Effect of Sowing Dates and Seeding Rates on Yield and Its Components of Triticale In Rainfed Region

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ABSTRACT

This investigation was carried out during two winter seasons (1992/1993 and 1993/1994) to determine the optimum time of sowing and seeding rate , of triticale , cultivar Rowaida which ensure maximum yield under rainfed region.
Results showed that the optimum time of sowing triticale is during 15th October. until 15th November. The delay beyond that period resulted in decreasing the yield and its components .The reasonable seeding rates were 160 - 200 kg /ha .

INTRODUCTION

Though triticale (X. Tritosecali Wittmack), was originally developed to be a food grain and it has been grown mainly as a feed grain (1).
The recent heavy demand on feed concentrates required for the fast growing poultry and animal production in the region may encourage farmers to grow forage grain crops such as triticale .
Studies in the areas of USA showed that it is comparable to other winter cereals for forage (2) hay (3) and for both forage and grains(4) . On the other hand in Pakistan there is a need for such a cereal crop that can offer significantly better yield than wheat in unfavorable growing areas and which is acceptable for making flat breads e.g. Chapati, Nann(5), while under dryland farming conditions in Syria it was observed that some triticale lines produced more forage and grain yield after simulated grazing than the local barley(6).
Triticale has been recently introduced to Sulaimani Research Station so no information is available , concerning growth and development of this crop .Time of sowing and seeding rate may be considered , the most important factors that have a great influence on yield productivity.
The objective of this study was to evaluate the effects of sowing dates and seeding rates on yield and some yield components .

MATERIALS AND METHODS

For two growing seasons (1992/1993 and 1993/1994) a factorial experiment in RCBD design with four replications was carried out under dry land farming conditions at Bakrajo Field Crop Research Station at Sulaimani . The experiment included five sowing dates at 15 days intervals starting from 15 October and five seeding rates which were (80, 120,160 and 200)kg/ha.
The cultivar used was Rowaida a local cultivate grown by Board Applied for Agricultural Research .An amount of 80

kg/ha of NP compound fertilizer (27:27) was used during sowing .Plots consisted of 8 rows each 5 m long with spacing 20cm between rows . (2,8)

Data were taken on final plant height from the ground level up to the end of five random plants/plot , grains yield of six central rows /plot in grams then converted to kg/ha , number and weight of grains/head were taken from ten random head/ plot, 1000 grains weight and test weight from four random samples.

Monthly precipitation in mm and a brief account of some mechanical and chemical properties of the experimental soil are presented in Table1.

Data were statistically analyzed and all comparisons among means were carried out using Duncan's Multiple Range Test (7).Averages within each column have the same letter or the same groups of letters are not statistically different at 5%level , also averages which are not bearing letters are not significantly different.

Table(1) : Meteorological data of the growing seasons , mechanical and chemical analysis of the experimental soil.

Monthes	Precipitation (mm) 1992-1993	1993-1994	Analyzed fraction	Estimation
October	—	55.5	Mechanical analysis	
November	158.9	196.1	Sand %	9
December	146.8	79.9	Silt %	43
January	159.0	179.1	Clay %	Silty clay
February	224.9	98.0		
March	156.8	99.9	Chemical analysis	
April	85.0	98.3		
May	74.5	7.8	Organic matter %	1.2
June	6.4	—	Nitrate (ppm)	23.5
Total	1012.3	814.6	PH	7.9

* Data were taken from the Meteorological station at Sulaimani.

RESULTS AND DISCUSSIONS

Sowing dates effects:

Data presented in Tables 2,3 showed that sowing dates significantly affected the studied traits in both seasons and their average . the combined analysis (Table 3) showed that sowing date on 1 November gave the highest final plant height (116.92cm) which was not significantly different from the first and third sowing dates, which gave 116.57 cm and 116.03cm respectively. These results are high in comparison with the results reported (93cm) under Cukorova region in Turkey(9).Regarding the grain yield (Table 2) the first two sowing dates significantly gave the higher grain yield than the rest sowing dates in 1992/1993 season .While ,in 1993/1994 season the first three sowing

dates significantly gave higher grain yield than the last two sowing dates . Moreover, the combined analysis showed that sowing date on 15 October gave the highest grain yield (2417 kg/ha) which was not significantly different from the second and third sowing dates, which gave 2403 and 2351 kg/ha respectively .These results are low in comparison with the results reported under the regions Tel Hadya rainfed condition in Syria and Sulaimani ,which were 3450 and 2878 kg/ha respectively [1, 8] and under Cukurova region (6000 kg/ha) of Turkey (9). While these results are high in comparison with the results (2000kg/ha) reported in Syria by ICARDA[10].

The effects of sowing dates averaged overall the two seasons (Table 3)showed that the sowing date on 15 October gave significantly higher number of grains/head (67.91).This result is low in caparison with the reported result (72.2) under Sulaimani region. The same trend mentioned above was found with respect to1000 grains weight (41.38 g). This result is similar to the results reported in Turkey and Sulaimani region(42.3 - 43.1 g) and (41.9- 43.2 g) respectively [9,8].Regarding the weight of grains/head and test weight , the combined analysis showed that the two earlier sowing dates gave significantly highest weights of grains /head (3.03g) and highest test weight (65.18kg/hl) .These results are similar with the results of grains weight/head reported (2.99-3.17 g) under Sulaimani region [8] .While the results of test weight reported under Cukurova region 73.2-75.2 kg/hl [9] is high in comparison with the results of this study (Table2) .

Table (2) : The effect of sowing dates on studied traits during 1992 / 1993 and 1993 / 1994 seasons

Sowing dates	Final plant height (cm)	Grain yield kg / ha	Number of grains/ head	1000 grains weight (g)	Weight of grains/ head	Test weight kg / hl
			1992 / 1993			
15-Oct	116.25 a	2400 a	48.37 a	39.06 b	3.41 a	64.55 a
1- Nov	116.75 a	2328 a	71.56 b	39.53 a	2.99 b	64.69 a
15- Nov	113.06 bc	2220 b	68.43 c	37.31 c	2.69 c	63.36 b
1- Dec	114.25 ab	1996 c	67.87 c	36.93 d	2.65 c	63.30 b
15- Dec	112.06 c	1816 d	66.56 c	37.26 c	2.69 c	63.36 d
			1993 / 1994			
15- Oct	116.90 ab	2435 a	57.46 a	43.71 a	2.66 b	66.81 a
1- Nov	117.10 ab	2478 a	59.21 a	42.21 b	2.90 a	65.81 a
15- Nov	119.00 a	2483 a	59.09 a	42.34 b	2.85 a	65.43 b
1- Dec	115.90 b	2191 b	57.59 a	41.59 c	2.62 b	65.18 c
15- Dec	109.10 c	1780 c	49.09 b	41.07 d	2.18 c	64.0 bd

Table (3) : The effect of sowing dates (averaged - overall) during the 1992 / 1993 and 1993 / 1994 seasons

15- Oct	116.57 ab	2417 a	67.91 a	41.38 a	3.03 a	65.18 a
1- Nov	116.92 a	2403 a	65.38 b	40.87 b	2.94 a	60.24 a
15- Nov	116.03 ab	2351 a	63.76 bc	39.82 c	2.77 b	64.31 b
1- Dec	115.07 b	2093 b	62.73 c	39.26 d	2.67 c	64.24 b
15- Dec	110.58 c	1798 c	57.82 d	39.17 d	2.43 d	63.71 c

Seeding rates effects:

Final plant height and test weight were not significantly affected by seeding rates during the two growing seasons and their average (Table4,5) ,while the rest studied traits were significantly affected by seeding rates .The last two seeding rates gave significantly higher grain yield than the first two seeding rates during both seasons and their average. The combined analysis (Table 5) showed that the highest grain yield (2373kg/ha) was at seeding rate (160 kg/ha) which was not significantly different from the last seeding rate (200kg/ha) which gave (2353 kg/ha). These results are low in comparison with results reported (3664kg/ha) under middle region of Iraq(11). Regarding the number of grains /head, weight of grains/head and 1000 grains weight , the combined analysis showed that the first seeding rate gave significantly highest numbers of grains /head weight of grains/head and 1000 grains weight although, there were not significant differences between the first and second seeding rates. The highest seeding rate (200kg/ha)gave significantly lowest number grains/head , weight of grains/head and 1000 grains weight .

Table (4) : The effect of seeding rates on studied traits during 1992 / 1993 and 1993 / 1994 seasons .

Seeding rates kg / ha	Final plant height (cm)	Grain yield kg / ha	Number of grains/ head	Weight of grains/ head	1000 grains weight (g)	Test weight kg/hl
			1992/1993			
80	115.43	2192 b	72.20 a	2.87 b	28.23 ab	64.17
120	113.00	2128 b	72.35 a	3.02 a	38.36 a	64.04
160	114.00	2295 a	70.95 a	2.98 ab	38.01 b	63.65
200	115.45	2347 a	66.75 b	2.68 c	37.48 c	63.53
			1993 / 1994			
80	115.40	2159 b	59.15	2.86 a	42.60 a	65.20
120	116.40	2119 b	59.15	2.63 b	42.22 a	65.70
160	116.10	2452 a	55.90	2.56 b	42.22 a	65.32
200	114.40	2360 a	54.75	2.57 b	41.72 b	64.82

Table (5) : The effect of seeding rates (averaged overall) during 1992 / 1993 and 1993 / 1994 seasons.

80	115.42	2144 b	65.67 a	2.86 a	40.41 a	64.68
120	114.70	2123 b	64.25 ab	2.82 ab	40.29 ab	64.87
160	115.05	2373 a	63.42 b	2.77 b	40.11 b	64.48
200	114.92	2353 a	60.75 c	2.62 c	39.60 c	64.17

The effect of years (averaged-overall) of the two growing seasons 1992 /1993 and 1993/1994on the studied traits are represented in Table 6 which showed that the grain yield was significantly varied between the two seasons, depending upon the climatical conditon prevailing in the region (Table 1).

Table (6):Effect of years(averaged -overall) of the sowing dates on the studied traits:

Year	Final Plant height(cm)	Grain yield (kg/ha)	Number of grains/head	1000 grains weight(g)	weight of grains/head	Test weight(kg/hl)
1992/1993	114.5	2152.0 b	64.56 a	38.02 b	2.89	63.85
1993/1994	115.6	2273.4 a	56.49 b	42.18 a	2.64	64.45

The highest grain yield (2273.4 kg/ha) was in the 1993/1994 season(Table 6) , although the amount of precipitation (1012.3 mm) in 1992/1993 season was more than in 1993/1994 season which was 814.6 mm (Table 1).This might be attributed to early coming of precipitation during October (55.5 mm) before the usual time in the region which is normally on November.

Consequently the early development of full canopy of foliage and getting leaves to a good start early in their growth cycle .This in turn might have good effects on grain yield (8).On the other hand the high amount of precipitation (74.5 mm) during the post flowering phase which is in May in Sulaimani region (Table 1) might be resulted in some grain yield loss due to lodging .Final plant height ,weight of grains/head and test weight were not significantly affected by years ,while the number of grains/head and 1000 grains/weight were significantly affected (Table 6).The effect of interaction between sowing dates and seeding rates were not significant, indicating that the two factors acting independently.

From the results of this study it could be concluded that the optimum time of sowing triticale is during 15th October until 15 th November and any delay beyond that period resulted in decreasing the yield significantly and the best seeding rates were 160-200 kg/ha.

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تاثير مواعيد الزراعة وكميات التقاوى على الحاصل ومكوناته لمحصول القمح الشيلمي في المنطقة الديمية المضمونة الامطار

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الخلاصة

اجرى هذا البحث لموسمين شتويين متتاليين ١٩٩٢/١٩٩٣ و ١٩٩٣/١٩٩٤ على محصول القمح الشيلمي بهدف تحديد انسب موعد لزراعة هذا المحصول مع انسب كمية من التقاوى تحت ظروف المنطقه الديمية المضمونة الامطار في السليمانية .

دلت نتائج هذا البحث على ان انسب فترة لزراعة هذا المحصول هي الفترة من ١٥ تشرين الاول لغاية ١٥ تشرين الثاني و ان تاخير الزراعة الى اواخر هذا الشهر تؤدي الى انخفاض الحاصل معنويا ، كما ان انسب كمية من التقاوي هي بين ١٦٠-٢٠٠ كغم /هكتار .

کاریگەری کاتی چاندن وچڕی تۆودان لە سەربەرهەی تریتیکالی لەژێر دۆخی ناوچە باراناویەکاندا

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کورتە

ئەم توێژینەوەیە ئەنجام درا لەهەردوو وەرزی زستانی ١٩٩٢/١٩٩٣ و١٩٩٣/١٩٩٤ بە چاندنی تریتیکالی لە توخمی رویدە بە مەبەستی دۆزینەوەی باشترین کات بۆ چاندن و گونجاوترین چڕی تۆودان لە ژێر دۆخی ناوچەی سلێمانی دا . ئەنجامی توێژینەوەکە رووونی کردەوە کە باشترین کات بۆ چاندنی بەروبومی تریتیکالی دەکەوێتە نێوان ناوەراستی مانگی ١٠ بۆ ناوەراستی مانگی ١١ و گونجاوترین چڕی تۆودان لە ١٦٠-٢٠٠کغم/هکتار .