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Growth Potential of *Laphygma exigua* in Relation to Certain Winter Food Plants *

by

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The leaf eating caterpillar, *Laphyma exigua* Hb. is not specific in its food habits. It is known to attack practically all types of crop plants belonging to several Natural Orders. Host plants of this insect are described by several workers in India. (Fletcher 1920, Trehan & Pingle 1946, Kadam & Patel 1956, Sengupta and Behura 1957, etc.). During the winter season of 1957-1958 the larvae were found infesting many crops at Uadipur. In some they were observed to be of very little importance while in others their population was very large resulting in severe damage. There is enough evidence and more is accumulating, which suggests that besides other things perhaps one of the most important factors which determines the distribution of insects on different crops is the capacity of food to support growth. It is therefore, necessary to study the relation between the food plant and the insect growth. This type of information is even more needed in case of insect pests which have a wide variety of hosts because the type of food plays the most important role in building up of the population.

The present paper is a report on the relative food values of some of the important food plants of *Laphygma exigua* which is a widely distributed pest of crops in the North Eastern Region of Rajasthan. Nothing is on record about the effect of various foods on its development. Investigations on the biology and nutrition have been undertaken with a view to understanding the behaviour and food requirements of this insect which is a real menace to the agriculturist and about which very little is known in this country. The following account deals with some of the results of investigations that are being carried out in the Department of Zoology and Entomology, Rajasthan College of Agriculture, Udaipur.

Material and Method: The culture of *Laphygma exigua* was maintained very satisfactorily on tender pea leaves at room temperatures prevailing at Udaipur during January and February. The development period from egg to adult stage was 25—27 days. On

* Paper read at the 46th Indian Science Congress 1959.

emergence the moths were kept on glucose water solution soaked in cotton. They laid eggs freely on the glass jars and papers placed for rearing, and these eggs also hatched satisfactorily under the same conditions in the laboratory. Immediately after hatching they were transferred to tender pea leaves in petri dishes by means of a camel hair brush. The larvae used for tests were of the same days hatchings and belonged to the second generation produced in the laboratory. The following food plants were tested and their effect on the development of this insect was observed.

Potato	*Solanum tuberosum*
Pea	*Pisum sativum*
Lucerne	*Medicago sativa*
Berseem	*Trifolium alexandrinum*
Linseed	*Linum usitatissimum*
Tomato	*Lycopersicum esculentum*
Brinjal	*Solanum melongena*

The food offered to the insects was from the tender portions of the plants which were changed in the morning and evening. For each type of food four lots of nearly 25 newly hatched larvae were placed in 4″ petri dishes containing ample food over $\frac{1}{2}'$ thick layer of soil. The effect was judged by the time taken by the larvae to pupate. Data on pupal period and the size of adults in terms of the wing expanse resulting from the tested larvae were also recorded.

The results are presented in the accompanying tables. The percentage (n) of the larvae becoming purpae has been given together with the average time (Av) taken to complete the development. The growth index figure is obtained by dividing n by Av as adopted by Srivastava and Bhatia (1957). The greater the value of the index figure the better was the development of the larvae in that food. All tests were performed at room temperatures prevailing at Udaipur during February and early March.

Experimental: The growth index figures and the emergence records are summarised in Tables I and II. In general only the larval period was affected by the different foods while the pupal period remained unaffected.

The following was the performance of the food plants tested.

TABLE I.

Growth of *Laphygma exigua* larvae on various hosts.

Food Plants	n	Range in days	Av	Growth Inex
Potato*	100.0	10-12	10·6	9·6
Pea*	100·0	10-12	10·7	9·3
Lucerne	98·1	12-12	10·5	9·3
Berseem	98·1	11-12	10·5	9·2
Linseed	91·1	12-13	12·1	7·5
Tomato	77·1	11-13	12·5	6·1
Brinjal	44·1	16-19	18·3	2·4

* Larvae fed voraciously on these food plants.

TABLE II

Poupulation and adult emergence records of *Laphygm aexigua* larvae fed on various hosts.

Food Plants	Pupal period days	% Emergence from		Adult Size
		Larvae	Pupae	
Potato	7-8	100·0	100·0	1·25″
Pea	7-8	100·0	100·0	1·25″
Lucerne	7-8	98·1	100·0	1·23″
Berseem	7-8	98·1	100·0	1·24″
Linseed	7-8	91·1	100·0	1·00″
Tomato	7-8	77·1	100·0	1·00″
Brinjal *	7-8	23·5	53·3	0·60″

* 33% adults abnormal.

Potato - It possessed the ideal nutritive value. This food also appeared very palatable to these insects because the amount of food consumed was markedly more in comparasion to other foods except peas. The size of adults emerging from the larvae fed on this food plant was 1·25″, one of the largest average produced.

Pea - Pea also proved equally nutritious to the larvae and the rate of development was as fast as with potato. The food consumption and adult size was also the same.

Lucerne - Development in lucerne compared very well with that of pea. The average size of adults obtained was 1·23″.

Berseem - The growth of the larvae on berseem was also very satisfactory. It was found as nutritious as lucerne. There was no significant difference in the size of the adults produced.

Linseed - It was found inferior to potato, pea, lucerne and berseem. The size of the adults produced was also comparatively smaller.

Tomato - Tomato was still inferior to linseed. The growth was slow and the successful pupation was 77·1%. The adult size was the same as in linseed.

Brinjal - The plant belongs to the same family and genus as potato yet it was found to be nutritively much inferior. The larvae developed so poorly that the growth index figure was only 2·4 as compared to 9.6 in potato. Only 44·1% of the larvae feeding on this host plant pupated out of which 53·3% emerged as adults. One third of the adults were abnormal. The size of the adults produced was the smallest of all the hosts tested.

Discussion: *Laphygma exigua* shows varying response to different food plants. Amongst the hosts evaluated, in general they develop better on potato, pea, lucerne and berseem. Potato was the most nutritious of all the foods. Next in order of nutritive value were linseed and tomato where the growth was slightly inferior. Brinjal proved to be the worst food because of the high mortality of the stages and abnormal adult emergence.

The slower response of *Laphygma exigua* to some food plants may be due to the presence of some growth - inhibiting substance (s) or to some type of deficiency. Further nutritional studies will provide a full explanation of this phenomenon of poor growth of this insect in some food plants.

Summary: The larvae of *Laphygma exigua* were reared on seven natural winter food plants and the growth response of the insect recorded.

Potato, pea, lucerne and berseem were found to be more nutritious than others. Linseed and tomato were poorer while brinjal was the worst food of all the plants tested.

The pupal period was not affected by the nature of food but the size of adults produced differed and was apparently correlated with the nutritive value of the food. From nutritious food plants larger size of adults were obtained while in plants of less nutritive value smaller size of adults were produced.

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