines, and many garden plants. The beetles feed on the upper surface of tree leaves, chewing out the tissue between the veins and leaving a lacelike skeleton. The injured leaves eventually turn brown and premature defoliation may occur. The trees most severely attacked include **lindens, elms, Japanese maple, Norway maple, horse chestnut, birches, black walnut, apples, cherries, plum, and mountain ash**. The beetles are very damaging to roses, corn silk, grapevines, asparagus, rhubarb, and many fruits. The beetles prefer to feed on plants in the full sun, rarely attacking plants in dense shade. Usually, beetles begin to feed on the foliage at the top of a plant, regardless of its height, and work downward. The larva (grub) destroys large areas of turf in lawns and pastures. The larvae feed on the roots of grasses, ornamental plants, and many crops. Feeding injury may not be obvious until plants are badly damaged. Large numbers of larvae cause patches of brown, dead grass in lawns and golf courses.

DESCRIPTION

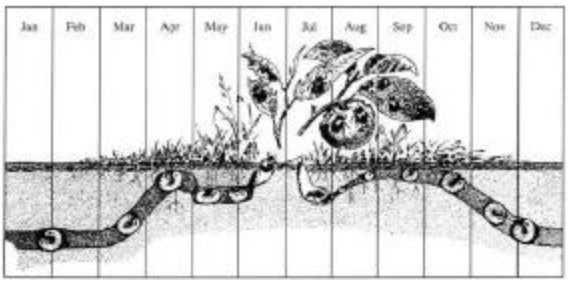
The adult beetle is a little less than 1/2 inch long and rather oval-shaped. The body is a brilliant metallic green. The coppery brown elytra (wing covers) leave exposed a row of five lateral spots of white hairs on each side of the abdomen. These spots on the green abdomen distinguish this beetle from other similar species. Larvae are white grubs with brown heads and are about one inch long when full grown. There are three pairs of legs and the body is lightly covered with brown hairs and spines. They are generally found lying in the soil in a C-shaped position



LIFE CYCLE

Adult beetles begin to emerge from the soil in early summer, generally in late May in the southern part of their range, and late June in the northern regions. They soon reach a peak of abundance and are still numerous in September. After feeding and mating, the females burrow two to four inches into soil to deposit eggs in the vicinity of a host plant.

Japanese beetle: Life cycle



Each female is capable of laying forty to sixty eggs, which are white, circular, and 1.5 mm in diameter. These hatch in about two weeks and the young grubs feed on fine rootlets until cold weather drives them deep into the soil. In the spring, grubs resume feeding and then pupate near the soil surface. The pupal stage lasts from seven to twenty days.

NON-CHEMICAL CONTROL

There is currently no non-chemical method, which will totally protect individual shade trees and gardens from beetle feeding. Even if local beetle development is prevented, the beetle is capable of flying at least five miles in sustained flight. However, there are several methods of reducing the population:

Traps: Virgin female Japanese beetles produce a sex attractant (pheromone), which is released into the air to attract male beetles for mating. In 1977 this compound was identified and is now synthesized and known as Japonilure. Traps with this lure have been effective when used in large numbers at airports and are useful to survey for new infestations. Large numbers of traps are an excellent method of reducing populations in areas such as golf courses, large estates and entire neighborhoods. However, they are not recommended for use by the individual homeowner to protect a small area. The use of one or two traps alone may draw beetles into the area, and while they will kill large numbers of beetles, the benefit will be indirect at best.

Milky Spore: This is a biological control method, which will provide 70-80% control of Japanese beetle larvae under ideal conditions. This bacterial disease of the grubs is caused primarily by Bacillus popiliae, which does not infect mammals, birds, or fish. Several commercial products containing the bacterial spores are registered for use on lawns and turf. After application, the material must penetrate the thatch and be infected by the grubs. When used on high populations, the bacteria multiply, and after three to five years the bacterium becomes well established throughout the soil. The Japanese beetle has not developed any resistance to this control method.

CHEMICAL CONTROL

Adults: Prevention of adult feeding requires frequent applications of chemical insecticides. One spray will generally not provide adequate protection. During years of heavy infestation, repeat treatments are often required every seven to ten days. The insecticides registered for this use have some repellent action, so it is difficult to kill all the beetles in an area.

Larvae: The Japanese beetle has developed resistance to many insecticides formerly used to control the larvae. Most of the available insecticides are limited in effectiveness. They may require heavy irrigation immediately after application; a serious drawback to their effective use since many turf areas cannot be irrigated. To produce satisfactory control an insecticide must penetrate through thatch into the upper soil level, be fast acting, and persist long enough in the soil so that timing of application is not a limiting factor. Most applications are made in either the spring or fall. Consult the Bartlett Tree Research Laboratories Insect Control Recommendations or local state recommendations for a list of labeled insecticides and rates for control of these insects.