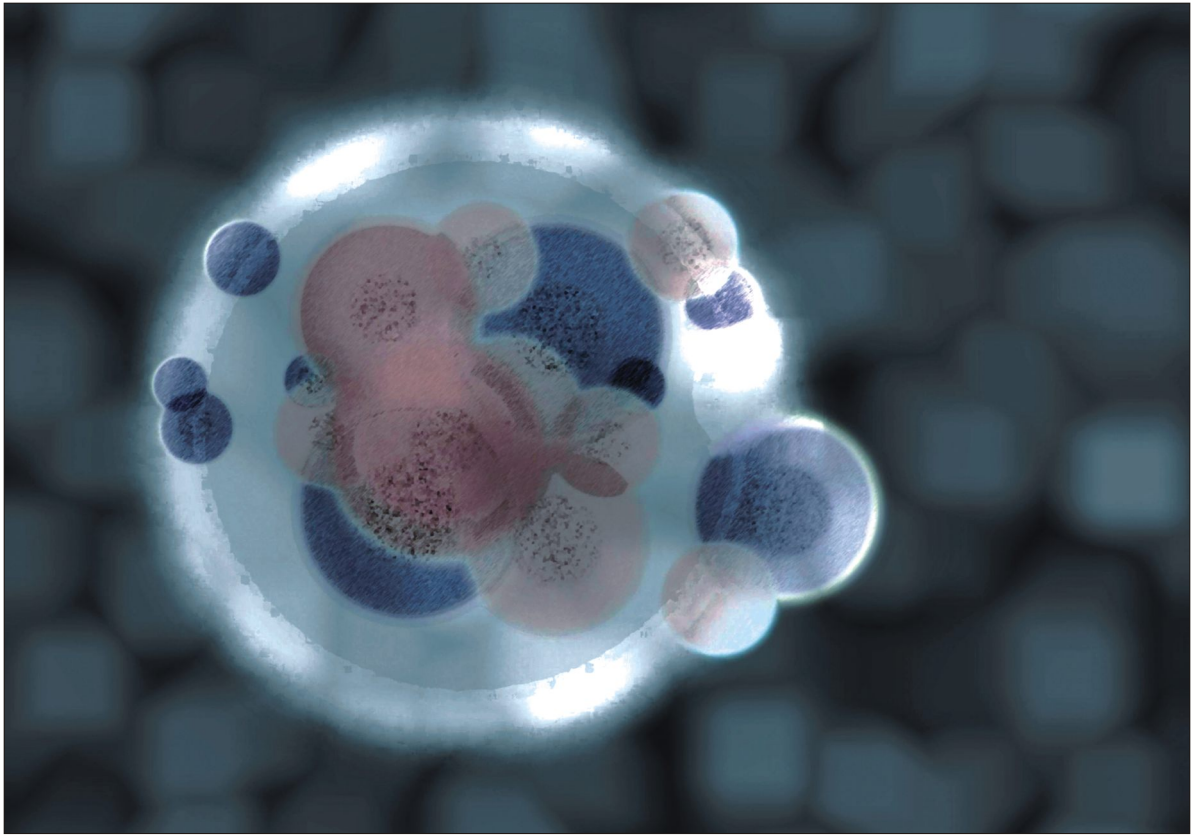




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Population and Damage Fluctuation of Tobacco Cutworm (*Spodoptera litura* F.) In Relation to Age of Turnip Crop

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Abstract: An investigation on loss assessment of Tobacco Cutworm (*Spodoptera litura* F.) on turnip crop was under taken during winter season, 1998-99 at Z.A. Bhutto Agricultural College, Dokri, Sindh, Pakistan. The seeds of local turnip variety were planted during second week of October, 1998. The insect population observations were recorded one month after sowing. The population of cutworm remained on turnip crop from November, 1998 to February, 1999, which indicated one generation of the pest on turnip crop. The maximum population of Tobacco Cutworm (*Spodoptera litura* F.) was 11.72 per plant, which recorded 12.25 percent damage in the crop at 19.97°C temperature and 75.85% relative humidity. The population of Tobacco Cutworm was significantly correlated with the age of the turnip plants. During November-December (vegetative stage) the population percentage was positively correlated and showed increasing trend ($b = 0.24$). However, population was negatively correlated and had decreasing trend ($b = -0.249$) when the crop was at maturity phase. This was due to the fact that crop early growth phase had sufficient number of green leaves containing chlorophyll which favoured the pest population for the food and survival.

Key words: Turnip, Cutworm, Population, damage

Introduction

Turnip is widely cultivated in Pakistan. It is grown for edible purposes i.e. green vegetable and salad, whereas, the leaves are very rich in mineral and vitamins and are also fed to animals. The yield of the turnip crop can be achieved by appropriate field practices including insect and pest control. Crop rotation and alternate host destruction are very important factors to get rid-off from the incidence of insect pests. Now a days tobacco cutworm (*Spodoptera litura* F.) is the most harmful insect pest of turnip crop, which remains in the crop upto maturity and exhibits maximum damage during the vegetative phase of the plant where enough chlorophyll is present (Abdel Fattah *et al.*, 1977). The pest emergence is found to be associated with food availability (Dass and Parshad, 1983) and suitable climatic condition where it attacks not only leaves but tunnels in the stem of the plant (Khoso, 1988). Looking the mode of damage, this study will help to observe pest incidence and damage during the crop growth phases.

Materials and Methods

The present investigations were carried-out at Z.A. Bhutto Agricultural College, Dokri, Larkana, Sindh, Pakistan, during 1998-99. The seeds of the local turnip variety were planted on ridges at 45 cm and 15 cm distance between row to row and plant to plant respectively. The weekly observations for insect population and damage were started after one month of sowing the crop. For recording the pest population 25 plants per plot were thoroughly observed and the number of cutworm larvae present on the leaves and near the roots at ground level were counted.

Results and Discussion

The cutworm (*Spodoptera litura* F.) appeared on the crop from 15th November, 1998 and remained up to December, 1998 having the 25°C temperature and 65.65% relative humidity. It was peak from 27th November to 27th December, 1998. The maximum larval population appeared on 27th November, 1998 which was 11.72 per plant at 15°C and 67.6% temperature

Table 1: Population and damage levels of the Tobacco Cutworm (*Spodoptera litura* F.) in turnip crop (1998-1999)

Month and Observation Date	Age of Crop Days	Cutworms Per 25 Plants	Cutworms Per plant	Damaged plants in 36 sqm plot Having 400 Plants	Damage Percentage
November					
15.11.98	15	35	01.04	11	02.75
22.11.98	22	73	02.92	18	04.50
29.11.98	29	122	04.88	26	06.50
December					
06.12.98	36	164	06.56	33	08.25
13.12.98	43	208	08.32	40	10.00
20.12.98	50	242	09.68	42	10.50
27.12.98	57	293	11.72	49	12.55
January					
03.01.99	64	259	10.36	34	08.50
10.01.99	71	215	08.60	27	06.75
17.01.99	78	171	06.84	22	05.50
24.01.99	85	116	04.64	18	04.50
31.01.99	92	60	02.40	13	03.25
February					
07.02.99	199	30	01.02	09	02.25
14.02.99	106	13	00.52	06	01.50
Total			84.36	348	87.00 %
Mean			06.02		

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Table 2: Regression analysis of larval density of Tobacco Cutworm (*Spodoptera litura* F.) on turnip crop in different periods (days) in relation to age of crop

Observation Date	r	b	a	S	SED	T	P
November	0.999	0.244	-2.034	0.998	0.004	59.485	<0.001**
December							
January	- 0.991	- 0.249	26.083	0.982	0.015	16.628	<0.001**
February							

and relative humidity respectively. After that, the population pattern started reverting and become minimum with the population of 0.52 per plant during 2nd week of February, 1999 at 20.93°C temperature and 37.25% relative humidity. The damage of plants initiated in 2nd week of November, 1998 and continued up to 2nd week February, 1999. At the initial stage when temperature was 25.25°C and relative humidity was 65.65%, the damage percentage was low as 2.75% but, as the larval population started to increase the damage percentage also increased simultaneously and reached on peak 12.25% at 18.97°C temperature and 75.85% relative humidity in the 4th week of December, 1998. The declined damage trend was observed when the larvae of cutworm went into the pupation i.e., at 2nd week of February, 1999 at 20.93°C temperature and 37.25% relative humidity. The overall damage up to the harvesting of the crop was 87% (Table 1, 2).

Further, it was noted that the population of tobacco cut worm was significantly correlated with the age of the turnip crop. During November, the early age (vegetative stage) the population percentage was positively correlated and showed increasing trend. However, population was negatively correlated and had decreasing trend when the crop was at maturity stage. This was due to the fact that crop early growth phase had sufficient number of leaves and chlorophyll which favoured the pest population incident (Abdel Fattah *et al.*, 1997). The cutworms started attacking turnip crop as soon as they appeared during the 2nd week of November, 1998 i.e., at the vegetative stage where enough leaves were present. The population and damage trend continued on the crop up to the 4th week of December and damage percentage declined

when the crop proceeded towards maturity i.e., January-February, 1999 where chlorophyll of the leaves started to decrease.

Tobacco cutworm have become serious pests of many vegetable crop in Pakistan, due to improper use of pesticides, they have acquired resistance against many insecticides. It is therefore, recommended that the insects resistant varieties of turnip crop should be introduced to combat the problem of infestation caused by tobacco cutworm.

Only selective insecticides should be applied when population reaches at the level of economic threshold.

Non toxic chemical control should be encouraged for suppressing the population of tobacco cutworm.

Alternate host plants should be avoided on which *Spodoptera litura* F. prefer feeding such as gram, lucern, etc.

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