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BIOLOGY OF ARMY WORM, *PSEUDALETIA (CIRPHIS) UNIPUNCTA* (HAW), NOCTUIDAE: LEPIDOPTERA.

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Studies on *Pseudaletia (Cirphis) unipuncta* (Haw) revealed that oviposition, incubation, larval, prepupal, and pupal stages and adult male and female life occupied 1–4, 3-5, 16-31, 1, 9-15 2–14 and 3-15 days with their averages as 3.3, 3.5, 21.95, 1.0, 11.8, 8.2 and 8.9 days, respectively. The insect completed its life cycle in 31–66 days. Wheat, sorghum, maize, 'bajra' and sugarcane were preferred as food as compared to barley, rice, oats, 'guara', 'mong', 'mash', ground-nut, 'sunn', 'kangni', 'khabbal grass', 'dub' and water grass.

INTROUCTION

The army worm, *Pseudaletia (Cirphis) unipuncta* (Haworth) is widely distributed and like many other noctuids, multiplies in masses to form large bands of crawling larvae that hide during day in soil and move from field to field feeding on crop foliage, during night. Loss, thus resulting from the attack of this insect is not only sudden but unbelieveable. In Kentucky and Minnesota (USA), during 1953, outbreak of the pest resulted in crop losses worth 10 and 12 million dollars, respectively (Pfadt 1971). MacNay (1965) reported it to be serious pest of maize in Canada. In Pakistan, Ahmad (1974) noticed increasing activity of the pest in maize and 'jowar' fields. The information on the biology of the pest is scanty. Earlier workers, Gurney (1918), Parks (1919), Britton (1938) and Earl and Lyle (1940) recorded observations on oviposition, duration of egg, larval, pupal and adult stages of the pest. The insect hitherto was of sporadic occurance on crops, hence was not given any attention in the country and no work worth mentioning has been done on any aspect of the insect. Now, with the increase in its harmful activities, it has become imperative to study this insect in all its details.

MATERIALS AND METHODS

The army worm larvae collected during May, June and August–September from maize and 'jowar' fields, in and around University Campus, were brought to laboratory. These were reared on maize leaves till adults, in 500 ml. beakers having 3 inch sand bed and a muslin cloth cover. On

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emergence, the adults were sexed, paired and released in glass chimneys having plugs of honey to serve as food. In addition, fresh tender leaves, as oviposition substrate were placed. These leaves were changed daily and those having eggs were removed to 4" dia. petri dishes having moist sand bed to avoid desiccation of eggs. On hatching, the larvae were transferred to 1 lb. capacity jars with 3" soil bed and succulent maize leaves provided and changed daily till the larvae were full fed. These full grown larvae were allowed to pupate in sand bed. On emergence, the adults were again sexed, paired and released in manner as stated above and observations on duration of copulation, oviposition, incubation, larval, prepupal, pupal and adult stages were recorded and sex ratio calculated.

Food preference of the pest was determined by offering leaves of 17 plants (Table 2) separately, each in 4 repeats in beakers, including control. Thus there were 68 beakers in the experiment. Ten grams of fresh leaves taken from each plant were placed separately in these beakers and thereafter five, sixth instar larvae, released in each beaker, excepting the beakers kept as control, and their mouths covered with muslin cloth. In control, drying effect on the individual plant leaves was recorded after 24 hours. The unconsumed food left by the larvae was weighed again, after 24 hours, to arrive at food consumption.

RESULTS AND DISCUSSION

Observations on different aspects of life history are summarized in Table 1. It shows that a female laid 18-344 eggs (average 175.2) and this figure is much lower than that of 700 eggs recorded by Gurney (1918) and Britton (1938) and 2000 by Pfadt (1971). However, 13-34 eggs per mass agree with the observations of Parks (1919). Earl and Lyle (1940) recorded 2-6 days as incubation period and in the present case it was 1-4 days. However, Pfadt (1971) reported 6-10 days as incubation period, which is too high. Number of larval instars currently recorded was 6 and it supports the results of previous workers. Larval life, worked out by Britton (1938), Earl and Lyle (1940) and Pfadt (1971) respectively, ranged from 20-30, 18-26 days and 3-4 weeks. The period occupied by Larval stages (16-31 days) is similar to their reports. Prepupal period lasted for a day, whereas, pupal period extended from 9 to 15 days with an average of 11.8 days and this is also in line with the observations of Jarvis (1921), Britton (1938) and Pfadt (1971) who recorded pupal duration of 7-11, 10-15 and 15-20 days, respectively. Total period occupied by immature stages has been reported to be 38-55 and

42-98 days by Britton (1938) and Pfadt (1971), respectively, and the present results are also similar showing immature stages occupying 26-46 days. The life after pupal emergence till death of adult male and female ranged from 2 to 14 and 3 to 15 days with averages of 8.2 and 8.9 days, respectively. Insect was found to complete its life cycle in 32-66 days to match with the observations of Severin (1921) showing 2-2½ months time, during summer. Adults sexed as male and female, collected from field, indicated sex ratio of 42.3 and 57.7 per cent, respectively, whereas laboratory reared stock revealed the respective ratio of 39.47 and 60.53 per cent.

The food preference results, given in Table 2, reveal that the insect preferred wheat, sorghum, maize, 'bajra' and this is in line with conclusions of MacNay (1965), Pfadt (1971) and Ahmad (1974), that the army worm feeds preferably on corn, small grains and foliage grasses.

Table 1. *Duration of different life stages of Pseudaletia (Cirphis) unipuncta*

Life Stages			Duration (Days)	
			Range	Average
Oviposition period			1-4	3.3
Incubation period			3-5	3.5
Larval instars		Ist	3-5	3.3
		2nd	2-5	3.2
		3rd	2-4	3.1
		4th	2-5	3.3
		5th	2-4	3.05
		6th	5-8	6.0
		Total :	16-31	21.95
prepupal period			1	1.0
Pupal period			9-15	11.83
Adult life		Male	2-14	46.35
		Female	3-15	46.65
Life cycle		Male	31-65	8.2
		Female	32-66	8.9
	LABORATORY REARED		FIELD COLLECTION	
Sex ratio	Male	39.47%	42.3%	
	Female	60.53%	57.7 %	
No. of eggs laid per female	Range	68-344		
	Average	175.2		
Percentage hatching		98.39		

Note : Each figure has been calculated from the data of 20 observations.

Table 2. *Consumption of Leaves of different plants during 24 hours feeding period*

Food Plants		Av. weight of leaves (grams) after 24 hours feeding (Out of 10 Grams fresh leaves)		Av. weight of leaves consumed during 24 hours feeding period
Common Name	Botanical Name	Control	Test	
Wheat	*Triticum aestivum*	8.65	3.31	5.34
Sorghum	*Sorghum vulgare*	7.63	2.42	5.21
Maize	*Zea mays*	7.15	2.42	4.73
Bajra	*Pennisetum typhoideum*	7.87	3.82	4.05
Sugarcane	*Saccharum officinarum*	9.16	5.67	3.49
Barley	*Hordeum vulgare*	7.88	4.55	3.33
Rice	*Oryza sativa*	7.73	4.48	3.25
Oats	*Avena sativa*	6.95	4.57	2.38
Guara	*Cyamopsis psoraliortes*	7.48	5.23	2.25
Mung	*Vigna aureus*	6.75	4.63	2.12
Mash	*Vigna mungo*	6.63	4.76	1.87
Groundnut	*Arachis hypogea*	7.08	5.40	1.68
Sunn	*Crotolaria juncea*	7.45	5.80	1.65
Kangni	*Setaria italica*	7.63	5.99	1.64
Khabal grass	*Cynodon dactylon*	8.40	7.01	1.39
Dub	*Desmostachya bipinnata*	9.04	7.76	1.28
Water grass	*Echinochloa crus-galli*	7.84	6.76	1.18

LITERATURE CITED

Ahmad, M. 1974. Pests of Maize and Jowar. Zarri Digest 8 (4): 43–75. A publication of the University of Agriculture, Lyallpur.

Britton, W. E. 1938. Connecticut State Entomologist. 37th report. Bull. Conn. Agric. Expt. Sta. 408: 133–166.

Earl, J. M. and Clay Lyle. 1940. Observations on *Cirphis unipuncta* Haw. in Mississippi. J. Econ. Ent. 33 (5): 768-769.

Gurney, W. B. 1918 Insect pests of Maize. Agric. Gaz. Sydney. 29 (9) 641–650.

Jarvis, E. 1921. A new moth pest of Sugarcane and Maize. Queensland. Agric. J. Brisbane. 16 (4): 276–280.

MacNay, C. G. 1965. Highlights of the occurrence of insects and other arthropods. F.A.O. Plant Bull. 13 (1): 17–19 (Rev. App. Ent. Ser. A. 53: 360, 1965).

Parks, T.H. 1919. Controlling army worm outbreaks in Ohio. Mthyl. Bull Ohio. Agric. Expt. Sta. Woostar 4 (9): 272–275. (Rev. App. Ent. Ser. A. 8:129, 1920).

Pfadt, R. E. 1971. Fundamentals of Applied Entomology. MacMillan Co; New York. pp. 693.

Severin, H. C. 1921 The army worm. Ent. Brook. Dakota. Circ. 24; 10. (Rev. App. Ent. Ser. A. 9: 484, 1921).