CARIBBEAN FOOD CROPS SOCIETY

PROCEEDINGS

ELEVENTH ANNUAL MEETING

PIGEON-PEA POD BORERS IN THE CARIBBEAN[1]
(A REVIEW)

by

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INTRODUCTON

Pigeon pea (*Cajanus cajan*) (L). Millsp. is an important legume in the West Indies forming a vital source of protein. The plant is attacked by several insects of varying importance – *Diphaulaca* sp. in Trinidad causes damage to the leaves (Barrow, 1968). In St. Vincent, leaf-hoppers of the genus *Empoasca* Delong cause severe leaf curl, and flower drop. Lace-wing bugs, red spider mites, and several species of Membracids also occur and cause damage.

This paper deals with the insects attacking the pods and their control.

MATERIALS AND METHODS

A survey was conducted to determine the main species of insects involved, their distribution and alternate hosts. For purposes of survey, pigeon pea growing in different parts of the islands were chosen at random. Samples

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of mature green pods were examined at bi-weekly intervals. The pods were examined singly for borer damage and separated into damaged and undamaged. The damaged pods were opened and the percentage of damaged seeds, and the number of larvae, kind of larvae and their stages noted.

RESULT AND DISCUSSION

The main pod borers encountered are listed below:–

(1) *Ancylostomia stercorea* (Zeller)

(2) *Heliothis (choridea) virescens* (F.)

(3) *Heliothis zea* (Boddie)

(4) *Fundella cistipennis* (Dyar)

(5) *Maruca testutalis (Geyr.)*

(6) *Heliothis armigera* (Hubner)

The eggs of the above species are laid mainly on the young emerging pods just as the petals begin to shrivel. In Trinidad *Maruca testutalis* lays eggs mainly on the young buds. The larvae on hatching feed on the developing flowers and cause flower drop.

Table 1 shows the egg laying of *Ancylostomia* based on observation of eggs in fields with infestation of 20% and 65% but with large number of pods present. No eggs were found on the buds. There were a large no. of buds in these fields. However, where few buds are available and the insect population is high, as many as 10–12 eggs are found on an un-opened bud.

Table 1

Egg counts on different stages of fruit in Dec. – Jan. (Infestation 20%) and April – May (Infestation 65%).

Stage	No. Examined	Dec.–Jan.	% Eggs laid April–May
Unopened bud (Green stage)	2000	0.00	0.00
Opened bud (Petals closed)	2000	0.00	0.00
Flowers (Petals opened)	2000	0.00	0.00
Young pods	2000	57.05	35.30
Medium pods	2000	41.23	63.60
Mature green pods	2000	1.72	1.10

Table 11

Instar/pods	Young	Medium	Mature
1	37	37	1
2	12	18	3
3	1	16	12
4	1	11	17
5	Nil	4	33
Total Larvae/200 pods	51	83	66

Eggs of *Ancylostomia* hatch in 3 days, and the larvae pass through 5 larval instars with a total larval period of 15 days. Examination of pods of different ages and noting the instar of the larvae present also provide information on the time of attack by the larvae. Table 11, shows that most of the newly hatched larvae were present in the young and medium pods while mature pods contained 4th and 5th instar larvae. This therefore corroborates the information in Table 1.

The knowledge of the egg-laying of *Ancylostomia* has proved of great benefit in the formulation of any control programme. Parasram (1970) has shown that 3 spray applications of chemical sprays at 3-day intervals beginning when approximately 75% of the pods begin to emerge gave significant control of *Ancylostomia* in the semi-dwarf varieties which are determinate. Sprays thus timed give better control than those applied at weekly and bi-weekly intervals, throughout the bearing life of the plant.

In indeterminate ones, because of the availability of all stages of the insect and the pods and flowers on the plant for a prolonged period, chemical control even if successful in controlling the pest would be uneconomical because of the large number of applications that will be necessary. Alternative methods of control must therefore be examined. The data given in Tables 111 and 1V show that pod-borers are serious pests if left uncontrolled.

Dominique C. (Pers. Communication) has shown that pupae of *Ancylostomia* which are subjected to long daylight in the larval stages take 41 days for pupation compared to the normal 10.4 days. Pupae collected from the fields around May–June also show this behaviour. There seems therefore to be a suggestion of diapause. Table V lists some 31 legumes which were carefully examined for stages or damage due to *Ancylostomia.* No signs of the insect were found in the field, although larvae feed on the seeds when exposed in the laboratory. The author could not confirm the finding of Heinrich (1956) that the larvae fed on *Cicer arietenum* and species of *Dolichos.*

If one takes into consideration (a) the high level of infestation around March, (b) that pupal diapause is not exhibited during this period, (c) the apparent lack of preferred host plants, there appears the possibility that the termination of the pigeon pea crop around March would reduce if not eliminate the population of *Ancylostomia* in the subsequent crop around October of that year. Several species may attack the same crop of pigeon peas and *Ancylostomia* may not be the most important species. This would suggest the need for work along the above trend for the other species of pod borers as well. Such work is in progress at the University.

Biological control of the pod borers should be investigated. Especially as many parts of the Caribbean grow the indeterminate varieties and it has already been suggested that the use of chemicals on such varieties would be uneconomical.

Bennet F. D. (1960) has recorded the following species from *Ancylostomia* in Trinidad:- *Apanteles etiellae* (Vier), *Phanerotoma bennetti* Mues., *Bracon thurberiphagae* (Mues.), *Bracon cajani* Mues., *Eiphosoma annulatum* Cress., and *Perisierola* sp. The C.I.B.C.*, Trinidad has also been rearing and shipping parasites to many of the West Indian islands mainly for the control of *Heliothis* spp. In 1972, an egg parasite *Trichogrammatoidea armigera* and *Eucelatoria* adults (larval parasite) were sent to Barbados, Grenada, St. Vincent, St. Lucia, Dominica, Montserrat and St. Kitts. In addition an egg parasite found by M. M. Alam in Barbados – *Telonomus remus* has been released in Trinidad and St. Kitts by the Institute. Yasheen (1972) has not reported any recovery of the parasites of *Heliothis* released. It is well known that due to several problems in the islands, releases are not done carefully enough. This could lead to problems in their establishment.

It is evident therefore that for a crop like pigeon peas, the use of integrated control of the pod borers should be investigated.

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Table III

% Pigeon pea-pod Infestation in the Eastern Caribbean

Island	Location	Dec./ Jan.	March/ April	Year	Main sp.	Other	Collaborator
Barbados	Haggatts	3.6	37.0	1967	*Heliothis*	Fundella	Pschorn-Walcher
	Vaucluse	1.6	14.0	"			
	Fisherpond	0.0	6.6	"			
	Sayes Court	7.6	36.5	"			
	Fairy Valley	0.0	29.5	"			
Grenada	Botanic Garden	1.4	6.2	"	*Heliothis*	*Ancylostomia*	A. Donelan
	Marigot	2.6	3.0	"			
	Grand Bacolet	0.6	7.2	"			
	Mt. Moritz	11.6	5.2	"			
	Cottage	18.0	–	1973	*Ancylostomia*	*Heliothis*	
	Mirabeau	12.0	–	"	"	"	

Table III – Cont'd.

% Pigeon pea-pod Infestation in the Eastern Caribbean

Island	Location	Dec/ Jan.	March/ April	Year	Main sp.	Other	Collaborator
St. Vincent	UNION ESTATE	4.4	22.0	1967	*Ancylos-tomia*		C. deFreitas
	Palmiste	19.0	35.8	"	"		
	Wallilabou	21.3	5.8	"			
	Rose Hall	8.0	–	1973			
St. Lucia	UNION	44.0	–	1972	*Heliothis*	*Ancylos-tomia*	
	Beau Sejour	50.0	–	"	"	"	
Montserrat	Rileys		20.0	1973	*Ancylos-tomia*	*Heliothis*	
	Gauges		60.0	"	"	"	

Table IV

% Pigeon pea-pod Infestation in Trinidad

Location	Dec./ Jan.	March/ April	Year	Main sp.	Other
Texaco Demonstration Farm	2.0	76.0	1965	*Ancylostomia*	*Heliothis Maruca*
	11.0	33.5	1967	"	"
	22.0	65.0	1969	"	"
St. Augustine Nursery	24.7	87.50	1967	*Ancylostomia* *Heliothis*	
Centeno	7.25	47.0	"	*Ancylostomia*	"
El Carmen	2.85	24.25	"	"	"
Mayaro (3 sites average)	12.6	51.0	"	"	"
Ecclesville	0.2	20.0	"	*Heliothis*	*Ancylostomia*

Average % seed damage was 60

Table V

Species of legumes examined for immature stages or damage of *Ancylostomia*

Species	Stage or damage
Andrea sp.	Nil
Bauhinia megalendra	Nil
Bauhinia pauletia	Nil
Bauhinia purpurea	Nil
Bauhinia sp.	Nil
Brownea sp.	Nil
Caesalpinia pulcherrima	Nil
Calpogonium sp.	Nil
Canavalia ensiformis	Nil
Cassia fistula	Nil
Cassia frutescora	Nil
Cassia javenica	Nil
Cassia occidentalis	Nil
Cassia tora	Nil
Centrosema pubesenis	Nil
Clitoria terrata	Nil
Crotolaria retusa	Nil
Delonix regia	Nil
Desmodium affine	Nil
Desmodium frutescens	Nil
Desmodium sp.	Nil
Dolichos lab lab	Nil
Glycine max	Nil
Indigofera teysmanii	Nil
Myroxylon sp.	Nil

Table V –Cont'd.

Species	Stage or damage
Phaseolus vulgaris	Nil
Pithecellobiym unguis-cati	Nil
Samanea saman	Nil
Tephrosia candida	Nil
Vigna sinensis	Nil
Vigna sp.	Nil

SUMMARY

The distribution and abundance of the two main pod-bores – *Ancylostomia stercorea* and *Heliothis* sp. are given. Pod borers are important pests in many areas. Other pod-borers and insects in general on Pigeon peas are listed. The control methods – Cultural, chemical and biological are discussed.

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