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EFFECT OF TRANSPLANTING DATES ON GROWTH AND YIELD COMPONENTS OF PEPPER (*Capsicum Spp*) IN BADEGGI, NIGERIA

[1]Ndagana, M.K., [2]Buba, A. and [2]Umar, A.B.
[1]Department of Crop and Forestry, NAERLS/ABU, Zaria
[2]National Cereals Research Institute, Badeggi.
Corresponding Author: kolomuhammad3@gmail.com ; +2348060971423

ABSTRACT

Field experiments were conducted to determine the effects of transplanting date on growth and yield of pepper (Capsicum Spp) varieties at the irrigated Research farm of the National Cereal Research Institute (NCRI) Badeggi, Niger State, Nigeria in 2018 and 2019 rainy seasons were assessed. The experiment was a 5 x 4 factorial laid out in a randomized complete block design with three replication and consisted of five pepper varieties (Tabasco, Bell pepper, Rocoto, Hottest pepper and South Africa pepper) and four transplanting dates (3rd June, 3rd July, 3rd August, and 3rd September). Result indicated significant differences ($P<0.05$) among the pepper varieties and transplanting dates. Rocoto variety was the tallest variety in both years while Bell pepper was the shortest. Bell pepper had the largest leaf area (49.88, 41.90 and 41.19cm^2 in 2018 and 46.78, 46.34 and 40.99cm^2 in 2019 at 6, 9, 12 weeks after transplanting WAT respectively). Fresh and dry fruit yields from Rocoto variety superseded other variety by 21-82% and 22-85% in 2018 and 27-83% and 35-87% in 2019. Pepper transplanted in July and significantly ($P<0.05$) higher number of leaves per plant, larger leaf area, number of branches per plant and taller plants than other transplanting dates. Also, transplanting dates had significant effects ($P<0.05$) on pepper phonological and yield components. 3rd September transplanting attained 50% of flowering, fruiting and ripening earlier than other dates in both years. July transplanting date had the highest fresh (13.40 and 13.87t/ha-1) and dry (9.88 and 9.15 tha-1) fruit yields in both years. Fresh and dry fruit yields from plants transplanted in 3rd July susperseded other dates in both years. Findings from this experiment show that transplanting Rocoto variety in July would guarantee high productivity of pepper in Badeggi, Southern Guinea Savanna agro-ecological zone of Nigeria.

Keywords: Pepper, varieties, transplanting dates, growth, yield.

INTRODUCTION

Peppers (Capsicum spp) are popular spices grown worldwide. Pepper is among the world's most important vegetable used mainly as spices and condiments (Berke, 2002). Nigeria accounts for about 50% of the Africa production (715,000tons in 90,000ha in 2001) (Ayo-John *et al;* 2012) and it is a good source of income to small holding farmers. It is a major crop in many home stead arms in West Africa. In Nigeria in particular, Tabascos and Rocot are third among the cultivate vegetables utilized as spice (Stern, 2000). It provides essential vitamins and minerals (Green and Kim, 1991) and contributes nutritiously to diet through enrichment with nutrients that maybe lacking in other food materials, making the food more palatable and hence improves food intake and digestion (Ikeh *et al*; 2012). Pepper are consumed in various forms as it has high nutritional, medical as well as economic values. Its high demand in domestic and international markets has compelled farmers now to engage in the cultivation of many pepper varieties at both subsistence and commercial levels. Despite the massive cultivation of pepper in Nigeria in different ecological zones, the yield in farmers field is still very low. Presently, the production of pepper is below the national demand. Strategies to increase pepper yield in Nigeria especially in the southern guinea savanna agro ecological zone of Nigeria, where majority of the farmers plant diverse pepper varieties using poor agronomic practices, would among others require determining appropriate varieties and stage of growth for transplanting.

Different pepper varieties have different yield potentials and response to biotic and abiotic factors. Utin (2015) reported differences in growth and yield of pepper varieties in high humid zone of Nigeria. Udoh *et al*., (2005) also reported that variety has influence on growth and yield of pepper. Despite varying differences in growth and yield of pepper, transplanting dates or planting seasons also have major influence on growth, yield and pest and diseases infestation of pepper. Yunana (1982) observed that transplanting early in the season with seedling between the age of 4-5 weeks produced the highest fruit and seed yields while poor pepper growth was observed when transplanted at period of very low soil temperature. Yamaguchi (1983) also reported delay in flowering fruiting and harvesting in the late transplanted pepper and emphasized that pepper adapted to both warm and cool seasons had higher yield and quality when transplanted in warm period. Udoh *et al.*, (2005) recommended that seedlings should be transplanted when they reach the height of 7-10cm.

Considering that optimum time and stage of transplanting pepper seedling affect the growth and yield of pepper, there is need therefore to establish the optimum time or stage of transplanting of pepper varieties in Nigeria. Consequently, this study was conducted to evaluate the effects of transplanting dates on performance of pepper varieties in Badeggi, southern guinea savanna agro ecological zone of Nigeria.

MATERIALS AND METHODS

Study Site

The study was conducted at the irrigated Research farm of the National Cereal Research Institute (NCRI) Badeggi, Niger State during the rainy cropping seasons of 2018 and 2019. Badeggi is located between 90^{o}45'N and Longitude 60^{o}7'E with an attitude of 420m above sea level (Ladan *et al.*, 1989). The farm had been under continuous cropping to various arable crops such as rice, maize, tomato, eggplant and cowpea, pepper.

Soil Sampling and Analysis

Soil samples were collected at the depth of 0-15cm before transplanting the seedling and the soil samples were subjected to physical and chemical properties according to the procedures described by Agbenin (1995).

Agronomic Practices

The entire land area was 51m x 31m. The land was ploughed and harrowed.

The treatment and experimental design was 5 x 4 factorial combinations of five pepper varieties (Tobasco, Bell pepper, Rogoto, Hottest pepper and South Africa pepper) and four (4) transplanting dates (3rd June, 3rd July, 3rd August, and 3rd September) laid out in a Randomized complete Block Design and replicated three times. Pepper seeds were raised in the nursery beds of 3 square meters by drilling at 10cm between rows at a depth of 5cm. Each plot measured 3m x 3m and was separated from the other by 1m path. The plots were covered with dry grass-mulch until the seedling emerged. The seedlings were irrigated and kept weed free until time of transplanting. The seedlings were well managed until they had attained the age of three weeks before transplanted into the permanent field on treatment basis. Only vigorous and pest/disease free seedlings of equal size were transplanted late in the evening.

Transplanting was done at a spacing of 1m between row and 50cm within row. Weeds were controlled manually using hoe from three weeks after transplanting (WAT) and continued monthly interval until 17WAT. Pest and diseases were not controlled since tolerance to pest and diseases were to be studied. Harvesting was done when the matured green fruits turned red or yellow depending on the variety. Harvesting was done at weekly interval until when the pepper varieties stopped flowering and the remaining fruits ripen.

Growth and Yield Parameters

The growth, yield, phenology and yield component were studied. Plant height determined by measuring the height of each tagged plant from the soil level to the tip of the plant terminal bud. Number of leaves per plant was obtained by counting all functional leaves per plant on the tagged plants. Leaf area was determined using Salau *et al.*, (2008) method with a correction factor of 0.64. Number of branches per plant was determined by counting all the branches on the tagged plants. Number of days to 50% flowering was determined by recording the number of days each of the pepper varieties used to attain 50% flowering. Number of fruits per plant was obtained by counting the number of ripe fruits harvested from the tagged plants in each of the pepper varieties. Fruit length was determined by measuring the harvested fruits with meter rule from proximal to distal end. Fresh fruit weight was determined by weighing the harvested fruits on treatment basis.

Statistical Analysis

Data collected were subjected to analysis of variance and significant means were compared using least significant different (LSD) at 5% probability level.

RESULTS AND DISCUSSION

Physical and chemical properties of the soil before transplanting

Table 1 present results of physical and chemical properties of the soil prior to transplanting. The result revealed that the soil texture of the experimental site was sandy loamy, slightly acidic in water which makes it suitable for plant growth because of the availability of plant nutrient for plant uptake at pH 5.5 to 6.5 (Brady and Weil, 2002). The result also showed that soil was also low in inorganic carbon, available phosphorous and medium in total nitrogen.

Number of leaves per plant as influenced by varieties and transplanting date

Table 2. The number of leaves per plant was significantly ($P<0.05$) influenced by varieties and transplanting dates. Rocoto variety had significantly higher number of leaves per plant at 6, 9 and 12 weeks after transplanting WAT (51.74 and 118.90, respectively in 2018) where as at 12 WAT, South Africa pepper had the highest (171.40). In 2019 Rocoto had the highest number of leaves per plant (52.11, 139.17 and 197.46) at all sampling periods. The least number of leaves was from Bell pepper in both years and at all sampling periods. The number of pepper leaves per plant only varied significantly among transplanting dates at 12 WAT in 2018 cropping season and at 9 and 12 WAT in 2019 (Table

2). Pepper transplanted on 3rd August had the highest number of leaves per plant in 2018 (142.98) and in 2019, those planted on 3rd July had the highest (91.40 and 146.00 at 9 and 12 WAT, respectively). The interaction between pepper varieties and transplanting dates on number of leaves per plant was significant different in all the sample weeks in both years.

Plant height of pepper as influenced by varieties and transplanting

Table 3. Pepper height differed significantly among varieties at all the sample period in both years. Rocoto was the tallest variety (59.33, 69.26 and 101.25m) in 2018) and (60.33, 75.41 and 99.70cm in 2019) at 6, 9 and 12 WAT respectively. Bell pepper was the shortest variety during the study for periods (24.71, 31.09 and 49.22 in 2018) and 23.89, 36.38 and 50.40cm in 2019), respectively. At 12 WAT, Rocoto variety was 11.51% and 13-50% taller than other varieties in 2018 and 2019, respectively. Effect of transplanting date on pepper height also indicated significant difference at 9 and 12 WAT in both years (Table 3). Pepper transplanted on 3rd July was taller than other months, except August transplanting. The shortest pepper plant was from June transplanting in both years. The interaction between pepper varieties and transplanting date on plant height was not significant different in all the sample periods.

Leaf Area of pepper as influenced by varieties and transplanting dates.

Leaf area of pepper as influenced by varieties showed significantly difference (P<0.05) among the varieties (Table 4). In all the weeks sampled, Bell pepper had the largest leaf area (49.88, 41.90 and 41.19cm^2 in 2018) and (46.78, 46.34 and 40.99 cm^2 in 2019) at 6, 9 and 12 WAT, respectively. The smallest leaf area (28.56, 29.67 and 30.44 cm^2 in 2018) and (29.11, 30.55 and 29.14 cm^2 in 2019), was from South Africa pepper variety. Leaf area of pepper as affected by transplanting date (Table 4) also varied significantly (P<0.05). July transplanting had the largest leaf area in 2018 (37.13, 39.90 and 37.19 cm^2 in 2018) and the least was observed in June transplanting (Table 4). In 2019, August Transplanting had the widest Leaf Area (39.10 and 40.14 cm^2 at 6 and 9 WAT, respectively). The smallest leaf area was observed in June (30.13, 32.32 and 31.65 cm^2 in 2018) and (32.01, 32.55 and 29.45 cm^2 in 2019) at 6, 9 and 12 WAT, respectively. The interaction effect between pepper varieties and transplanting dates on leaf area was not significant difference in all the weeks in both years.

Number of Pepper branches per plant as influenced by varieties and transplanting dates.

Table 5. Number of pepper branches per plant as influenced varieties differed significantly (P<0.05) in both years. Hottest pepper had more branches than other varieties at 6 WAT in 2018 while at 9 and 12 WAT, Rocoto variety branches profusely than other varieties. In 2019, Hottest pepper, South Africa pepper and Rocoto pepper had more branches than others at 6, 9 and 12 WAT respectively in 2019. The Bell pepper variety had the least branches in both years.

Transplanting dates significantly (p<0.05) affected the number of branches per plant in both cropping seasons. Peper transplanted in July had the highest number of branches per plant (11.33, 29.80 and 38.40 in 2018, at 6, 9, and 12 WAT) and (31.13, 37.77 at 6 and 9 WAT in 2019). The least number of branches per plant was from September transplanting in both years. Significant interaction effect between pepper variety and transplanting date on number of branches per plant was observed at 6 and 12 WAT (Table 5) with number of branches declining after August.

Number of days to 50% flowering, and ripening as influenced by varieties and transplanting dates.

Table 6. Effect of pepper transplanting dates on 50% flowering also differed significantly (p<0.05) in both years. The pepper transplanted in September attained 50% flowering than other varieties (99.68 and 101.80 days in 2018 and 2019 respectively) where as plants transplanted in June took the longest time to attain 50% flowering (132.40 and 130.91 days). The interaction effect between pepper varieties and transplanting date on number of days to 50% flowering showed significant difference (P<0.05) in both years with delayed transplanting encouraging early flowering. Number of days to 50% ripening was influenced by pepper varieties as indicated by significant difference (P<0.05) in both years (Table 6). Rocoto variety attained 50% ripening first in both years (52.66 and 54.08 days) while Tabasco used the highest number of days to flower (178.50) and (180.27).

Transplanting dates also showed significant (P<0.05) effect on pepper ripening in both years (Table 6). Pepper transplanted in September attained 50% ripening earlier (132.14 and 138.05 days) than those transplanted in other months in both years. Pepper transplanted in the months of June took the longest time to ripe (171.60 and 175.16 days in 2018 and 2019). The interaction between pepper varieties and transplanting dates varied significantly in both years (Table 6) with delayed transplanting encouraging early ripening.

Yield and yield components of pepper as affected by varieties and transplanting dates.

Table 7. Number of pepper fruits per plant differed significantly among the varieties in both cropping seasons. Rocoto variety had significant higher number of fruits per plant (31.55 and 34.86) in 2018 and 2019 where as Bell pepper variety had the least number of fruits per plant (8.33 and 9.93). Transplanting date also significantly influenced the number of fruits per plant (Table 7). Pepper

transplanted in July had significantly higher number of fruits per plant (28.35 and 30.60 in 2018 and 2019) than other transplanting dates. June transplanting had the least number of fruits per plant (10.59 and 11.40). There was significant interaction effect between pepper varieties and transplanting dates on number of fruits per plant with delayed transplanting increasing the number of fruits per plant. Effect of pepper varieties on fresh pepper fruits yield differed significantly ($p<0.05$) in both years (Table7) with Rocoto variety producing higher fresh fruits yield (15.77and 17.09 t/ha^{-1} in 2018 and 2019 respectively. Pepper transplanted in July has significantly higher fruit yield that other month (13.40 t/ha^{-1} and 13.87 t/ha^{-1} in 2018 and 2019). Pepper transplanted in June had the lowest fresh fruit yield (5.22 t/ha^{-1} and 5.38 t/ha^{-1}) in 2018 and 2019. Bell pepper variety had the least fresh fruit yield (2.88 t/ha^{-1} and 2.92 t/ha^{-1}).

Dry fruits yield among pepper varieties also showed the same trend observed in fresh fruit yield in both years (Table 7). Rocoto variety had the highest dry fruit yield (10.45/ha^{-1} and 12.45 t/ha^{-1} in 2018 and 2019) while Bell pepper variety had the least dry fruit yield (1.80t/ha^{-1} and 1.82t/ha^{-1}). Transplanting date significantly influenced dry fruit yield with pepper transplanted in July having higher dry fruits yield (9.88t/ha^{-1} and 9.15t/ha^{-1} in 2018 and 2019). Pepper transplanted in June had the lowest dry fruit field (2.09 t/ha^{-1} and 2.15t/ha^{-1} in 2018 and 2019). The interaction effect between pepper varieties and transplanting date on dry pepper yield was significant ($P<0.05$) in both years with delayed transplanting favouring fresh and dry fruit yields.

DISCUSSION

The differences on growth and yield parameters could be attributed partly to inherent genetic differences among the different pepper varieties. Apparently, some varieties used their genetic potentials to take advantage of the environmental factors better than others probably in their ability to absorb and utilize moisture and nutrients. This view is in tandem with findings of earlier studies (Vos and Frinking, 1997; Sana *et al.,* 2003; Alizadeh and Carapetian, 2006; Nkansah *et al*,. 2011; Ndaeyo *et al*,. 2017) where significant difference in plant height in other crops were reported and due to differences in genetic and environment conditions. This observation also agrees with findings of Utin (2015) that considerable differences exist among the pepper varieties in 50% to flowering of different pepper varieties grown in Southern Guinea savanna zone of Nigeria.

The results indicated significant variations in number of branches and this agrees with the finding of Sana *et al.* (2003) who reported similar findings in the number of branches in canola cultivars and attributed the reasons to differences in genetic make-up. The variations may also influence the yielding potentials of crop since varieties with good vigour, wider leaf area, more branches and bigger fruit size could produce more fruits than varieties with less vigour apparently due to more increased number of secondary and tertiary branches which are the locations for fruits bud formation (Orak and Iker, 2004). From the study early and late maturing types were observed. Earliness or lateness in days to 50% flowering may be attributed to the plant's inherited characters, genetic capability and even early acclimatization to the growing area as well as the ability of seedlings to withstand transplanting shock (Sana *et al*. 2003; Hassan and Wasiullah *et al.* 2003). Alizadeh and carapetian (2006) also indicated that early branches can lead to a mechanism in time of fruiting especially at the reproductive stage and may impact postively on yield. The significant differences in fruit yield (number of fruits per plant, fresh fruit yield and dry fruit yield) in the pepper varieties as found in this study agree with the findings of other researchers (Izge *et al.,* 2007; Hassan Wasiullah *et al.,* 2003; Sana *et al.,* 2003 and Tsegaye *et al.,* 2007 who reported similar differences in other crops and ascribed it to genetic and environmental factors. In addition, during fruit development, the fruit vary in size and this is said to be determined by the cultivar and by cell elongation during anthesis and post-anthesis (Bosland and Votava, 2006).

Effects of transplanting dates on growth and yield of pepper also indicated significant in both years. Pepper transplanted in July performed best in all the growth and yield parameters assessed. The differences observed in growth and yield of pepper under different transplanting dates could be due to differences/variation in growth factors/environmental conditions such as sunlight, moisture and temperature received by the pepper varieties since they were grown at different times. The decrease in fruiting and low yield observed in June transplanting could be due to excess rainfall and low temperature compared to July which had dry spell. *Islam et al*. (2010) reported that optimum sowing dates of a crop ensure proper growth, development and maximize the yield.

CONCLUSION

Rocoto variety out-performed other varieties while July planting superseded other transplanting dates in fresh and dry fruit yields. Therefore, transplanting Rocoto variety in July would guarantee high productivity of pepper in Badeggi, Southern Guinea Savanna Agro ecological zone of Nigeria.

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Table 1: Physico-chemical properties of soils from 0-15cm at Experimental site of Badeggi during 2018 and 2019 Rainy Season.

Soil properties	2018	2019
Properties Size (g/kg)		
Clay	130	110
Silt	150	140
Sand	720	750
Chemical properties	**Sandy-Loam**	**Sandy Loam**
P^H (H_20; 1:2:5 w/v)	5.40	6.10
P^H (0.01M $CaCl_{2;}$2.5w/v)	6.20	6.60
Exchange Acidity (Cmol/kg soil)	0.05	0.06
Electrical conductivity (mg/kg)	0.08	0.09
Bray/P (mg/k)	6.40	7.55
Organic Carbon (g/kg)	4.10	5.70
Total N (g/kg)	0.18	0.31
Exchangeable Cations (Cmol/kg)		
K (Cmol/kg)	0.17	0.25
Ca (Cmol/kg)	4.15	5.25
Mg (Cmol/kg)	0.45	0.91
Na (Cmol/kg)	0.23	0.29
CECK (Cmol/kg)	5.65	6.75
Extract Micro Nutrients (Cmol/kg)		
Zinc (zn)	6.15	6.55
Sodium Adsorption Ratio	0.05	0.07
Percent Base Saturation (PBS)	84.20	88.60

Source: soil samples as analysed at the soil Department, Federal University of Technology (FUT), Minna, Niger State, Nigeria.

Table 2: Number of Pepper Leaves per Plants as Affected by Varieties and Transplanting Dates

Treatment	Number of Pepper Leaves per Plant					
	2018			2019		
	Weeks after Transplanting					
	6	9	12	6	9	12
Pepper Varieties (V)						
Tabasco	31.50	81.75	130.40	28.90	77.36	125.91
Bell Pepper	20.12	56.88	93.30	22.07	24.81	86.33
Rocoto	51.74	118.98.	150.60	52.11	139.17	197.46
South Africa Pepper	23.71	91.40	171.40	25.26	28.97	102.40
Hottest pepper	41.39	80.23	116.45	39.22	47.33	120.02
LSD (P<0.05)	2.13	4.59	6.22	2.21	4.41	6.18
Transplanting Dates (T)						
3rd June	34.70	79.55	120.60	39.43	62.41	123.31
3rd July	50.40	82.75	140.60	45.25	91.40	146.00
3rd August	51.40	84.01	142.98	48.09	89.40	143.66
3rd September	45.60	82.40	139.40	43.40	69.40	138.46
LSD(P<0.05)	ns	ns	3.40	ns	2.55	3.13
Interaction ($\boldsymbol{V \times T}$)	ns	ns	ns	ns	ns	ns

ns - not significant

Table 3: Pepper Height as affected by Varieties and Transplanting Dates

Treatment	Pepper Height (cm)					
	2018			2019		
	Weeks after Transplanting					
	6	9	12	6	9	12
Pepper Varieties (V)						
Tabasco	35.14	48.66	85.40	32.11	45.51	78.66
Bell Pepper	24.71	31.09	49.22	23.89	36.38	50.40
Rocoto	59.33	69.26	101.25	60.33	75.41	99.70
South Africa Pepper	42.68	64.36	77.48	39.01	76.11	86.30
Hottest pepper	55.72	65.70	89.92	50.14	71.18	93.42
LSD (P<0.05)	3.52	3.97	4.19	3.16	5.22	3.88
Transplanting Dates (T)						
3rd June	38.43	52.40	73.40	38.91	59.33	77.34
3rd July	39.67	63.40	109.33	48.40	88.40	113.40
3rd August	40.56	63.25	102.43	42.71	78.43	108.39
3rd September	37.57	54.31	89.40	40.22	68.40	99.40
LSD(P<0.05)	ns	2.13	3.41	ns	3.20	4.75
Interaction ($V \times T$)	ns	ns	ns	ns	ns	ns

ns - not significant

Table 4: Leaf Area of Pepper as Affected by Varieties and Transplant Dates

Treatment	Pepper Leaf Area (cm^2)					
	2018			2019		
	Weeks after Transplanting					
	6	9	12	6	9	12
Pepper Varieties (V)						
Tabasco	30.08	33.87	31.55	30.23	32.44	29.12
Bell Pepper	49.88	41.90	41.19	46.78	46.34	40.99
Rocoto	39.34	39.56	40.33	40.55	41.16	38..23
South Africa Pepper	28.56	29.67	30.44	29.11	30.55	29.14
Hottest pepper	37.90	40.11	37.13	36.17	41.89	38.33
LSD (P<0.05)	1.90	2.12	2.18	1.78	2.23	2.34
Transplanting Dates (T)						
3rd June	30.13	32.32	31.65	32.01	32.55	29.45
3rd July	37.13	39.90	37.19	38.33	38.72	38.55
3rd August	37.11	38.50	36.11	39.10	40.14	38.34
3rd September	36.03	36.99	33.53	37.55	38.45	33.11
LSD(P<0.05)	1.14	1.17	1.09	1.24	2.33	2.46
Interaction ($V \times T$)	ns	ns	ns	ns	ns	ns

ns - not significant

Table 5: Number of Pepper Branches per Plants as affected by Varieties and Transplanting Dates.

Treatment	Number of Branches per plant					
	2018			2019		
	Weeks after Transplanting					
	6	9	12	6	9	12
Pepper Varieties (V)						
Tabasco	5.13	12.44	17.56	3.12	8.33	13.90
Bell Pepper	2.11	8.33	11.45	1.91	5.57	10.33
Rocoto	10.04	30.23	39.22	12.45	22.09	37.66
South Africa Pepper	9.44	21.33	28.77	10.41	25.16	29.01
Hottest pepper	11.89	20.42	25.32	12.90	23.14	28.43
LSD (P<0.05)	3.21	4.23	4.98	3.23	5.11	5.34
Transplanting Dates (T)						
3rd June	8.68	15.40	22.55	9.11	17.22	21.31
3rd July	11.33	29.80	38.40	12.35	31.13	37.77
3rd August	10.18	28.17	36.60	10.55	27.33	38.43
3rd September	7.18	11.00	19.14	8.17	13.81	18.33
LSD(P<0.05)	2.51	3.35	4.75	3.01	3.56	5.30
Interaction ($V \times T$)	ns	1.60	1.45	ns	1.33	1.76

ns - not significant

Table 6: Some Phenological Stages of pepper as affected by varieties and Trnasplanting Dates.

Treatments	2018			2019		
	No. of Days to 50% Flowering	No. of Days to 50% Fruiting	No. of Days to 50% Ripening	No. of Days to 50% Flowering	No. of Days to 50% Fruiting	No. of Days to 50% Ripening
Pepper Varieties (V)						
Tabasco	139.40	153.77	178.50	128.31	155.39	180.27
Bell Pepper	120.30	133.60	152.40	121.48	131.51	158.66
Rocoto	30.41	38.59	52.66	28.77	40.77	54.08
South Africa Pepper	28.91	37.13	55.62	26.08	36.81	59.51
Hottest pepper	87.47	101.34	129.28	89.40	108.25	130.18
LSD (P<0.05)	5.33	6.15	7.04	4.95	5.71	6.97
Transplanting Dates (T)						
3rd June	132.40	149.81	171.60	130..91	152.40	175.16
3rd July	129.40	133.40	158.22	127.35	141.33	163.59
3rd August	118.75	129.31	140.40	120.72	132.59	145.38
3rd September	99.68	118.43	132.14	101.80	120.77	138.05
LSD(P<0.05)	4.88	5.65	6.39	4.93	5.50	7.12
Interaction ($V \times T$)	1.45	2.03	2.16	1.38	2.27	2.53

ns - not significant

Table 7: Yield and Yield Components of Pepper as affected by varieties and Transplanting Dates.

Treatments	2018 No. of Fruits per Plant	2018 Fresh Fruit Yield (tha^{-1})	2018 Dry Fruit Yield (tha^{-1})	2019 No. of Fruits per Plant	2019 Fresh Fruit Yield (tha^{-1})	2019 Dry Fruit Yield
Pepper Varieties (V)						
Tabasco	18.75	3.95	1.55	17.22	4.01	1.66
Bell Pepper	8.33	2.88	1.80	9.93	2.92	1.82
Rocoto	31.55	15.77	10.45	34.86	17.09	12.45
South Africa Pepper	26.17	12.49	8.10	25.44	12.55	8.15
Hottest pepper	24.35	5.16	2.85	21.70	5.04	2.77
LSD (P<0.05)	3.40	2.13	1.98	3.51	2.33	2.15
Transplanting Dates (T)						
3rd June	10.59	5.22	2.09	11.40	5.38	2.15
3rd July	28.35	13.40	9.88	30.60	13.87	9.15
3rd August	26.75	12.39	8.52	28.47	12.66	8.39
3rd September	18.02	8.58	5.99	17.81	8.81	5.78
LSD(P<0.05)	2.95	2.08	1.75	3.48	2.13	1.91
Interaction ($V \times T$)	0.91	0.26	0.16	1.01	0.77	0.18

ns - not significant