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RESEARCH PAPER

Population dynamics of stem fly and defoliator pests of soybean and their natural enemies in relation to weather parameters

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Abstract : The field experiment was carried out at Polasa Farm, Regional agricultural research station Jagtial during the *Kharif*, 2014-15 and 2015-16. Study about pre dominant lepidopteran insect –pests in soybean crop noticed that the tobacco cut worm, (*Spodptera exigua* Hubner), green semi looper(*Crysodexis acuta* Walker), and tobacco caterpillar (*Spodoptera litura* Fab) along with stemfly, (*Melanagromyza obtusa* Zehnter) as non lepidopteran pest were noticed at various growth stages of cropgrowth. The peak activity of stem fly (37.84%) was observed during 37th standard week per meter row) for the year 2014 and for the year 2015 to a maximum infestation of 35.70 per cent during 30th std.week. The peak activity of caterpillar pests i.e., *S. litura* (7.6 larvae per meter row) for the year 2014 was observed during 34th std.week and for the year 2015 (12.4 per meter row during 36th std.week and *C. acuta* (0.7 larvae per meter row) during 36th std. week for the year 2014 and for the year 2015 (2.20 larvae/mrl on 37th std week. *S. exigua* (1.6 larvae per meter row) for both the years 2014 and 2015 was observed during 32th std.week Among the natural enemies, one predators namely, spiders (*Oxyopes sp.* was observed to prey on the insect pests.The biocontrol agent's one species, lynx spider, *Oxyopes* sp. population recorded on the crop during *Kharif* , 2014 ranged from 0.15 to 0.40 /mrl and 0.15 to 0.60/ mrl during *Kharif*, 2015.

Key Words : Population dynamics, Stem fly, Foliage feeders, Natural enemies, Soybean

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INTRODUCTION

In India, soybean [*Glycine max* (L.) Merrill] has been the number one oilseed crop in terms of both area and production since 2005. Soybean occupies 42% of India's total oilseeds and 25% of edible oil production. In India, soybean is mainly grown in the states of Madhya Pradesh, Maharashtra, Rajasthan, Karnataka and Andhra Pradesh as a rainfed crop during *Kharif* season. Over the years, cultivation of the crop has been instrumental

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in improving the socioeconomic conditions of large numbers of small and marginal farmers in the rainfed agro-ecosystems of central and peninsular India. The low productivity of soybean both at national and state level is attributed to abiotic and biotic stresses like drought, weeds, insect pests and diseases. Among these, insect pests often pose a serious threat to soybean production by increasing cost of cultivation and impairing quality of produce in many ways. Soybean crop is reported to be attacked by about 350 species of insects in many parts of the world. About 65 insect pests have been reported to attack soybean crop from cotyledon to harvesting stage (Jayappa, 2000). Soybean has luxuriant crop growth, soft and succulent foliage, unlimited source of food, space and shelter there by it invites many insect-pests. During the introduction of soybean in India in the early seventies, only about a dozen minor insect pests were recorded, while in 1997, this number has swelled to an alarming figure of 270, besides 1 mite, 2 millipedes, 10 vertebrate and 1 snail pest (Singh, 1999) . In India, 20 insect species have been recorded major pests infesting soybean crop (Singh and Singh, 1990). The soybean defoliators mainly include tobacco caterpillar *Spodoptera litura (Fab.)* and green semilooper, *Chrysodeixis acuta*. Immature stages (larva or caterpillar) of both tobacco caterpillar and green semilooper damages the crop at vegetative stage and in severe case, it completely defoliate the crop and dramatic yield loss. *Spodoptera litura* larvae even damages to soybean pods also (Chaturvedi *et al.,* 1998, Mandal *et al.,* 1998, Patil 2002 and Sastawa *et al.,* 2004). The Bihar hairy caterpillar, *S. obliqua* is a voracious feeder which feeds gregariously on soybean leaves. In case of severe infestation, the entire crop is damaged badly thus causing 40 per cent defoliation of leaf area. The tobacco caterpillar*, S. litura* is a serious pest and its incidence is being observed in all the soybean growing areas of northern Karnataka during *Kharif* season. After feeding the leaves, it also feed on tender pods, consequently damaging 30 to 50 per cent of pods (Anonymous, 2007).

MATERIAL AND METHODS

The investigations on pests succession sucking pests on soybean (*Glycine max* L.) were carried out at research farm, Regional Agricultural Research Station , Polasa , Jagtial, Telangana during *Kharif,* 2014 and 2015. Soybean (JS -335) was sown on during *Kharif*, 2014 and 2015 and raised by recommended agronomical practices. Observations were recorded at weekly interval during morning hours starting from second week after sowing to the maturity of the crop. Experimental area was kept free from insecticidal spray throughout the crop season.

Stem fly :

Observations on stem fly incidence was recorded in one meter row length at three places in field where the infestation was recorded based on visual observation of infested plants which was given by formula:

$$\text{\% stem fly infestation} = \frac{\text{No. of infested plants}}{\text{Total number of plants}} \text{ x } 100$$

Defoliators:

Observations on larval population of defoliators *viz.,* tobacco caterpillar, *Spodoptera litura,* cut worm, *S.exigua* and pod borer, *Helicoverpa armigera* were taken by visual counts of larval population at three randomly selected spots of one meter row length of each field. Average number of caterpillars found per meter row length (mrl) was worked out.

Natural enemies:

The data on bio control agents (spiders was recorded from ten plants from randomly selected three places of one meter row length from field. Later mean number of bio control agents per plant was calculated.

RESULTS AND DISCUSSION

The data of stem fly and lepidopterans are here under discussed under the following sub heads which are represented in Tables 1,2,3,4,5 and represented graphically in Fig 1,2,3,4,5 and 6.

Stem fly (*Melanagromyza sojae* Zehnter):

During *Kharif*, 2014 the incidence of stem fly on the crop was observed from the seedling stage of the crop during third week of July (30th SMW) with an initial mean infestation of 3.44 per cent and then increased a peak infestation of (37.84%) during 3rd week of September(37thSMW). At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 7 mm, 31.79^0 C, 31.79^0 C, 79.43% , 63.14% , 6.14 km/hr, 5.34hr/day and 2.59mm/day, respectively and there after the infestation reduced gradually and reached to

10.32 per cent at the end of the crop season (43th std.week).

Similar trend of stemfly infestation was observed during *Kharif*, 2015 and the mean per cent infestation of stemfly recorded during this season varied from 3.57 to 11.10 per cent. The initial infestation (3.57%) was recorded during 30th std.week and it reached to a maximum infestation of 35.70 per cent during 3rd week of September. At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 167.9 mm, 34.5^{0}C, 25.3^0 C, 85.7%, 75.9%, 3.3 km/hr, 4.4 hr/day and 2.7 mm/day respectively and the infestation reduced thereafter and recorded 1.11 per cent at the end of the crop season. The present findings are in line with Fand

Table 1 : Seasonal incidence of soybean pests at RARS, Jagtial during *Kharif*, 2014

SMW	Date of observation	Sucking pests (3 leaves/plant)				Natural enemies (mrl)
		Whiteflies	Leaf-hoppers	Thrips	Aphids	Coccinellid beetles
30	28/7/14	1.40	0.50	0.45	0.00	0.00
31	4/8/14	2.10	0.75	0.55	0.20	0.00
32	11/8/14	2.65	1.20	0.75	0.30	0.20
33	18/8/14	2.80	1.80	1.10	0.30	0.30
34	25/8/14	5.45	2.05	1.80	0.40	0.30
35	1/9/14	2.20	2.40	1.55	0.60	0.40
36	8/9/14	2.05	2.55	0.40	0.40	0.60
37	15/9/14	4.50	1.70	0.40	0.45	0.20
38	22/9/14	1.55	1.00	0.25	1.00	0.15
39	29/9/14	0.80	0.15	0.10	1.20	0.00
40	6/10/14	0.45	0.05	0.05	2.50	0.00
41	13/10/14	0.15	0.05	0.00	2.05	0.00
42	20/10/14	0.00	0.00	0.00	0.00	0.00
43	27/10/14	0.00	0.00	0.00	0.00	0.00
	Mean	1.86	1.01	0.52	0.60	0.15

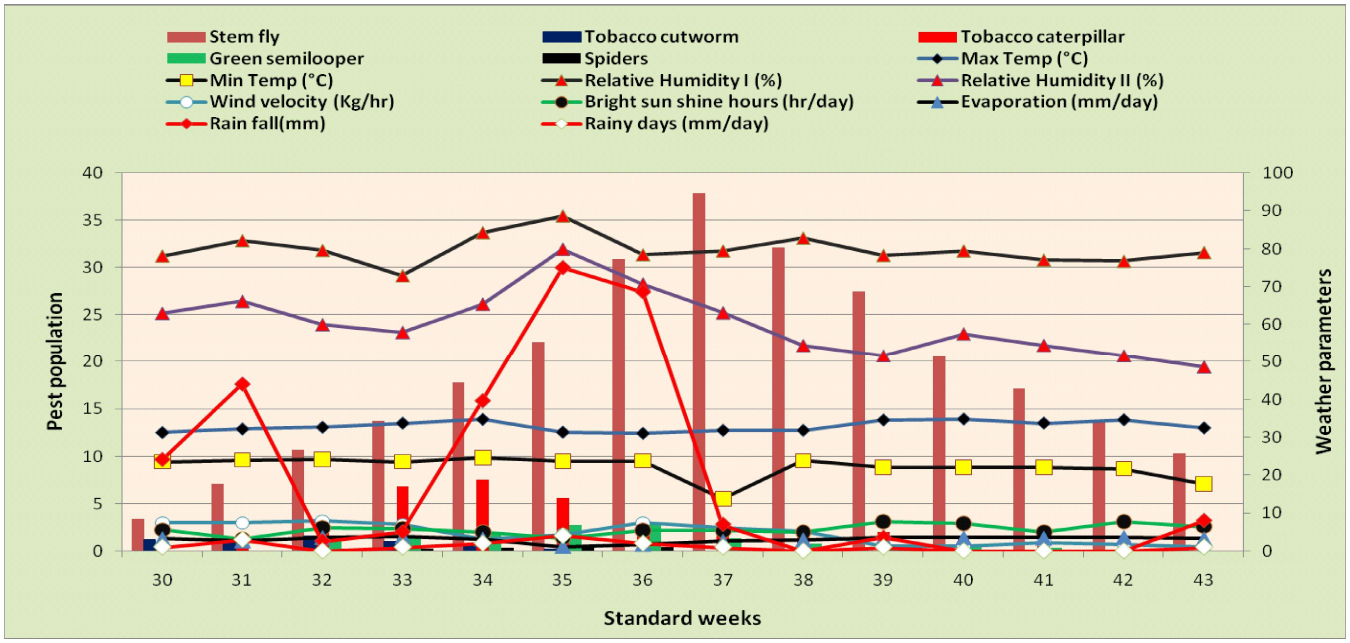


Fig. 1: Seasonal incidence of stem fly and defoliators and their natural enemies in relation to weather parameters during *Kharif*, 2014

et al. (2017) who recorded that the incidence of stemfly was observed from the first week after sowing and continued up to the 44th week until harvest. Similarly, Kumar *et al*. (2012) and Sharma *et al*.(2014) reported its infestation at all stages of crop growth, right from seedling to maturity. The correlation studies carried out between stem fly infestation and weather parameters did not show any significant influence of any weather parameters on stem fly incidence during both *kharif*, 2014 and 2015 seasons.

Defoliators:

The seasonal incidence studies carried out on soybean pests during *Kharif,* 2014 and 2015 seasons recorded the incidence of three lepidopteran defoliators attacking the crop at different stages of the crop where

Table 2 : Seasonal incidence of soybean pests at RARS, Jagtial during *Kharif*, 2015

SMW	Date of observation	Sucking pests (3 leaves/plant)				Natural enemies (mrl)
		Whiteflies	Leaf-hoppers	Thrips	Aphids	Coccinellid beetles
29	16/7/15	0.00	0.00	0.00	0.00	0.00
30	25/7/15	0.00	0.00	0.80	0.00	0.00
31	1/8/15	2.20	1.10	2.15	0.30	0.00
32	8/8/15	2.65	1.45	2.45	3.95	0.20
33	15/8/15	3.55	1.75	2.90	0.35	0.30
34	22/8/15	4.65	2.60	1.95	0.25	0.25
35	29/8/15	6.05	1.80	1.55	0.00	0.30
36	5/9/15	5.05	1.75	1.40	0.00	0.40
37	12/9/15	4.10	1.30	1.10	0.25	0.50
38	19/9/15	2.65	0.60	0.95	0.35	0.15
39	26/9/15	3.10	0.85	0.85	0.20	0.15
40	3/10/15	2.65	0.50	0.85	0.00	0.00
41	10/10/15	2.35	0.65	0.45	0.00	0.00
42	17/10/15	1.85	0.40	0.00	0.00	0.00
	Mean	2.91	1.05	1.24	0.40	0.16

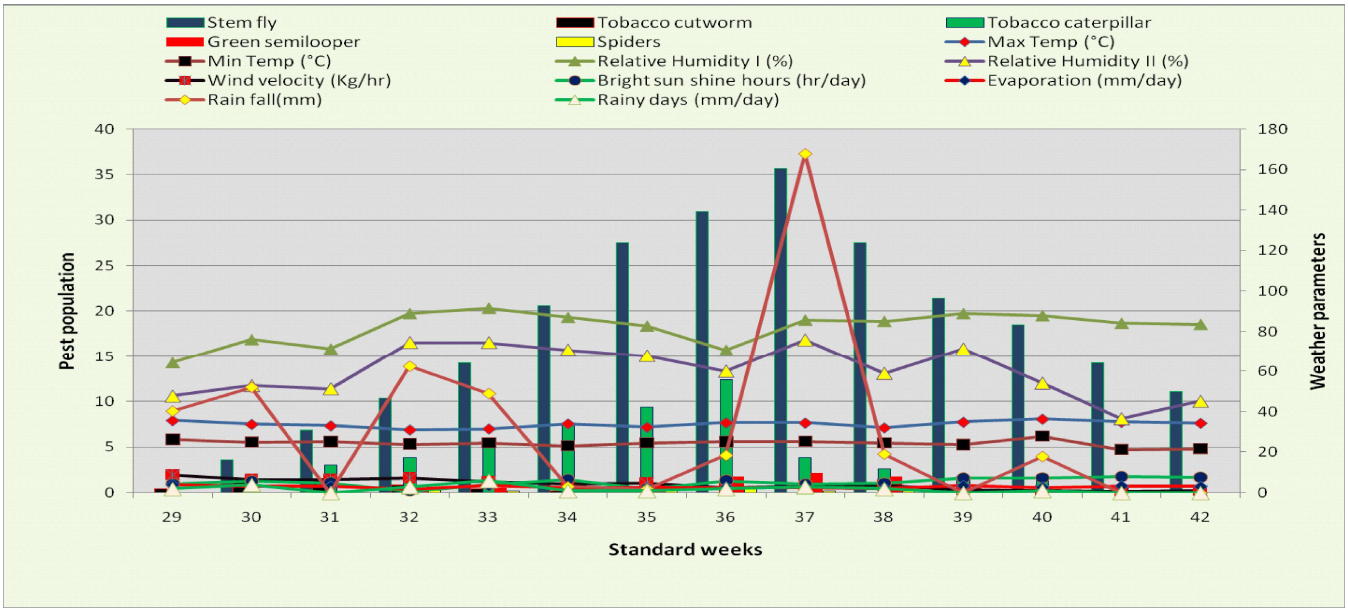


Fig. 2: Seasonal incidence of stem fly and defoliators and their natural enemies in relation to weather parameters during *Kharif*, 2015

in the tobacco cut worm *Spodoptera exigua* incidence was observed during initial stages of the crop while the other two defoliators attacked the crop upto the end of the crop season.

Tobacco cut worm (*S.exigua*):

The cutworm incidence was observed in the seedling stage of the crop during both seasons of *Kharif*, 2014 and 2015 and the incidence of the pest recorded during *Kharif*, 2014 ranged from 0.20 to 1.60 larvae/ metre row length (mrl). The initial population of 1.2 larvae/mrl was observed at 30th std.week and it reached to maximum number 1.60 larvae/mrl by 32nd std.week. At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 2.6 mm, 32.6^0 C, 24.14^{0}C, 79.57%, 60.0%, 7.89 km/hr, 6.16 hr/day and 3.63 mm/day, respectively and there after the population continued to decrease and reached to low population of 0.2 larvae/ mrl on 34th std.week and the population was not noticed on the crop there after.

Similar trend continued even during *Kharif*, 2015 season and the larval population recorded during this season also showed the similar trend and it ranged from 0.2 to 1.6 larvae/metre row length (mrl). At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 0.0 mm, 33.1^0 C, 25.2^0 C, 71.3 %, 51.3% , 6.6 km/ hr , 4.8 hr/day and 3.2 mm/day respectively. The tobacco cut worm larval population was mainly influenced by wind velocity (0.681** and 0.720**) which recorded highly significant and positive relation during both *kharif*, 2014

Table 3 : Correlation coefficients of stem fly and defoliators of soybean with weather parameters during *Kharif*, 2014 and 2015

Weather data	Stem fly		Tobacco cutworm		Tobacco caterpillar		Green semilooper		Spiders	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Maximum temperature (^{O}C)	-0.112	-0.029	-0.169	-0.374	0.118	-0.304	-0.311	-0.134	-0.382	-0.482
Minimum Temperature (^{O}C)	0.180	0.035	0.453	0.170	0.537*	0.079	0.477	0.156	0.578*	0.061
Morning Relative humidity (RH-I (%)	0.182	0.364	-0.047	-0.370	0.277	-0.005	0.354	0.186	0.518	-0.012
Evening Relative humidity (RH-II (%)	0.125	0.491	0.228	-0.063	0.522	0.508	0.729**	0.570*	0.784**	0.473
Wind velocity (Km/hr)	-0.082	-0.516	0.681**	0.720**	0.222	0.009	0.333	-0.199	0.451	0.164
Bright sunshine hours (hrs/day)	0.018	-0.015	-0.306	-0.373	-0.318	-0.326	-0.334	-0.174	-0.523	-0.597*
Evaporation (mm/day)	-0.414	-0.492	0.216	0.071	-0.251	-0.419	0.684**	-0.498	-0.687**	-0.580*
Rainfall (mm)	0.049	0.252	0.093	0.025	0.423	-0.043	0.661**	0.433	0.723**	0.042
Rainy days	-0.069	-0.048	0.289	0.237	0.480	0.169	0.537*	0.190	0.654*	0.072

Table 4 : Step down multiple linear regression equations for insect pests and natural enemies of soybean with weather parameters during *Kharif*, 2014

Insect Pests	Regression equation	Coefficient of determination R^2
Stem fly	$Y= -4.146+2.252X_1+4.212X_2-1.144X_4+2.762X_6- 29.04X_7-0.304X_8$	0.67
Tobacco cutworm	$Y= -0.638-0.180X_1+0.037X_4+0.065X_5+1.294X_7+0.391X_9$	0.92
Green semilooper	$Y= -14.07+0.531X_1+0.257X_5-0.262X_6-1.664X_7$	0.59
Tobacco caterpillar	$Y= -50.138+1.194X_1+0.204X_4+0.276X_5$	0.40
Spiders	$Y= -2.32 +0.091X_1+0.044X_5-0.240X_7$	0.61

Table 5: Step down multiple linear regression equations for insect pests and natural enemies of Soybean during *Kharif*, 2015

Insect Pests	Regression equation	Coefficient of determination R^2
Stem fly	$Y= 67.60-0.716X_3+0.668X_4-3.645X_5-5.686X_7$	0.71
Tobacco cutworm	$Y= -0.216+0.131X_5$	0.47
Green semilooper	$Y= 4.987-0.060X_3+0.045X_4-0.196X_5-0.460X_7+0.004X_8$	0.55
Tobacco caterpillar	$Y= 33.78-0.438X_3+0.285X_4-0.970X_5-2.596X_7-0.046X_8+1.044X_9$	0.55
Spiders	$Y= 1.568-0.014X_3+0.008X_4-0.059X_5-0.089X_6-0.001X_8$	0.63

and 2015 seasons, respectively.

Tobacco caterpillar (*S.litura*):

Among the three defoliators infesting the soybean crop, tobacco caterpillar was the dominant species and maximum incidence of tobacco caterpillar was recorded during vegetative and reproductive stages of the crop throughout the crop season during both seasons of 2014 and 2015.

The tobacco caterpillar infestation on the foliage was noticed as early as during 30th std.week with an initial population of 0.6/mrl and maximum population of 7.6 larvae/mrl was recorded during 34th std.week. At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 39.6 mm, 34.67^0 C, 24.69^0 C, 84.29% , 65.43% , 3.37 km/hr , 5.06 hr/day and 3.2mm/day respectively and the incidence reduce to 0.2 larvae/mrl at the end of the crop season (43 std.week).

The tobacco caterpillar incidence was comparatively more during *Kharif*, 2015 season and the larval population recorded during this season ranged from 0.5 to 12.4 / mrl. The maximum population (12.4/mrl) was recorded during 2nd week of September of 36th std.week. At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 18.6 mm, 34.6^0 C, 25.2^0 C, 70.7% , 60.1%, 2.5 km/hr, 5.9hr/day and 2.7mm/day, respectively and thereafter the population decreased and reached to 0.8 larvae/mrl at the end of the crop season. The present findings are in line with Yeotikar *et al.* (2015) who recorded the incidence from 30th SMW to 38th SMW. Babu *et al.* (2017) recorded the incidence from 30th SMW to 38th SMW whereas Matti and Deotale (2017) reported its incidence from 35th to 46th SMW. Kumar (2012) also recorded similar observations where *S. litura* was maximum at flowering and pod formation stages in soybean. Shrivastava and Shrivastava (1989) observed the activity of *S.litura* from August to October and population varied from 5 to 6 larvae per 10 plants. The highest population was recorded in the first week of August. Yeotikar *et al.* (2015) reported that the overall incidence of *S.litura* was observed during 32nd and 35th SMW. Neetam *et al*., (2013) also found the peak activity of *S.litura* in the last week of August with 5.0 larvae per meter row.

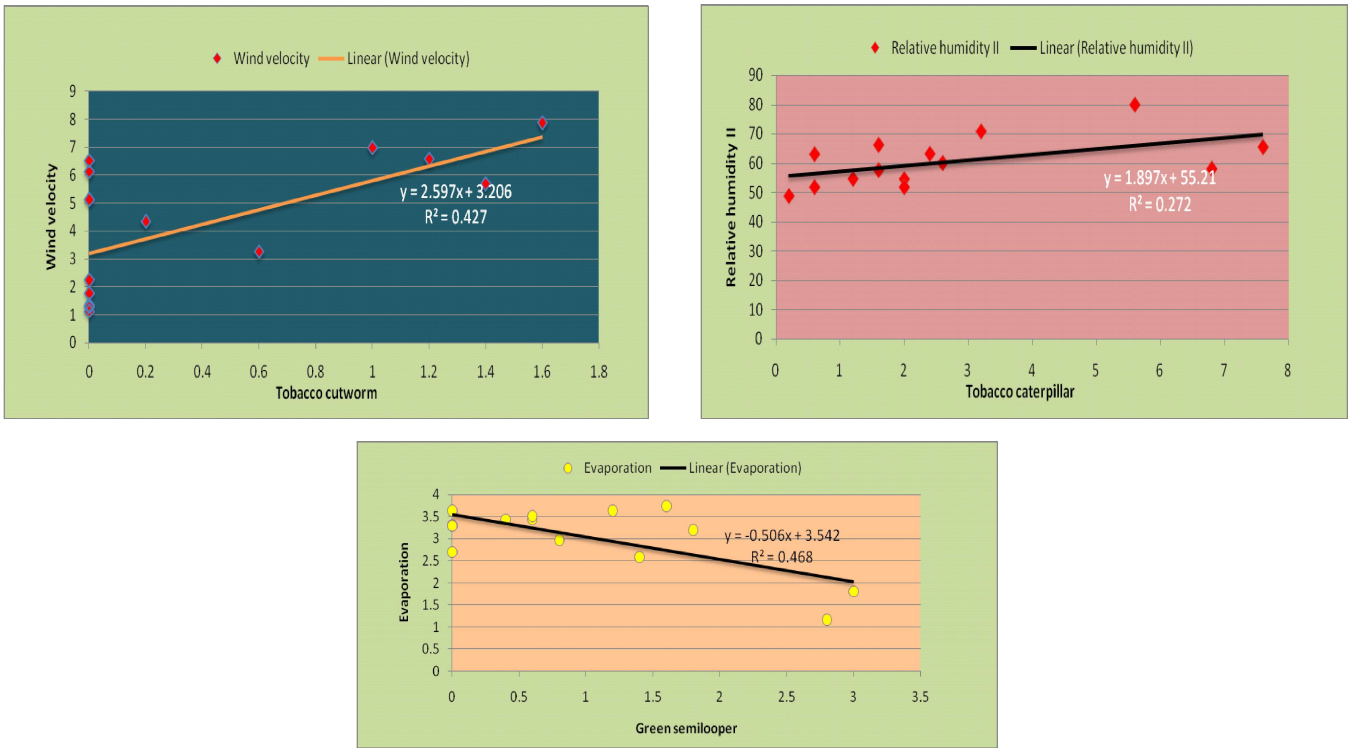


Fig. 3: Linear relationship of observatory weather parameters with defoliators incidence during *Kharif*, 2014

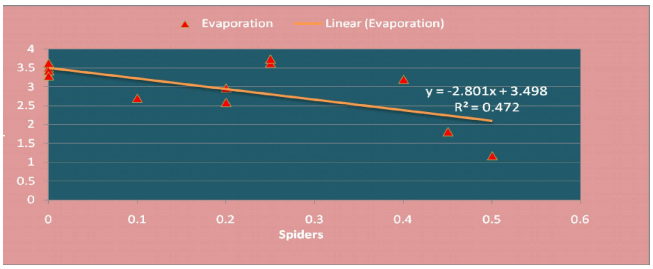
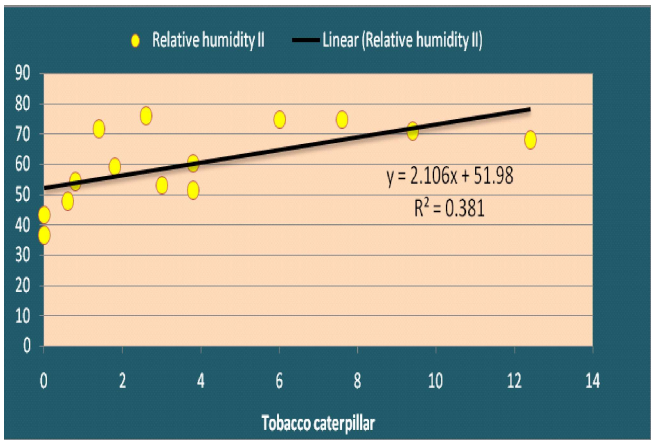
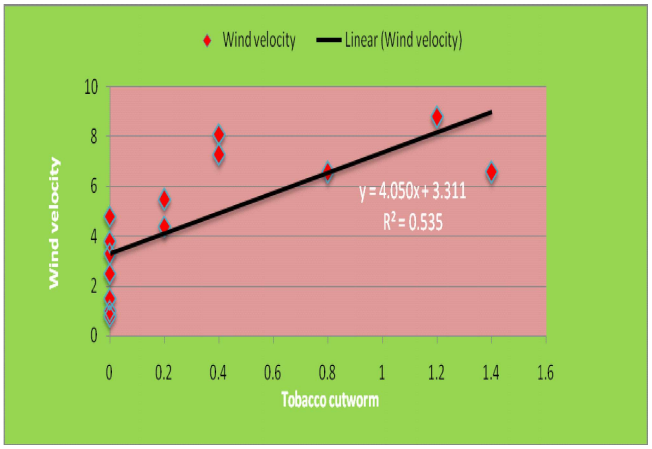


Fig. 4: Linear relationship of observatory weather parameters with spiders incidence during *Kharif,* 2014

positive and significant relation (0.537*) during *kharif,* 2014, while the weather parameters did not show any effect on the population build up of *Spodoptera* during *kharif,* 2015 season. Patil *et al*. (2012), Gaur *et al.* (2015) also reported that all the weather parameters were non significantly related to the incidence of *S.litura* and *O.brevis*. However, Matti and Deoptale (2017) recorded positive correlation of tobacco caterpillar incidence with max. temperature although a negative correlation was





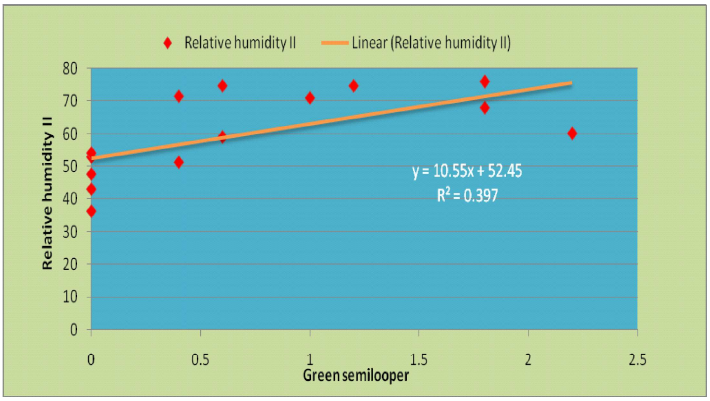


Fig. 5: Linear relationship of observatory weather parameters with defoliators incidence during *Kharif,* 2015

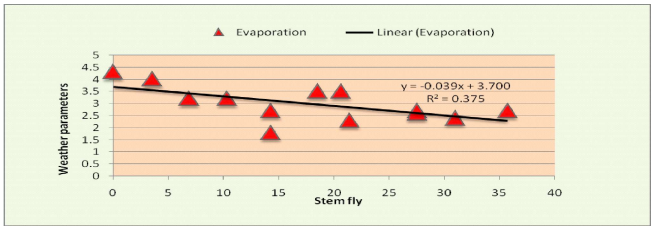


Fig. 6: Linear relationship of observatory weather parameters with stemfly and defoliators incidence during *Kharif,* 2015

The tobacco caterpillar incidence was mainly influenced by minimum temperature which recorded seen with sunshine. Besides, Gaur *et al.(*2015) also observed positive correlation of *Spodoptera* with max.temperature. In the present studies, a negative correlation was found with morning RH, evening RH and rainfall though they were non significant.

Green semi looper (*C. acuta*) :

The green semilooper incidence recorded on the crop was comparatively less during both seasons of *Kharif*, 2014 and 2015 when compared to tobacco caterpillar and the larval population recorded on the crop during *Kharif*, 2014 ranged from 0.40 to 3.00 / mrl. The

initial population (0.6 larva /mrl) was recorded on the crop during 32nd std.week and it reached to maximum number by 36th std. week (3 larva/mrl). At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 68.6 mm, 30.99^0 C, 23.8^{0}C, 78.43%, 70.71 % , 7.5 km/hr, 5.4hr/day and 1.81mm/day, respectively. At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 7 mm, 31.79^0 C, 31.79^0 C, 79.43%, 63.14%, 6.14 km/hr, 5.34hr/day and 2.59mm/day, respectively and reached to lowest population (0.4 mrl) on 41st std.week.

During *Kharif*, 2015 season, comparatively less incidence of green semilooper was recorded and the population ranged from 0.4 to 2.20 larvae / mrl). The pest reached the maximum number 2.20 larvae/mrl on 37th std week. At the time of its peak, the rainfall, maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, wind velocity, bright sun hours and evaporation were 167.9 mm, 34.5^0 C, 25.3^0 C, 85.7% , 75.9%, 3.3 km/hr, 4.4hr/day and 2.7mm/day, respectively and the population decreased to 0.4 larvae/mrl by 40th std.week and thereafter there was no incidence of green semilooper was observed on the crop.

The peak activity of semiloopers were found in the first week of September with 3.0/ mrl and 2.2/ mrl for both the seasons, which are similar to results of Meena (2005) and Ahirwar *et al.* (2015) who reported the peak activity during last week of August or early September.

The correlation coefficient studies carried out between green semilooper and weather parameters revealed the positive and highly significant effect of evening relative humidity (0.729**), evaporation (0.684**) rainfall (0.661**) and rainy days (0.537*) on semilooper population during *Kharif*, 2014 while during 2015 *Kharif*, season the semilooper population showed significant and positive relationship with evening relative humidity (0.570*), while the other weather parameters had no influence on the population buildup of green semiloopers. Gaur *et al*. (2015) and Ahirwar (2010) reported negative correlation of semilooper population with max. temperature and sunshine. Yeotikar *et al.* (2015) also reported similar findings. Anjali (2012) and Patel (2012) also reported negative correlation of semilooper with sunshine hours and evaporation.

Predators:

The soybean crop pests were mainly predated in the field by the lynx spider (*Oxyopes* sp.) though both the predators were found in low population. The spider was seen preying on the defoliators and sucking pests.

The spider population recorded on the crop during *Kharif* , 2014 ranged from 0.15 to 0.40 /mrl and 0.15 to 0.60/ mrl during *Kharif*, 2015. The peak activity of spiders was noticed in the 38th and 35th SMW with 0.50 and 0.60 spiders/mrl. Ahirwar *et al.* (2015) reported similar findings where the lady bird beetle and orb weaver spider were found predating upon whiteflies and jassids, whereas lynx spider was noticed sucking the body sap of lepidopterous larvae in soybean ecosystem where the peak activity of lady bird beetle was reported in the second week of August and September with 0.4 grub and adult per plant whereas the peak activity of spiders were reported in the last week of August with 1.2 spiders per plant. Similar results were reported by Neetam *et al*. (2013) who reported the peak activity of lady bird beetle and spiders were in the third week of September with 0.2 to 0.9 (beetles/meter row) and (02 to 0.7 spiders /meter row) which were similar to present findings.

The correlation studies carried out between weather parameters and spider population during *Kharif,* 2014 season revealed the highly significant and position relationship of minimum temperature(0.578*), evening relative humidity(0.784**), rain fall (0.723**) and rainy days (0.654*) with spider population, while it was negative and significant with evaporation (-0.687**). During *kharif*, 2015 season except sunshine hours(-0.597*) and evaporation (0.580*) which recorded negative and significant relation, the other weather parameters had no influence on the population build up of spiders.

The multiple regression analysis obtained during *Kharif*, 2014 indicated that among the pests, the tobacco cut worm population was significantly influenced (0.92) by the combined effect of maximum temperature, evening relative humidity, wind velocity,evaporation and rainy days. While among the predators, maximum temperature, wind velocity and evaporation together exerted 61 % effect on spider population.

The results obtained during *kharif*, 2015 revealed that, the coefficient of determination values (R^2) of insect pests of soybean obtained with weather parameter varied from 0.36 to 0.81, and among the pests stem fly

infestation was significantly influenced by morning and evening relative humidity, wind velocity and evaporation which together contributed 71 per cent variation and predator population of soybean pests were also significantly influenced by weather parameters. Morning and evening relative humidity, wind velocity, sun shine hours and rain fall together resulted in 63 per cent variation in the population of spiders. The, semiloopers (0.55), tobacco caterpillar (0.55) and tobacco cut worm (0.47) were also influenced by combined effect of weather parameters.

Conclusion :

During the course of study soybean crop was attacked at various growth stages by, stemfly *(Melanagromyza sojae* Zehnter) which is non defoliator and three lepidopteran defoliators *viz*., tobacco cut worm (*Spodoptera exigua* Hubner), tobacco caterpillar (*Spodoptera litura* Fabricius), green semilooper (*Chrysodeixis acuta* Walker). Stem fly incidence was noticed right from germination until harvest of the crop. At early stages death of seedlings was observed where as vegetative, flowering and pod setting stages stem fky incidence was noticed in the form of tunnelling across the stem length. Tobacco cut worm was noticed at the early stages of crop growth whereas green semilooper, *C. acuta,* were observed during vegetative stage whereas Tobacco caterpillar, *S. litura* was observed to be the major defoliator pest on soybean observed during flowering and pod formation stages. Among the predator *Oxyopes* sp. were observed feeding on the lepidopterous larvae.

Study of population dynamics of insect pests is one of the most important objective of pest management. Population dynamics provides the data of seasonal fluctuation and peek activity of insect pests. Correlation study of insect pests with pest's population also provides information about weather influence on insect pest population. The information collected in this study is useful in insect pest management.

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