AU
e ISSN-0976-6847
Agriculture Update
Volume **12** | TECHSEAR-10 | 2017 | 2788-2794
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RESEARCH ARTICLE :

Succession of major insect pests and impact of abiotic factors in green gram

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ARTICLE CHRONICLE :
Received :
11.07.2017;
Accepted :
25.08.2017

SUMMARY : The present investigation was taken up at Agronomy Farm, B. A. College of Agriculture, Anand Agricultural University, Anand during Summer and *Kharif*, 2015. In Summer, aphids, jassids and thrips population showed two peaks whereas whiteflies showed only one peak. Peak activity of flower thrips was observed during 19th SMW.The highest activity of spotted pod borer was recorded during 18th SMW. Whereas in *Kharif*, all major sucking pests and spotted pod borer showed two peaks. The activity of natural enemies was seen in both the seasons while spiders only during Summer. Maximum temperature (r = 0.62*) on jassids and rainfall (r = 0.62*) on spiny brown bug during Summer whereas bright sunshine hours (r = 0.65*) on jassids and BSS (r = 0.69*) on thrips during *Kharif* showed significant positive association. There was significant association between coccinellids and sucking pest's *viz.*, jassids, thrips, flower thrips and mites.

KEY WORDS :
Pests succession, green gram, abiotic factors

How to cite this article : Sujatha, B. and Bharpoda, T.M. (2017). Succession of major insect pests and impact of abiotic factors in green gram. *Agric. Update*, **12** (TECHSEAR-10) : 2788-2794.

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BACKGROUND AND OBJECTIVES

Green gram (*Vigna radiata* (L.) Wilczek) belongs to family Leguminosae (Fabaceae). In India, during 2014-15, area occupied by pulses is about 23.10 million hectares (Anon., 2015[a]) with green gram production 1.51 million tonnes (Anon., 2015[b]).Major green gram growing states are Orissa, Andhra Pradesh, Maharashtra, Karnataka, Gujarat and Bihar. The sucking pests*viz.*, aphids, jassids, white flies, thrips, flower thrips, mites, green bug, spiny brown bug and lepidopteran pests *viz.*, spotted pod borer, Bihar hairy caterpillar are known to come. The annual yield loss due to the insect pests has been estimated to 30 per cent by Soundararajan and Chitra (2011) in green gram.

The management strategy rather becomes difficult when more than one insect pests from the different category occur. In addition, there may be some relationship between or among them in nature. The strategy for the management of insect pests becomes sound and economical by incorporating the information on occurrence, association with weather parameters and pest succession.

RESOURCES AND METHODS

The pest succession of major insect pests in green gram was carried out at College

Agronomy farm, B. A. College of Agriculture, Anand Agricultural University, Anand during summer and *Kharif* seasons of 2015. Green gram crop, Meha cultivar was raised by adopting standard recommended agronomical practices with plot size of 9.0 m × 10.0 m and spacing 45 cm × 15 cm. The whole experimental plot was kept free from application of any insecticides. The plot was divided into five equal sectors and ten plants were selected randomly from each sector for recording the observations on major insect pests and natural enemies. The population of aphids (*Aphis craccivora* Koch), jassids (*Empoasca kerri*Pruthi), whiteflies (*Bemisia tabaci* Gennadius) and thrips (*Thrips palmi* Karny) was counted from three (upper, middle and lower leaves) and mites per 4 cm^2 leaf area of same leaves from the same selected plants in each sector. The population of flower thrips (*Megalurothrips usitatus* Bagnall) per five flowers was counted from the same selected plants in each sector. Number of green bug (*Nezara viridula* Linnaeus) and spiny brown bug (*Clavigralla* spp.) were counted from the same selected plants in each sector. Observations were taken from one week after germination and continued till the removal of the crop at weekly interval.

The larval population of Bihar hairy caterpillar *Spilosoma obliqua* Walker from one week after germination; spotted pod borer as well as *Maruca vitrata* Fabricius was recorded from the initiation of pod formation and continued till the removal of the crop from each randomly selected plants. The population of natural enemies' *viz.*, *Chrysoperla* (grubs), spiders, coccinellids (grubs and adults) *i.e. Coccinella transversalis* Fabricius and *Coccinella septempunctata* Linnaeus per plant were recorded by counting from the randomly selected plants.

The instantaneous effect of week-wise data on weather parameters *viz.*, bright sunshine (BSS), rainfall (RF), wind speed (WS), maximum (MaxT) and minimum (MinT) temperature, morning (RH_1) and evening (RH_2) relative humidity as well as morning (VP_1) and evening (VP_2) vapour pressure recorded by department of Meteorology, B. A. College of Agriculture, AAU, Anand during Summer and *Kharif* seasons of 2015 (study period) were correlated with population fluctuation of various pests. Simple correlation was also worked out between various pests and their natural enemies using their weekly mean incidence by adopting a standard statistical procedure (Steel and Torrie, 1980).

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads :

Table 1: Population of major insect pests in green gram during Summer, 2015

SMW	No. of sucking pests/ 3 leaves				No. of flower thrips/5 flowers	No. of spiny brown bug/ plant	No. of *M. vitrata* larvae/ plant	No. of *S.obliqua* larvae/plant	Natural Enemies/ plant		
	Aphids	Jassids	Whiteflies	Thrips					Coccinellids (grubs and adults)	*Chrysoperla* spp. (grubs)	Spiders
10	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1.40	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	1.70	0.80	0.00	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	2.84	1.26	0.88	2.60	0.00	0.00	0.50	0.00	0.00	0.00	0.00
14	1.68	1.50	1.72	2.42	0.34	0.40	0.80	0.62	0.00	0.00	0.00
15	0.00	1.08	1.28	2.08	0.46	0.50	1.40	0.74	0.08	0.00	0.00
16	1.14	1.32	2.44	3.22	0.60	0.32	1.20	0.32	0.16	0.04	0.08
17	2.34	2.00	1.56	4.36	1.34	0.00	0.70	0.00	0.22	0.08	0.00
18	2.00	1.98	0.00	4.42	2.68	0.00	0.60	0.00	0.48	0.00	0.00
19	0.00	1.84	0.00	4.58	3.26	0.00	0.00	0.00	0.36	0.00	0.00
20	0.00	1.60	0.00	1.80	0.60	0.16	0.00	0.00	0.24	0.04	0.12
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	1.20	1.12	0.66	2.34	0.77	0.12	0.43	0.14	0.13	0.01	0.02
±	±	±	±	±	±	±	±	±	±	±	±
SE	1.00	0.76	0.88	1.61	1.11	0.19	0.51	0.27	0.17	0.03	0.04

Note: WAS = Week After Sowing; SMW = Standard Meteorological Week; No. of observations (n) = 12

Activity of various insect pests as well as natural enemies in green gram :

Aphids, A. craccivora :

The data on population of aphids presented in Table 1 during Summer indicated that the population was commenced from 10th SMW (Standard Meteorological Week) and persisted till 18th SMW with its first peak during 13th SMW and second during 17th SMW. During *Kharif*, it was initiated from 33rd SMW (Table 2). The incidence gradually increased and showed two peaks *i.e.* 37th SMW and 42nd SMW. Relatively higher activity observed from 35th to 37th SMW in green gram. The peak activity of aphids coincided with findings of Shukla *et al.* (2009) in cowpea.

Jassids, E. kerri :

It was evident from the data presented in Table 1 that population of jassids was observed from 12th SMW and persisted till 20th SMW during Summer and reached on first peak during 14th SMW. On subsequent week, jassids population was reduced (15th SMW) and again started to build up and reached on its second peak during 17th SMW. During *Kharif*, incidence commenced from33rd SMW (Table 2) and its activity remained throughout the crop season. The population increased and reached on its first peak (4.16/ 3 leaves) during 37th SMW. It showed decreasing trend in subsequent two weeks and again flared back during 41st SMW with its second peak (3.46). Yadav and Singh (2006), Yadav and Singh (2013) and Damasiya *et al.* (2014) in green gram reported the activity of jassids but it was differed from present study. This is due to the differences in location, crop variety or sowing periods. However, the incidence of jassids coincided with the findings of Sutaria *et al.* (2010) in soybean.

Whiteflies, B. tabaci :

There was no incidence of whiteflies in the green gram crop up to 12th SMW during Summer, 2015 (Table 1) and it was appeared and remained on the crop during 13th SMW to 17th SMW with one peak (2.44/3 leaves) during 16th SMW. The data on population of whiteflies presented in Table 2 indicated that population commenced from 33rd SMW during *Kharif*, 2015 and persisted till 39th SMW. The highest population (1.24) was observed during 37th SMW with only one peak. Yadav and Singh (2006), Manjunath *et al.* (2013),Yadav and Singh (2013), Damasiya *et al.* (2014) and Duraimurugan and Tyagi (2014) in green gram reported the activity of whiteflies. The initiation of whiteflies was also supported by Yadav and Singh (2006) in green gram.

Thrips, T. palmi :

It was evident from the data presented in Table 1that

Table 2 : Population of major insect pests during *Kharif*, 2015

SMW	No. of sucking pests/ 3 leaves				No. of flower thrips/ 5 flowers	No. of mites/ 4 cm^2 leaf area	Green bug/ plant	Spiny brown bug/ plant	No. of *M. vitrata* larvae/ plant	No. of *S. obliqua* larvae/ plant	Natural Enemies/ plant	
	Aphids	Jassids	Whiteflies	Thrips							Coccinellids (grubs + adults)	*Chrysoperla* spp. (grubs)
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	1.04	0.78	0.32	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00
34	3.52	1.94	0.68	4.02	0.00	4.26	0.34	0.00	0.12	10.34	0.92	0.36
35	6.84	2.80	0.86	5.48	0.00	5.64	0.56	0.00	0.28	24.40	1.16	0.54
36	8.26	3.58	1.08	8.52	0.92	6.54	0.80	0.62	0.74	28.32	2.04	0.68
37	8.64	4.16	1.24	10.16	1.64	6.60	0.92	1.08	1.04	31.68	2.60	0.22
38	0.00	2.48	0.12	4.26	2.34	4.42	0.56	0.50	0.82	32.24	1.52	0.00
39	0.38	2.62	0.32	6.02	2.96	5.76	0.84	1.24	1.26	34.62	1.86	0.00
40	0.94	3.18	0.00	8.20	3.24	6.22	1.26	1.76	1.42	27.44	3.08	0.00
41	2.80	3.46	0.00	7.94	2.10	5.86	0.60	0.92	1.18	20.36	2.84	0.00
42	3.02	2.76	0.00	5.14	1.02	4.58	0.00	0.54	0.64	11.68	1.66	0.00
43	2.56	1.92	0.00	4.42	0.00	0.00	0.00	0.00	0.30	0.00	0.52	0.00
Mean	3.17	2.47	0.39	5.50	1.19	4.16	0.49	0.56	0.65	18.42	1.57	0.15
±	±	±	±	±	±	±	±	±	±	±	±	±
SE	3.12	1.18	0.46	2.91	1.24	2.62	0.43	0.59	0.51	13.41	0.96	0.25

Note: WAS = Weeks After Sowing; SMW = Standard Meteorological Week; No. of observations (n) = 12

the thrips commenced from 11th SMW and persisted till 20th SMW. Two peaks were found first (13th SMW) and second peak (19th SMW). Data on population of thrips recorded at weekly interval during *Kharif*, 2015 (Table 2) clearly indicated that thrips population appeared during 33rd SMW and persisted throughout the crop growth. Higher activity of this pest was observed during 37th SMW and reached to its first peak. Population suddenly declined in subsequent weeks and again reached on second peak during 40th SMW. The present findings on initiation matched with Damasiya *et al.* (2014) in green gram.

Flower thrips, M. usitatus :

There was no incidence of flower thrips up to 13th SMW and it was appeared during 14th SMW (Table 1) during Summer, 2015. The highest population (3.26 flower thrips/ 5 flowers) was observed during 19th SMW. Population suddenly declined in a subsequent week (20th SMW).The initiation of flower thrips was observed during 36th SMW in green gram raised during *Kharif*, 2015 (Table 2). The incidence was gradually increased and reached on its peak (3.24/ 3 leaves) during 40th SMW. The present findings were supported by the findings of Yadav and Singh (2013), Duraimurugan and Tyagi (2014) and Damasiya *et al.* (2014) in green gram.

Mites, T. urticae :

The population of mites (Table 2) was recorded only during *Kharif*, 2015 and there was no incidence of mites up to 33rd SMW on a crop. The population of mites was observed 34th SMW and steadily increased and reached on its first peak (6.60 mites/ 4cm^2 leaf area) during 37th SMW. In subsequent weeks, population drastically reduced and then again started to build up and reached on its second peak (6.22 mites/ 4cm^2 leaf area) during 40th SMW. The information on this pest is scanty in the past literatures so far green gram is concerned.

Green bug, N. viridula :

There was no incidence of green bug during Summer season. The population data on green bug recorded at weekly interval during *Kharif*, 2015 (Table

Table 3: Correlation co-efficient (r) between sucking pests infesting green gram and weather parameters during Summer, 2015

Weather parameters	No. of sucking pests/ 3 leaves				No. of flower thrips/ 5 flowers	No. of spiny brown bug/plant
	Aphids	Jassids	Whiteflies	Thrips		
Bright Sunshine, hrday^{-1} (BSS)	-0.49	0.36	0.18	0.25	0.46	0.28
Rainfall mm (RF)	-0.37	-0.10	0.18	-0.11	-0.13	0.62*
Wind Speed, Km/ hr (WS)	-0.46	0.02	-0.24	-0.07	0.21	-0.12
Maximum Temperature, ^{0}C (MaxT)	-0.18	0.62*	0.02	0.53	0.48	-0.10
Minimum Temperature, ^{0}C (MinT)	-0.43	0.50	0.01	0.40	0.49	0.05
Morning Relative Humidity, % (RH_1)	0.27	-0.16	0.23	-0.09	-0.13	0.24
Evening Relative Humidity, % (RH_2)	-0.14	-0.38	0.03	-0.40	-0.28	0.35
Morning Vapour Pressure, mm (VP_1)	-0.31	0.49	0.10	0.42	0.49	0.13
Evening Vapour Pressure, mm (VP_2)	-0.20	0.16	0.01	0.08	0.20	0.22

Note: * and ** indicate significance of values at P=0.05 and 0.01, respectively

Table 4: Correlation co-efficient (r) between sucking pests infesting green gram and weather parameters during *Kharif*, 2015

Weather parameters	No. of sucking pests/ 3 leaves				No. of flower thrips/ 5 flowers	No. of mites/4 cm^2 leaf area	No. of green bug/ plant	No. of Spiny brown bug/ plant
	Aphids	Jassids	Whiteflies	Thrips				
Bright Sunshine, hrday^{-1} (BSS)	0.35	0.65*	0.07	0.69*	0.36	0.56	0.42	0.35
Rainfall mm (RF)	-0.34	-0.05	-0.19	-0.18	0.26	-0.02	0.01	-0.34
Wind Speed, Km/ hr (WS)	-0.02	-0.30	0.35	-0.36	-0.22	-0.06	-0.02	-0.02
Maximum Temperature, ^{0}C (MaxT)	0.25	0.48	-0.21	0.49	0.16	0.28	0.08	0.25
Minimum Temperature, ^{0}C (MinT)	0.15	-0.25	0.48	-0.23	-0.23	0.02	0.07	0.15
Morning Relative Humidity, % (RH_1)	0.02	0.02	-0.09	-0.15	-0.12	0.02	-0.38	0.02
Evening Relative Humidity, % (RH_2)	-0.11	-0.34	0.29	-0.40	-0.15	-0.14	-0.05	-0.11
Morning Vapour Pressure, mm (VP_1)	0.19	-0.16	0.50	-0.14	-0.17	0.09	0.14	0.19
Evening Vapour Pressure, mm (VP_2)	0.14	-0.21	0.52	-0.22	-0.18	-0.01	0.08	0.14

Note: ** and * indicate significance of values at P=0.05 and 0.01, respectively

4) clearly indicated that there was no incidence of green bug up to 33rd SMW and it was appeared during 34th SMW. The highest population (1.26 green bug/ plant) with one peak was observed during 40th SMW. Scanty information is available on this pest in past literatures for its activity in green gram.

Spiny brown bug, Clavigralla spp. :

Population of spiny brown bug recorded on crop during Summer, 2015 revealed its occurrence during 14th, 15th, 16th SMW and 20th SMW (Table 1). There was no incidence of spiny brown bug up to 35th SMW in *Kharif*, 2015 (Table 2) and it was commenced from 36th SMW and remained on the crop up to42nd SMW (0.50 to 1.76/ plant). Yadav and Singh (2013) reported incidence of spiny brown bug in green gram from 33rd SMW and peak activity at 37th SMW.

Spotted pod borer, M. vitrata :

The periodic data on activity of *M. vitrata* are presented in Table 1.The infestation commenced from 13th SMW (0.50 larva/ plant) and remained on the crop till 18th SMW. The highest larval population of *M. vitrata* observed during 15th SMW *i.e.* 1.40 larva per plant and gradually decreased in successive three weeks. During *Kharif*, 2015 (Table 2) green gram crop was attacked by *M. vitrata* larva from 34th SMW with its first peak during 37th SMW *i.e.* 1.04 larva per plant and second peak during 40th SMW. The activity of spotted pod borer was reported in green gram (Umbarkar*et al.*, 2010) earlier.

Bihar hairy caterpillar, S. obliqua :

The data on incidence of *S. obliqua* during Summer, 2015 are presented in Table 1.The population was comparatively lower throughout crop period. The larval population of *S. obliqua* appeared and remained on the crop during 14th, 15th and 16th SMW, respectively (0.62, 0.74 and 0.32 per plant, respectively).The data on the larval population of *S. obliqua* recorded during *Kharif*, 2015 are presented in Table 2. The incidence was first noticed from 34th SMW and gradually increased in succeeding weeks. The peak activity was recorded during 39th SMW *i.e.* 34.62 *S. obliqua* per plant with gradual decreasing in the larval population up to 43rd SMW. Scanty information is available on this pest in past literatures about its activity on crop.

Coccinellids, C. Septempunctata and C. transversalis:

Mean population of coccinellids (grubs and adults) recorded at weekly interval presented in Table 1 revealed that population appeared during 15th SMW and gradually increased; recorded the highest (0.48/ plant) population during 18th SMW with decreasing trend and then disappeared during Summer, 2015. The data presented in Table 2 indicated that population of coccinellids was initiated from 33rd SMW and remained till the maturity of the crop during *Kharif*, 2015.

Chrysoperla spp. :

The population of *Chrysoperla* spp. (grubs) observed during Summer, 2015 presented in Table 1revealed that population was recorded only during 16th

Table 5: Correlation co-efficient (r) between major insect pests and natural enemies in green gram during Summer, 2015

Insect pests	No. of sucking pests/ 3 leaves				No. of flower thrips/ 5 flowers	No. of spiny brown bug/ plant	No. of *M.vitrata* larvae/ plant	No. of *S. obliqua* larvae/ plant	Natural Enemies/ plant	
	Aphids	Jassids	Whiteflies	Thrips					Coccinellids (grubs and adults)	*Chrysoperla* spp. (grubs)
Jassids	0.19	-	-	-	-	-	-	-	-	-
Whitefly	0.25	0.36	-	-	-	-	-	-	-	-
Thrips	0.27	0.92**	0.34	-	-	-	-	-	-	-
Flower thrips	-0.11	0.69*	-0.13	0.80**	-	-	-	-	-	-
Spiny brown bug	-0.30	0.18	0.67*	0.03	-0.18	-	-	-	-	-
M. vitrata	0.13	0.40	0.85**	0.39	0.03	0.77**	-	-	-	-
S. obliqua	-0.20	0.12	0.65*	0.03	-0.17	0.96**	0.78**	-	-	-
Coccinellids	-0.10	0.74**	-0.11	0.77**	0.92**	-0.14	0.08	-0.22	-	-
Chrysoperla spp.	0.15	0.45	0.46	0.38	0.10	0.02	0.24	-0.12	0.28	-
Spiders	-0.34	0.22	0.17	0.01	-0.07	0.27	0.04	-0.02	0.22	0.47

Note: ** and * indicate significance of values at P=0.05 and 0.01, respectively

SMW, 17th SMW as well as 20th SMW during the crop season. During *Kharif*, 2015; *Chrysoperla* spp. activity was initiated from 34th SMW presented in Table 3 and remained till 37th SMW.

Spiders :

The activity of spiders was observed during Summer, 2015 season only and the data are presented in Table 3. The population was seen only during 16th SMW and 20th SMW. The population was not recorded during rest of the crop period.

Scanty information is available so far the activity of coccinellids, *Chrysoperla* spp. and spiders in green gram.

Effect of weather parameters :

Summer, 2015 :

The data presented in Table 3 clearly indicated that none of weather parameters under study exerted significant pressure on activity of aphids, whiteflies, thrips, flower thrips, mites, jassids except MaxT (r = 0.62*) on jassids and RF (0.62*) on spiny brown bug

Kharif, 2015 :

The effect of abiotic factors on pests population (Table 4) revealed that there was significant positive association of BSS (r = 0.65*) on jassids and on thrips (r = 0.69*). Further, rest of the abiotic factors did not impose any significant impact on the fluctuation of the pest in green gram. The findings of Yadav and Singh (2015) in green gram is matched with the impact of weather parameters except MinT.

Association between/ among insect pests in green gram (Pest succession) :

Summer, 2015 :

The correlation studies between and among the insect pests was worked out and presented in Table 5.There was no any significant association between aphids and rest of the pests including major natural enemies in green gram. However, there was highly significant association between thrips and jassids (0.92**) as well as jassids and coccinellids (0.74**). The activity of *M. vitrata* and *S. obliqua* were significantly associated with the activity of whiteflies (0.85** and 0.65*, respectively). The simultaneously occurrence of thrips (*T. palmi*) and flower thrips (*M. usitatus*) was observed as there was highly significant association between them (0.80**). Further, it was also observed highly significant association between thrips (*T. palmi*) and coccinellids (0.77**). Activity of flower thrips (*M. usitatus*) and coccinellids (0.92**) were significantly associated. There was no any significant association of *Chrysoperla* spp. and spiders activity with any of the pest in green gram.

Kharif, 2015 :

The data on correlation co-efficient (r) worked for the association between and among the insect pests are

Table 6: Correlation co-efficient (r) between major insect pests and natural enemies in green gram during *Kharif*, 2015

Insect pests	No. of sucking pests/ 3 leaves				No. of flower thrips/5 flowers	No. of mites/ 4 cm^2 leaf area	No. of green bug/ plant	No. of spiny brown bug/ plant	No. of *M.vitrata* larvae/ plant	No. of *S. obliqua* larvae/ plant	No. of coccinellids/ plant
	Aphids	Jassids	Whiteflies	Thrips							
Jassids	0.62*	-	-	-	-	-	-	-	-	-	-
Whitefly	0.87**	0.45	-	-	-	-	-	-	-	-	-
Thrips	0.62*	0.97**	0.47	-	-	-	-	-	-	-	-
Flower thrips	-0.24	0.55	-0.19	0.57	-	-	-	-	-	-	-
Mites	0.50	0.89**	0.46	0.85**	0.62*	-	-	-	-	-	-
Green bug	0.28	0.73**	0.36	0.79**	0.76**	0.82**	-	-	-	-	-
Spiny brown bug	-0.02	0.65*	-0.03	0.72**	0.92**	0.68*	0.83**	-	-	-	-
M. vitrata	0.03	0.76**	-0.04	0.78**	0.95**	0.75**	0.82**	0.95**	-	-	-
S. obliqua	0.31	0.78**	0.41	0.73**	0.75**	0.89**	0.87**	0.70*	0.79**	-	-
Coccinellids	0.28	0.87**	0.16	0.89**	0.80**	0.84**	0.83**	0.89**	0.92**	0.74**	-
Chrysoperla spp.	0.80**	0.35	0.82**	0.32	-0.34	0.42	0.25	-0.21	-0.18	0.28	0.03

Note: ** and * indicate significance of values at P=0.05 and 0.01, respectively

presented in Table 6. There was co-existence of aphids with activity of jassids (0.62*), whiteflies (0.87**) and thrips (*T. palmi*) (0.62**). Aphids and *Chrysoperla* spp. (0.80*) were significantly associated. Significant co-existence of jassids was recorded with mites (0.89**), green bug (0.73**), spiny brown bug (0.65*), *M. vitrata* (0.76**), *S. obliqua* (0.78**) and coccinellids (0.87**). Whiteflies and *Chrysoperla* spp. (0.82**) exerted highly significant association. Simultaneously occurrence of mites with green bug (0.89**) and coccinellids (0.84**) was established. More or less, both the caterpillars *i.e. M. vitrata* and *S. obliqua* were observed at the same periods.Scanty information is available on these findings.

Conclusion :

Overall, occurrence of sucking pests *i.e.* aphids, jassids, thrips, mites, *M. vitrata, S. obliqua,* green bug and spiny brown bug was recorded in the same periods in green gram. There was significant association between coccinellids and other sucking pest's *viz.*, jassids, thrips, flower thrips and mites. Hence, while taking the control measures for the major sucking pests, the status of the other pests should as well as existing population of coccinellids should also be considered in respect to the conservation of natural enemies.

Acknowledgement :

The authors, thankfully, acknowledge department of Meteorology, B. A. College of Agriculture, AAU, Anand, Gujarat, India for providing the required meteorological data for the area. Also, first author gratefully acknowledge the assistance extended in analysis work by Dr. P. R. Vaishnav, Professor and Head, Department of Agricultural Statistics, BACA, AAU, Gujarat.

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