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EFFECT OF SEEDING RATE ON YIELD, YIELD COMPONETS AND SOME AGRONOMIC CHARACTERS OF TWO WHEAT CULTIVARS

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ABSTRACT

Two field experiments were conducted at Al-Oha wheat State Farm, Department of Agriculture and Livestock – Al-Ain, United Arab Emirates, during the two successive seasons of 1996/1997 and 1997/1998, to find out the effect of the different seeding rates on yield, yield components and some other agronomic characters of Mexican wheat cultivar Ceti Serres (7C) and Syrian wheat cultivar Sham 2 .

The results obtained could be summarized as follows:

1- The two cultivar produced statistically the same grain and straw yields.
2- Increasing seeding rate decreased each of spike length, number of spikelets/ spike flag leaf area, number of kernels/ spike and spike grain weight but in the same time increased number of spikes /m^2. However, 1000-grain weight was not affected by the different seeding rates.
3- Grain and straw yields were not affected by various seeding rates in both seasons.

INTRODUCTION

Wheat plant is known to have compensatory nature by using its tillering habit. Giving a wheat plant big land area encourages the plant to give more tiller. Increasing plants/ unit area of land limits the production of tillers. Finally, the grain yield of this crop is determined by both number of plant/unit area and the productivity of the individual plant. Maximizing both factors leads to maximum yield. Increasing seeding rate to the point at which minimum reduction of yield/ plant is the philosophy of optimum seeding rate.

Regarding the effect of seeding rate on the agronomic characters of wheat cultivars, Ibrahim (1972) recorded significant decrease in spike length with increasing seeding rate. Saleh (1981) recorded significant decrease, in the number of spikelets/spike, plant height and spike length with increasing seeding rate from 30 to 60 or 90 kg seeds/fed., Gabr (1988) recorded that 60kg seeds/fed. reduced number of days to heading, spike length and number of spikelets/spike compared with sowing by 40kg seeds/fed. Meanwhile plant height increased by increasing the seeding rate up to 60 kg seed /fed while flag leaf area was not affected by the different seeding rates. Mosalem (1993) reported increase in plant height by increasing seeding rate from 40 to 70 kg seeds / fed. El-Shaarawy (1998) recorded significant decrease in flag leaf area, spike length and number of spikelets/spike with increasing seeding rate while number of days to heading and plant height were not affected by various seeding rates.

The effect of seeding rate on yield components of wheat cultivars recorded by many investigators. In general, number of spikes/ m^2 was increased by increasing seeding rate while number of grains/ spike and spike grain weight decreased, this was shown by Saleh (1981), Gomaa (1983), El-Gharieb and El-Monoufi (1988), Gabr (1988), Kumar *et al*. (1991), Megahed (1991) and El-Shaarawy (1998).

Regarding the effect of seeding rate on 1000-grain weight, different trends were reported, Saleh (1981), Gomaa (1983), El-Gharieb and El-Monoufi (1988), Mahmoud (1988), Blue *et al*. (1990) Mosalem (1993), Al-Ubidi (1995) and El-Shaarawy (1998) recorded significant decrease of 1000-grain weight with increasing seeding rate. However, Hegazi *et al*. (1982), Samra and Dhillan (1987), Gabr (1988) and Megahed (1991) found that, 1000-grain weight was not affected by Various seeding rates.

Grain and straw yields increased by increasing seeding rate, this was recorded by Hagras (1985), Abd El-Latif and El-Tuhamy (1986) and Mahmoud (1988) which they recorded significant increases in grain and straw yields with increasing seeding rate up to 75kg/fed.,while Samra and Dhillan (1987) and Singh *et al*. (1992) obtained the highest yields of grain and straw by increasing seeding rate up to 120 kg seeds/ha. Saleh (1981) and Gomaa (1983) recorded increases in straw yield by increasing seeding rate and in the same time grain yield was not affected by difference seeding rate. Bassiouny (1979) and Megahed (1991) reported that grain and straw yields were not affected by various the seed rate.

MATERIALS AND METHODS

This study was performed at Al-Oha wheat State Farm, Department of Agriculture and Livestock – Al-Ain, United Arab Emirates, during the two successive seasons of 1996/1997 and 1997/1998, to find out the effect of six seeding rates on yield, yield components and some agronomic characters of two wheat cultivars.

I- Cultivars:

1- Ceti Serres (7c). 2- Sham 2.

II- Seeding rates:

1- 60 kg seeds/ha. 2- 90 kg seeds/ha.
3- 120 kg seeds/ha. 4- 150 kg seeds/ha.
5- 180 kg seeds/ha. 6- 210 kg seeds/ha.

The split plot design with four replications was followed. The two cultivars were allocated for the main plots. The six rates of seeding were randomly distributed in the sub- plots. The area of the sub- plot was 2 x 3 m including 10 rows at 20 cm apart. Planting date was 11th of November in both seasons while harvesting date was 14th and 5th of April in the first and second season, respectively. Other agronomic practices of wheat like N,P and K fertilizers were done as recommended. Sprinkler irrigation system was used and about 60 irrigations were given with water of 1200 ppm soluble salts.

At milk ripe stage flag leaf area was determined using the method suggested by Lal and Subba Rao (1951). Harvesting took place at physiological maturity harvested area was 2.4 m^2 from each sub-plot (4 inner rows x 3 m length and 20 cm apart). Days to heading was recorded when 50% of the spike emerged.

At harvest time, each sub plot was harvested and following characters were measured.

1- plant height (cm).
2- spike length (cm).
3- Number of spikelets/spike.
4- Number of spikes/m^2 .
5- Number of kernels/spike.
6- 1000-kernel weight (gm).
7- Spike grain weight (gm).
8- Grain yield (ton/ha)
9- Straw yield (ton/ha).

The data obtained in each season were statistically analysed according to procedures outlined by Snedecor and Cochran (1967) and the treatments means were compared by Least Significant Difference (L.S.D.) at 5% level.

RESUTS AND DISCUSSION

The effect of seeding rate on yield, yield components and agronomic characters on the studied characters are shows in (Tables 1 and 2).

1- Varietal Variations:

Data presented in Table (1) showed that Ceti-Serres (7c) wheat cultivar was earlier than Sham 2 cultivar, while Sham 2 cultivar had larger spike length and higher number of spikelets/spike.

Data presented in Table (2) indicated that Ceti-Serres (7c) wheat cultivar had heavier spike grain and 1000 grain weights than those of Sham 2 cultivar.

The two cultivars did not differ from each other in flag leaf area, plant height, number of spikes/m^2 , number of grains/spike, grain and straw yields in both seasons as shown in Tables (1and 2).

2- Effect of seeding rates:

The results in Table (1) indicated that increasing seeding rate caused a significant decrease in spike length, number of spikelets / spike and flag leaf area in both seasons and number of days to heading as well as plant height in one season. These findings are in accordance with those obtained by Saleh (1981) and El-Shaarawy (1998). Regarding the effect of seeding rate on yield components of the two wheat cultivars, date in Table (2) indicated that increasing seeding rate caused significant increase in number of spikes/m^2, whereas, number of kernels/spike and spike grain weight were decreased. However, 1000-grain weight was not affected by varying the seeding rate. These results are in harmony with those obtained by Gabr (1988) and Megahed (1991).

Data in Table (2) indicated that various seeding rates did not affect grain or straw yields in both seasons. The results of grain yield are in harmony with those obtained by Bassiouny (1979), Saleh (1981), Gomaa (1983) and Megahed (1991) while the results of straw yield are in harmony with those obtained by Bassiouny (1979) and Megahed (1991).

3- Effect of the intereaction between cultivars and seeding rates:

The effect of the interaction between the cultivars and seeding rates in this study was not statistically significant on all the characters studied.

REFERENCES

Abd El-Latif L.I. and M.K. El-Tuuhamy (1986). Effect of nitrogen fertilization levels and seeding rates on growth and yield of wheat . Annals Agric. Sci., Fac. of Agric., Ain Shams Univ., Egypt 31(1):265-272.

Al-Ubidi Hyad F.A. (1995). Effect of planting dates and seeding rates on yield, yield components and other charcters of two wheat cultivars. M.Sc. Thesis, Fac. of Agric., Bagdad Univ.

Bassiouny, A.H.M. (1979). Effect of methods and rates of seeding as related to nitrogen fertilization on growth and yield of wheat. M. Sc. Thesis, Fac. of Agric. Zagazig Univ., Egypt.

Blue, E.N; S.C. Mason and D.H. Sander (1990). Influence of Planting date, seeding rate and phosphorus rate on wheat yield. Argon. J., 82: 762-768.

El-Ghareib, E.A. and M.M. El-Monoufi (1988). Effect of seeding rates and nitrogen fertilization levels on the productivity of Giza 157 Egyptian wheat cultivars. Annals Agric. Sci. Fac. Agric. Ain Shams Univ., Cairo, Egypt.

El-Shaarawy, G.A.M. (1998). Effect of some agricultural treatments on growth and yield of some new wheat varieties. M.Sc. Thesis, Fac. of Agric., Al-Azhar Univ., Egypt.

Gabr, E.M.A. (1988). Effect of seed rate and nitrogen application on wheat yield. Ph. D.Thesis, Fac. of Agric. Zagazig Univ., Egypt.

Gomaa, M.A. (1983). Studies on some factors affecting yield of some wheat varieties. Ph. D., Thesis, Fac. of Agric. Zagazig Univ., Egypt.

Hagras A.M. (1985). Influence of seed rates and nitrogen fertilization on yield of durum wheat. Annals of Agric. Sci, Ain Shams Univ. 30 (2): 929 - 949.

Hegazi, K.F., E.H. Ghanem; A.M.A.S. Ali and E.S. Shokr (1982). The effect of seeding rate and nitrogen application on the yield and its components of the wheat variety Giza 157. Annals of Agric. Sci, Moshtohor, 18:1-13.

Ibrahim, A.A., (1972). Differential response of dwarf wheat vanities to time of planting and rate of seeding. Ph.D. Thesis, Indian Agric. Res. Institute.

Kumar, A.; A.K. Sinha and B.P. Sinha (1991). Response of wheat genotypes to seed rates an row spacing. Indian J. Argon., 36 (1): 78 - 82.

Lal, K.N. and M.S. Subba Rao (1951). A rapid method of leaf area determination. Nature, 167 : 72.

Mahmoud, K. (1988). Study on some agricultural factors affecting growth yield, yield components and technological characteristics of wheat. Ph. D. Thesis, Fac. of Agric., Minia Univ, Egypt.

Megahed, M.A.M. (1991). Effect of some agricultural treatments on wheat. Ph. D. Thesis, Fac. of Agric., Zagazig Univ., Egypt.

Mosalem, M.E. (1993). Response of two wheat cultivars to nitrogen levels and seeding rate. J.Agric. Res. Tanta Univ., Egypt 19(4): 791-805.

Saleh, M.E.E. (1981). Productivity and floral fertility of wheat plant as affected by some agronomic treatments. Ph.D. Thesis, Fac. of Agric., Zagazig Univ., Egypt.

Samra, J.S. and S.S. Dhillan (1987). Response of wheat varieties to seed rates and nitrogen. Indian J. Argon., 32 (2) : 167 – 169.

Singh, R.V.; V.K. Dubey and M.D. Vyas (1992). Effect of seed rate, nitrogen level and method of fertilizer placement on wheat (*Triticum aestivum,* L.) under late sown condition. Indian J. Argon., 37 (1) : 43 – 46.

Snedecor, G.W. and W.G. Cochran (1967). Statistical methods, sixth Edition. Iowa State Univ. Pres. Ames. Iowa U.S.A.

تأثيــر معدلات التقاوي على الإنتاجية وبعض الصفات الخضرية لصفتين من القمح

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خبير الشئون الزراعية ـ دائرة الزراعة والثروة الحيوانية بالعين ـ دولة الإمارات العربية المتحدة

أقيمت تجربتان حقليتان خلال الموسم الزراعي 1997/1996 والموسم الزراعي 1998/1997 بمشروع إنتاج القمح بالعوهــه التابع لدائرة الزراعة والثروة الحيوانية بالعين – دولة الإمارات العربية المتحدة وذلك بهدف تحديد أنسب معدل من البذار لصنفين من أقمــاح الخبــز التي تزرع بدولة الإمارات العربية المتحدة وهما الصنف سيتي سيرس والصنف شام 2 حيث يزرع الصنف الأول في مساحة حوالي 30% والثاني في حوالي 10% من مساحة إنتاج القمح بدولة الإمارات العربية المتحدة 0

ولقد أوضحت نتائج هذه التجارب أنه لا توجد فروق بين هذين الصنفين من حيث الإنتاج سواء في محصول الحبوب أو محصول القش كما أن استخدام المعدلات المختلفة من التقاوي من 60 كجم وحتى 210 كجم بذور للهكتار لم يكن لها أي تأثير على كل من محصول الحبوب أو القش0

Table (1): Effect of seeding rate on some agronomic characters of two wheat cultivars during 1996/1997 and 1997/1998 seasons.

Characters	Spike length cm		Number of spikelets /spike		Flag leaf area cm^2		Days to heading		Plant height cm	
Trearments	**96l97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**
A- Cultivates:										
Ceti Serres (7c)	10.0	8.5	15.1	12.9	43.4	30.1	59.7	54.4	86.4	73.7
Sham 2	10.6	8.7	17.7	13.6	41.1	27.9	65.1	58.5	86.0	71.6
F- test	**	NS	**	**	NS	NS	**	**	NS	NS
B- Seeding rates:										
60 kg seeds/ha.	11.0	9.4	17.7	15.1	49.8	31.6	63.6	56.6	86.1	74.0
90 kg seeds/ha.	10.5	9.0	16.9	14.3	43.2	28.9	63.3	56.5	85.3	75.3
120 kg seeds/ha.	10.3	8.8	16.3	14.0	40.3	29.2	62.3	56.1	85.9	72.7
150 kg seeds/ha.	10.2	8.3	16.3	12.9	39.2	28.3	62.1	56.4	88.0	72.2
180 kg seeds/ha.	10.1	8.1	16.1	12.4	40.9	28.3	62.0	56.1	85.9	70.6
210 kg seeds/ha.	9.7a	8.0	15.1	12.6	39.6	27.5	61.1	57.0	86.0	71.3
F- test	**	**	**	**	**	**	**	NS	NS	*
L.S.D. at 5% level	0.4	0.5	0.7	0.9	4.1	2.4	0.9	--	--	2.9
Interactions (AxB)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table (2): Effect of seeding rate on yield and yield components of two wheat cultivars during 1996/1997 and 1997/1998 seasons.

Characters	Number of spikes/m²		Number of kernels /spike		Spik grain weight (gm)		1000-grain weight (gm)		Grain yield (ton/ha)		Straw yield (ton/ha)	
Trearments	**96l97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**	**96/97**	**97/98**
A- Cultivars:												
Ceti Serres (7c)	435	384	49.8	43.1	1.90	1.54	38.3	35.8	6.0	4.7	8.4	4.8
Sham 2	464	424	52.4	40.9	1.88	1.24	36.0	30.5	5.8	4.2	8.6	4.9
F- test	NS	NS	NS	NS	NS	**	**	**	NS	NS	NS	NS
B- Seeding rates:												
60 kg seeds/ha.	388	315	55.7	50.1	2.05	1.66	36.9	31.2	6.0	4.1	8.2	4.8
90 kg seeds/ha.	433	374	52.7	45.7	1.97	1.50	37.3	33.0	6.0	4.6	8.3	4.4
120 kg seeds/ha.	402	392	49.7	42.7	1.95	1.44	37.4	33.8	6.0	4.4	8.3	4.8
150 kg seeds/ha.	479	403	49.5	39.2	1.89	1.28	37.2	32.8	5.9	4.5	8.9	4.9
180 kg seeds/ha.	476	463	50.4	38.0	1.85	1.25	37.3	33.0	5.8	4.6	8.9	5.1
210 kg seeds/ha.	525	478	48.9	36.2	1.80	1.20	36.8	32.9	5.6	4.5	8.5	4.9
F- test	**	**	*	**	*	**	NS	NS	NS	NS	NS	NS
L.S.D. at 5% level	51	52	3.9	4.6	0.16	0.17	--	--	--	--	--	--
Interactions (A xB)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS