IRIS BORER

and its Control

Water-soaked slits and ragged edges show where young larvae of the iris borer have fed in leaves.

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Iris Borer and its Control

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The Iris borer *Macronoctua onusta* Grote is one of the many insects which fluctuate yearly in abundance. It is a serious pest of German and Japanese iris and also infests the native blue flag, *Iris versicolor,* the German lily and the blackberry lily, *Belameanda chinensis* (1).

The habits of the pest account for apparently unpredictable damage. Since insects spend most of their larval life as borers they cannot be seen unless the plants are thoroughly examined. Thus the borers usually go unnoticed until serious damage is done, and they seem to destroy a bed of iris almost as soon as their presence is recognized. One of the first indications of borer infestation may be seen in mid-summer when leaves appear wilted, discolored, and partly dead.

Character of Injury

In early spring injury is caused by the larvae boring in the leaves. As the borers grow they work downward through the sheaves to the crowns and rhizomes. Seriously injured leaves turn brown and die, and the rhizomes are hollowed out, resulting in partial or complete loss of the root stock. In addition to the direct injury caused by the borers a bacterium is introduced into the damaged crowns and rhizomes causing an ill-smelling soft rot.

Description, Life History, and Habits

The adult iris borer is a moth with a wing spread of about 1½ to 2 inches. The forewings are dark purplish brown with minor color markings. The hind wings are mostly yellowish brown. Moths begin to emerge in late summer, usually during early September. Adult flight continues into October and sometimes later when the fall season is mild. They are secretive in habit, fly only at night, and seldom fly far. Hence, the adults are rarely seen.

The elaborately sculptured eggs are at first creamy white with a slight greenish tinge. They soon turn pink and finally become distinctly lavender in color. They are noticeably flattened at the top and bottom and rounded at the edges, with shallow ribs which are most conspicuous on sides of the eggs.

Eggs are laid during September and October and occasionally in early November. Confined in the laboratory a single female moth may deposit more than 1000 eggs. They are seldom laid singly, but occur most often in groups of 100 or more (3). An examination of egg clusters in November 1967, indicated an average of 22 per cluster in a range of 11 to 37. In natural surroundings egg deposition takes place on roughened or crinkled surfaces of the oldest bleached and twisted iris leaves or on other plant material nearby.

An examination of 150 leaves (averaging 19 inches in length) taken from plants in a 3-foot iris bed indicated that most of the eggs were laid in folds in the leaves or in crevices over which the edge of the leaf had curled or folded. The eggs occurred singly or in rows of from three to five together.

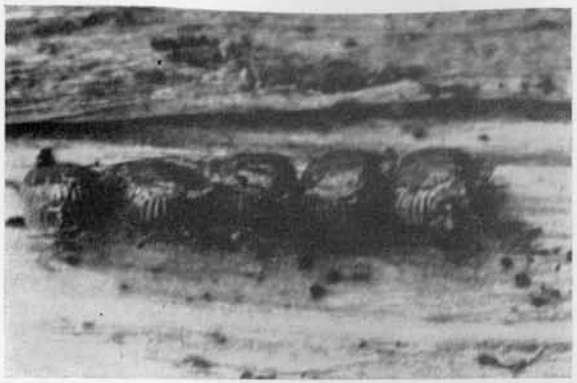

Fig. 1. Sculptured eggs are laid in folds and crevices of dried leaves.

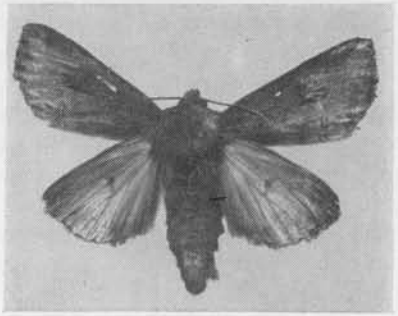

Fig. 2. Adult of the iris borer, life size.

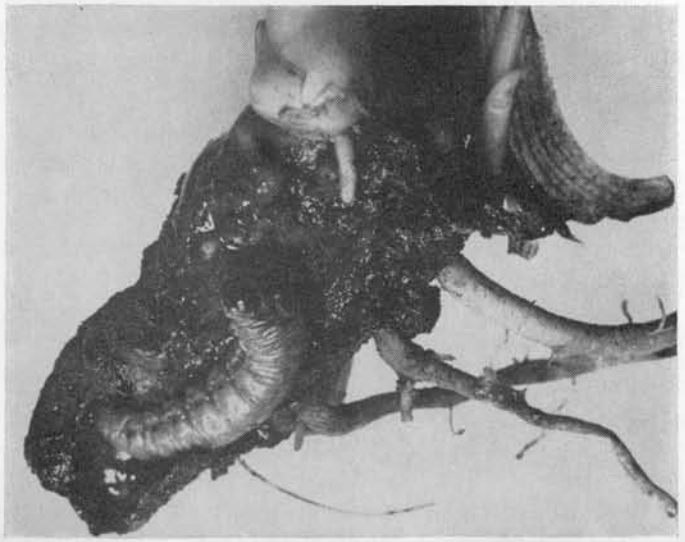

Fig. 3. Larva of the iris borer feeding on a rhizome.

Location of the eggs on the leaves varied considerably. Most of them were laid between 8 and 14 inches and some 1 to 2 inches beyond the point of union of leaf and rhizome. Eggs were not found on green leaves nor on leaves that were turning yellow or brown and had not dried out completely.

Eggs hatch in April or early May of the following spring. Eggs commenced hatching in Hamden on April 10, 1968. Free living larvae were observed on iris foliage at the time. In addition, one individual had worked its way downward into the sheath of a plant. At first the young larvae wander restlessly over the foliage. They chew small holes in the surface of the leaves and feed on the softer inner tissue. These wounds bleed, causing deposits of sap to accumulate on the outside of the leaf at the point of injury. The larvae then mine for a while before working down into the unsheathing lower areas of the foliage. Narrow, shredded, water-soaked slits frequently appear where the external feeding and mines have injured the leaves. In addition ragged marginal leaf injury occurs. This is most noticeable at the tender edges of the new leaves where they are protected by the sheaths. Hence, this type of injury is not conspicuous unless the sheaths are opened or the leaves removed.

As the larvae grow they produce quantities of wet slimy excrement in which bacteria and fungi develop causing a characteristic objectionable odor (2).

Larvae are about one-half grown when they reach the roots of the plants. They may feed along the edge or on the underside of a rhizome. Quite often the inside of a rhizome is devoured completely, leaving a collapsible shell and dead plant. Larvae may migrate to several rhizomes before pupating, injuring all more or less seriously.

Full-grown borers taken from infested rhizomes in early August had reached maturity during the latter part of July. They were smooth, plump, and cylindrical, flesh-colored to deep pink with chestnut brown heads. Average length was 1¾ inches. Pupae were dark chestnut brown to almost black in color and shiny. All pupae occurred in the soil outside of the injured rhizomes. There is one generation of iris borers a year.

Parasites

Two parasites of the iris borer have been reared during the course of the work here. A single specimen of a wasp parasite of the genus *Amblyteles* emerged from a pupa. Several specimens of the Tachinid fly *Lydella thompsoni* Herting were recovered. These were identified by C. W. Sabrosky of the U.S.D.A., Beltsville, Maryland. This is the first time this parasite has been reported from the iris borer.

General Control Measures

An important cultural practice has been to clean up all rubbish and old plant material before the eggs hatch in early spring.

The young larvae may be crushed by pressing the infested areas of the shredded and water-soaked parts of the leaves between the thumb and forefinger.

In cases of heavy infestation it was thought best to dig up and destroy the affected rhizomes. On the other hand, when infestation was light the rhizomes were removed from the soil and the borers destroyed with a piece of wire forced into their cavities. In addition the soil was sifted by hand for free-moving larvae

and pupae. The healthy rhizomes were than replanted. It was also advisable to thin iris every few years even though no borer infestation appeared to be present. By so doing, healthy plants were assured continually.

Control With Insecticides

The fact that young larvae feed on leaves and migrate to the roots is the basis for control using insecticides. Thorough treatment of the plants during this period of development has prevented infestation in roots and rhizomes. Arsenate of lead, nicotine sulfate, derris, methoxychlor, and pyrethrum have been used with indifferent success.

Since the last Station bulletin on control of iris borer was published (4), several experiments were undertaken with newer insecticides to determine their effectiveness in controlling the pest. The results of the work are reported here.

Soil Treatments

On May 6, 1966, 2% Di-Syston® granules were applied to iris beds infested with an average of 45 borers per bed in September 1965. The systemic was used at the rate of 20 and 40 ounces of formulation to 20 sq. ft. of plants. The tests were randomized and replicated three times. The granules were not watered into the soil. Subsequent rainfall provided the necessary penetration of the insecticide to the roots of the rhizomes.

Control of borers was assayed on August 30. All rhizomes were removed from a 24 x 24 sq. in. area in the center of each treated and untreated area and examined for borers. In addition, the soil in which the plants had grown was carefully sifted by hand. At this time 76 per cent of the borers were in the pupae stage. Twenty live larvae and pupae were found in the beds treated with 20 ounces of Di-Syston and 14 in those treated with 40 ounces. There were 53 in the untreated area.

Foliar Treatments

Sprays. On April 15, 1968, 42% Sevin®, 57% malathion, and 40% Dylox® emulsions were applied to borer infested iris plants as foliar sprays at the rate of 2 pts. of formulation per 100 gal. of water and 25% Gardona® at a 3 pt. rate (2 and 3 teaspoons in 1 gal.). Aqua-Gro® wetting agent was added to each spray at the rate of 4 ounces in 100 gal. (¼ teaspoon in 1 gal.). The iris plants were growing in 9 x 2 ft. beds. The treatments were randomized but not replicated. All plots were resprayed on April 22. Then on April 29, half of each plot was resprayed. This latter procedure was intended to show if two or three treatments may be needed to control the pest.

A thorough examination on August 28 of all of the iris plants and rhizomes in the sprayed beds indicated complete control of borers with the four insecticides used in the tests. Moreover, the two-treatment plots were as free from iris borer injury as were those treated three times. There were 5 live larvae and 3 live pupae in one 24 x 24 sq. in. check area.

On April 14, 1969, Pyrenone® emulsion was sprayed onto plants in a 35 x 2 ft. bed at the rate of 4 ounces in 100 gal. of water. Four ounces of Aqua-Gro wetting agent were added to the complete spray solution. The treatment was repeated on April 21 and 28.

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Data obtained in late August indicated 95.2% control of borers with the insecticide.

Dusts. Chlordane 4% and malathion 5% dusts were applied to 40 sq. ft. of iris beds on April 14, 1969. Dusting was repeated on April 21 and 28. There was an equal area of untreated plants.

Results assayed on August 28 indicated complete control of borers with both materials. There were 9 live larvae and 11 live pupae in 2 sq. ft. of undusted plants.

Discussion

It is evident that Sevin, malathion, Dylox, and Gardona used as spray treatments, and chlordane and malathion as dust treatments during April were completely effective in controlling iris borer. Pyrenone spray was only slightly less effective. A single soil treatment of Di-Syston provided some control of borers. However, this insecticide was not as thorough in its effectiveness as those applied as sprays and dusts.

Registrations

Sevin and malathion are registered for iris borer control. The following materials are not registered for iris borer control: Di-Syston, Dylox, Gardona, Pyrenone, and chlordane.

Photograph of adult (Figure 3) by courtesy of Dr. Charles Remington of Yale University. Other photographs by B. W. McFarland.

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