

and is therefore termed the heavily infested section. Outside of this, in all the section represented in the unshaded portion of the distribution area the beetle is present, but, in 1928, not in large enough numbers to be seriously injurious.

Patches of Heavy Infestation

It will be observed that certain solid black or heavily shaded patches are shown within the stippled section. These represent those portions of the heavily infested section in which, during 1928, the beetle was distinctly more abundant and destructive than elsewhere. In other words, they represent the most heavily infested portions of the general heavily infested section. These patches of maximum or exceptionally heavy infestation, it will be noticed, form a sort of broken ring or zone lying not far within the outer margin of the heavily infested section, or, at least, considerably nearer this margin than to the original center, represented on the map by the star.

As regards the matter of relative density of population of the Japanese beetle at the present time, the territory within which the beetle reaches its maximum abundance no longer coincides with the original center. It is true that at the beginning, and for several years thereafter, the latter actually formed the area of maximum density, but within the last few years, most evidently since 1925, a change has taken place; the territory of maximum density has, year by year, shifted outwards on all sides from the original center until it has reached its present position.

This shifting of the heaviest infestation from its original to its present position has been shown by field surveys, conducted year after year, to be correlated with an actual reduction in the number of beetles occurring within the earlier infested districts and a rapid increase in those more recently invaded. This rapid increase of the beetle in territory of relatively recent infestation appears to be in every respect comparable with the increase which took place at the beginning in the original center. During the first few years of the present decade the damage inflicted in the latter by the insect was fully as striking as any to be observed in the most heavily infested districts at the present day.

HENRY FOX.

JAPANESE Beetle Is Controlled on Some Trees by Spraying

The adult Japanese beetles begin to appear about June 15 and gradually become more numerous until the latter part of July, when the height of their abundance is reached.

While they are present the adult beetles may cause serious injury to a wide variety of plants. The more seriously injured include apple, peach, grape, cherry, plum, quince, corn, and bean. The most serious damage to ornamental plants has occurred on elm, linden, horsechestnut, sugar maple, Norway maple, white oak, Lombardy poplar, rose, althea, hollyhock, dahlia, hibiscus, and zinnia. The beetles feed on the foliage, fruit, and blossoms.

Experience has shown that it is much easier to prevent infestation than it is to drive the insects away after they have once become numerous on the plants. The point underlying success in preventing injury by the Japanese beetle is to maintain, on the foliage and fruit, a coat-

ing of some material which the insects do not like. This coating must be maintained throughout the time when the adult beetles are present. Lead arsenate has been found one of the most useful materials for this purpose.

To obtain the most successful results it is necessary that all portions of the foliage should be thoroughly covered by a coating of the spray. Good spray equipment should be used capable of throwing a mist over the tops and sides of the plants, thus covering the upper and lower surfaces of the leaves. The spray should be applied between June 25 and July 1. In case rains should remove portions of the deposit on the plants, it may be necessary to repeat the spraying two or three weeks later.

The Protection of Apples

Trees bearing late-ripening varieties of apple, beginning with the Wealthy, may be protected by a thorough application of a mixture composed of powdered lead arsenate 6 pounds, wheat flour 4 pounds, and water to make 100 gallons. The flour and lead arsenate should be thoroughly mixed in a dry state, and sufficient water may then be added to form a thin paste. Stir until no lumps remain, dilute with more water, and strain into the spray tank.

Early-ripening varieties of apple, including Yellow Transparent, Williams, Starr, and others, may be protected by the use of the spray formula recommended for later varieties, provided that all residue is removed from the fruit when harvested. This is satisfactorily done by thoroughly washing it in a bath of dilute hydrochloric acid. In case washing is impracticable, early varieties of apples may be protected by a thorough spraying with a lime wash prepared by slaking 16 pounds of stone lime in a small quantity of water, to which is added sufficient water to make 100 gallons. The lime sprays should be applied before the beetles appear in any considerable numbers and must be repeated as often as it becomes necessary to maintain the coating of the lime on the fruit and foliage. Any residue remaining on the fruit may be removed by wiping or by washing.

Lead Arsenate for Young Peach Trees

Young and nonbearing peach trees may be protected by a thorough spraying with a mixture composed of 3 pounds of powdered lead arsenate, 8 pounds of a good grade of hydrated lime high in calcium content, and sufficient water to make 100 gallons. It may be necessary to repeat this treatment in order to protect new growth. Late-ripening varieties (including Elberta and those ripening later) may be protected by the use of the materials recommended for nonbearing peach trees, provided that the application is made not later than June 25. Early-ripening varieties of peaches can not be adequately protected from the Japanese beetle by the use of arsenical sprays. Some protection for them can be obtained by placing canvas beneath infested trees and jarring the beetles off the plants early in the morning. The collected beetles may be killed by being placed in barrels containing kerosene oil.

Grapevines may be protected by a thorough spraying with a mixture composed of 6 pounds of powdered lead arsenate, 5 pounds of cheap wheat flour, and water to make 100 gallons. The Japanese beetles feed only on the grape foliage, and cause no damage to the fruit. Every effort should be made to coat the foliage thoroughly,

getting the least possible residue on the berries. The spray should be a fine mist directed downward on the foliage. It is usually necessary when the first spraying is made during the last week in June to repeat the application three or four weeks later in order to cover new growth.

Ornamental shrubs and shade trees should be sprayed in the last week in June with a mixture of 8 pounds of oleate-coated lead

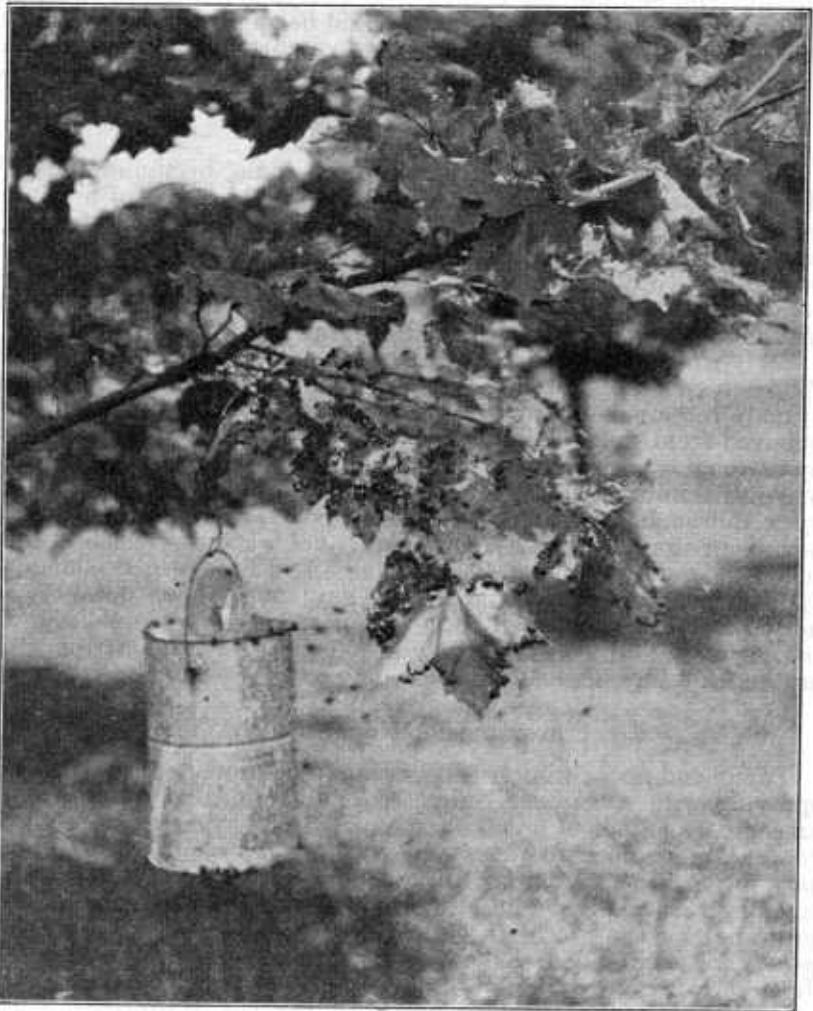


FIGURE 129.—Japanese beetle trap. The beetles are captured by falling in the funnel placed in the top of the trap

arsenate and 100 gallons of water. For preparing smaller quantities use 2 heaping tablespoonfuls of coated lead arsenate to each gallon of water. The spray should be applied not later than July 1, and all portions of the foliage should be thoroughly covered. In the case of plants making considerable growth during July and August it may be necessary to repeat the application in the latter part of July in order to protect the new foliage.

Japanese Beetle Traps

Very efficient traps, one of which is illustrated in Figure 129, have been devised for capturing the adult Japanese beetles. Many types of these traps have been tested, and most of them have been found efficient for this purpose. The traps should be used in connection with spraying, since the use of the traps alone does not protect fruit, flowers, or foliage. The efficiency of the traps is materially increased when the surrounding foliage has been sprayed with lead arsenate. It is recommended that on the average suburban lot, approximately 60 by 100 feet in size, three to six standard traps can be used to good advantage. Geraniol bait must be maintained in a fresh condition and replenished frequently. To obtain the best results the trap should be suspended from a post extending from 5 to 7 feet above the ground in the open sunlight and at a distance of not less than 5 feet from the nearest tree or shrub.

LOREN B. SMITH.

JAPANESE Higan Cherries Gain in Favor for the Adornment of Parks Every year the Japanese flowering cherries, with their numerous varieties differing in color, size, and degree of doubleness, are becoming more popular as their peculiar beauty is appreciated. An ever-increasing

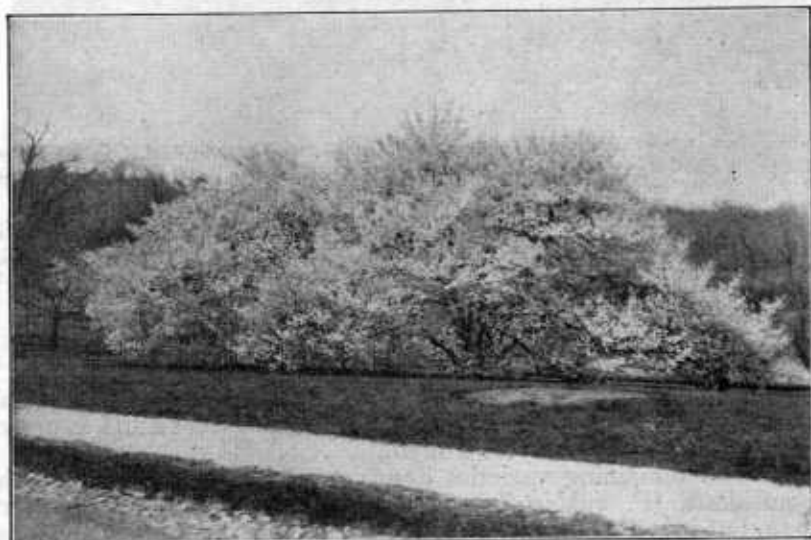


FIGURE 130.—The compact, bushy form of the spring cherry as it grows at the Arnold Arboretum, Jamaica Plain, Mass.

number of inquiries gives evidence of the growing interest in these immigrants from the Orient, and already a number of cities are planning definitely to utilize them in beautifying their parks.

At the present time probably the most popular forms are those with large double flowers. But there is a relatively little-known group of Japanese flowering cherries, mostly single, which are quite as attractive in their way as are the large double varieties. Collectively these are known as the Japanese Higan cherries (*Prunus subhirtella*) because