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RELATIVE SEASONAL ABUNDANCE OF "HADDA" BEETLE, *HENOSEPILACHNA CHRYSOMELINA* F. AT LYALLPUR

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The "hadda" beetle, *Henosepilachna chrysomelina* F. remained active under natural and semi-natural condition from second fortnight of March till September, feeding on various cucurbitaceous, plants viz., 'tar' *Cucumis melo* var. *flexuosus* (Linn); Naud; 'kheera' *Cucumis sativus* Linn; 'kharbooza', *Cucumis melo* L.; 'sarda', *Cucumis melo* var. *sarda*; 'garma', *Cucumis melo* var. *garma*; 'tarbooz', *Citrullus lanatus* (Thunb) Mansf; 'phut', *Cucumis melo* var. *momordica*; 'patha' *Benincasa hispida* Cogn; 'kadoo', *Lagenaria siceraria* (Molina) Standl. and 'tinda', *Citrullus lanatus* (thunb) Mansf var. *fistulosus* and passed through seven overlapping generations in one calendar year.

INTRODUCTION

Henosepilachna chrysomelina F., commonly known as "hadda" beetle is a serious pest of cucurbits. Its adults and larvae have been reported causing serious damage to cucumber, *Cucumis sativus* L. (Morstatt, 1912 and 1913, Del Canizo, 1928 and Klemm, 1930); vegetable marrow, *Cucurbita pepo* L. (Noel, 1913) muskmelon, *Cucumis melo* L. and watermelon, *Citrullus vulgaris* Schrad (Perret, 1936) and pumpkin, *Cucurbita maxima* (Del Canizo, 1928; Harris, 1937). In India, Kapur (1950) recorded this pest on pumpkin, melon and water-melon. However, Ashrafi (1966) reported muskmelon as its major and pumpkin, water-melon, cucumber and beans as alternate hosts. Studies reported herein were made to determine the host plants and seasonal abundance of this insect at Lyallpur.

MATERIALS AND METHODS

The seasonal prevalence of the pest and its occurrence on different host plants was studied by carrying out surveys of vegetable fields fortnightly within a radius of five miles of the University campus. A pilot experiment was conducted all the year round in the laboratory, rearing 12 pairs of sexed adults on the natural hosts, to determine the duration of different life

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stages in the different generations. The duration of one generation was counted as the period between egg laying in one and the subsequent generations.

RESULTS AND DISCUSSION

The relative seasonal abundance of "hadda" beetle, *Henosepilachna chrysomelina* F. recorded at Lyallpur is given in Table 1.

The insect was scarce in the field during March whereas, in April it was frequently found in fair number. However, it built up a sizable population from May to September and became a serious pest on cucurbits. By the first fortnight of October the insect began to disappear in search of suitable quarters for hibernation.

The detailed study on the life-history of *H. chrysomelina* F (Shah and Khan, 1972) revealed that the adults quit the winter hiding quarters during second fortnight of March and resumed activity with the onset of spring season. The pest remained active till september, feeding on various cucurbitaceous plants viz., 'tar' *Cucumis melo* var. *flexuosus* (Linn.) Naud; 'kheera', *Cucumis sativus* Linn; 'kharbooza', *Cucumis melo* L.; 'sarda', *Cucumis melo* var. *sarda;* 'garma', *Cucumis melo* var. *garma*; 'tarbooz', *Citrullus lanatus* (thunb) Mansf; 'phut', *Cucumis melo* var. *momordica* 'patha', *Benincasa hispida* Cogn; 'kadoo', *Lagenaria siceraria* (Molina) Standl; 'tinda', *Citrullus lanatus* (thunb) Mansf var. *fistulosus*. During this period the pest remained very active and passed through seven overlapping generations. The average duration of one generation came to 24.6 days, whereas the active period (2nd fortnight of March to last week of September) was 188 days. The active period (188 days) divided by average duration of one generation (24.6 days) roughly gave the figure of 7. Shah (1939) however, recorded 4 to 6 generations of *Epilachna* on brinjal crop. During the present investigations the pest was never recorded on brinjal crop as reported by Shah (*loc. cit*) and Rehman (1940). Ashrafi (1966) observed only four generations of the pest from last week of March till 3rd week of July at Karachi on cucurbits in one calendar year. Another striking difference between our observations and that of Ashrafi's (*loc. cit*) is in the duration of larval stages. Ashrafi *loc.cit* recorded the average larval duration as 25 to 31, 11 to 27, 10 to 25 and 16 to 25 days in the first, second, third and fourth generations, respectively. During the present investigations the overall average of total larval life ranged from 8.4 to 10.3 with an average of 9.3

TABLE 1. *Population dynamics of H. chrysomelina at Univ. of Agriculture Lyallpur*

S. No.	Month	Fortnight	Mean temp. (°F)	Mean humidity (percentage)	Population		Host Plants
					Adult	Larvae	
1.	March	1st	77.5	83.5	Scarce	Nil	tar
		2nd	79.3	80.5	Scarce	Fair	tar
2.	April	1st	85.4	72.6	Fair	Fair	tar, kheera, kharbooza.
		2nd	93.4	67.4	Fair	Fair	tar, kheera, kharbooza.
3.	May	1st	94.6	59.1	Abundant	Abundant	tar, kheera, kharbooza.
		2nd	106.8	54.9	Abundant	Abundant	tar. kheera, kharbooza, sarda, garma, tarbooz.
4.	June	1st	104.3	60.8	Abundant	Abundant	tar, kheera, kharbooza, sarda, garma, tarbooz.
		2nd	109.9	59.6	Abundant	Abundant	kheera, kharbooza, sarda, garma, tarbooz.
5.	July	1st	99.7	74.5	Abundant	Abundant	sarda, garma, tarbooz, patha, phut, kadu.
		2nd	101.7	71.5	Abundant	Abundant	sarda, garma, tarbooz, phut, tinda
6.	August	1st	67.6	75.7	Abundant	Abundant	tarbooz, phut, tinda
		2nd	94.8	84.3	Abundant	Abundant	phut, tinda
7.	September	1st	95.3	76.0	Abundant	Abundant	phut.
		2nd	98.5	72.0	Abundant	Abundant	phut
8.	October	1st	89.5	70.9	Scarce	Absent	phut.
		2nd	87.9	75.1	Absent	Absent	hibernation.

9.	November	1st	80.2	80.2	Absent	Absent	hibernation
		2nd	77.4	77.8	Absent	Absent	hibernation.
10.	December	1st	67.5	34.4	Absent	Absent	hibernation
		2nd	64.5	87.6	Absent	Absent	hibernation
11.	January	1st	62.8	86.3	Absent	Absent	hibernation
		2nd	61.6	87.7	Absent	Absent	hibernation
12.	February	1st	75.9	75.4	Absent	Absent	hibernation
		2nd	76.7	73.8	Absent	Absent	hibernation.

i) FAIR: When insects resumed activity after hibernation and were found in fair number.
ii) ABUNDANT: When insect were found in large number to constitute a pest.
iii) ABSENT: Insect in hibernation
iv) SCARCE: When insects were collected with great difficulty.

days. The prolonged larval period at Karachi may be attributed to the scarcity and poor nutritive value of the host plants or to the difference in climatic conditions or both. This may have affected the active period of the pest and consequently reduced the number of generations at Karachi in one calender year.

The duration of various stages in each generation is given in Table 2.

1. *First generation* : The overwintered adults resumed activity during the second fortnight of March and the entire generation was completed on 'tar' crop in 21 to 26, with an average of 23.7 days.

The incubation period varied from 3 to 4, with an average of 3,5 days. The hatching of eggs began as early as the 22nd March and continued till the 18th April. The larvae were full fed in 8 to 12, with an average of 9.8 days. The prepupal and pupal stages occupied 1 to 2 and 3 to 4, with an average of 1.2 and 3.2 days, respectively. The first pupation took place on 1st April and continued till 28th April. The pre-oviposition period occupied 5 to 7, with an average of 6 days. The adults of the first generation emerged on the 4th April and the emergence continued till 1st May.

2. *Second generation* : The second generation was completed on 'tar', 'kheera', 'kharbooza', 'sarda', 'garma', or 'tarbooz', crop in 20 to 24, with an average of 22.2 days

The incubation period varied from 3 to 4, with an average of 3.8 days. The hatching of eggs began on 12th April and continued till 11th May. The larvae were full fed from 8 to 12, with an average of 8.8 days. The pre-pupal and pupal stages occupied 1 to 2 and 3 to 4, with an average of 1.2 and 3.5 days, respectively. The first pupation took place on 23rd April and continued till 23rd May. The pre-oviposition period occupied 4 to 6, with an average of 4.9 days. The first adult of the generation emerged on the 26th April and the emergence continued till 27th May.

3. *Third generation* : The third generation was completed on 'tar', 'kheera', 'kharbooza', 'sarda', 'garma' or 'tarbooz' crop in 20 to 23, with an average of 21·2 days.

The incubation period varied from 3 to 4, with an average of 3.3 days. The hatching of eggs began on 3rd May and continued till 4th June.

The feeding period of the larvae ranged from 8 to 12, with an average of 8.8 days. The pre-pupal and pupal stages occupied 1 to 2 and 3 to 5, with an average of 1.2 and 3.7 days, respectively. The first pupation took place on 15th May and continued till 14th June. The pre-oviposition period occupied 4 to 6, with an average of 4.1 days.

TABLE 2. *Duration of various life-Stages of H. chrysomelina F. in different generation*

S. No.	Generation		Egg	Larvae	Prepupa	Pupa	Pre-Oviposition
1.	1st	R	3-4	8-12	1-2	3-4	5-7
		A	3.5	9.8	1.2	3.2	6.0
2.	2nd	R	3-4	8,12	1-2	3.4	4-6
		A	3.8	8.8	1.2	3.5	4.9
3.	3rd	R	2-4	1-12	1-2	3-5	4-6
		A	3.3	8.9	1.2	3.7	4.1
4.	4th	R	3.5	8-12	1-2	3-5	4-6
		A	4.0	8.6	1.1	4.0	4.5
5.	5th	R	3-5	8.11	1-2	3-6	4-7
		A	4.1	9.1	1.5	4.4	3.8
6.	6th	R	3-5	1-12	1-2	4-5	6-9
		A	4.2	2.7	1.2	4.4	7.2
7.	7th	R	4-6	8-12	1-2	5-8	7-12
		A	4.6	9.6	1.3	6.4	10 0
Overall average of 7 generations		R	3.3-4.6	8.6-9.8	1.1-1.5	3.2-6.4	4.1-10.0
		A	3.9	9.2	1.2	4.2	6.1

Note : R - denotes range.
A - denotes average

The first adult emerged on 20th May and the emergence continued till June.

4. *Fourth generation* : The fourth generation was completed on the leaves as well as fruit of 'tar', kheera', 'kharbooza', 'sarda', 'garma', 'tarbooz', 'phut' and 'kadu' in 20 to 25, with an average of 22.2 days.

The incubation period varied from 3 to 5, with an average of 4 days. The hatching of eggs began as early as 30th May and continued till 25th June. The feeding period of the larvae ranged from 8 to 12 with an average of 8.6 days. The pre-pupal and pupal stages occupied 1 to 2 and 3 to 5, with an average of 1.1 and 4 days, respectively. The pre-oviposition period occupied 4 to 6, with an average of 4.5 days, The first pupation took place on 11th June and it continued till 5th July. The first adult emerged on 17th June and the emergence continued till 10th July.

5. *Fifth generation* : The larvae and adults of this generation preferred to complete their development on fruit of 'sarda, 'garma', 'tarbooz', 'patha', 'phut', 'kadu', and 'tinda', in 22 to 27, with an average of 24.9 days.

The incubation period varied from 3 to 5, with an average of 4.1 days. The hatching of eggs began on 7th July and continued till 23th July. The feeding period of the larvae ranged from 8 to 12, with an average of 9.1 days. The pre-pupal and pupal stages occupied 1 to 2 and 5 to 6, with an average of 1.5 and 4.4 days, respectively. Preoviposition period occupied 4 to 7 with an average of 5.8 days.

The first pupation took place on 18th July and it continued till 31st July. The first adult of this generation emerged on 24th July and the emergence took place till 4th August.

6. *Sixth generation* : This generation was completed on fruit of 'tarbooz' ,'phut', and 'tinda' in 23 to 30, with an average of 27.1 days.

The incubation period varied from 3 to 5, with an average of 4.2 days. The hatching of eggs began on 8th August and continued till 16th of August. The feeding period of the larvae varied from 8 to 12, with an average of 9.7 days. The pre-pupal and pupal stages occupied 1 to 2 and 4 to 5, with an average of 1.2 and 4.4 days, respectively. The pre-oviposition period occupied 6 to 9, with an average of 7.2 days. The first pupation took place on 19th August and it continued till 28th August, The first adult emerged on 23rd August and the emergence continued till 2nd September.

7. *Seventh generation* : This generation completed its development exclusively on 'phut' in 29 to 36, with an average of 31.79 days

The incubation period varied from 4 to 6, with an average of 4.6 days. The hatching of larvae began on 9th September which continued till 19th September. The feeding period of larvae ranged from 8 to 12, with an average of 9.6 days. The pre-pupal and pupal stages occupied 1 to 2 and 5 to 8, with an average of 1.3 and 6.4 days, respectively. The pre-oviposition period occupied 7 to 12, with an average of 10 days. The first pupation took place on 20th September and it continued till 30th September. Earliest date of adult emergence was 27th September and the emergence continued till 6th October.

Wintering over : The adult of the seventh generation hibernate from first week of October till the second fortnight of March. The insects sought shelter under the dried leaves, uprooted vines of cucurbits and grass blades

etc., and resumed activity when long-melon crop sprouted during the onset of spring season.

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