

DIFFERENTIAL DEVELOPMENT AND UNIFORM SURVIVAL OF *DIACRISIA OBLIQUA* WALK ON DIVERSE HOST PLANTS

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The larval development and adult survival of the hairy caterpillar, *Diacrisia obliqua* Walk. was studied on sunflower, soybean, mash and mung in the laboratory at room temperature. Survival was not statistically different on tested host plants. The larvae weight after 6 and 12 days feeding was the highest on sunflower as compared to other three host plants. Larval development was faster on sunflower as compared to other tested plants. For higher larval weight and faster development these host plants could be arranged in order as: sunflower, mung, mash and soybean. The larval duration was also shortest i.e., 16 days on sunflower as compared to mung (24 days) and soybean (30 days), but pupal duration was not statistically different.

Key words: *Diacrisia obliqua* survival, Development sunflower, Soybean.

Introduction

Hairy caterpillar *D. obliqua* is a polyphagous insect and a serious defoliator of numerous crops and vegetables. Some of these are jute, sunflower, castor, cotton, mung, gardenia, berseem, groundnut, gram, soybean, sunhemp and tomato, etc., [1,2]. It is distributed throughout the country [3] potential to become a major pest on summer crops due to its high egg laying capacity [4], larval mobility and high feeding rate in the later instars.

A female lays eggs in clusters containing a total of 602-849 eggs [1]. There are 6-7 instars and a complete life cycle takes 42-49 days on sunflower at room temperature [4]. The total life span (birth to death) on the one side is linked to the kind of host plants and their nutritive value and on the other to the prevailing temperature and humidity. Thus different host plants have a significant effect on the survival and larval duration [2], development of instars and egg laying capacity [5]. Even different entries/cultivars have significant effect on larval survival and gain in body weight [6].

Some of the hosts plant may have the propensity to affect some biological parameters of an insect species, such as, egg laying capacity and larval duration in a way to increase or decrease insect population in next generation on particular crop cultivars [1]. The survival and development of an insect pest on certain crops are important feature to determine suitability of host plants in insect-plant interaction. The rate of growth of an insect on particular crop/cultivars is also important in developing pest management strategy knowing about.

The major objectives of the present studies were therefore, to investigate the survival, gain in larval weight and development of hairy caterpillar on important summer crops like sunflower, soybean, mash and mung.

Materials and Methods

D. obliqua eggs were obtained from mung fields at the National Agricultural Research Centre (NARC) Islamabad, Pakistan. The eggs were hatched in the laboratory, at an average temperature of 3° and 50% relative humidity. Two hundred and forty neonate larvae of the same age group were used in the study. These larvae were randomly selected for treatments under completely randomized design with 6 replications for each treatment. There were 10 larvae in each replicate. The treatments comprised (i) Fresh middle age green leaves from sunflower *Helianthus annuus*, cv. Hysun 33. (ii) Soybean (*Glycin max* cv. Swat-84). (iii) Mung MN-51. (iv) Mash-9002. Each batch of 10 larvae was reared on respective leaves in 500 ml (10.5x5cm) open mouth glass jars, covered with muslin cloth tied with rubber bands. Fresh leaves of the host plants collected from NARC field were supplied daily to the respective insect batch for feeding. The total duration of experiment was approx. 60 days during summer.

For survival data, larvae were counted daily. The data were converted into percentage survival for statistical analysis. For body weight data, the batches of larvae of each replicate were weighed in milli gram on Sartorius laboratory balance with sensitivity drift (1.10^{-5}) after 6 and 12 days feeding on respective host plants. The data for larval and pupal duration were also recorded. The pre-pupal days were included in pupal stage when larvae has started cocoon spinning and became immobile and in non-feeding condition. The data on mean body weight, mean larval and pupal duration were analyzed for the analysis of variance with MSTAT-C. LSD value was used for mean separation.

Results and Discussion

Percentage survival was not significantly higher on

soybean and mash compared to sunflower and mung (Table 1). But simple average shows that soybean and mash leaves were comparatively suitable for initial establishment of hairy caterpillar larval population. The lowest survival on mung and sunflower suggest that there might be some injurious physical or chemical factor against hairy caterpillar larvae [7].

The initial body weight was similar in all the larvae. After 6 days, larvae feeding on sunflower gained significantly more weight than soybean, mung and mash (Table 2). Net weight gained on sunflower was almost 3 times more than on soybean within 1 week. The weight after 12 days feeding was also significantly higher on sunflower (664.17) than mung, mash and soybean larvae feeding on mung gained higher weight than soybean and mash. Faster development was recorded on sunflower than other host plants.

Larval developmental time was significantly less on sunflower than soybean, mung and mash (Table 3). Larval

period was the longest on soybean (30.75%), but larval duration of feeding on mash was in between mung and soybean larval period. The larval duration on mung recorded in the present study was similar to the one observed [2] on mung but, the larval duration on sunflower in the present study is till shorter than larvae reared on gardenia, cotton, mung, jute and castor [2]. These results reveal that rapid gain in body weight results in shorter larval duration on sunflower[2].

There were no significant differences in pupal duration among hairy caterpillar larvae populations fed on these plants, but larvae fed on sunflower and mung took 1 and 2.5 days longer than those fed on soybean and mash to complete the pupal stage.

The total time from egg emergence to adult stage were 28.50 days on sunflower, 36-38 days on mung and mash compared to 42 days on soybean. These results show that development of hairy caterpillar was more rapid on sunflower than on all other tested host plants. This rapid development on sunflower plants will result in more generations in a year or crop season which may cause a major outbreak of hairy caterpillar on summer sunflower crop. Thus for control purposes more chemical spray intervention would be required in sunflower crop. The present investigation revealed that sunflower *H. annuus* is the best host for hairy caterpillar to attain maximum weight and faster development. It is also concluded that plants species favourable for initial survival are not necessarily best for rapid development contrary a previously reported study to [8].

TABLE 1. SURVIVAL PERCENTAGE OF *DIACRSIA OBLIQUA* ON DIFFERENT HOST PLANTS.

Host plants	Survival % after feeding (days)					
	One	Two	Three	Four	Five	Six
Soybean	91.67	81.67	81.67	80.00	76.67	76.67
Mash	85.00	81.67	78.33	75.00	75.00	75.00
Sunflower	85.00	75.00	70.00	70.00	70.00	61.67
Mung	96.67	73.33	60.00	51.67	51.67	46.67

Means are not significantly different at P=0.05

TABLE 2. AVERAGE BODY WEIGHT/LARVA OF *D. OBLIQUA* ON DIFFERENT HOST PLANTS.

Host plants	Initial weight (mg/larva)	Weight after six days (mg/larva)	Weight after twelve days (mg/larva)
Sunflower	7.305	90.95a	664.17a
Mung	7.302	40.70b	346.33a
Mash	7.295	36.43b	146.17c
Soybean	7.305	30.27b	98.50c

Means followed by the same letter in a column are not significantly different at P=0.05 by LSD.

TABLE 3. DURATION OF LARVAL AND PUPAL STAGES OF *D. OBLIQUA* ON DIFFERENT HOST PLANTS.

Host plants	Larval days	Pupal days
Soybean	30.75a	11.50
Mash	28.00 ab	10.00
Mung	24.25 b	12.50
Sunflower	16.00 c	12.50

Means followed by the same letter in a column are.

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