

The Mexican Bean Beetle and Its Control in Missouri

LEONARD HASEMAN and CURTIS W. WINGO.

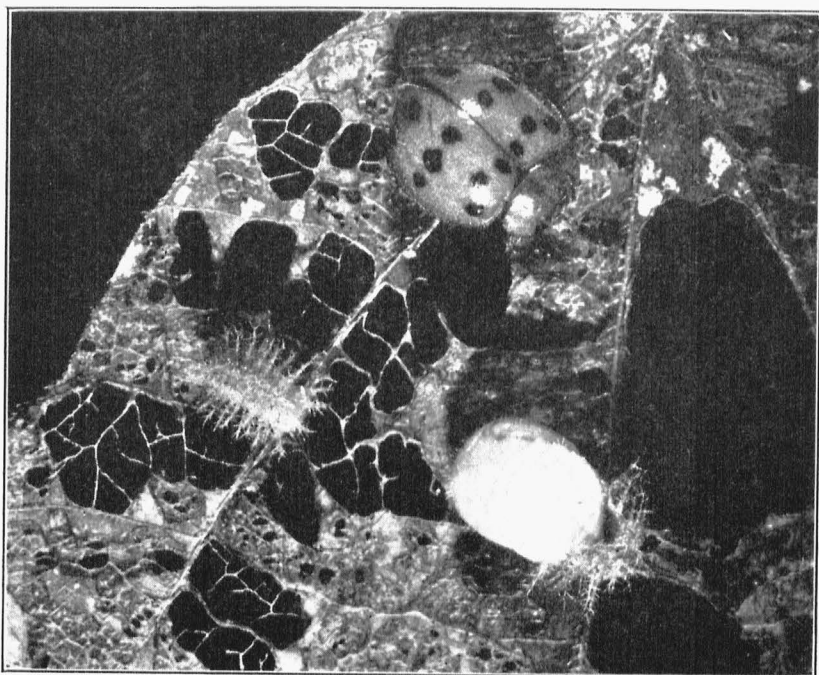


Fig. 1.—Mexican bean beetle, adult, larva and pupa on injured leaf.

For a number of years the Mexican bean beetle (*Epilachna varivestis* Muls.), an important pest of beans and other legumes, has been present in the states to the east and south and has been threatening to move into Missouri. However, not until 1936, when a few of the beetles were taken in the Japanese beetle traps in St. Louis,

was it known to be present in the state. The beetle is a strong flier and its spread into new territory is usually rapid. During the summer of 1938 the junior author found it in the southeast part of the state in numbers sufficient to do real damage to garden plantings of beans. Later in the fall it was found as far west as Poplar Bluff and Fredericktown. Sooner or later, gardeners and farmers throughout the state will have this new bean pest to deal with, and this report has been prepared to acquaint them with it and with methods of protecting crops against it.

HISTORY OF THE PEST

As the name implies, Mexico is supposed to have been its original home and for nearly 100 years it has been a pest of considerable importance from the Mexican border north to Colorado. In 1920, it was discovered in Alabama, probably having been introduced into that state with western alfalfa hay. Its spread from Alabama north and east was rapid so that in ten years it had reached most of the states east of the Mississippi River, as well as the Province of Ontario, Canada. Its movement westward was less rapid and it presumably did not reach Missouri until 1935 or 1936.

DESCRIPTION OF THE PEST

This pest is one of the lady beetles and was formerly known as the bean lady beetle. It and a related species on squash are the only species of the lady beetles in this country which attack rather than protect crops. The common lady beetles are all beneficial as they prey on plant lice, scale insects, and other injurious insect pests. The adult Mexican bean beetle resembles other common lady beetles in general shape and markings. It is about one-fourth inch long, and a gray to copper-brown color with sixteen black spots arranged in three transverse rows across the closed wing covers. The orange-yellow eggs appear in clusters on the underside of bean leaves. The grubs or larvae are yellowish and covered with rows of black-tipped spines. The pupae are orange-colored and are attached to the leaves or other objects close to their food plant. On first emerging the beetles are soft, yellowish, and without any spots, but in a short time the color darkens and the black spots appear.

LIFE HISTORY OF PEST

It spends the winter in the adult beetle stage, hibernating singly or in groups of greater or less numbers. Leaves and other coverage, preferably in woodlands or fence rows near where the beetles mature, are usually selected. In the latitude of central Missouri the beetles may begin to leave their winter quarters in late April and continue to emerge until June. The adults fly to the garden or field and, after feeding on the under surface of bean leaves for a few days, they begin to deposit eggs in small patches on the

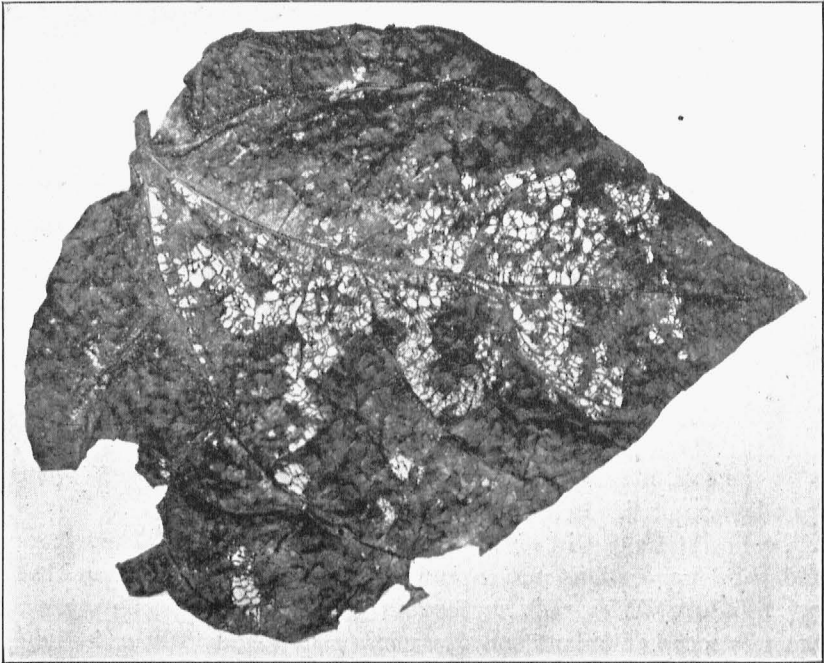


Fig. 2.—Bean leaf showing work of Mexican bean beetle.

underside of the leaves. In the spring, in ten days to two weeks the eggs hatch, and after a few hours the small grubs begin to eat away the soft lower surface of the leaves. Where the infestation is severe and control measures are not used the leaves take on a net-like appearance, dry up, and the crop may be a complete loss. These first generation larvae usually require about five weeks to mature but during the summer they may mature in three weeks. When full-grown the larva attaches the tip of its body to a leaf or

other object and pupates. In about a week the adult beetles emerge from the pupal cases, and in two weeks more they begin laying eggs for a second generation.

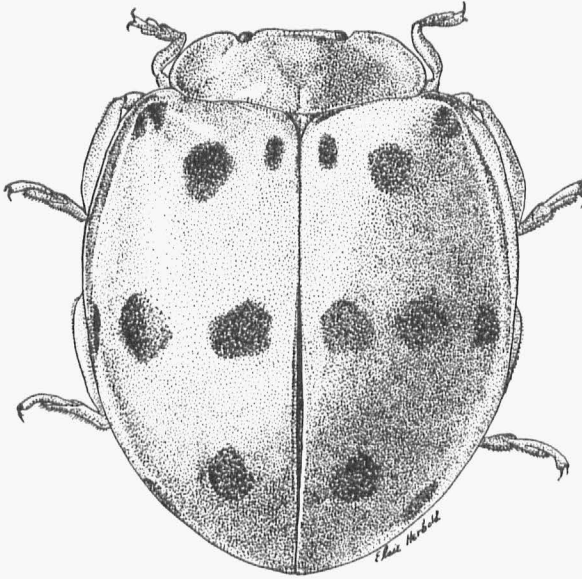


Fig. 3.—The adult Mexican bean beetle, greatly enlarged.

In the latitude of Missouri two (or a partial third) generations may be expected. In 1938, the spring generation began to mature as beetles at Cape Girardeau the latter part of June. The second and third generations may require only a month to develop from egg to adult. With each succeeding generation the pest naturally becomes more abundant and destructive. By midsummer, in 1938, they were sufficiently abundant in some gardens in southeast Missouri to practically destroy the beans.

CROPS WHICH THEY MAY ATTACK

While they seem to prefer the common string beans, they also attack lima beans, "dry" beans, and at times soybeans, cowpeas, and other legumes. They feed mostly on the foliage but may also attack the pods. By feeding on the lower surface of the foliage they may be overlooked until they have seriously damaged the crop. The severely infested crop soon takes on a bedraggled appearance, the foliage wilting, drying up, and the plants dying completely.

CONTROL MEASURES

The Mexican bean beetle is usually most destructive during the first few years after it appears in any region and thereafter it tends to decrease in severity. Growers soon learn to cope with it, in part at least. There are a number of things one can do to help reduce damage besides using insecticides. The timing of the planting so that the crop may become well developed before it is attacked severely will help. Good cultural practices to hasten growth and maturity of the crop, prompt destruction of the plants after the crop is off, and the elimination of favorable winter harbors will reduce damage as well as the number of beetles to carry over the winter. String bush beans, which mature quickly, can be planted between broods of the pest more effectively than either lima beans or the so-called "dry" beans and pole beans. Hand destruction may protect a small garden planting but is not effective against the pest on a larger scale. Unfortunately this harmful species seems to enjoy the same tendency toward immunity to parasites and predators which the beneficial lady beetles enjoy.

Control of the pest by means of insecticides has not always been satisfactory. Arsenate of lead is not considered safe to use on beans because of foliage injury. At times, especially in wet weather, the bean is also severely injured by other poison insecticides. Also, feeding as they do largely on the underside of the leaves, the pest is not effectively reached with a poison unless it is applied to the lower leaf surface. Generally speaking, sprays directed up under the leaves are more effective than dust applications.

Of the arsenicals, magnesium arsenate and calcium arsenate have proven most effective and the safest to use so far as spray injury is concerned. Cryolite has also given satisfactory result. Of the newer non-poisonous materials, derris is being widely used with

effective results. Either one of the following spray and dust mixtures may be used safely and quite effectively if properly applied.

Sprays

(1) Derris powder (4 to 5 per cent rotenone content)	1 oz.
Water	2 gal.
<hr/>	
(2) Magnesium arsenate	1 oz.
Casein spreader	1 oz.
Water	2 gal.
<hr/>	
(3) Calcium arsenate	1 oz.
Hydrated lime	1 oz.
Water	2 gal.
<hr/>	
(4) Cryolite	2 oz.
Water	2 gal.

To apply sprays effectively they must be directed up under the plants. An angle nozzle or an upturn in the short spray rod used with any small hand outfit will enable the operator to direct the spray at the lower surface of the bean foliage. On larger field outfits the nozzles should be arranged to face upward so as to direct the spray properly.

Dusts

(1) Derris powder (4 or 5 per cent rotenone content)	2 ozs.
Talc, sulfur or gypsum (finely ground)	1 lb.
<hr/>	
(2) Magnesium arsenate	2 ozs.
Hydrated lime	½ lb.
<hr/>	
(3) Calcium arsenate	2 ozs.
Hydrated lime	½ lb.
<hr/>	
(4) Cryolite	3 ozs.
Talc, or sulfur (finely ground)	2 ozs.

For small garden plantings any hand or bellows duster may be used, but for best results the discharge tube should have an upturned tip for directing the dust up under the plants.

SUMMARY

1. The Mexican bean beetle, the most important pest of garden and field beans, has made its appearance in the southeast part of the state.
2. Its rapid advance threatens to carry it to all parts of the state in the next few years.
3. The adult beetles hibernate in leaves or other vegetation singly or in groups.
4. The first beetles appear in the garden and field soon after early beans come up.
5. The beetle resembles the common beneficial lady beetles in size and general hemispherical shape. It varies in color from gray to a copper-brown with sixteen small black spots on its back arranged in three transverse rows.
6. When disturbed the beetle feigns death and drops to the ground.
7. It feeds on the lower surface of the leaves, but may cut holes through the leaves.
8. The yellow eggs are laid in small clusters on the underside of the leaves.
9. The yellowish larvae armed with black-tipped spines also feed on the lower surface of the leaves but, when abundant, they may also feed on the pods.
10. Before pupating the larva fastens the tip of its abdomen to the leaf.
11. In Missouri the pest may be expected to have two generations with a partial third perhaps in the southern part.
12. The pest has few natural enemies and it multiplies rapidly, completely destroying plantings of beans when control measures are not applied.
13. The characteristic lace-like appearance of the wilting and drying leaves of beans caused by the feeding of this pest is not easily mistaken for that of any other bean pest.
14. The prompt disposal of bean plants after the crop is off and the destruction of the hibernating beetles will help to prevent losses from the pest.
15. In small garden plantings, hand destruction of the beetles and larvae will help, and by growing string bush beans between generations of the pest less damage will be done.
16. Spray or dust applications of derris, magnesium arsenate, calcium arsenate or cryolite directed at the lower surface of the leaves where the larvae and beetles feed will protect the crop.