Yield Pattern of Sugar Peas Cultivars as Influenced By Planting Dates to Meet The Export Requirements

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ABSTRACT

Six cultivars of sugar peas (*Pisumsativum, L.*) Var. Sugar Lace, Mange Tout, Cascadia, Sugar Daddy, Toledo and Giant Sugar, were tested at eight planting dates (1and 15 September, October, November and December) in (2010/2011)and (2011/2012) growing seasons. Significant differences were detected among planting dates in relation to their effects on plant height and total yield.

The planting dates of the first and mid October were the best in this regard. Exportable yield was significantly the highest when sown on 1 and 15 October, in both seasons.

The first and 15of October and the first of November planting dates did not show any significant differences in the percentage of exportable yield, while, significant differences were found when these dates were compared to earlier or later dates of planting in both seasons, where substantial reduction in exportable yield noticed was occurred. Planting on the first of September resulted in the earliest opened flowering in both seasons.

Sugar Daddy had the tallest plants followed by Toledo, Giant sugar, sugar Lace and Mange Tout.

Where the first cultivar gave the earliest flowering, followed by Sugar lace, Cascadian, Sugar Daddy and Mange Tout, in both season, and significant differences between cultivars were found .

Mange Tout gave the highest yield in the two seasons, while Sugar Daddy showed the lowest total yield in both seasons.

The highest amount of exportable yield was obtained from.Mange tout; Sugar Daddy had the lowest yield in both years.

Significant differences were found among cultivars in both seasons on the percentage of exportable yield.

INTRODUCTION

Sugar pea (Pisum Sativum, L.) is one of the vegetable legumes known to be grown in the middle at southern Africa, for more than five southand years ago.

Peas thrives in relatively cool weather and regions having relatively low temperature and a good rainfall or where irrigation and good drainge are practiced. The optimum temperature for seed germination is about 22^{o}C but at higher temperature loss of stand may result due to various decay organism present in the soil (Thompson and Kelly, 1957). Boswell (1929) showed that, as the temperature increases during the growing season the yield drops off rapidly.

This fact explains the reason for low yield in later planting dates when temperature is high during the vegetative and reproductive growth. (Thompson and Kelly, 1957).

Pumphrey and Ramig (1991)found the daily temperature below 25.6^{o}C had little influence on yield of peas, mean while– temperature above 25.6^{o}C depressed yield. The predicted decrease in fresh pea yield ranged from 16Kg/ha at temperature above 27^{o}C to 67 Kg/ha at temperature above 35^{o}C.

Temperature is not the only factor that influenced growth of peas Summerfield et al., (1984) reported that there are large genetic difference in response of peas to photo period.

There is an increasing demand on sugar peas for European market. Dealing with supermarkets entails a continuous flow of supply with prefixed amounts on a certain periods of time. This leads to scheduling the planting dates and area of farming procedures.

Objective of Study:

This study was carried out to test six promising cultivars of sugar peas namely, sugar lace, mange tout, Cascadia, Sugar Daddy, Toledo and Giant Sugar, and the following points were studied:

1. Appropriate planting date for each cultivar.
2. Determine crop yield in newly reclaimed land for each planting date to expect the area of land by which scheduling the production can be made.
3. Determine the extent to which the quality could be affected in each planting date, in terms at exportable yield and its percentage, relative to total yield.

MATERIALIS AND METHODS

This experiment was in two successive growing seasons,of (2010/2011) and (2011/2012), in special farm, located in Burg El-Arab regionabout 60Km. west of Alexandria, Egypt.

Eight planting dates were designed starting from the first of September to 15 December at 15 days intervals. The six cultivars of sugar peas (Sugar Lace, Mange Tout, Cascadia, Sugar Daddy, Toledo and Giant Sugar) were planted in a calcareous sandy loam soil using drip irrigation system.

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The area of the experimental plot consisted of six dripper lines 6m in length and 0.5m in width. Seeds were sown in hills (20cm) apart on one side at dripper lines and two seeds per hill with about 162 plants in every plot.

All conventional agricultural practices were applied. Harvesting was done by hand every four days. Split-plot Design experiment (8 planting dates x6 cultivars) in RCBD with 3 replicates was applied. Analysis of variance was calculated according to Snedecor and Cochran (1980), and means were discussed according to LSD 0.05 level probability. The following parameters was studied:

1. Plant height (cm).
2. Earliness, number of days from planting to first flowering.
3. Total yield, weight of pods at all pickings (Kg /feddan) through the entire season.
4. Yield pattern through the harvesting season for the main and sub-factor, (planting dates and cultivar's), respectively, was expressed by the weight of pods (in kg/feddan) for each picking. The relationships were presented in linear figures.

   Exportable yield. Was calculated after the total yield was graded and sorted out to exclude the following defects, so as to fulfill the exportation prerequisites. Presence of pests, diseases or extraneous material, broken pods, under and over length and over mature thick pods.
5. Percentage of exportable yield, estimated as amount of exportable yield relative to total yield.

RESULTS AND DISCUSSION

Plant height:

The data introduced in Table (1) explained the effects of planting dates and cultivars on plant height of peas plants. Difference were found among planting dates in both seasons. In (2010/2011), planting on the first of October gave tallest plants. All remaining dates were different except 15 November and 1 December that were not significantly different. In (2011/2012), planting on 15 October resulted taller plants, compared to all remaining planting dates. Meanwhile, the first of October and the first of November were not significantly different from each other.

Planting on the first and 15 September, when the temperature was relatively high compared with late planting dates, resulted in taller plants in both seasons. These agree with Moore and Moore (1991). They found that peas plants grown underlow temperature helped gibberellin biosynthesis for enhancing plant growth, when transferred to normal growing conditions.

The cultivars were different. Sugar Daddy had the tallest plants followed by to lido and Giant Sugar then Sugar Lace, Cascadia and Mange tout, and this trend was found in both seasons.

The significant interaction between cultivars and planting dates showed that the tallest of Sugar Lace, Mange Tout and Cascadia cultivars were obtained when planted at 15 October, while Sugar Daddy, Toledo and Giant sugar reacted well with the first October in the first season.

In the second season, November 1st, was the best planting date for Sugar Lace, Mage Tout and Cascadia, while October 15th the best for Sugar Daddy, however October 1st, was the best for Toledo and Giant Sugar cultivars.

Earliness:

The data regarding the effect of planting dates and cultivars on earliness of peas, in terms of number of days required for the opening of flower are presented in table (4).

Earliness was steadily declined as planting dates advanced toward December. The longest time for the flowering was for the plants grown on 15 December in both seasons. Since temperature is very low during December, canopy growth and flowing could be affected adversely, as indicated by Troung and Duthion (1993). They found that flowering date is related to the leaf appearance rate which, in turn, is highly correlated with temperature.

Toledo and Giant Sugar were the earliest cultivar followed by Cascadia and Sugar Lace, then, Sugar Daddy and Mange Tout, in both seasons. The differences among all cultivars were obtained; varietal differences were also reported by Rudraradhyaet al. (1991), who found that the "DT-7" variety was promising for its high yield and earliness when compared to 5 early genotypes. Also, Truong and Duthion (1988) found that (Ferilene) cultivar was earlier than (Frisson) when both were sown at monthly intervals between October 1988 and August 1990.

Different planting dates due to different photoperiods and temperatures, Summerfiled et al., (1984) found large genetic differences in relative sensitivity of cultivars to photoperiod and for temperature regarding flowering responses.

Planting on the first of September resulted in the shortest time for the flower, while, 15 December resulted in the longest time for all cultivars in both seasons.

Total yield:

The data presented in Table (3) showed the effect of planting dates and cultivars on the total yield of sugar peas. Data illustrated that, planting on the first and mid October resulted in higher total yield, compared to all remaining planting dates in both seasons where, differences were found.

Moreover, when planting date was proceeded towards December in weather cold, or back to September when weather was warm gradual decreased total yield, in both seasons.

The lowest total yield in first season prevailed when the plants were planted on the first of September, while planting on 15 December gave the lowest yield in the second season.

Total yield seemed to be responsive to a wide range of temperature through different planting dates. This result is in accordance with those obtained by Pummphrey and Ramig (1990)also Melesse and Singh(2012) . They found that temperature above 25^{o}C during the reproductive stage of growth depressed yield and this adverse effect increased as maximum daily temperature increased. Aziz and Abdul (1986) found that the total yield of some cultivars (sown on 1, 16 and 31 March) declined with later sowing. Also, Schans et al., (1991)and Karungi et al.,(2000) detected that yield of peas was strongly affected by temperature.

The cultivars showed different responses to planting dates in both seasons. While mange tout gave the highest total yield in the two seasons. Sugar Daddy had the lowest total yield in both seasons.

Yield Pattern

Figures (1-12) explained the effect of planting dates on the six peas cultivars. Regarding yield distribution during harvest time in the two seasons. Figures (1) and (2) showed Sugar Lace had one peak of maximum production for each planting date by which the rush at crop yield could be predicted in terms of time and quantity.

Early pickings started with low level of production and gradually reached its maximal and then declined thereafter to reach minimal production at the end of the season. This was true in both seasons. In the cooler part of the season, the first picking took some longer time than in the warmer part. The peak of Sugar lace reached the border at 30 kilogram (per plot) in the first season, which was around 32 kilogram in the second season.

On the average the first harvest was picked after 78.0 and 77.00 days from planting and lasted for 41.5 and 39.5 days in first and second seasons respectively. The same trend was found in Fig (5) and (6) for Cascadia cultivar which had one peak of maximum production for each planting dates, which was 30 Kg and around 32Kg. in the first and second season respectively. On the average the first harvest was picked after 77.25 and 75.00 days and period of harvest was 40.00 and 38.50 days in the two seasons respectively.

Fig 5 and 6 explained the pattern of yield behavior along with planting dates, which had two peaks-curve for each planting date.

It is obvious that longer time was elapsed from planting time in the cold part of the season until the first harvest than in warmer part, in both seasons.

The average number of days from planting to the first harvest were 90.5 and 91 days and the average harvest time was 52.0 and 53.5 days in first and second seasons respectively. Moreover, the highest values of yield were 25Kg and less than 25 Kg in the two seasons, respectively.

Mange Tout cultivar Fig (3) and (4) showed a unique style of pattern yield, like Sugar Daddy pattern, that it had two peaks-curve for each planting date, the maximum yield was 45 and 40 Kg/plot in the first and second seasons respectively. The average numbers of days from planting to the first harvest were 93 and 94 days, and the average harvest period was 55.2 and 54 days in the first and second season respectively.

Toledo cultivar Fig (9) and (10) gave a continuous flow of yield through the harvesting period for each planning date, and the maximal production per picking period did not reach the border of 25 kilogram. Some curves with two small peaks where plotted on the two seasons. Also planting Toledo cultivars in the cooler part of the season (1- 15 December) resulted in a longer time required for the first harvest than in the warmer part seasons. The average number of days from planting to the first harvest was 79.00 and 77 days and the average harvesting times was 48 and 50 days in the two seasons respectively.

Fig 11 and 12 explained the yield pattern of Giant Sugar cultivars. The maximal production per picking time were 25 and 30 kilogram in the two seasons respectively, the average number of days from planting to the first harvest were 77 and 75 days and the average harvesting times were 47 and 79 days in the two seasons respectively. Cascadia cultivar was the earliest (115.75 and 115) followed by sugar lace (119.5 and 116.5), Giant Sugar (124 and 124), Toledo (127 and 127), Sugar Daddy (142.5 and 144.5), and Mange tout (148.2 and 148), in the two seasons respectively.

Table 1. Physical and chemical properties of the experimental filed soils (average of the two seasons)

Soil depth (cm)	Texture	PH	EC. (ds/m)	O.M. (%)	Total $CaCO_3$	Soluble cations (meq / l00g soil)				DTPA-extractable (mg/ Kg)		
						Na^+	K^+	Ca^{++}	Mg^{++}	Fe	Mn	Zn
0 – 30	Sandy	8.19	3.05	0.46	25.20	2.81	0.157	9.90	8.83	0.38	0.47	0.28
30 – 60	Clay	7.95	2.54	0.50	27.15	3.32	0.074	8.71	3.30	0.35	0.43	0.27
60 – 90	Calcareous	7.86	2.45	0.53	29.10	2.86	0.096	8.60	4.40	0.32	0.63	0.23

Table 2. Average temperature in (C^0) for Burg El-Arab region (Alexandria), during the winter seasons of (2010\2011) and (2011\2012)

Month	Minimum		Maximum		Average	
	Season (1)	Season (2)	Season (1)	Season (2)	Season (1)	Season (2)
Sept.	17	21	31	28	24	24.5
Oct.	13	16	24	26	18.5	21
Nov.	14	13	23	20	18.5	16.5
Dec.	8	6	18	16	13	11
Jan.	6	6	15	12	10.5	9
Feb.	9	10	15	13	12	11.5
Mars.	11	10	15	16	13	13
Apr.	12	11	17	20	14.5	15.5
May.	14	17	22	22	18	19.5

Table 3. Plant height (cm.) of Sugar peas cultivars, as influenced by planting dates, in (2010/2011) and (2011/2012) seasons

Season	2010/2011							2011/2012						
Cultivar Planting Dates	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean
1 Sept.	76.1	75.2	76.00	106.00	75.5	75.4	68.12	80.00	79.00	80.00	111.00	770	76.00	83.83
15 Sept.	80.1	79.0	80.00	110.00	84.3	83.8	86.2	78.5	78.00	79.00	113.00	77.00	77.00	83.75
1 Oct.	58.5	85.3	86.25	133.5	96.00	95.5	97.01	86.90	86.00	87.00	126.00	97.00	96.00	96.48
15 Oct.	93.25	93.3	93.87	130.00	86.80	87.00	97.37	95.50	95.00	96.00	137.00	89.00	88.00	100.08
1 Nov.	92.00	91.10	92.00	127.60	86.30	87.00	96.00	97.30	96.00	97.00	123.00	88.00	87.00	98.05
15 Nov.	78.3	79.2	79.00	122.2	87.5	86.9	88.85	85.70	85.00	86.00	122.00	89.50	88.50	92.78
1 Dec.	80.9	80.3	81.00	117.0	89.00	88.6	89.47	81.3	80.00	81.00	116.00	86.00	85.00	88.22
15 Dec.	83.00	82.5	83.00	111.00	87.70	88.00	89.2	80.2	79.00	80.00	113.00	88.00	87.00	87.87
Mean.	83.64	83.24	83.89	119.66	86.64	86.53		85.68	84.75	85.75	120.13	86.44	85.57	
L.S.D. 0.05					L.S.D. 0.05									
CVs 0.81					CVs 1.03									
Dates 1.34					Dates 1.68									
CVs X Dates 2.31					CVs X Dates 2.31									

Table 4. Earliness of sugar peas cultivars, as influenced by planting dates, in (2010/2011) and (2011/2012) seasons

Season	2010/2011							2011/2012						
Cultivar Planting Dates	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean
1 Sept.	50.00	60.00	51.00	59.00	46.50	45.50	52.00	53.50	62.00	54.50	60.00	47.00	46.25	53.88
15 Sept.	54.00	65.50	55.00	64.50	50.25	49.25	56.42	56.25	64.00	57.00	62.00	53.00	52.50	57.46
1 Oct.	63.25	72.00	64.50	72.00	67.00	66.00	67.46	59.50	71.50	60.00	70.50	65.00	64.00	65.08
15 Oct.	65.00	78.00	66.00	78.50	68.00	67.00	70.42	66.25	72.50	67.25	78.00	67.50	66.50	70.53
1 Nov.	70.25	79.50	71.00	80.00	69.50	68.50	73.13	71.25	78.25	72.00	77.00	71.00	70.25	73.29
15 Nov.	81.50	84.50	82.50	85.00	76.00	75.00	80.75	80.00	83.25	80.00	82.00	74.50	73.50	78.88
1 Dec.	83.25	87.50	84.50	88.00	79.50	78.50	83.54	82.50	90.50	83.25	89.50	76.00	76.25	83.00
15 Dec.	86.00	90.50	87.00	91.00	78.00	77.25	84.96	84.25	93.25	85.00	92.00	80.00	79.50	85.67
Mean.	69.16	77.19	70.19	71.25	66.84	65.88	-	69.19	77.78	69.00	76.38	66.75	66.09	-
L.S.D. 0.05					L.S.D. 0.05									
CVs 0.81					CVs 0.92									
Dates 1.32					Dates 1.51									
CVs X Dates 2.29					CVs X Dates 2.61									

Table 5. Total yield (Kg./feddan) of sugar peas cultivars, as influenced by planting dates, in (2010/2011) and (2011/2012) seasons

Season	2010/2011							2011/2012						
Cultivar / Planting Dates	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean
1 Sept.	2331	3000	2176	2000	2580	2171	2376	2112	3111	2001	2080	2360	2131	2649
15 Sept.	2122	3012	2026	2024	2471	2102	2292	2153	3036	2094	2030	2280	2060	2792
1 Oct.	3177	4123	3365	3016	3435	3544	3443	3301	4161	3270	2870	3370	3230	3267
15 Oct.	3345	4369	3406	3127	3625	3600	3579	3432	4350	3340	2920	3350	3300	3315
1 Nov.	2813	3820	2902	2946	3251	3000	3122	2000	3822	3030	2990	3220	3301	3127
15 Nov.	2961	3920	2850	2894	3091	3211	3109	2624	3770	2980	2880	2820	2900	2829
1 Dec.	2200	3211	2846	2052	2088	2801	2533	21000	3190	2080	2070	2050	2115	2638
15 Dec.	2164	2812	2635	2081	2022	2610	2387	2010	2980	2110	2050	2070	2000	2587
Mean.	2639	3533	2775	2518	2820	2879		2867	3040	2963	2711	2905	2917	
L.S.D. 0.05				L.S.D. 0.05										
CVs 420				CVs 520										
Dates 690				Dates 850										
CVs X Dates 1190				CVs X Dates 1480										

Table 6. Exportable yield (Kg/feddan) of sugar peas cultivars, as influenced by planting dates, in (2010/2011) and (2011/2012) seasons

Season	2010/2011							2011/2012						
Cultivar / Planting Dates	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean
1 Sept.	2271	2940	2116	1930	2510	2101	2311	2060	3061	1951	2010	2300	2071	2242
15 Sept.	2072	2962	1976	1964	2401	2032	1831	2113	2990	2054	1960	2210	1990	2220
1 Oct.	3137	4123	3325	2956	3385	3491	3403	3261	4121	3230	2830	3320	3180	3324
15 Oct.	3295	4319	3306	3067	3575	3550	3519	3382	4300	3290	2880	2300	3250	3234
1 Nov.	2773	3780	2862	2896	3191	2940	3074	1950	3772	2980	2940	3160	3241	3007
15 Nov.	2901	3860	2790	2824	3031	3151	3093	2554	3700	2910	2830	2760	2840	2932
1 Dec.	2140	3151	2846	1972	2028	2741	2480	2020	3110	2000	2000	1980	2045	2930
15 Dec.	2084	2732	2555	2001	1942	2580	2307	1930	2900	2030	1980	2010	1940	2132
Mean.	2584	3483	2722	2451	2758	2817		2409	3494	2556	2429	2505	2270	
L.S.D. 0.05					L.S.D. 0.05									
CVs 420					CVs 440									
Dates 1690					Dates 1710									
CVs X Dates 1200					CVs X Dates 1230									

Table7. Percentage of exportable yield of sugar peas cultivars, as influenced by planting dates, in (2010/2011) and (2011/2012) seasons

Season	2010/2011							2011/2012						
Cultivar / Planting Dates	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean	Sugar Lace	Mange Tout	Cascadia	Sugar Daddy	Toledo	Giant Sugar	Mean
1 Sept.	97.43	98.00	97.24	96.50	97.28	96.77	97.20	97.53	98.39	97.50	96.63	97.54	97.18	97.44
15 Sept.	97.64	98.34	97.53	97.03	97.16	96.66	97.39	98.14	98.67	98.08	96.55	96.92	96.60	97.49
1 Oct.	98.74	98.50	98.81	98.01	98.54	98.58	98.53	98.78	99.03	98.77	98.60	98.51	98.45	98.69
15 Oct.	98.51	98.85	97.06	98.08	98.62	98.61	98.28	98.54	98.85	98.50	98.63	97.87	98.48	98.47
1 Nov.	98.58	98.90	98.62	98.30	98.15	98.00	98.42	97.5	98.69	98.34	98.32	98.13	98.18	98.19
15 Nov.	98.28	98.46	97.89	97.58	98.05	98.13	98.06	97.33	98.14	97.65	98.26	97.87	97.93	97.86
1 Dec.	97.27	98.13	97.21	96.10	97.12	97.85	97.28	96.19	97.49	96.15	96.61	96.58	96.69	96.6
15 Dec.	96.30	97.15	96.96	96.16	96.04	98.85	96.91	96.01	97.31	96.20	96.58	97.10	97.00	96.7
Mean.	97.84	98.29	97.67	97.22	97.62	97.93		97.50	98.32	97.64	97.52	97.55	97.56	
L.S.D. 0.05								L.S.D. 0.05						
CVs 0.43								CVs 0.44						
Dates 1.70								Dates 1.71						
CVs X Dates 1.20								CVs X Dates 1.23						

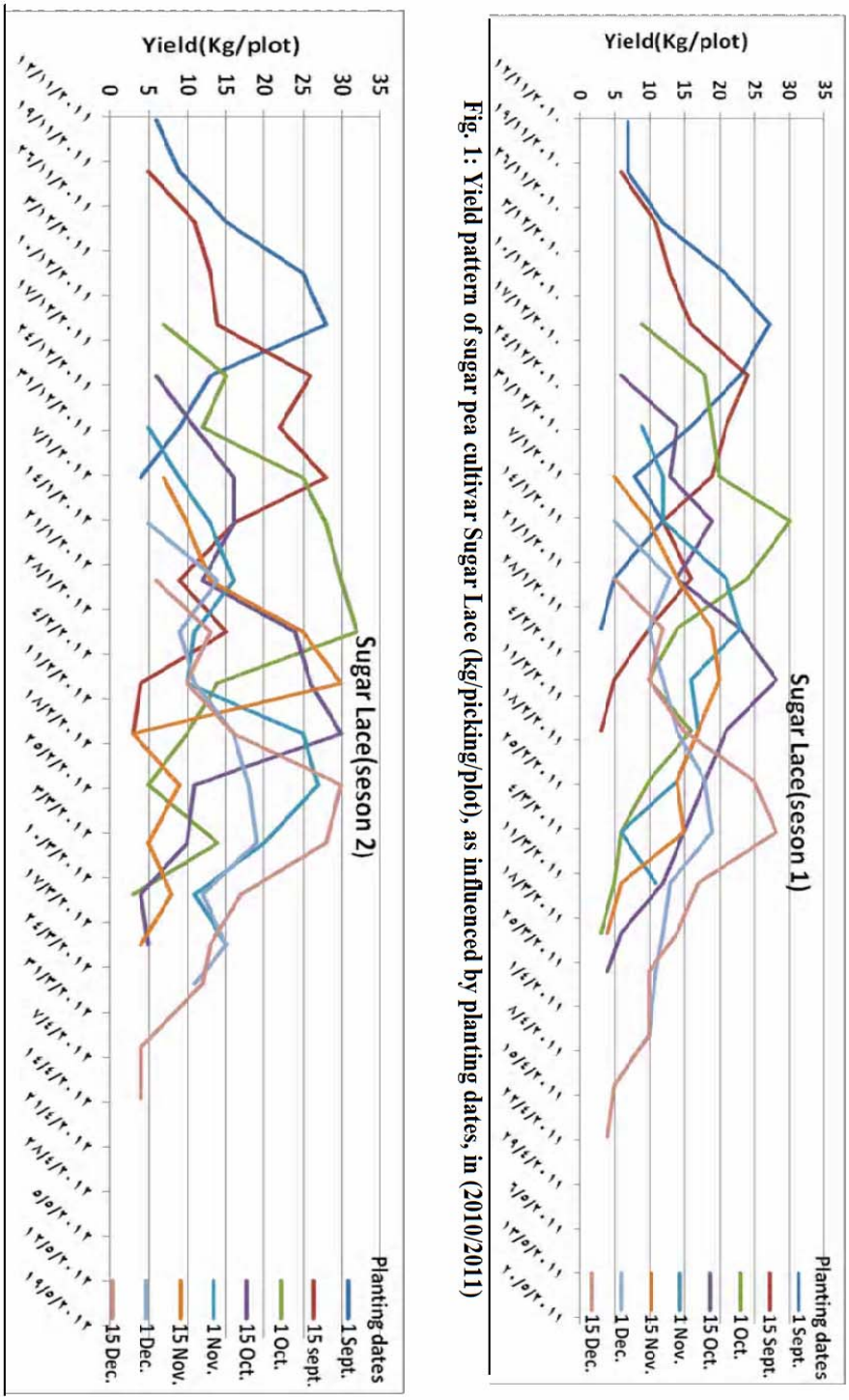

Fig. 1: Yield pattern of sugar pea cultivar Sugar Lace (kg/picking/plot), as influenced by planting dates, in (2010/2011)

Fig. 2: Yield pattern of sugar pea cultivar Sugar Lace (kg/picking/plot), as influenced by planting dates, in (2011/2012)

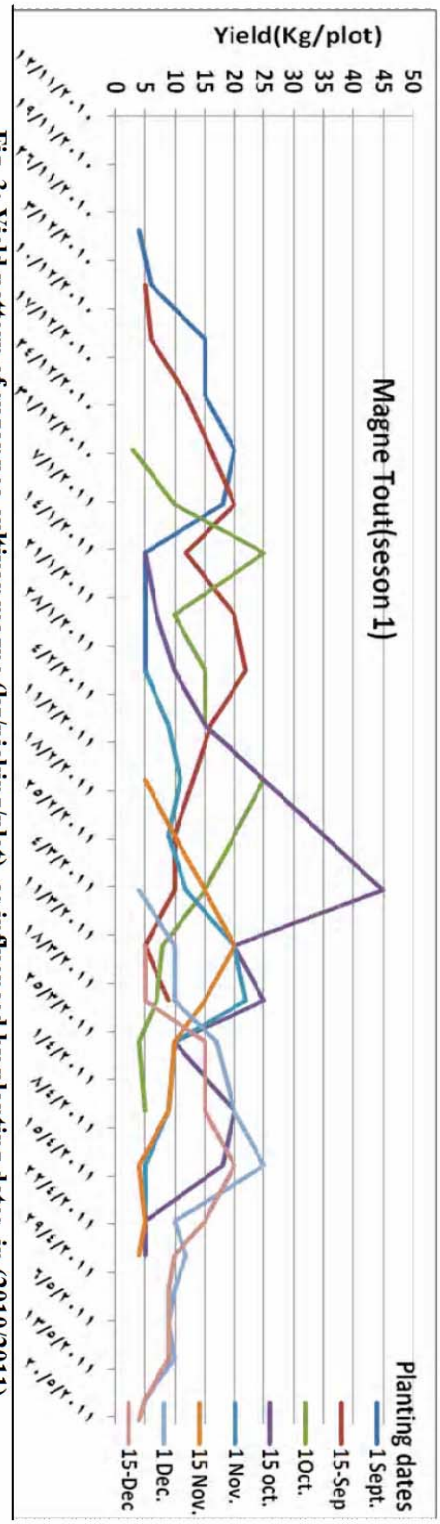

Fig. 3: Yield pattern of sugar pea cultivar magne (kg/picking/plot), as influenced by planting dates, in (2010/2011)

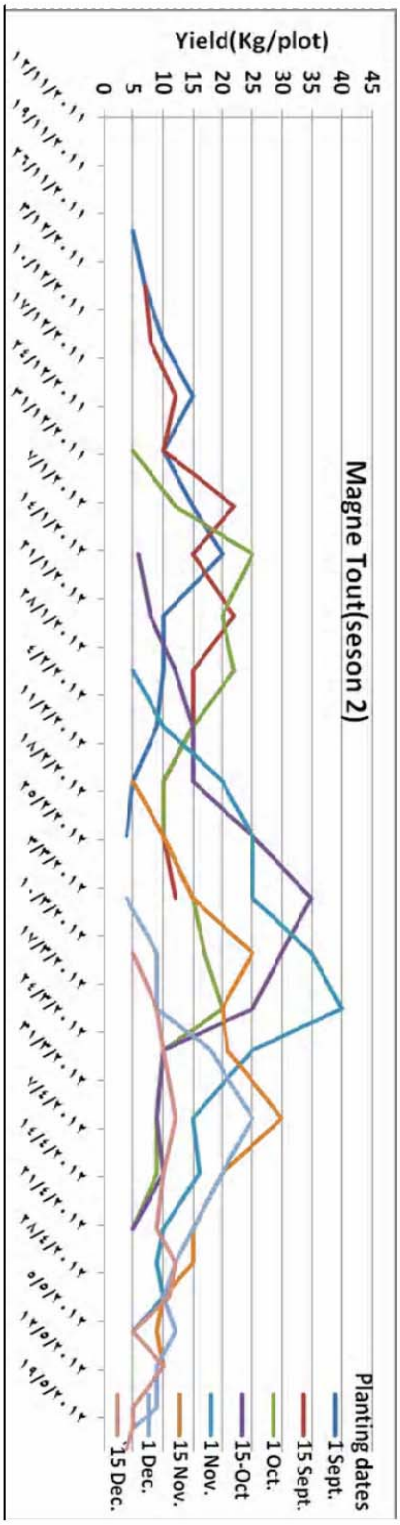

Fig. 4: Yield pattern of sugar pea cultivar magne tout (kg/picking/plot), as influenced by planting dates, in (2011/2012)

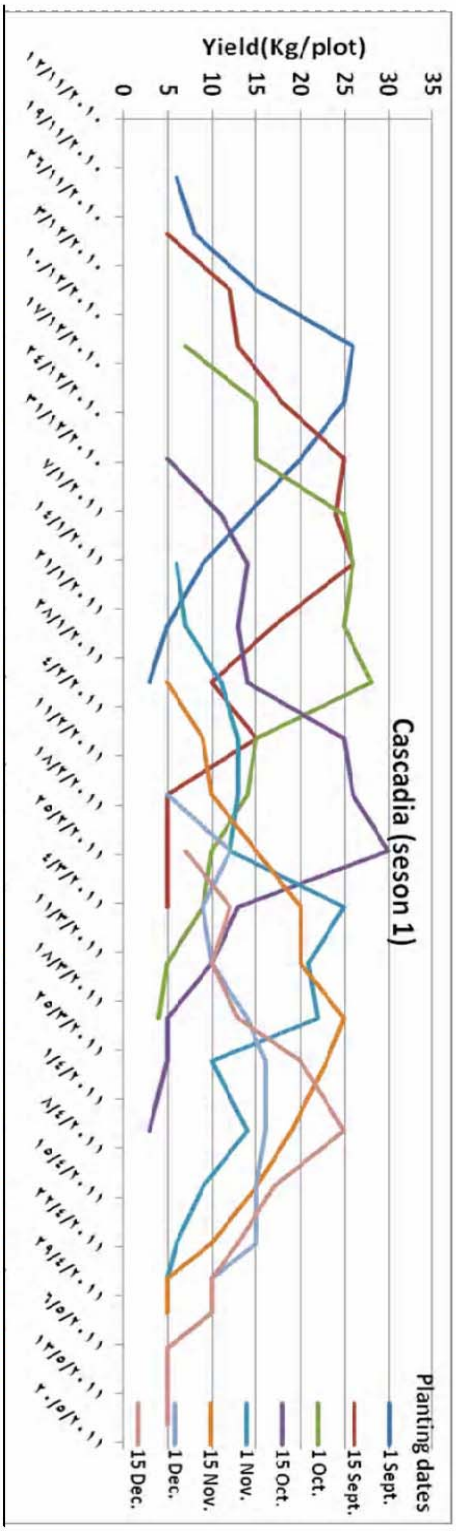

Fig. 5: Yield pattern of sugar pea cultivar cascadia (kg/picking/plot), as influenced by planting dates, in (2010/2011)

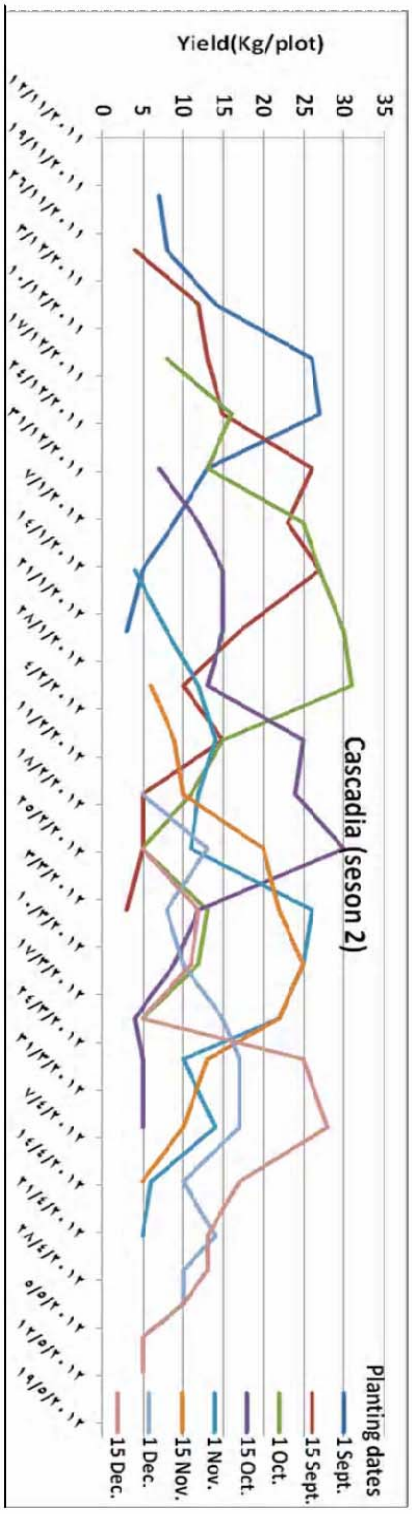

Fig. 6: Yield pattern of sugar pea cultivar cascadia (kg/picking/plot), as influenced by planting dates, in (2011/2012)

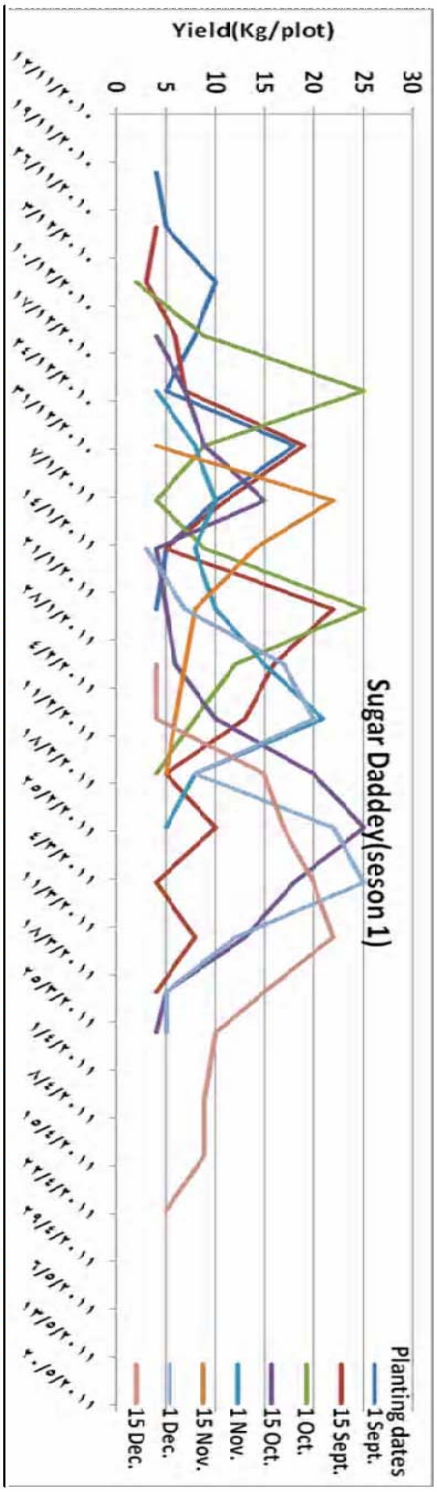

Fig. 7: Yield pattern of sugar pea cultivar daddey (kg/picking/plot), as influenced by planting dates, in (2010/2011)

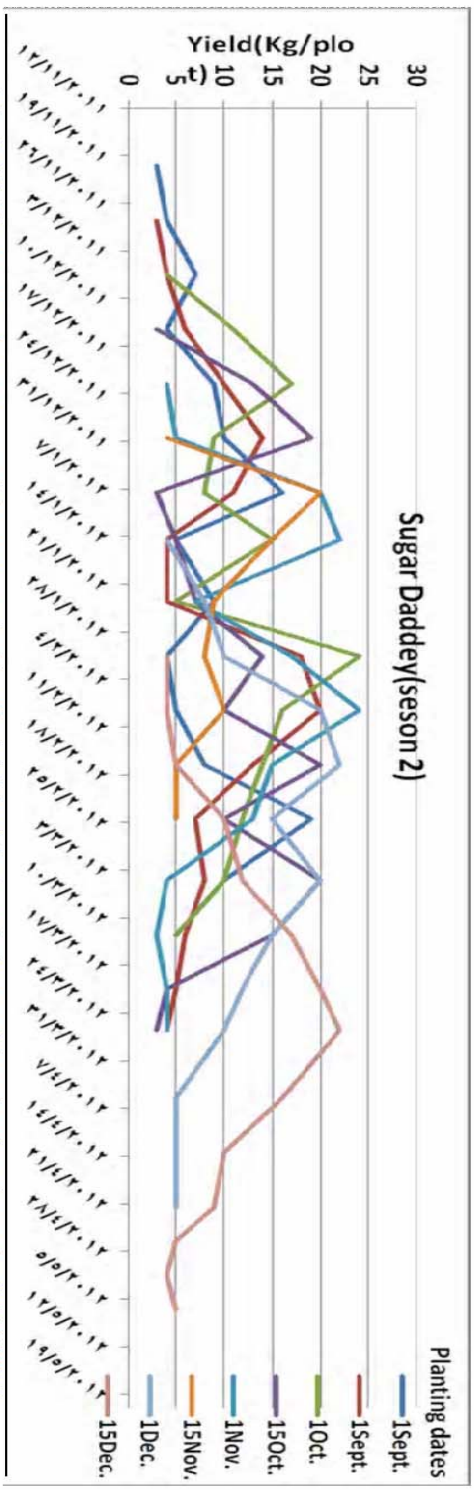

Fig. 8: Yield pattern of sugar pea cultivar sugar daddey (kg/picking/plot), as influenced by planting dates, in (2011/2012)

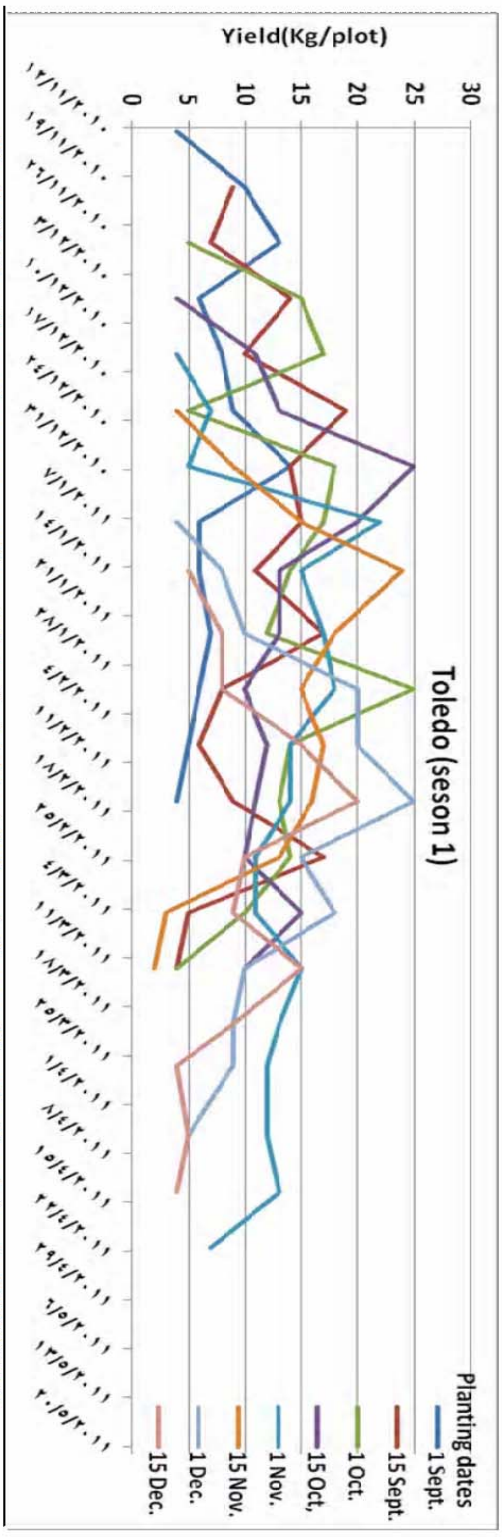

Fig. 9: Yield pattern of sugar pea cultivar toledo (kg/picking/plot), as influenced by planting dates, in (2010/2011)

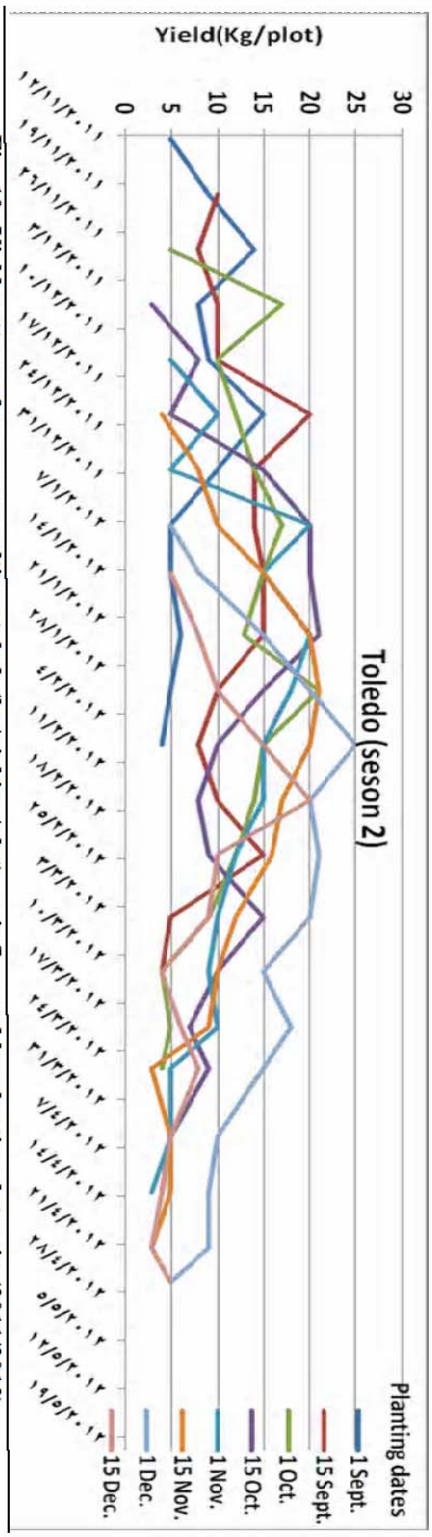

Fig. 10: Yield pattern of sugar pea cultivar toledo(kg/picking/plot), as influenced by planting dates, in (2011/2012)

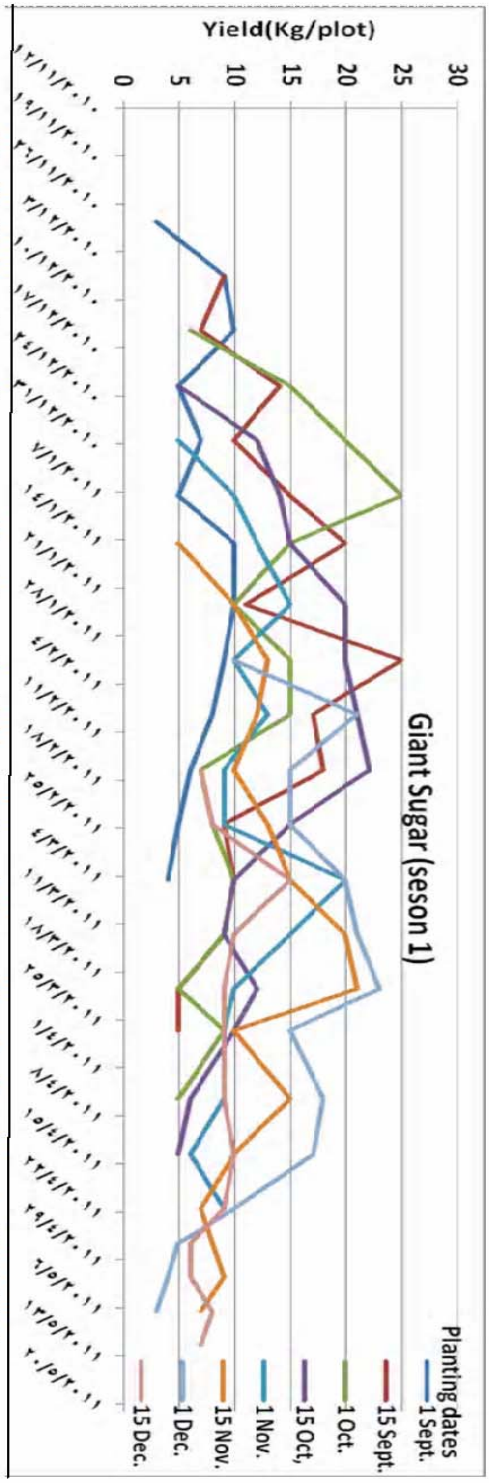

Fig. 11: Yield pattern of sugar pea Giant Sugar (kg/picking/plot), as influenced by planting dates, in (2010/2011)

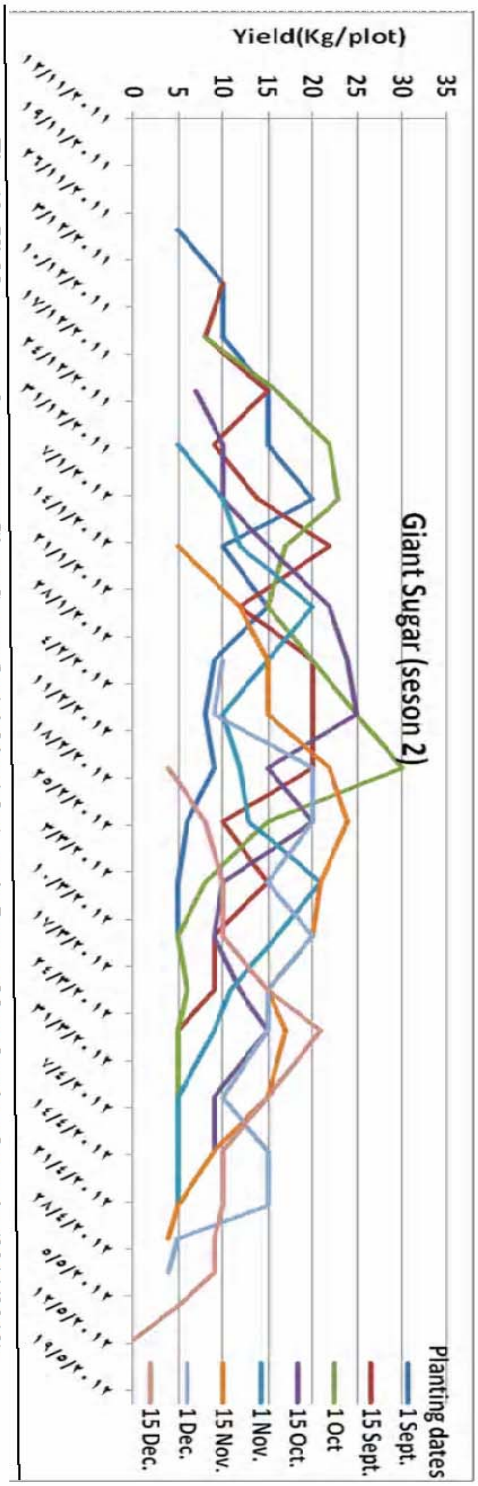

Fig. 12: Yield pattern of sugar pea Giant Sugar (kg/picking/plot), as influenced by planting dates, in (2011/2012)

Exportable Yield

The data presented in Table (4) showed the effect of planting dates and cultivars on exportable yield. Planting dates, cultivars and their interaction showed high significant effect on this trait, in both seasons.

Planting on the first and mid of October significantly resulted in the highest exportable yield in both seasons. Significant gradual decrease in exportable yield was noticed as planting date was shifted back ward to September or forward to December. The significant lowest exportable yield in first and second seasons were for the mid of September and (first and mid) of December, respectively. No significant differences were found in (2010/2011) between 1 September and 15 December, planting dates also between 15 September and 15 November in (2011/2012) season. Planting on the first and mid of October and the first of November showed no significant differences.

Boswell (1929) found that the high temperature during harvest time lowered the quality of peas as a result of rapid rate of maturing. On the other hand, Schans et al. (1991) and David Myers et al. (2001) found that late sowing in the wet season reduced yield that were caused by the fungal disease when it was wet after flowering.

Mange Tout cultivar obtained the highest amount of exportable yield in the two seasons. Sugar Daddy showed to be the lowest cultivar in this regard, in both seasons.

Sugar lace, Cascadia, Toledo and Giant sugar cultivars did not differ regarding the amount of exportable yield, in both seasons.

Planting on the 1 and mid of October was the best planting date in both seasons for all cultivars, but Sugar Daddy cultivar reacted better when planted on the mid of October in first season, also Toledo cultivar was better when planted in 1 October in the second season. The lowest yield, for all cultivars was recorded when they were planted on 15 December.

Exportable yield percentage

Data presented in Table (5) showed the effect of planting dates and cultivars on the percentage of marketable(exportable) yield. Differences were detected among planting dates in both seasons.

Planting dates, from October even 15 November gave the highest percentage of exportable yield in the first season, while planting dates from
1 October even 1 November were gave the highest values in the second season. The percentage of exportable yields were reduced significantly when peas was grown on the first and mid of September, as well as in advanced dates staring from the mid of November to 15 December, in both seasons.

As regard to cultivars, Sugar Daddy gave the lowest percentages of exportable yield in the first seasons. While Mange Tout gave the highest rate in the first and second season. There were no significant differences between the cultivars in the second season regarding exportable yield.

Mange Tout cultivar gave the highest percentage of exportable yield when planted in the 15 October and 1 October in the two seasons respectively.

The data showed an ideal planting date for every cultivar, when planting on first October was favorable for sugar Lace, Cascadia, Sugar Dadd, Toledo and Giant Sugar in the two seasons.

All cultivars gave the highly total yield when sown in the first and mid of October compared to remaining planting dates. Planting dates in the first and second season on the first and 15 of October resulted in the highest total yield for Mange Tout, Giant Sugar, Toledo, Cascadia, sugar lace and sugar Daddy cultivars respectively. More over planting earlier or later than these planting dates resulted in significantly lower total yields. Similar results were Obtained by Satpute and Khare(1992)Who detected significant interaction between five peas genotypes and planting dates (from fall to spring seasons) regarding total yield.

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الملخص العربي

تأثير الصنف وميعاد الزراعة على منحنى الحصاد وجدولة أنتاج البسلة السكرية للتصدير

دعاء محمد مصطفى أحمد

أجريت هذه الدراسة لتحديد أنسب مواعيد زراعة لستة أصناف من البسلة السكرية وهى (شوجرليس)، (مانج توت)، (كاسكاديا)، (شوجردادى)، (توليدو) و(جيانت شوجر)، وذلك بغرض جدولتها بغرض التصدير للسوق الأوروبية ومساعدة المصدر لاختيار الأصناف والمواعيد الملائمة لجداول التصدير. وقد اختيرت ثمانية مواعيد للزراعة وهى أول ومنتصف كل من سبتمبر وأكتوبر ونوفمبر وديسمبر فى موسمى(٢٠١٠-٢٠١١)و(٢٠١١- ٢٠١٢)، وتم دراسة صفات طول النبات، التيكير، المحصول الكلى، والتوزيع المحصولى بعمل منحنيات الحصاد خلال موسم الحصاد، والمحصول التصديرى، والنسبة المئوية له.

وقد أظهرت النتائج اختلاف مواعيد الزراعة فيما بينها فى تأثيرها على الصفات المدروسة فى كلا الموسمين. فكانت الزراعة فى أول ومنتصف أكتوبر هى أنسب المواعيد لصفة طول النبات، والمحصول الكلى، أما الزراعة المبكرة أو المتأخرة عن هذا الميعاد أدت إلى نقص معنوى فى هذه الصفات.

أما المحصول التصديرى فكانت الزراعة فى أول ومنتصف أكتوبر فى كلا الموسمين أفضل المواعيد لتحقيق أعلى محصول تصديرى. وقد ازدادت النسبة المئوية للمحصول التصديرى عند الزراعة فى الفترة من أول أكتوبر إلى أول نوفمبر وقد أظهرت مواعيد الزراعة التى تسبق هذه المواعيد أو التى كانت متأخرة عنها إلى نقص معنوى فى هذه الصفة.

تأثر التوزيع المحصولى أثناء موسم الحصاد بمواعيد الزراعة حيث أدت الزراعات المبكرة والمتأخرة إلى قصر موسم الحصاد ونقص المحصول.

أما بالنسبة للأصناف فقد اختلفت فيما بينهما فى صفة طول فترة للحصاد فقد حقق الصنف (شوجر دادى) و(مانج توت) أعلى فترة يليه (توليد) و(وجيانت شوجر) ثم (شوجرليس) و(كاسكاديا) وكان للأصناف نفس الترتيب من حيث طول موسم النمو.

وقد أظهرت الأصناف اختلافاً فيما بينها فى صفة طول النبات فكان الصنف (شوجردادى) أطول النباتات يليه(توليدو) ثم (جيانت شوجر) و(شوجرليس) ثم (مانج توت). وقد حقق الصنف (توليدو) وكذلك (جيانت شوجر) أكبر الأصناف تبكيراً فى الإزهار وكانت الفروق بين الأصناف معنوية فى كلا الموسمين.

وبالنسبة للمحصول الكلى فقد أعطى الصنف (مانج توت) أعلى محصول كلى وحقق كذلك أعلى نسبة مئوية للمحصول التصديرى. بينما أعطى الصنف شوجردادى أقل محصول كلى ولكنه أعطى أعلى نسبة للمحصول التصديرى فى كلا موسمى الزراعة.

ومن النتائج السابقة يتضح الحاجة الضرورية لاختيار الصنف وميعاد الزراعة المناسب له والذى يحقق أعلى محصول وجودة وكذلك أعلى نسبة مئوية للمحصول التصديرى، وهذا ما يحدده القائم على التصدير لاختيار التوافيق اللازمة بين الأصناف ومواعيد الزراعة بما يتلائم مع جداول التصدير.