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THE EFFECTS OF PIX APPLIED AT DIFFERENT GROWING STAGES ON SOME AGRONOMICAL CHARACTERISTICS OF PEANUT

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ABSTRACT

This study was conducted to determine the effects of pix on the seed yield and some agronomic characters of peanut cultivar Halisbey in 2011 and 2012. The trial was arranged in the Randomized Complete Blocks Design with three replications. The pix applications at different growing stages significantly increased pod yield. The pod yield was 5808 kg ha^{-1} in the pix applied plot while 4930 kg ha^{-1} in the control plot. The highest pod yield increases (17.8% and 15.7%) were obtained from pix applied plots at four (beginning of the flowering + peg formation + pod formation + seed formation) and three (beginning of flowering + peg formation + pod formation) different growing stages respectively.

Key Words: Agronomic character, growth regulator, peanut, pix, pod yield,

INTRODUCTION

Peanut, containing high levels of fat, proteins, carbohydrates, minerals and vitamins, is cultivated in several countries located either tropical or subtropical regions (Arioglu, 2007).

Peanut was cultivated in 21.8 million hectares in the world with a production of 38.6 million tons. In addition, total vegetable oil production in the world was 151.1 million tons and peanut oil corresponds to 3.5 % of this production (FAO, 2011).

Peanut cultivation started around 1920s and has increased up to 25,471 ha with 90,400 tons production in Turkey in 2011 (FAO, 2011). Peanut is cultivated mainly in Adana, Osmaniye and Aydın provinces. Since the production of peanut in Turkey is not sufficient, it is only used as snacks and appetizers (Arioglu, 2007).

The application of growth regulators, which are organic or inorganic to stimulate, block or modify the physiological functions in plants has been used as an alternative to cultural practices in increasing the yield.

Hormones, produced naturally by the organisms, are chemical stimulators that do not require external applications, and they are capable of impacting the physiological process. They can be divided in four main categories such as auxins, gibberellins, cytokines, and inhibitors, based on their physiological activities and chemical structures. They affect the synthesis of enzymes and manage metabolic activities (Jones, 1973; Kumluay and Eryigit, 2011).

There has been intensive research on the effects of growth regulators on the agricultural and technological properties of peanut; such as increasing pod yield and the accumulation of dry matter in the seed, increasing the root development, achieving earliness, ensuring the formation of pegs by the flowers and increasing the number of pegs that develop into a pod especially through extending the maximum flowering period. There have been several research providing evidence about the important effects of growth regulator chemicals on these factors (Ketring and Schubert, 1981; Hallock, 1982; Reddy and Patil, 1983; Reddy and Shah, 1986; Venkateswariu et al., 1986; Arslantas, 1991; Toklu, 2003; Arioglu et al., 2003; Jeyakurmar and Thangaraj, 2008; Verma et al., 2009; Gulluoglu, 2011).

One of the chemicals used in the recent years on various plants is the Pix. The Pix contains the active ingredient mepiquat-chloride, which is known as a plant development regulator. Mepiquat-chloride is reported to prevent the over development and branching in plants through decreasing the formation of gibberellins, to ensure earliness, to reduce abortion of flowers, to control leaf formation and flowering, to induce plant root development, to increase the chlorophyll content of the plant. The application of pix has been increasing on various crops in many countries for recent years (Arslantas, 1991; Anlagan, 2001; Anonymous, 2002).

In the Çukurova region of Turkey, peanut growers apply the Pix at any stage of development so the expected yield increase are not obtanied. The purpose of this study was to investigate the optimal dose of Pix and the optimal Pix application time to obtain feasible yield in peanut cultivation in the Çukurova region.

MATERIALS AND METHODS

Research Materials

This study was conducted at the Experimental Farm of the Cukurova University (41°04´N, 36°71´E, and 36 m), in Adana (Turkey) for two years during the 2011 and 2012 main crop season. A commercial cultivar Halisbey registered by the Department of Field Crops of the Cukurova University was used in this study. Halisbey is a member of the Virginia group and has a semi-erect development form. It has a growing period of approximately 130 140 days. Its pod kernel color is yellowish brown, while the seed testa color is pink in color.

Soil Properties of the Research Area

The soil at the experimental area has formed as alluvial carried by the sub-branches of the river Seyhan. It has type A and C horizons, and has a mid-deep to deep structure. The ratio of organic materials decreases with depth. The soil has a loamy structure and its pH levels were in the range of 7.28-7.29. Its salt ratio is in the range of 0.052-0.060 % levels. The useable P_2O_5 is approximately 14.17 % at the top levels and decreases with depth. In addition, the nitrogen levels are approximately 0.122 % at the top levels, whereas it is approximately 0.056 % at deeper levels. Lastly, its lime levels are approximately 33.02 % at the top level, while it decreases with depth.

Climatical Properties of the Research Area

The meteorological data of Adana, for 2011 and 2012 is given in Table 1 (Anonymous, 2012). In Adana, a typical Mediterranean climate prevails, the winters are warm and rainy, whereas the summers are hot and dry. During the research period, monthly mean temperatures were in the 16.7 to 28.9 ^{o}C range during the year 2011, while they were in the 18.8 to 29.4 ^{o}C range during the year 2012. During the research, the maximum temperatures were recorded as 39.3 ^{o}C and 40.6 ^{o}C in the August of 2011 and August of 2012, respectively. The total rainfall was 184.7 mm and 110.4 mm during the years 2011 and 2012, respectively.

Table 1. The Meteorological Data of the Research Area.

Year	Climatical Data	April	May	June	July	August	Sept.	October
2011	Min. Temperature (^{0}C)	3.7	11.5	18.3	19.5	21.0	18.1	8.2
	Max. Temperature (^{0}C)	29.5	31.2	34.9	35.4	37.6	39.3	33.4
	Aver. Temperature (^{0}C)	16.7	20.9	24.9	27.9	28.9	27.0	21.2
	Relative Humidity (%)	68.0	68.9	72.2	72.5	67.1	62.8	48.5
	Total Rainfall (mm)	68.4	81.5	30.2	-	-	4.6	9.4
2012	Min. Temperature (^{0}C)	8.2	13.9	16.7	18.1	19.9	18.7	13.7
	Max. Temperature (^{0}C)	33.5	32.9	41.6	40.6	37.8	38.7	35.5
	Aver. Temperature (^{0}C)	18.8	21.4	26.4	29.2	29.4	27.4	22.5
	Relative Humidity (%)	62.5	68.5	66.3	63.2	61.1	60.7	60.9
	Total Rainfall (mm)	12.8	95.0	2.0	0.2	0.4	-	68.2

* Based on the records of the state meteorological station

Arrangement of the Trail and the Pix Applications

The study was conducted at the Research and Experimental Fields of the Cukurova University. The design of the experiment was a Randomized Complete Blocks Design with three replications. The Pix a plant development regulator, was applied during the beginning of flowering (A), peg formation (B), pod formation (C) and seed formation (D) stages, which are considered at the most vital growth stages of the peanut plant, in a total of 13 different combinations with the dose. Each plot consisted of four rows of 5.0 m in length and row distance was 70 cm and 15 cm within row. The time and dose of the pix application stages and designs are presented in Table 2.

The seed bed was prepared by deep plowing, disking and loosening. Before the sowing, 200 kg ha^{-1} of 18-46-0 fertilizer (36 kg ha^{-1} N, 92 kg ha^{-1} P) and 2.0 lha^{-1} of Traflen (trifluralin) as herbicide was applied. The sowing was done by hand with a depth of approximately 5 to 6 cm in the rows.

The pix was applied during the development stages and at doses described in Table 2, in early mornings with a Knapsack sprayer, using 200 liters of water ha^{-1}. The control plot was rather sprayed with plain water instead.

In order to determine whether or not the peanut pods were ready for harvest, samples were gathered from the plots and mature pod ratios were determined through

"Shell-out" method. At the harvest, the middle two rows of each plot was harvested by hand, while the outer two rows of each plot were discarded.

Table 2. The Application Stages and Doses of the Pix.

Treatment Number	Application Stages	Application Doses
1	Control	-
2	Beginning of flowering (A)	1.5 lha^{-1}
3	Peg formation (B)	1.5 lha^{-1}
4	Pod formation (C)	1.5 lha^{-1}
5	Seed formation (D)	1.5 lha^{-1}
6	A + B Stages	1.5 lha^{-1} + 1.5 lha^{-1}
7	A + C Stages	1.5 lha^{-1} + 1.5 lha^{-1}
8	A + D Stages	1.5 lha^{-1} + 1.5 lha^{-1}
9	B + C Stages	1.5 lha^{-1} + 1.5 lha^{-1}
10	B + D Stages	1.5 lha^{-1} + 1.5 lha^{-1}
11	C + D Stages	1.5 lha^{-1} + 1.5 lha^{-1}
12	A+B+C Stages	1.0 lha^{-1}+1.0 lha^{-1}+1.0 lha^{-1}
13	A+B+C+D Stages	1.0 lha^{-1}+1.0 lha^{-1}+1.0 lha^{-1}+1.0 lha^{-1}

The following characteristics were measured; pod number per plant (pod/plant), the pod weight per plant (g/plant), shelling percentage (%), 100 seed weight (g), protein content (%), oil content (%), crude oil yield (kg ha^{-1}) and pod yield (kg ha^{-1}).

The data obtained were statistically analyzed by the computing MSTAT-C package program in accord with the Randomized Complete Block Design. The means of the treatment were compared by using the LSD as described by Steel and Torrie (1997).

RESULTS AND DISCUSSION

Pod Number per Plant

Table 3 presents the means of the treatments for pod per plant. As can be observed in Table 3, the pod per plant means for the year 2011 were in the range of 27.20 to 34.47 pod/plant. The highest value, which is 34.47 pod/plant, was obtained from the multiple application of the pix during the beginning of flowering and the seed formation (A+D) stages. On the other hand, the pod per plant means for 2012 were in the range of 19.60 to 27.33 pod/plant. As it could easily be observed, the pod per plant means were lower in the second year of the experiment. This could potentially be explained by the higher temperatures occured in 2012.

Table 3. The means of the Pix Applications for Total Pod Numbers per Plant (pod/plant).

Treatment Number	Applications	Years		Mean of two years
		2011	2012	
1	Control	27,47 cd	19,60 d	23,53 e
2	Beginning of flowering (A)	32,20 ab	22,77 bcd	27,48 abcd
3	Peg formation (B)	29,50 bcd	21,57 cd	25,53 bcde
4	Pod formation (C)	28,13 cd	20,13 cd	24,13 cde
5	Seed formation (D)	27,60 cd	20,07 cd	23,83 de
6	A + B Stages	32,27 ab	23,27 bcd	27,77 abc
7	A + C Stages	32,77 ab	22,93 bcd	27,85 abc
8	A + D Stages	34,47 a	22,87 bcd	28,67 ab
9	B + C Stages	30,97 abc	22,00 cd	26,48 abcde
10	B + D Stages	30,93 abc	21,57 cd	26,25 bcde
11	C + D Stages	27,20 d	20,57 cd	23,88 de
12	A+B+C Stages	32,47 ab	25,87 ab	29,17 ab
13	A+B+C+D Stages	33,10 ab	27,33 a	30,22 a
	LSD (%5)	**3,63**	**3,57**	**3,78**

The average of the pod number per plant means over 2011 and 2012 were in the range of 23.53 to 30.22 pod/plant. It can also be observed in the Table 3 that the applications of Pix resulted in higher values of pod per plant, compared to the control means (23.53). Such as the highest pod number per plant (30.22 pod/plant) was achieved through the application of the pix at all of the four stages. Since the pix was applied at various stages stoped the vegetative development of the plant, the penetration of the pegs into the soil becomes easier. This might lead to higher pod per plant values. It can also be seen in Table 3 that the application of the Pix during the two or three stages substantially increased the pod numbers. These findings are in accordance with the reports given by Venkateswariu et al. (1986), Aslantas (1991), Toklu (2003), Verma et al. (2009) and Gulluoglu (2011).

The Pod Weight per Plant

The means of the pod weight per plant resulted in the application of the pix at various stages and doses are presented in Table 4. The means for the pod weight per plant in 2011 were in the range of 69.70 to 79.83 g/plant. The highest mean was obtained from the application of the pix at all of the growing stages (A+B+C+D) with a value of 79.83 g/plant. On the other hand, in 2012, the values were in the range of 45.33 to 55.70 g/plant. For comparison to pod numbers, pod weight figures were lower in 2012. This could potentially be explained by the high temperatures in 2012, during the stages of the development of the pod and the seed.

Table 4. The Means of the Pix Applications for Pod Weight per Plant (g/plant).

Treatment Number	Applications		Years		Mean of two years
			2011	2012	
1	Control		69,70 b	45,33 c	57,52 e
2	Beginning of flowering	(A)	77,77 a	53,33 ab	65,55 ab
3	Peg formation	(B)	77,23 ab	50,83 abc	64,03 abc
4	Pod formation	(C)	70,03 b	48,57 bc	59,30 cde
5	Seed formation	(D)	69,83 a	45,50 c	57,67 de
6	A + B Stages		78,27 a	53,90 ab	66,08 a
7	A + C Stages		79,20 a	52,50 ab	65,85 a
8	A + D Stages		77,77 a	50,23 abc	64,00 abc
9	B + C Stages		77,47 a	49,23 bc	63,35 abcd
10	B + D Stages		79,03 a	48,90 bc	63,97 abc
11	C + D Stages		71,20 b	48,60 bc	59,90 bcde
12	A+B+C Stages		78,70 a	54,40 ab	66,55 a
13	A+B+C+D Stages		79,83 a	55,70 a	67,77 a
	LSD (%5)		**5,45**	**6,42**	**5,70**

When we look at the means over 2011 and 2012, we can see that the pod weight per plant was in the range of 57.52 to 67.77 g/plant. The treatments, pix applied, had higher pod weight per plant as compared to the control. As a result of the potential effects of mepiquat-chloride suggested by (Arslantas, 1991; Anonymous, 2002) in peanut cultivation, the pix application caused an increase in pod number and pod weight, so pod weight per plant is high. These findings are in agreement with the earlier findings reported by Verma et al. (2009) and Gulluoglu (2011).

The Shelling Percentage

Table 5 presents the means of shelling percentages derived from the application of the pix at various times and doses.

Table 5. The means of the Pix Applications for Shelling Percentage (%).

Treatment Number	Applications		Years		Means of two years
			2011	2012	
1	Control		64,03 b	63,43 b	63,63
2	Beginning of flowering	(A)	66,27 ab	67,07 ab	66,67
3	Peg formation	(B)	65,53 ab	66,23 ab	65,88
4	Pod formation	(C)	64,23 ab	64,53 ab	64,38
5	Seed formation	(D)	64,10 ab	65,57 ab	64,83
6	A + B Stages		65,23 ab	67,40 a	66,32
7	A + C Stages		65,87 ab	66,77 ab	66,32
8	A + D Stages		66,93 ab	67,13 ab	67,03
9	B + C Stages		66,43 ab	65,57 ab	66,00
10	B + D Stages		67,43 a	66,27 ab	66,85
11	C + D Stages		63,83 b	65,50 ab	64,67
12	A+B+C Stages		64,90 ab	63,37 ab	64,13
13	A+B+C+D Stages		65,77 ab	63,73 ab	64,75
	LSD (%5)		**3,34**	**4,14**	**Ö.D.**

The means of shelling percentage value over 2011 and 2012 were in the range of 63.63 % to 67.03 %.But the means of, the shelling percentages were not different substantially in stages. On the other hand, as compared to the control, the application of the Pix increased the shelling percentages, although the F values were not significant. These findings are in accord with the results suggested by Venkateswariu et al. (1986), Aslantas (1991), Verma et al. (2009), and Gulluoglu (2011).

100 Seed Weight

The means of 100 seed weights obtained from the application of the pix in various times and doses are presented in Table 6. The means 100 seed weight over 2011 and 2012 were in the range of 120.0 g to 129.2 g. The means indicated that the pix application had a positive effect on seed weight. The findings are in accordance with the results of Venkateswariu et al. (1986), Aslantas (1991), and Gulluoglu (2011).

Table 6. The Means of the Pix Applications for the 100 Seed Weight (g).

Treatment Number	Applications	Years		Means of two years
		2011	2012	
1	Control	117,6 c	122,4 b	120,0 b
2	Beginning of flowering (A)	122,2 abc	126,9 ab	124,6 ab
3	Peg formation (B)	123,8ab	127,3 ab	125,6 ab
4	Pod formation (C)	120,7 bc	124,2 ab	122,4 ab
5	Seed formation (D)	121,0 bc	123,5 ab	122,3 ab
6	A + B Stages	120,0 bc	126,9 ab	123,4 ab
7	A + C Stages	121,9 abc	131,2 a	126,5 ab
8	A + D Stages	120,7 bc	126,1 ab	123,4 ab
9	B + C Stages	124,4 ab	124,4 ab	124,4 ab
10	B + D Stages	127,3 a	131,1 a	129,2 a
11	C + D Stages	120,9 bc	125,1 ab	123,0 ab
12	A+B+C Stages	121,1 bc	128,4 ab	124,8 ab
13	A+B+C+D Stages	122,0 abc	127,2 ab	124,6 ab
	LSD (%5)	**6,2**	**8,2**	**7,1**

Protein Content

Table 7 presents means of the protein content. The table 7 shows that even though the protein contents of various pix applications statistically were different, when the means of 2011 and 2012 are considered, the difference was not very substantial. In addition, the figures indicated that application of the pix had negative effects on the protein content in some applications. For example, while the mean protein content over 2011 and 2012 for the control was 26.65 %, it down to 24.15 % when the Pix was applied at the stages C and D together as well as the B stages (24.18%).

Table 7. The Means of the Pix Applications for Protein Content (%).

Treatment Number	Applications	Years		Means of two years
		2011	2012	
1	Control	25,13 a	28,17 a	26,65 ab
2	Beginning of flowering (A)	22,70 bc	25,67 fg	24,18 e
3	Peg formation (B)	24,87 a	27,17 bc	26,02 abc
4	Pod formation (C)	24,57 a	26,07 ef	25,32 cde
5	Seed formation (D)	24,83 a	26,40 de	25,62 abcd
6	A + B Stages	24,30 ab	27,67 ab	25,98 abc
7	A + C Stages	25,27 a	28,10 a	26,68 a
8	A + D Stages	24,50 a	24,80 h	24,65 de
9	B + C Stages	25,73 a	24,33 h	25,03 cde
10	B + D Stages	24,50 a	24,43 h	24,47 de
11	C + D Stages	22,47 c	25,83 efg	24,15 e
12	A+B+C Stages	24,63 a	25,43 c	25,03 cde
13	A+B+C+D Stages	24,13 abc	26,67 cd	25,40 bcde
	LSD (%5)	**1,78**	**0,59**	**1,27**

Oil Content

Table 8 presents the means of oil content of the treatments. The means of oil content for various pix applications were significantly different, in two years. When the mean oil content over 2011 and 2012 are considered, the values were in the range of 49.67 % to 52.68 %. The results suggested that the application of the pix actually had a negative effect on the oil contents in some pix applications.

Table 8. The Means of the Pix Applications for Oil Content (%).

Treatment Number	Applications		Years 2011	Years 2012	Means of the two years
1	Control		51,90 bcd	52,33 ab	52,12 abc
2	Beginning of flowering	(A)	52,00 bcd	52,00 abc	52,00 abc
3	Peg formation	(B)	51,63 cd	50,33 abcde	50,98 abcd
4	Pod formation	(C)	51,27 cd	50,67 abcde	50,95 abcd
5	Seed formation	(D)	51,83 cd	49,00 de	50,42 bcd
6	A + B Stages		53,70 a	51,67 abcd	52,68 a
7	A + C Stages		52,77 abc	51,67 abcd	52,22 abc
8	A + D Stages		52,67 abc	49,67 bcde	51,17 abcd
9	B + C Stages		50,67 d	48,67 e	49,67 d
10	B + D Stages		52,43 abc	52,67 a	52,55 ab
11	C + D Stages		52,30 abc	48,33 e	50,32 cd
12	A+B+C Stages		52,40 abc	50,33 abcde	51,37 abcd
13	A+B+C+D Stages		53,40 ab	49,33 cde	51,37 abcd
	LSD (%5)		**1,53**	**2,79**	**2,21**

Crude Oil Yield

Table 9 presents the means of the treatments for crude oil yields. The results showed that the application of the pix at various stage and dose combinations led to substantially higher crude oil yields in both experiment years as compared to the control. The mean crude oil yields over 2011 and 2012 were in the range of 2506 kg ha^{-1} to 3005 kg ha^{-1}. The highest value were obtained from the plots where the pix was applied in all of the four stages (A+B+C+D), with a value of 3005 kg ha^{-1}. The mean crude oil yield increases was 17.06% in this application (A+B+C+D) as compared to control plots (3005 kg versus 2567 kg). Although, the oil content means were not substantially different by the application of the Pix, the pod yield per hectar led to a difference in crude oil yield. The findings are in agreement with the findings reported by Venkateswariu et al. (1986), Aslantas (1991), and Gulluoglu (2011).

Table 9. The Means of the Pix Applications for Crude Oil Yield (kg ha^{-1}).

Treatment Number	Applications		Years 2011	Years 2012	Means of the two years
1	Control		3102 de	2032 ef	2567 cd
2	Beginning of flowering	(A)	3464 abc	2287 abcd	2921 ab
3	Peg formation	(B)	3418 abc	2194 abcde	2806 abc
4	Pod formation	(C)	3079 e	2105 cdef	2592 cd
5	Seed formation	(D)	3102 de	1910 f	2506 d
6	A + B Stages		3603 ab	2386 a	2994 a
7	A + C Stages		3582 ab	2328 abc	2955 ab
8	A + D Stages		3509 ab	2132 bcdef	2821 abc
9	B + C Stages		3365 bcd	2050 def	2707 bcd
10	B + D Stages		3550 ab	2208 abcde	2879 ab
11	C + D Stages		3194 cde	2013 ef	2603 cd
12	A+B+C Stages		3537 ab	2344 ab	2940 ab
13	A+B+C+D Stages		3654 a	2356 ab	3005 a
	LSD (%5)		**276**	**238**	**257**

Pod Yield

Table 10 presents the means of pod yield the application of the pix at various stages and doses. The Table 10 shows that the pod yield was in the range of 5976 kg ha^{-1} to 6844 kg ha^{-1} in 2011, whereas it was in the range of 3885 kg ha^{-1} to 4774 kg ha^{-1} in 2012. In both years, the lowest pod yields were obtained from the control. The highest pod yields, on the other hand, were obtained from the plot where the pix was applied at all 4 stages (A+B+C+D). The pod yields in 2012 were lower than those in 2011. The reason for this was the pod per plant and pod weight per plant differences due to the higher temperatures in 2012 (Table 3 and Table 4).

The pix applications had substantial impact on the pod yield in both 2011 and 2012. The pod yield for the control plot in 2011 was 5976 kg ha^{-1}. With the application of the pix, the pod yield reached a high level of 684.4 kg/da. When the pix was applied at all of the four stages (A+B+C+D), the increase in the pod yield was 14.5 %, followed by an increase of 13.6 % when the Pix was applied during the beginning of the flowering and pod formation stages. Similarly, when the pix was applied during the peg formation and seed formation stages, the increase was 13.4 %. However, substantial increases were not achieved when the pix was applied during the pod formation stage, and the seed formation stages each and as well as combined.

Table 10. The Means of the Pix Applications for Pod Yield (kg ha^{-1}).

Treatment Number	Applications	Years		Means of the two years
		2011	2012	
1	Control	5976 b	3885 c	4930 d
2	Beginning of flowering (A)	6664 a	4572 ab	5618 ab
3	Peg formation (B)	6619 a	4357 abc	5488 abc
4	Pod formation (C)	6002 b	4161 bc	5082 cd
5	Seed formation (D)	5983 b	3900 c	4942 d
6	A + B Stages	6709 a	4621 ab	5665 a
7	A + C Stages	6787 a	4502 ab	5645 a
8	A + D Stages	6665 a	4304 abc	5485 abc
9	B + C Stages	6641 a	4219 bc	5430 abc
10	B + D Stages	6774 a	4193 bc	5483 abc
11	C + D Stages	6106 b	4165 bc	5135 bcd
12	A+B+C Stages	6747 a	4660 ab	5703 a
13	A+B+C+D Stages	6844 a	4774 a	5808 a
	LSD (%5)	**466**	**547**	**487**

On the other hand, the pod yield of the control in 2012 was 3885 kg ha^{-1}, whereas the application of the pix raised the pod yield to high levels of 4774 kg ha^{-1}. Parallel to the results obtained in 2011, in 2011 the highest increase was achieved when the pix was applied in all four growth stages (A+B+C+D).

The mean of pod yield values over 2011 and 2012 were in the range of 4930 kg ha^{-1} to 5808 kg ha^{-1}. The results obtained from the pix application were substantially higher than those obtained from the control. The pod yield was 4900 kg ha^{-1} in the control, whereas it reached to high levels of 5808 kg/ha in the multiple stages applications. The pod yield increase was 17.8 % when the pix was applied at all four stages (A+B+C+D), whereas it was 15.7 % in a triple stage application, and 14.9 % in a double stage application.

This positive effect of the pix on the pod yields could be explained by the positive effects of mepiquat-chloride in peanut cultivation mentioned in the text earlier. Due to its mepiquat-chloride content, the pix application led to an increase in the number and the weight of the pods causing the increase of the pod yield. These findings are in accordance with earlier reports by Keting and Schubert (1981), Redy and Patil (1983), Arslantas (1991), Jeyakurmar and Thangaraj (2008), Verma et al. (2009), and Gulluoglu (2011).

CONCLUSION

Our results indicated that the pix applications at various times and doses had substantial influence on the pod yield, based on the means of 2011 and 2012. The pod yield of the treatment: the pix was applied during all four stages was 5808 kg ha^{-1}, whereas the pod yield from the control was 4930 kg ha^{-1}. All of the various pix applications, except the applications during the pod formation and seed formation stages, separately and combined, led to a yield increase of at least 10 %. The highest yield increase achieved by the application of the pix was 17.8 % followed by a 15.7 % increase from pix application during three growing stages.

The findings suggested that any one of the applications that were employed in treatments 2 (beginning of flowering), 6 (beginning of flowering + peg formation), 7 (beginning of flowering + pod formation), 12 (beginning of flowering + peg formation + pod formation), 13 (beginning of the flowering + peg formation + pod formation + seed formation) could be recommended to peanut growers. The applications of the pix at these stages could lead to substantial pod yield increase so could provide an economical net income levels.

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PUBLICATION POLICY

This publication policy statement outlines policy and procedures relative to Turkish Journal of Field Crops.

1. General Policy

All material intended for publication by the Society should be written in English. Manuscripts for the Journal should be sent to the Editor.

2. Editor

Editor is nominated by the Governing Board and serves a 3-year term. The Editor makes recommendations to the Governing Board to appointment of the technical and associate editors and serves as a Chairman of the Editorial Board.

3. Editorial Board

Editorial Board consisting of the Editor, Technical Editors and Associate Editors prepares the Journal. Editorial Board develops procedures for manuscript submission, review and referee criteria, acceptance, release and publication. The editor delegates editorial functions to other members of the Editorial Board. The Editor also processes review and interpretive papers and handles the appeal procedure for rejected manuscripts. The Editor may write editorials or solicit manuscripts on special topics.

4. Technical Editor

Technical editors are appointed for specific subject matter areas and are responsible for the technical and intellectual content of the journal in these areas. They supervise the registering of manuscripts and other record keeping activities and direct the work of the assigned Associate Editors in reviewing and evaluating manuscripts submitted to Turkish Journal of Field Crops.

5. Associate Editor

Associate Editors are responsible for obtaining a minimum of two reviews for each manuscript assigned to them, one of which should be accomplished by the Associate Editor. Each review is an evaluation of the intellectual content of the manuscript for publication. The fallowing steps will be fallowed for prompt reviews.

a. Associate Editors are expected to act as primary reviewer for papers close to their area of expertise.

b. Associate Editors are encouraged to contact prospective reviewers and request return of the reviewed paper within two weeks.

c.Associate Editors are advised to read papers carefully before sending them out for review. Associate Editor is encouraged to be one of the primary reviewers. Two quality reviews of manuscript is the goal.

d. Associate Editors should avoid sending revisions out for additional reviews unless very extensive revision makes it mandatory.

e. The Associate Editor is encouraged to handle minor revisions by telephone rather than returning the paper to the author.

6. Manuscript Handling

Three copies of manuscripts should be submitted to the receipt of the Editor. The Editor notifies the corresponding author of the receipt of the manuscript, sends a permission to print and reprint form to the author, assigns registration number to the manuscripts. The registration number must be used in all correspondence regarding the manuscript. The Editor assigns manuscripts to the Technical Editors on the basis of subject matter. The Technical Editors in turn assign manuscripts to the Associate Editors. The Associate Editors obtain a minimum of two reviews for each manuscript.

If the reviewers recommend publication without change and the Associate Editor agrees, the manuscript and reviewers report are sent to Technical Editor for concurrence.

The editor could also assign manuscripts to the technical editors and two referees. If two referees accept, the manuscript is accepted for publication after the approval of technical editor.

If the reviewers and the Associate Editor find the manuscript could be published after some revision, the manuscript is returned to the author to obtain a satisfactory revision. If a revised manuscript is not returned by the author the first released manuscript must be submitted to the Technical editor to receive additional consideration for the Journal.

If the reviewers and Associate Editor recommend that a manuscript be rejected, the manuscript and reviewers comments are sent to the Technical Editor. If the Technical Editor concurs that the manuscript should be rejected, the manuscript is released to the author. The author of a manuscript rejected has the option of appealing the release to the Editor. In appealing the release, the author must provide the Editor with a clean copy of the released version of the manuscript. All editorial correspondence and a letter are stating the reasons why the author is appealing the release.

7. Notes

Short papers covering experimental techniques, apparatus and observations of unique phenomena are published as notes. Review procedures for notes are the same as those for regular articles. The format for notes less than two printed pages is less formal than that for full length articles.

8. Letters to the Editor

The journal publishes Letters to the Editor. Letters may contain comments on articles appearing in the Turkish Journal of Field Crops or general discussion about crop science research and are limited to two printed pages. If a letter discusses a published paper, the author of that paper may submit a response to the comments. Published papers must be approved by the Editor and may receive a peer review.

ASSOCIATION NEWS

THE 11th CONGRESS OF FIELD CROPS

The 11th congress of field crops will be held at the Çanakkale 18 Mart University Campus in 2015.

THE 10th CONGRESS of FIELD CROPS

The 10th Congress was held at the Selçuk University, Konya in September, 10-13, 2013 with the attendance of 582 participants. Two hundred and 3 oral and 288 posters were presented. The gowerning board extents its sincere thanks and congratulations to the Prof.Dr. Ali Topal Head of the Organizing Committee

MEMBERSHIP FEES FOR 2014

The membership fee for 2014 will be 30 Turkish Liras and it could be send to the following address:
Dr. Gülsüm Oztürk
Ege Universitesi Ziraat Fakültesi Tarla Bitkileri Bölümü, Bornova-İZMİR 35100
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PUBLICATION CHARGE

Four hundred (400 TL) Turkish Liras will be charged for a normal article (7 printed pages) published in the Offical Journal: Turkish Journal of Field Crops. Non-citizens will pay $ 200 for publication charge in order to share the publication costs.
Additonal information could be found in the offical web site of the Journal (Field-Crops).
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IMPACT FACTOR

The impact factor of the Turkish Journal of Field Crops has been steadyl increasing such as 0.23 in 2010; 0.47 in 2011; 0.65 in 2012 and 0.89 in November 2013. The h-index in 5.
On this occasion, we would like to thanks to all participants who take valuable part in the publication process of the Journal.

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