

LIFE HISTORY STUDIES OF THE SUGARCANE  
MOTH BORER,  
*Diatraea saccharalis* Linn.

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INTRODUCTION

This report covers in summary, an investigation conducted upon the sugar cane borer moth, *Diatraea saccharalis* Linn., extending from March through December 1941. It is of significance in that it is the only one of its kind ever attempted to date in Florida. It has attempted to determine some of the facts concerning the life cycle and habits of the sugar cane borer as it occurs in the Everglades section of Florida. Although studies of this nature have been carried on in other areas, the data obtained do not apply to the Florida conditions in many instances.

A very important study of this kind has been in progress at the United States Sugar Cane Experiment Station at Houma, Louisiana, for the past several years. Work there has been developed to a point of considerable efficiency and accuracy under Ingram, Bynum, Holloway, Mathis and others. Several publications have been issued as the result of this and closely associated studies, from the Houma station. The present work has been partially based upon some of these investigations.

The writer deeply appreciates the assistance of Dr. John W. Wilson under whose council and direction this work was performed.

METHODS

*D. saccharalis* eggs were obtained for daily incubation records in the laboratory, by collecting pupae and using the eggs laid by the emerging adults. The pupae were obtained usually from collections made while determining the percentage of parasitization of individual fields of sugar cane. The pupae were kept in a glass petri dish until the adults had emerged.

Pint ice cream cartons were used for laying quarters for the adult moths. Waxed paper, which had been crumpled, was used favorably as a surface for the eggs to be laid upon. The waxed paper somewhat resembles in texture the natural laying habitat, the cane leaf.

Each morning the paper, including the eggs which were laid thereon the previous night, was removed from the carton and replaced by fresh paper. These eggs were examined daily, each

day's batch having been separated into individual tin pill boxes. The length of the incubation period was observed and recorded.

In the larval studies the newly hatched larvae were placed in the tin pill boxes with two pieces of sugar cane leaf. Five larvae were placed in each box, until immediately following the first molt in order to save much time and exacting labor.

Following the first molt, the larvae were transferred to individual glass tubes. These tubes were one inch in diameter, four inches long, open on both ends to facilitate cleaning, and stoppered with metal caps. Cane leaf was still used as food. The lower part with the larger midrib was preferred in this stage. These were replaced with fresh leaves often enough to prevent drying out or molding. The larvae would seldom if ever eat the entire leaf before it needed to be replaced.

The glass tubes were kept in a dark cabinet to simulate the dark interior of the sugar cane stalk. Records were kept during the daily observations.

After the second or third molt, the cane leaves were discontinued as food and 2½-inch pieces of cane stalk, cut from the part above the growing point, were used instead. This food was replaced as often as necessary as shown above.

Following the third or fourth molt, (larvae about 1 centimeter long), the growing stalk was exchanged for solid pieces of cane stalk about 2 inches long. This food was used until pupation of the larvae. It was also necessary to change this for new pieces to prevent the development of fungi.

Corn stalks were occasionally substituted for cane stalks as food. The larvae apparently developed as rapidly on the corn as they did on the cane stalks. Usually in warm weather the corn did not develop fungi as rapidly as did sugar cane, particularly if it was dried in the open air before being placed in the tubes.

#### DATA

The summary of the egg laying record of twenty *Diatraea saccharalis* females at the Everglades Experiment Station, between August 23rd and September 10th, 1941, follows:

Average preoviposition period, five unmated females	3.6 days
Average preoviposition period, eleven mated females	2.3 days
Average length of egg-laying period, all females.....	3.2 days
Average length of life of unmated females (5) .....	6.0 days
Average length of life of mated females (11) .....	4.4 days

## COMPOSITE SUMMARY OF THE LIFE CYCLE OF THE SUGAR CANE BORER AT BELLE GLADE, FLORIDA, 1941

Generation .....	First Generation* 3-11-41 to 5-23-41		Second Generation 7-9-41 to 9-4-41		Third Generation 8-19-41 to 10-23-41		Fourth Generation 10-9-41 to 12-26-41	
Stage of Life Cycle	No. indiv.	Av. no. da.	No. indiv.	Av. no. da.	No. indiv.	Av. no. da.	No. indiv.	Av. no. da.
Incubation .....	653	13.3	925	5.0	800	5.0	1240	6.0
1st Instar .....	30	5.0	50	3.1	68	2.2	26	7.4
2nd Instar .....	40	5.7	25	6.2	60	3.0	14	4.0
3rd Instar .....	20	4.8	14	3.5	52	4.2	24	5.0
4th Instar .....	19	8.6	17	3.5	49	4.5	26	10.5
5th Instar .....	25	7.4	18	4.5	45	6.9	17	13.7
6th Instar .....	4	6.5	17	5.2	26	7.6	9	9.3
7th Instar .....	1	10.1	17	6.9	12	9.6	6	14.3
8th Instar .....	—	—	6	8.5	4	10.8	5	12.4
9th Instar .....	—	—	4	8.8	1	3.0	1	8.0
10th Instar .....	—	—	2	7.5	—	—	—	—
Prepupal .....	37	15.3	18	8.4	1	24.0	—	—
Pupal .....	32	10.2	15	7.1	1	7.0	—	—
Total eggs to adult .....	861	86.8	1128	78.2	1119	87.8	1368	90.6
Total, eggs thru 5th .....	—	44.8	—	25.8	—	25.8	—	46.6

\* The first adults of first generation emerged 5/12/41 while eggs for 2nd generation were not laid until 7/9/41.

Average number of eggs laid by unmated females ....	66.6 eggs
Average number of eggs laid by mated females .....	221.7 eggs
Av. no. eggs in body of unmated females at death ....	235.8 eggs
Av. no. eggs in body of mated females at death .....	119.0 eggs

The duration of the incubation period of *D. saccharalis* eggs was studied daily between February 25, 1941 and November 29, 1941. The period of incubation at room temperature, varied from 15 days on March 7th, to 5 days in July and August, and to 11 days on November 8th. The percentage of hatch was recorded also in September, October and November, and averaged around 75 per cent. The writer considers these figures fairly accurate, due to the close daily observations and recording of data.

During the time covered in this study 4 generations of *Diatraea saccharalis* were observed. These 4 generations were consecutive, in fact they over-lapped, with the exception of the first and the second. A lapse of time from May 23rd to July 9th occurred between these generations due to factors that were beyond the writer's control.

The accompanying table is a composite summary of the studies conducted and shows for the 4 generations the duration of the various stages.

#### CONCLUSIONS

This study as carried on is insufficient evidence on which to base definite conclusions as to how many generations occur or how many molts the larvae of the *D. saccharalis* go through under Florida conditions. However, many important facts have been established which might readily be used as a beginning for further studies of the ecological relations of the pest in this locality. Due to the national emergency of war, there will probably be no further work done here on this particular subject at least until after peace has been established.

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#### A NEW CUBAN PEST OF CITRUS

*Cryptocephalus marginicollis* Suffr. (Col.)

The writer has recently received four tiny beetles from Mr. Fred O. Somerford of Catalina de Guinas, Cuba. He makes the following statement concerning the activities of this beetle:

..... "During over thirty years of grove management here where I own a small grove of mostly Valencia oranges, this is

(Continued on Page 18)