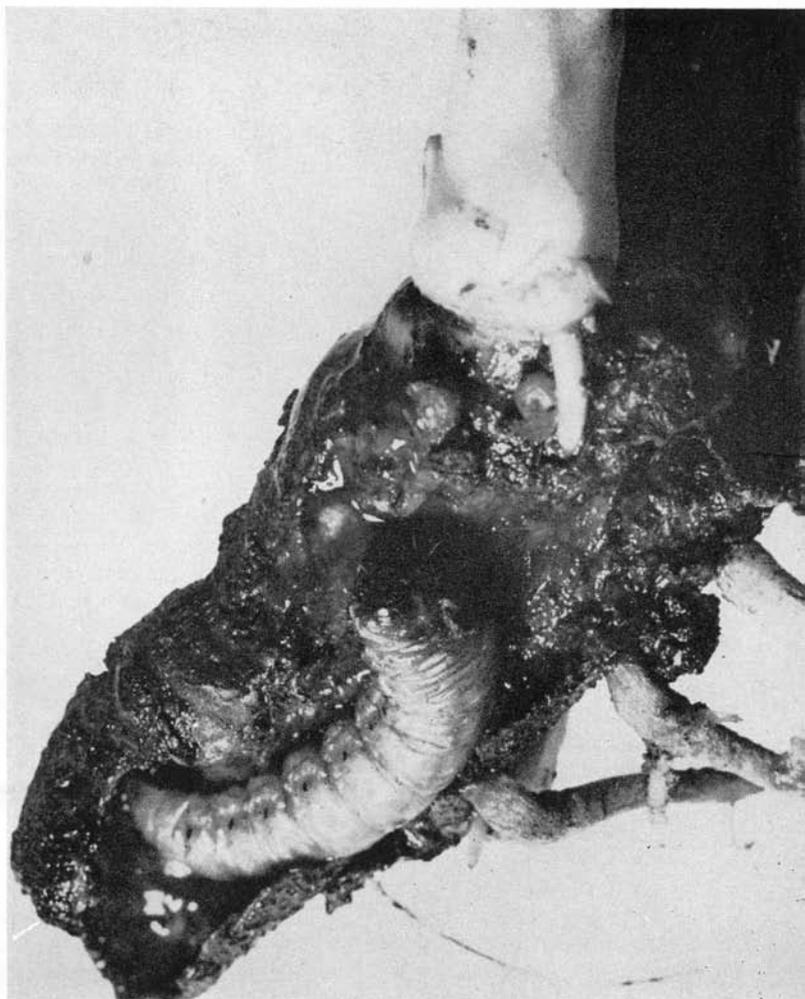


IRIS BORER

and its Control

Pests of
ORNAMENTALS

Reports on control experiments



Larva of the iris borer feeding on a rhizome

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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 the 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). In natural surroundings overwintering egg deposition takes place on roughened or crinkled surfaces of the oldest bleached and twisted iris leaves or on other plant material nearby.



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

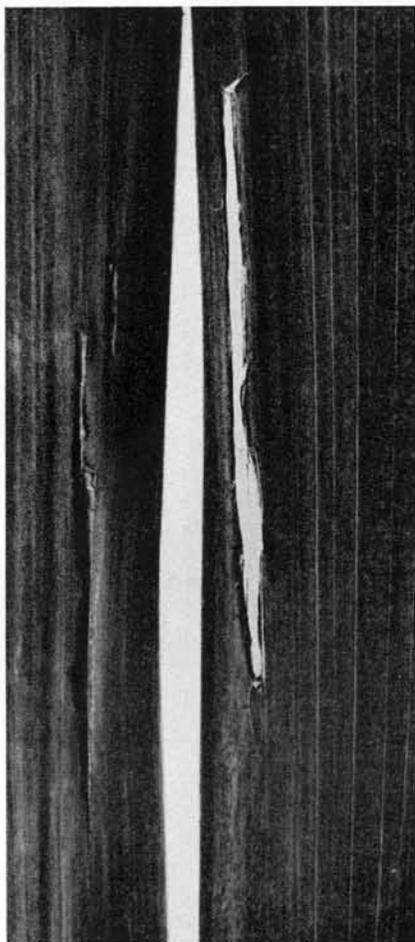


Figure 2. Water-soaked, ragged slits show where the young larvae have fed in iris leaves.

An examination of 150 leaves (averaging 19 inches in length) taken from plants in a three-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. 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 late April or early May of the following spring. 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 unshathing 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

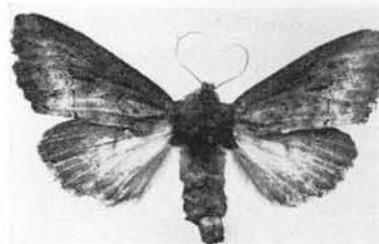


Figure 3. Adult of the iris borer, life size.

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 $1\frac{3}{4}$ 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.

Earlier Control Measures

Arsenate of lead, DDT, nicotine sulfate, derris, and pyrethrum have been used to control young larvae during egg hatching time in early spring. Repeated treatments were necessary to

protect the rapidly developing foliage with spray residue. Carbon bisulfide emulsion used as a soil drench killed borers without injuring the plants.

An important cultural practice has been to clean up and burn all rubbish and old plant material before the eggs hatch in early spring. The iris plants may be burned over after the litter has been raised and dried out; however, some injury to the rhizomes may result. 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.

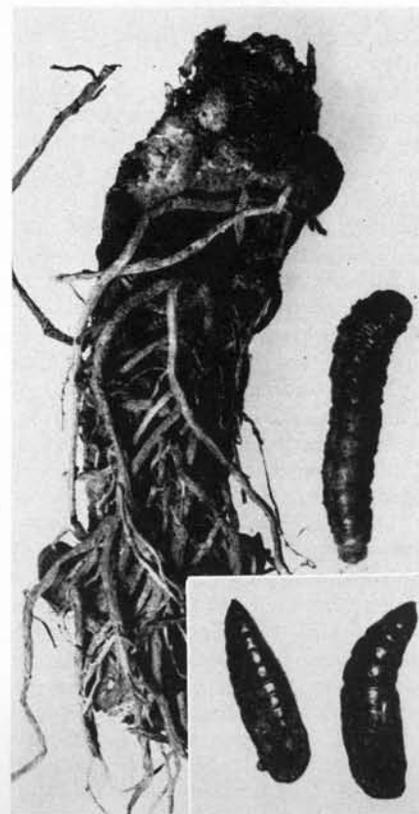


Figure 4. The iris borer larva hollows out rhizomes as it feeds, leaving a shell exposed to infection. Larva is shown at right above, pupae in insert.

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 the cavities made by them. In addition the soil was sifted by hand for free-moving larvae and pupae. The healthy rhizomes were then replanted. It was also advisable to thin iris every few years even though no borer infestation appears to be present. By so doing, healthy plants were assured continually.

DDT as a Foliage Spray

A bed of iris containing German bearded varieties had been seriously damaged by iris borers during the summer of 1954. An exact count of the number of borers involved in the infestation was not obtained. It was estimated, however, on a basis of the number of damaged leaves and rhizomes that there were about 7 borers per square foot of plants.

The first leaf punctures produced by the newly hatched larvae in 1955 were noticeable on May 4, at which time DDT (25 per cent) emulsion was applied to the iris at a 1:600 dilution, with Triton B 1956 added as a sticker. The treatment was repeated twice at about 12-day intervals.

The results of the experiment were obtained on June 14 by examining all of the iris leaves (about 2500) and crowns in the bed. Five leaf sheaves were found to be infested just above the crowns. They contained one larvae each or an average of 0.16 borers per square foot of plants. The differential between this figure and the 7 borers present per sq. ft. before treatment is substantial. Obviously, DDT foliar sprays prevented serious injury by iris borers. The plants were reexamined on July 7, but no additional infestation was found.

Control with Phosphate Insecticides

German bearded and Japanese varieties of borer infested iris growing in beds and clumps were sprayed on August 7, 1956 with Thimet (44 per cent), Trithion (37 per cent), and Systox (40 per cent) emulsions at dilutions of 1:200 and 1:400. Triton B 1956 was added as a sticker. All of the leaves and the exposed rhizomes as well as the surface of the soil in which the plants were growing were thoroughly wet with the insecticides. Many of the borers were fully grown and ready to pupate when the treatments were made.

The results of the experiments were taken on August 24. The plants in each bed and clump were lifted out of the soil and examined. In addition, the soil in which the plants had grown was carefully examined to a depth of 3 to 4 inches. The results of the examination are given in Table 1, which includes data taken from both the German bearded and Japanese varieties of iris.

The results of the experiment indicate good control of iris borers with Thimet. Trithion showed some promise in destroying the borers that came in contact with the material in the soil. Systox was not satisfactory.

Summary

The iris borer occurs as an annual pest of cultivated and wild iris. Serious outbreaks are unpredictable but may appear where light infestations of several years' standing are allowed to persist. There is only one brood of borers a year. Larvae that hatch from overwintering eggs damage the iris leaves and destroy the rhizomes.

Destruction of rubbish and old plant material in iris beds destroys overwintering eggs. Heavily damaged beds

Table 1. Control of iris borer with phosphate insecticides, treatments made on August 7, 1956

Material and dilution	Borer-damaged rhizomes	Number found on examination August 24			Pupae Alive
		Dead	Borers Alive		
Thimet 1:200	12	12	0	0	
Thimet 1:400	6	2	0	0	
Trithion 1:200	1	0	1	0	
Trithion 1:400	6	4	0	0	
Systox 1:200	17	7	10	1	
Systox 1:400	15	3	18	4	

may be replanted in August, saving only uninfested rhizomes and destroying infested plants.

Spraying iris at 7- to 10-day intervals from mid-April through late May with DDT emulsion at the rate of 1 pint per 100 gallons of water, or 1 teaspoon per gallon, killed young larvae. Thimet and Trithion emulsions used in August at the rate of 2 to 4 pints per 100 gallons of water or 2 to 4 teaspoons per gallon killed the borers in the rhizomes and soil. The labels on

these materials give necessary precautions for handling them safely.

Literature Cited

1. BIRD, HENRY. 1915. Boring Noctuid Larvae. N. Y. Ent. Soc. Jour. 10:214-216.
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3. GRISWOLD, GRACE H. 1934. Oviposition of the Columbine Borer and the Iris Borer. Ann. Ent. Soc. Amer. 27: 545-549.

Photograph of adult (Figure 3) by courtesy of Peabody Museum of Yale University. Other photographs by B. W. McFarland.

This publication is one in a continuing series on research conducted at this Station to control insect pests on ornamentals. Titles of other publications in this series to date are given below.

- B 578 Scale Insects and Their Control
- B 588 Aphids and Scale Insects on Ornamentals
- B 591 Mite Pests of Ornamentals and Their Control
- C 199 Dogwood Borer
- C 200 Systemic Insecticides to Control Pests of Ornamentals
- C 201 Thrips on Privet and Other Pests on Ornamentals