



# IMPACT OF ARTIFICIAL DIET ON DIFFERENT BIOLOGICAL PARAMETERS IN *Spodoptera litura*

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## **ABSTRACT**

*Spodoptera litura* is a global and major pest, which attacks a good range of cultivated plants including wheat, pulses, oilseeds, fiber crops, vegetables and decorative plants. This pest can grow and survive on several plant species, belonging to approximately 37 families in India and it feeds on at least 157 plants species. There is a need for a more imaginative and holistic approach to research directed towards the management of this pest. In the present study we analyzed the impact of different tomato varieties on adult emergence, sex ratio and longevity of *Spodoptera litura*. In the present experiment we used Arka Abha, Arka Saurabh, Pant Bahar, Ratna and Pusa Gaurav tomato varieties as artificial diet for the pest. Results indicated that adult emergence of *Spodoptera litura* was minimum (69.33%) on variety Arka Saurabh and maximum (85.64%) on variety Pant Bahar. It is recorded from the data that the male longevity is maximum in Pant Bahar (30.33 days) and minimum in Arka Saurabh (23.92 days). It is amply documented that maximum female longevity recorded in Pant Bahar (38.65%) and minimum female longevity recorded in Arka Saurabh (31.65%). It is apparent from the data that the minimum sex ratio observed in Arka Saurabh (1:1.23) and maximum sex ratio recorded in Pant Bahar (1:1.93).

**Key words:** Arka Abha, Arka Saurabh, Pant Bahar, Ratna, Pusa Gaurav, *Spodoptera litura*.

## **INTRODUCTION**

Tomato (*Lycopersicon esculentum*) is one among the important and remunerative vegetable crops grown round the world for fresh market and processing. Tomato is a crucial vegetable crop grown around the world occupying the daily food regime of a majority of individual. Tomato is claimed to be the native of Tropical America. From Tropical America, it spread to other parts of the world in the 16<sup>th</sup> century and it becomes popular in India within last seven decades. Tomato production is greatly influenced by cultural methods and environmental factors (Jaiswal *et al.*, 2015). Among the several problems for the high yield of good quality production, insect-pests cause great loss to the farmers upto considerable extent.

The production and productivity of the crop is greatly restricted by the *Spodoptera litura* which causes damage to the developing fruits. It leads to yield loss starting from 20 to 60 percent. Tomato fruit borer, *Spodoptera litura* is an important pest which causes considerable losses in quantity as well as quality of tomato fruits (Matharu *et al.*, 2016). The four characteristics like polyphagy, high mobility, high fecundity, and facultative diapause of *S. litura* help attaining the status of a major pest. At certain occasions, it has been found that more than 50% crop is damaged by this pest alone. The damage is caused within the larval stage. The tomato fruit worm is active year-round, but is usually more abundant in tomato and pepper during warmer months of both the spring and fall. The insect may overwinter on volunteer plants and various weed species, and migrates into tomato and pepper after the plants begin flowering. Larvae bore the fruit usually near the calyx. Infested fruit are rendered unmarketable and typically rot due to invasion of secondary microorganisms. Study of the consequences of host plants on the biology of insects is important in understanding host suitability of plant infesting insect species (Jawar S. *et al.*, 2013). Pests are consumed different type of foods having varied types of nutrients. These plant nutrients play a vital role in insect development, reproductive, fecundity and other developmental factors (Klemola *et al.* 2007) The growth and development of pest is dependent upon the type of food and its utilization during larval stage (Balasubramanian *et al.* 1984).

## **MATERIAL AND METHOD**

**Rearing of pest:** Larvae of *Spodoptera litura* were collected from the plots of Vegetable research farm, Kalyanpur and reared in petridish containing fresh foods. The larvae were reared in groups of 12-15 in 1-liter containers on different tomato varieties. Larvae were allowed to pupate in moist and loose soil. To avoid any mechanical injury, the pupae were sexed on 3rd or 4th day after the sclerotization and hardening of pupal integument. Adult moth enclosed in 7-8 days. 10-12 pairs of moths were held for mating and oviposition in cages (20×20×20 cm) with 15-20% honey solution as food (Gupta G.P. *et al.*, 2005). Different tomato varieties were provided as an ovipositional substrate.

**Treatments** Laboratory experiment was set up in three replications with one control for each tomato variety.

**Data collection:** in laboratory experiments data was collected at five days interval of application.

**Statistical analysis:** The data will be subjected to statistical analysis, 'F' test (Chandel, 1975), for testing the variance ratio. The 't' test and correlation co-efficient will also be calculated, where ever it will be necessary.

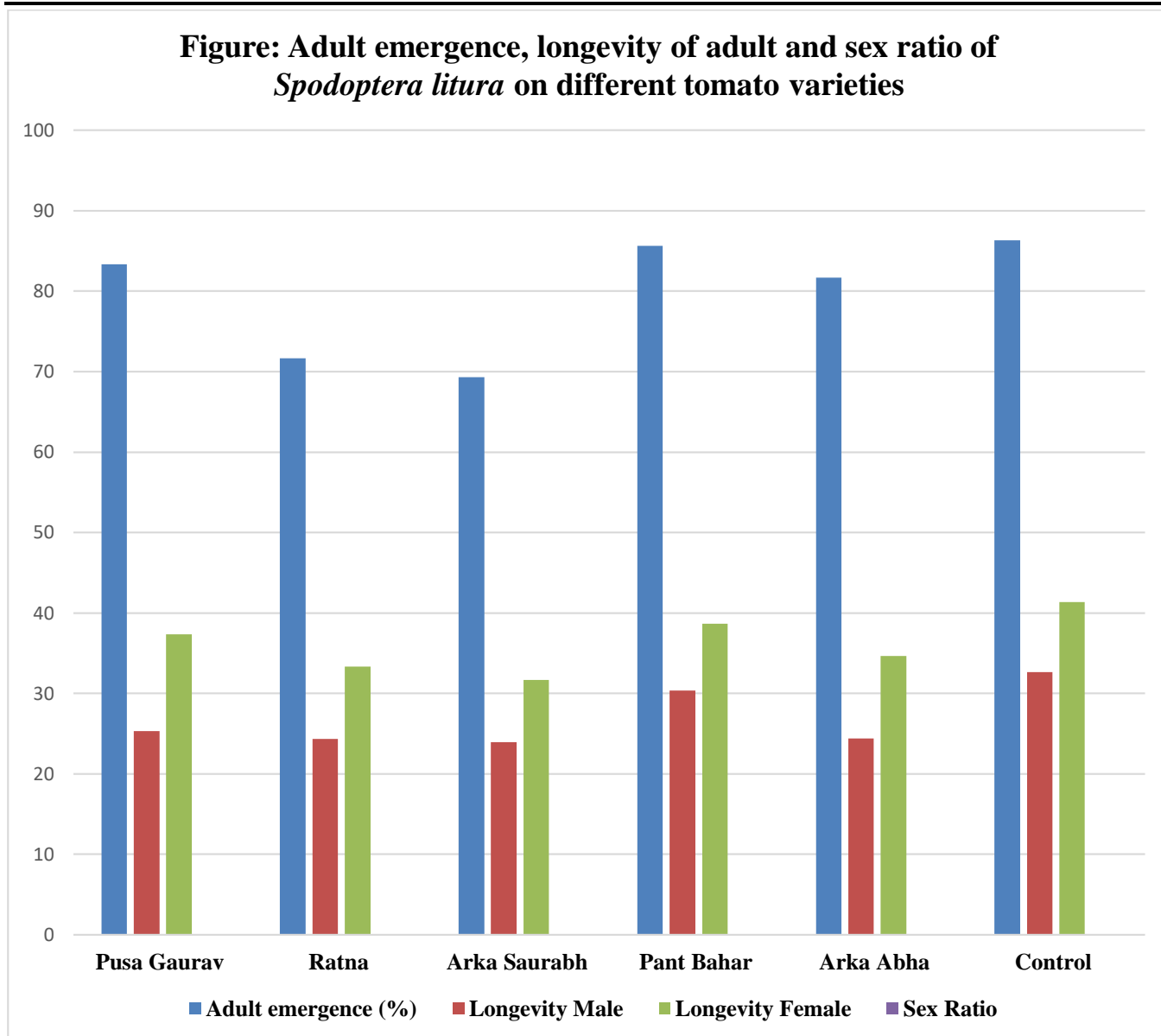
**RESULT AND DISCUSSION** It is amply documented from the data presented in table 1 and figure 1, that the male longevity is maximum in Pant Bahar (30.33 days) and minimum in Arka Saurabh (23.92 days) which was followed by Pusa Gaurav, Arka Abha and Ratna having 83.33%, 81.67% and 71.65% respectively.

The data enumerated in table 1 and fig 1 showed that maximum female longevity in Pant Bahar (38.65%) and followed by Pusa Gaurav (37.33%). The minimum female longevity recorded in Arka Saurabh (31.65%) which was followed by Arka Abha (33.33%) and Ratna (34.62%).

It is amply documented from the data presented in table 1 and figure 1, the sex ratio of female moth on different tomato varieties with significant differences. The minimum sex ratio observed in Arka Saurabh (1:1.23) and followed by Pusa Gaurav (1:1.31). The maximum sex ratio recorded in Pant Bahar (1:1.93) which was followed by Arka Abha and Ratna being 1:1.69 and 1:1.56.

<b>ADULT EMERGENCE, LOGEVITY OF ADULT AND SEX RATIO OF <i>Spodoptera litura</i> ON DIFFERENT TOMATO VARIETIES</b>				
<b>Tomato variety</b>	<b>Adult emergence (%)</b>	<b>Longevity</b>		<b>Sex Ratio</b>
		<b>Male</b>	<b>Female</b>	
Pusa Gaurav	83.33	25.33	37.33	1:1.31
	(65.88)			
Ratna	71.65	24.32	33.33	1:1.56
	(57.73)			
Arka Saurabh	69.33	23.92	31.65	1:1.23
	(56.35)			
Pant Bahar	85.64	30.33	38.65	1:1.93
	(67.70)			
Arka Abha	81.67	24.42	34.62	1:1.69
	(64.60)			
Control	86.33	32.67	41./33	1:1.91
	(68.28)			
S.E. Difference	1.09	0.78	0.49	-
C.D. at 5%	3.02	0.832	1.81	-

**Figure: Adult emergence, longevity of adult and sex ratio of *Spodoptera litura* on different tomato varieties**



**CONCLUSION:** the role of host plant is an important factor in regulating pest population (Shahout H. A. *et al*, 2011). It is apparent from data that adult emergence of *Spodoptera litura* was minimum (69.33%) on variety Arka Saurabh and maximum (85.64%) on variety Pant Bahar which was at par with 83.33%, 81.67% and 71.65% being Pusa Gaurav, Arka Abha and Ratna respectively. Adult emergence significantly affected by host plant. It is recorded from the data that the male longevity is maximum in Pant Bahar (30.33 days) and minimum in Arka Saurabh (23.92 days) which was followed by Pusa Gaurav (25.00 days), Arka Abha (24.29 days) and Ratna (24.29 days) respectively. It is amply documented that maximum female longevity recorded in Pant Bahar (38.65%) and followed by Pusa Gaurav (37.33%). The minimum female longevity recorded in Arka Saurabh (31.65%) which was followed by Arka Abha (33.33%) and Ratna (33.33%). It is apparent from the data that the minimum sex ratio observed in Arka Saurabh (1:1.23) and followed by Pusa Gaurav (1:1.31). The maximum sex ratio recorded in Pant Bahar (1:1.93) which was followed by Arka Abha and Ratna being 1:1.69 and 1:1.56. Results indicated that sex ratio was not significantly differ in standard diet reared pest and simplified diet reared pest.

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