The Pharma Innovation Journal 2020; 9(7): 176-179

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; 9(7): 176-179

www.thepharmajournal.com
Received: 08-05-2020
Accepted: 10-06-2020

Bhupendra Kumar
Department of Vegetable Science, College of Agriculture Raipur, Indira Gandhi Agriculture University, Raipur, Chhattisgarh, India

KP Singh
Department of Vegetable Science, College of Agriculture Raipur, Indira Gandhi Agriculture University, Raipur, Chhattisgarh, India

Kalpna Kunjam
Department of Vegetable Science, College of Agriculture Raipur, Indira Gandhi Agriculture University, Raipur, Chhattisgarh, India

Sanjay Nishad
Department of Vegetable Science, College of Agriculture Raipur, Indira Gandhi Agriculture University, Raipur, Chhattisgarh, India

Corresponding Author:
Bhupendra Kumar
Department of Vegetable Science, College of Agriculture Raipur, Indira Gandhi Agriculture University, Raipur, Chhattisgarh, India

Correlation studies in different intercrops in kinnow orchard

Bhupendra Kumar, KP Singh, Kalpna Kunjam and Sanjay Nishad

Abstract
A field experiment was conducted during the Rabi season of 2016-17 at the Instructional farm, College of Horticulture and Research Station, Jagdalpur (C.G.). The treatment consisted of mulched and non mulched plots in four different crops *viz*., tomato, chilli, brinjal and bitter gourd. Correlation analysis revealed that fruit yield showed the with mulch is high positive and significant correlation with Plant height, Number of branches plant, Leaf area (cm^2), Number of fruits plant, Days taken to 1st flowering, Days taken to 50% flowering, Days taken to 1st harvesting.

Keywords: Positive, negative

Introduction
Vegetables are the fresh and edible portions of herbaceous plants. They are important food and highly beneficial for the maintenance of health and prevention of diseases. They contain valuable food ingredients which can be successfully utilized to build up and repair the body. They are valued mainly for their high carbohydrates, vitamin and mineral contents. India produces 168.300 million tonnes of vegetables from an area of 95.41 million hactare (Horticulture Statistics Division, 2015) [4]. Tomato (*Solanum lycopersicon L.*) is one of the most popular and versatile cash earning vegetable crop and plays a vital role in culinary purposes for its nutrients, delicious taste and various modes of consumption i.e. fresh as salads, cooked vegetables and its utilization in preparation of range of processed products such as puree, paste, powder, ketchup, sauce, soup and canned whole fruits. In India, tomato is cultivated in about 791 thousand hectares area with the production of 173.98 t ha^{-1} (Horticulture Statistics Division, 2015) [4]. In Chhattisgarh also, tomato is one of the top ranking vegetable and is estimated to be grown on about 414.440 hectares area comprising three leading districts of the state *viz*. Bilaspur 74.05 ha, Jashpur 51.43 ha and Durg 44.10 ha (Directorate of Horticulture, 2015) [3]. Brinjal (*Solanum melongena* L.*)* is a common vegetable crop grown in the sub-tropics and tropics. It is called eggplant in USA and aubergine in Europe. It is being produced in 14.76 million tonnes from an area of 23.63 million hectare (Horticulture Statistics Division, 2015) [4]. Chhattisgarh produces nearly 606.711 metric tonnes of brinjal from an area of 334.21 hectares whereas; Jagdalpur region of Bastar produces 124.00 metric tonnes from an area of 77.5 hectares (Directorate of Horticulture, 2015) [3]. Chilli (*Capsicum annuum* L.*)* is an important spice crop belonging to the family Solanaceae. Chilli is widely cultivated throughout the warm temperature of tropical and sub-tropical countries and is a native to Mexico. Its fruits are rich source of vitamin C, A and E. Nearly 19.83 million tonnes of it is being produced from an area of 17.0 million hectare (Horticulture Statistics Division, 2015) [4]. Chhattisgarh produces 640.027 metric tonnes of chilli from an area of 911.15 hectares. The region in Bastar produced 119.07 metric tonnes of chilli from an area of 10.85 hectares (Directorate of Horticulture, 2015) [3]. Bitter gourd (*Momordica charantia* L.) is grown for its bitter tender fruits. It is a rich source iron. It can be canned and pickled. India produces 12.40 million tonnes of bitter gourd from an area of 12.2 million hectares (Horticulture Statistics Division, 2015) [4]. Chhattisgarh produces 130.772 metric tonnes from an area of 103.85 hectare whereas Jagdalpur region of Bastar produces 31.00 metric tonnes from an area of 31.0 hectares (Directorate of Horticulture, 2015) [3].
Intercropping refers to growing two or more dissimilar crops simultaneously on the same piece of land, crop intensification is in both time and space dimensions. It also helps the farmers for having a stable production and maintaining the soil fertility level. Intercropping between high and low canopy crops is a common practice in tropical agriculture and to improve light

interception and hence yields of the shorter crops requires that they be planted between sufficiently wider rows of the taller once. Intercropping is advantageous when intercrop combinations make better use of growth factors and thus produces more yield than monocultures. According to Timbilla and Nyako (2001) [8] intercropping increased the grain yield by 70% over sole crop due to (i) better utilization of natural resources (ii) less incidence of pest, disease and weeds (iii) improved nitrogen economy where legume crop is present.

Materials and methods

The study was conducted during Rabi season 2016-17 at the Instructional farm, College of Horticulture and Research Station, Jagdalpur (C.G.). The experiment was laid out in T-test with three replications. The treatment consisted of mulched and non-mulched plots in four different crops *viz.*, tomato, chilli, brinjal and bitter gourd.

Results and discussion

Correlation analysis

The correlation analysis in tomato with mulch revealed (Table 4.1) that the total fruit yield had a significant positive correlation with leaf area (0.989) whereas it exhibited a negative correlation (-0.940) with the number of branches plant^{-1}. Plant height showed a significant negative correlation with the number of fruits plant^{-1} (- 0.957). Number of branches plant^{-1} expressed a significant positive correlation with days taken to first flowering (0.940) however; days taken to 1st harvesting (-0.933) and leaf area (-0.979) expressed a significant negative correlation with it. Days taken to first flowering expressed a significant negative correlation with leaf area (-0.989) while, days taken to 50% flowering expressed a significant negative correlation with days taken to 1st harvesting (-0.944) in plots with mulch.

The data given in Table (4.1.1) depicted that the total fruit yield showed significant positive correlation without mulch leaf area (0.998), whereas it exhibited a negative correlation with plant height (-0.923), number of fruits plant^{-1}(-0.956) and days taken to 1st flowering (-0.981). Plant height showed a significant positive correlation with number of fruits plant^{-1} (0.995), days taken to 1st flowering (0.979) and days taken to 50% flowering (0.991) whereas leaf area (-0.941) expressed a significant negative correlation without mulch. Number of fruits plant^{-1} had expressed significant positive correlation with days taken to first flowering (0.994) and days taken to 50% flowering (0.974). However, leaf area (-0.969) expressed a significant negative correlation without mulch. Days taken to 1st flowering and days taken to 50% flowering expressed significant negative correlation with leaf area (-0.990 and -0.890 respectively) in tomato. Similar results were reported by Tiwari and Upadhyay (2011) [9].

Table 4.1: Correlation analysis in the mulched tomato plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
Yield	1							
P.H.	-0.619	1						
N.B.	-0.940*	0.316	1					
N.F.	0.818	-0.957*	-0.575	1				
1st F.	-1	0.619	0.940*	-0.818	1			
50%F.	-0.5	-0.370	0.764	0.088	0.5	1		
1st H.	0.755	0.045	0.933*	0.242	-0.755	-0.944*	1	
L A	0.989*	-0.500	-0.979*	0.727	-0.989*	-0.619	0.842	1

R value = 0.878 *Significant at 5% level of probability

Table 4.1.1: Correlation analysis in the non mulched tomato plots

	yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
yield	1							
P.H.	-0.923*	1						
N.B.	-0.433	0.746	1					
N.F.	-0.956*	0.995*	0.678	1				
1st F.	-0.981*	0.979*	0.596	0.994*	1			
50%F.	-0.866	0.991*	0.826	0.974*	0.944*	1		
1st H.	-0.866	0.607	-0.075	0.682	0.755	0.5	1	
L A	0.998*	-0.941*	-0.478	-0.969*	-0.990*	-0.890*	-0.839	1

R value = 0.878 *Significant at 5% level of probability

In chilli the correlation analysis in the mulched plots is depicted in Table (4.1.2) the results revealed that the Number of branches plant^{-1} had a significant negative correlation with days taken to 1st harvesting (-0.889). The number of fruits plant^{-1} had a significant positive correlation with days taken to first flowering (0.999) and days taken to 50% flowering (0.999) however; days taken to 1st harvesting (-0.994) and leaf area (-0.909) expressed a significant negative correlation with number of fruits plant^{-1}. Days taken to 1st flowering and days taken to 50% flowering expressed a significant negative correlation with days taken to 1st harvesting (-0.995 and -0.995 respectively) and leaf area (-0.904 and -0.904 respectively).

Table (4.1.3) depicts the correlation in the non mulched plots. The total fruit yield showed a significant positive correlation with days taken to 50% flowering (1). Plant height had a significant positive correlation with number of branches plant^{-1} (0.970) while, days taken to 1st flowering (0.905) recorded a significant negative correlation. Number of fruits plant plant^{-1} had a significant positive correlation with leaf area (0.884) while, days taken to 1st harvesting (-0.996) a significant negative correlation. Similar findings were reported by Ojeniyi *et al.* (2007) [4] and Tiwari and Upadhyay (2011) [9].

Table 4.1.2: Correlation analysis in the mulched chilli plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
yield	1							
P.H.	-0.636	1						
N.B.	-0.093	0.827	1					
N.F.	0.464	0.388	0.838	1				
1st F.	0.454	0.397	0.844	0.999*	1			
50%F.	0.454	0.397	0.844	0.999*	1	1		
1st H.	-0.371	-0.479	-0.889*	-0.994*	-0.995*	-0.995*	1	
L A	-0.790	-0.030	-0.535	-0.909*	-0.904*	-0.904*	0.862	1

R value = 0.878 *Significant at 5% level of probability

Table 4.1.3: Correlation analysis in the non mulched chilli plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
Yield	1							
P.H.	0.696	1						
N.B.	0.848	0.970*	1					
N.F.	-0.819	-0.159	-0.392	1				
1st F.	-0.327	-0.905*	-0.777	-0.273	1			
50%F.	1*	0.696	0.848	-0.819	-0.327	1		
1st H.	0.866	0.244	0.470	-0.996*	0.188	0.866	1	
L A	-0.457	0.318	0.081	0.884*	-0.690	-0.457	-0.841	1

R value = 0.878 *Significant at 5% level of probability

Table (4.1.4) depicted the correlation values among various traits in brinjal grown under the mulched plots. The results revealed that the total fruit yield showed a significant positive correlation with plant height (0.900), number of fruits plant^{-1} (0.957) and days taken to 50% flowering (1). Plant height had a significant positive correlation with days taken to 50% flowering (0.900). Number of branches plant^{-1} also expressed a significant positive correlation with days taken to first flowering (0.999) however leaf area (-0.999) recorded a significant negative correlation. The number of fruits plant^{-1} had a significant positive correlation with days taken to 50% flowering (0.957) whereas, days taken to 1st harvesting (-0.973) had a significant negative correlation with it.

The correlation analysis in the non-mulched plots has been depicted in the Table (4.1.5) the total fruit yield showed a significant negative correlation with leaf area (-0.981). Plant height recorded a significant positive correlation with number of branches plant^{-1} (0.957), number of fruits plant^{-1} (0.999) and days taken to 1st flowering (0.947) however, days taken to 50% flowering (-0.947) and days taken to 1st harvesting (-0.947) expressed a significant negative correlation. Number of branches plant^{-1} had a significant positive correlation with number of fruits plant^{-1} (0.965). The number of fruits plant^{-1} had a significant positive correlation with days taken to 1st flowering (0.938) whereas, days taken to 50% flowering (-0.938) and days taken to 1st harvesting (-0.938) expressed a significant negative correlation. Days taken to 1st flowering had a significant negative correlation with leaf area (-0.944). Days taken to 50% flowering and days taken to 1st harvesting recorded a significant positive correlation with leaf area (0.944). The results are in conformity with Moniruzzaman (2006) [5], Awodoyin (2007) [1], Ojeniyi *et al.* (2007) [7], Dauda (2011) [2], Norman *et al.* (2011) [6] and Tiwari and Upadhyay (2011) [9].

Table 4.1.4: Correlation analysis in the mulched brinjal plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
Yield	1							
P.H.	0.900*	1						
N.B.	0.421	0.774	1					
N.F.	0.957*	0.735	0.140	1				
1st F.	0.397	0.757	0.999*	0.114	1			
50%F.	1*	0.900*	0.421	0.957*	0.397	1		
1st H.	-0.866	-0.562	0.088	-0.973*	0.114	-0.866	1	
L A	-0.397	-0.757	-0.999*	-0.114	-1	-0.397	-0.114	1

R value = 0.878 *Significant at 5% level of probability

Table 4.1.5: Correlation analysis in the non mulched brinjal plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
yield	1							
P.H.	0.661	1						
N.B.	0.417	0.957*	1					
N.F.	0.641	0.999*	0.965*	1				
1st F.	0.866	0.947*	0.815	0.938*	1			
50%F.	-0.866	-0.947*	-0.815	-0.938*	-1	1		
1st H.	-0.866	-0.947*	-0.815	-0.938*	-1	1	1	
L A	-0.981*	-0.791	-0.581	-0.774	-0.944*	0.944*	0.944*	1

R value = 0.878 *Significant at 5% level of probability

Perusal of data in Table (4.1.6) depicts the correlation in the mulched plots in bitter gourd. The total fruit yield showed a significant positive correlation with leaf area (0.938) however, the plant height (-0.893) recorded a significant negative correlation. Plant height expressed a significant positive correlation with number of branches (0.991) whereas, it was negative with the leaf area (-0.993). Number of branches had a negative correlation with leaf area (-0.971). Number of fruits plant^{-1} had shown significant positive correlation with days taken to 1st harvesting (0.960) whereas, days taken to 50% flowering (-0.960) expressed a significant negative correlation. Days taken to 1st flowering had a significant positive correlation with days taken to 50% flowering (0.944) whereas it was negatively correlated with days taken to 1st harvesting (-0.944).

Table (4.1.7) shows the correlation results in bitter gourd under non mulched plots. The total fruit yield had a significant positive correlation with leaf area (0.985), whereas, it was negatively correlated with plant height (-0.998). Plant height had a significant positive correlation with days taken to 1st flowering (0.892) and days taken to 50% flowering (0.892) whereas it had a negative correlation with the leaf area (-0.974). Number of branches had expressed significant positive correlation with days taken to 1st harvesting (0.991) however, it had a significant negative correlation with leaf area (-0.886). With regard to the days taken to 1st harvesting it had a significant negative correlation with leaf area (-0.938). The results are in conformity with Moniruzzaman (2006) [5], Awodoyin (2007) [1], Ojeniyi *et al.* (2007) [7], Dauda (2011) [2], and Norman *et al.* (2011) [6].

Table 4.1.6: Correlation analysis in the mulched bitter gourd plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
Yield	1							
P.H.	-0.893*	1						
N.B.	-0.829	0.991*	1					
N.F.	-0.277	-0.183	-0.306	1				
1st F.	-0.327	0.716	0.799	-0.817	1			
50%F.	0	0.449	0.558	-0.960*	0.944*	1		
1st H.	0	-0.449	-0.558	0.960*	-0.944*	-1	1	
L A	0.938*	-0.993*	-0.971*	0.070	-0.632	-0.344	0.344	1

R value = 0.878 *Significant at 5% level of probability

Table 4.1.7: Correlation analysis in the non mulched bitter gourd plots

	Yield	P.H.	N.B.	N.F.	1st F.	50%F.	1st H.	L A
Yield	1							
P.H.	-0.998*	1						
N.B.	-0.794	0.760	1					
N.F.	0.240	-0.186	-0.780	1				
1st F.	-0.866	0.892*	0.384	0.277	1			
50%F.	-0.866	0.892*	0.384	0.277	1	1		
1st H.	-0.866	0.837	0.991*	-0.693	0.5	0.5	1	
L A	0.985*	-0.974*	-0.886*	0.402	-0.768	-0.768	-0.938*	1

R value = 0.878 *Significant at 5% level of probability

Conclusion

Correlation analysis revealed that fruit yield showed the with mulch is high positive and significant correlation with Plant height, Number of branches plant, Leaf area (cm2), Number of fruits plant, Days taken to 1st flowering, Days taken to 50% flowering, Days taken to 1st harvesting.

References

1. Awodoyin RO, Ogbeide FI, Oluwole O. Effects of three mulch types on the growth and yield of tomato (*Lycopersicon esculentum* Mill.) and weed suppression in Ibadan, Rainforest-savanna Transi-tion Zone of Nigeria. Tropical Agricultural Research and Extension, 2007.
2. Dauda belel M. Effects of grassed and synthetic mulching materials on growth and yield of sweet pepper (*Capsicum annum*) in Mubi, Nigeria Journal of Agriculture and Social Sciences. 2011; 8:97-99.
3. Directorate of Horticulture. Area and Production of Vegetable crops, Raipur (Chhattisgarh). 2015; 12(8):56-58.
4. Horticulture Statistics Division, FAC & FW, 2015.
5. Moniruzzaman M. Effects of Plant Spacing and Mulching on Yield and Profitability of mulch in arid region of India. Agrochemical. 2006; 31:183-202.
6. Norman JC, Opata J, Ofori E. Growth and yield of okra and hot pepper as affected by mulching. Ghana Journal of Horticulture. 2011; 9:35-42.
7. Ojeniyi SO, Awodun MA, Odedina SA. Effect of Animal Manure, Amended Spent Grain and Cocoa Husk on Nutrient Status, Growth and Yield of Tomato. Middle – East Journal of Sciencetific Research. 2007; 2(1):33-36.
8. Timbilla JA, Nyako KO. Efficacy of intercropping as a management tool for the control on insect pests of cabbage in Ghana. Tropicultural. 2001; 19(2):49-52.
9. Tiwari JK, Upadhyay D. Correlation and path-coefficient studies in tomato (*Lycopersicon esculentum* Mill.). Res. J. of Agric. Sci. 2011; 2(1):63-68.