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RESEARCH NOTE

Insect pest complex on cherry tomato under protected cultivation in Arunachal Pradesh

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ABSTRACT: An experiment was conducted to study the insect pest complex on cherry tomato under protected condition at Pasighat, Arunachal Pradesh, India during summer 2021-22. It was observed that major pests found to damage cherry tomatoes were *Spodoptera litura* (Fab.), *Helicoverpa armigera* (Hb.), *and Liriomyza trifolii* (Burgess). The peak activity *S. litura*, with 2.30 larvae per plant, was recorded from May 6th to 12th (19th SMW). The fruit borer also peaked during this period, with one larva per plant. The leaf miner infestation reached its highest at 21.98% in the second week of May. Correlation between weather parameters and larval population of *S. Litura* was found to be non-significant. It was observed that tobacco cutworm is a potential pest on cherry tomato.

Keywords: Arunachal Pradesh, Cherry tomato, pest complex, protected condition, *Spodoptera litura*

Cherry tomatoes, *Solanum lycopersicum* L. var. *cerasiformae*, are considered the ancestral form (2n=24) of all cultivated tomato varieties. These small fruits come in diverse shapes weighing 10 to 30g and colors, often called "salad tomatoes" due to their rising global popularity. This popularity is attributed to their high content of vitamins A and C, substantial protein levels, flavorful texture and resilience in maintaining firmness even at elevated temperatures (Prema *et al.,* 2011). Cherry tomato production faces many biotic and abiotic stresses, such as seasonal weather which includes temperature, relative humidity, diseases and insect pests. Among the many factors, insect pest infestation is the most important one that affects economically. The major insect pests that cause economic losses in this crop are tomato fruit borer, *Helicoverpa armigera* (Hub.), jassids, *Amrasca biguttula biguttula* Ishida, aphids, *Myzus persicae* Sulzer, mites, *Tetranychus urticae* Koch., leaf miner (*Liriomyza trifolii* (Burgess) and tobacco caterpillar (*Spodoptera litura* F. starting from nursery stage to harvesting stage. These pests considerably impact crop yield and fruit quality, consequently diminishing their market value.

In the recent past, there has been scanty information on the incidence of insect pests and natural enemies in cherry tomato in protected ecosystem. As a result, an insect pest complex study has been initiated to determine the incidence of insect pest complex and study the seasonal incidence of major insect pests on cherry tomato grown under protected condition.

To study the pest complex of major insect pests of cherry tomato, an experiment was conducted on cherry tomato grown in a naturally ventilated polyhouse during 2021-22at the Department of Vegetable Science, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh. The F_1 hybrid seedlings of cherry tomato were transplanted onto the bed by making holes in the polythene mulch sheet. The experimental area was kept free from insecticidal spray throughout the crop season to record the incidence of insect pests.

To investigate the prevalence of significant insect pests affecting tomatoes, 30 plants were chosen randomly, and their conditions were visually observed weekly during the duration of the growing season. For recording incidence of *S. litura* and *H. armigera*, the number of larvae on 10 randomly selected plants at a weekly interval from the initiation of pest incidence to the final picking of the crop were recorded. The incidence of *L. trifolii* infestation on six leaves (two upper, two middle and two lower) of the plant canopy were observed on 10 randomly selected plants.

The influence of weather parameters such as maximum, minimum temperatures, relative humidity

Table 1. Incidence of insect pests on cherry tomato during different months

Date	SMW*	Number of larvae/plants		*Liriomyza trifolii* infestation (%)
		Spodoptera litura	*Helicoverpa armigera*	
12th - 18th March	11	0.00	0.00	0.00
19th- 25th March	12	0.00	0.00	0.20
26th-31st March	13	0.10	0.00	0.90
1st - 7th April	14	0.20	0.00	2.73
8th-14th April	15	0.30	0.05	7.89
15th-21st April	16	0.90	0.10	11.48
22nd-28th April	17	1.20	0.30	18.90
29th-5th May	18	1.70	0.90	19.50
6th-12th May	19	2.30	1.00	21.98
13th-19th May	20	1.20	0.80	16.40
20th -26th May	21	0.60	0.00	11.20
27th-2nd June	22	0.50	0.00	9.60
3rd-9th June	23	0.00	0.00	0.50

morning and evening time on the population of *S. litura, H. armigera* and *L. trifolii* on cherry tomato plants and the simple correlation coefficient was calculated. For this analysis, weekly meteorological data from the Department of NRM, College of Horticulture and Forestry, CAU (I), Pasighat were utilized. The statistical analysis was performed using Fischer's Analysis of Variance method, as outlined by Panse and Sukhatme (1967), at a 5% level of significance.

During the course of the experiment, which spanned from March 2022 to June 2022, three insect pests *viz.*, tobacco cutworm (*S. litura*), leaf miner (*L. trifolii*) and fruit borer (*H. armigera*), were observed infesting the cherry tomato crop grown under protected conditions as depicted in the table 1. These insect pests were also reported by Cheema *et al*. (2004) under protected condition. Incidence of major pests of cherry tomato observed during the experiment and correlation coefficient of pest population with weather parameters as follows.

***Spodoptera litura* (Fabricius)**

The larval activity of *S. litura* on cherry tomato crop was noticed from the last week of March up to the end of the cropping period. There was an increasing trend in the larval population from the 14th SMW up to the 19th SMW, *i.e.,* 0.2 to 2.30 larvae per plant. The highest number of larvae was observed on the 19th SMW (2.30 larvae/plant). The larval population was decreased from the 20th SMW onwards and reached its status of no observed incidence by the end of the 23rd SMW.These results were similar with earlier findings of Chaudhuri and Senapati (2004) and Dhiman and Singh (2002).

Correlation coefficient between weather parameters and larval population of *S. Litura* showed a non-significant positive correlation with maximum temperature and relative humidity and a negative but non-significant correlation with minimum temperature and relative humidity afternoon, respectively. These results are similar to the findings of Rai *et al.* (2000) and Reddy and Kumar (2005).

***Helicoverpa armigera* (Hubner)**

Observation on the incidence of *H. armigera* was negligible when compared to *S. litura.* Larvae of *H. armigera* initially appeared during 15th SMW with 0.05

Table 2. Correlation coefficient of insect population with weather parameters

Insect pest	Temperature Max (°C)	Temperature Min (°C)	R.H Morning (%)	R.H Afternoon (%)
S. litura	0.103	-0.016	0.039	-0.040
H. armigera	-0.022	-0.105	0.233	-0.028
*L. trifoli*i	0.017	-0.056	-0.048	0.014

larvae per plant and reached its peak incidence during 19th SMW *i.e.,* 1 larva per plant. Several researchers reported that the incidence of *H. armigera* during March, but results were different from these researchers.

With respect to correlation of *H. armigera* larval population with weather parameters it exhibited non-significant and negative relationship with maximum temperature, minimum temperature and relative humidity afternoon, while non-significant positive association with relative humidity morning (Table 3).The obtained results are in line with the findings of Kakati *et al.* (2005).

***Liriomyza trifolii* (Burgess)**

The *L. trifolii* was first observed during 2nd SMW causing 0.2 percent leaf infestation and its damage lasted till the end of the cropping period. Peak infestation of 21.98 percent was recorded during 2nd week of May. Thereafter, its incidence was gradually reduced from 3rd week onwards and finally reached to 0.5 percent by the end of 23rd SMW. Present results are similar to the work done by Marcano and Issa (2000), Chaudhuri *et al.* (2001), Asalatha (2002) and Reddy and Kumar (2004).

Perusal of data depicted in Table 4.8 revealed that *L. trifolii* infestation was observed to be positively correlated with temperature maximum temperature and relative humidity afternoon. However, it showed negative association with minimum temperature and relative humidity morning.These results were in accordance with the findings of Asalatha (2002).

The initial infestation of 5 per cent by *S. litura* on cherry tomato started with larval population 0.1 larva per plant in the 13th SMW and reached the maximum of 25 percent during the second week of May *i.e.,*2.3 larvae per plant. It was followed by gradual decrease in the damage with the parallel reduction of larvae (0.5/ plant) and reached only 2 per cent leaf damage due to the end of crop growing period. It can be attributed to non-availability of suitable leaves as food and effect of natural enemies like Braconid parasitoids. Literature pertaining to percent damage level of *S. litura* on cherry tomato under protected condition was scanty to support our research findings.

The findings of this study reveal that *S. litura, H. armigera* and *L. trifolii* were the predominant pests affecting cherry tomatoes cultivated under protected conditions under Arunachal Pradesh conditions.

REFERENCES

Asalatha, R. 2002. Seasonal activity and bioefficacy of some eco-friendly insecticides against the serpentine leaf miner *Liriomyza trifolii.* M. Sc. (Ag.) Thesis. JNKVV, Jabalpur.

Chaudhuri, N. and Senapati, S. K. 2004. Incidence and biology of leaf miner (*Liriomyza trifolii*) on tomatoes influenced by weather conditions. *Annals of Plant Protection. Sciences,* **12**: 55-58.

Chaudhuri. N., Deb, D. C. and Senapati, S. K. 2001. Assessment of loss in yield caused by pest complex of tomato under terai region of West Bengal. *Crop Research*, **2** (1): 71-79.

Cheema, D. S., Kaur, P. and Kaur, S. 2004. Off-season cultivation of tomato under net house conditions. *Acta Horticulturae*, **659**:177-181

Dhiman,S.C.andSangeeta,Singh.2002.Seasonaloccurrance and population dynamics of *Triazahirsuta,* a gallinaceous insect of *Terminaliatomantosa. Annals of PlantProtection. Sciences,***10**: 243-247.

Kakati, M., Saikia, D. K. and Nath, R. K. 2005. Seasonal history and population build-up of tomato fruit borer, *Heliothis armigera* (Hub.) (Lepidoptera: Noctuidae). *Research on Crops,***6**(2):371-373.

Marcano, R. and Issa, S. 2000. Spatial and vertical distribution of *Liriomyza trifolii* on tomato. *Bol. Entomologica Venezolana*, **8**(1): 115-122.

Panse, V. G. and Sukhatme, P. V. 1967. Statistical Methods for Agricultural Workers, 4th Edn. ICAR, New Delhi, pp. 228-232.

Rai, A. K., Sinha R. B. P. and A. K. Singh. 2000. Effect of abiotic factors on the population of rice leaf folder. *Annals of Plant Protection. Sciences,* **8**: 154-158.

Reddy, N. A. and Kumar, C. T. A. 2004. Insect pests of tomato, *Lycopersicon esculentum* Mill. in eastern dry zone of Karnataka. *Insect Environment,* **10** (1): 40-42.

Reddy, N. A., and Ashok Kumar, C. T. 2005. Influence of weather factors on abundance and management of serpentine leaf miner on tomato. *Annals of Plant Protection. Sciences,* **13**: 315-318.

Prema, G, Indiresh, K. K. and Santosha, H. M. 2011. Evaluation of cherry tomato (*Solanum Lycopersicum* var. *cerasiforme*) genotypes for growth, yield and quality traits. *Asian Journal of Horticulture,* **6**:181-4.

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