Evaluation of Some Winter Chickpea Varieties Under Dry Farming

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ABSTRACT

This study was carried out during three successive winter seasons (1991-1994), to evaluate some introduced chickpeas varieties for their yield and other agronomic traits under dry farming prevailing in Sulaimani region .

Results obtained showed that the introduced varieties tested in this investigation possess a good yield ability , survival to climatical conditions prevailing in the region and a suitable plant height which makes them convenient for mechanical harvesting , specially the varieties number 1,2,5 and 6 . The combined analysis showed that the vatiety number 6 was ranked number 1 among the highest yielding varieties .

INTRODUCTION

Chickpea is a major food legume in many under developed countries. It is an important source of protein in human diets and it plays a significant role in the farming systems , particularly in dry lands , in which chickpea is added an amount of 57-85 kg N/ha, depending upon , the length of growing season , varieties , available moisture content of the soil and plant population (1) .

In Kurdistan , chickpea production and average yield are relatively low (9000 tons) and 600 Kg/ha respectively in comparison with other developing countries , in which average seed yield had found to be varied from 1952 to 1164 Kg/ha for Egypt and Turkey , respectively (2) . Chickpea is still grown in the region during spring due to lack of cold tolerant varieties suitable for winter sowing . Furthermore , the spring sowing is restricted in a growing season of 70-90 days due to earlier onset of heat and moisture stresses and lacking of mechanization due to short stem of plant (2) .

Under Sulaimani conditions it was found that seed yield , plant height and 100 seed weight of 20 conducted trials during spring seasons from 1975 to 1985 were 752 kg /ha , 31cm and 31.8g respectively (3) .

In India , at Hycherabad seed yield ranged from 2000 to 3000 kg /ha in a growing season of 160 to 170 days . On the other hand , in panisular , India where the growing season is restricted to 100-170 days due to earlier onset of heat and moisture stresses , seed yield is reduced to 1000-1500 Kg/ha , (4).

In north Syria , yield increase of up to 100% were recorded for winter sown chickpea in comparison with the same cultivars when sowing in spring .This indicates a good potential for winter sowing .Moreover , at Jabal Syria , the trial mean of 24 entries was 4654 Kg /ha which is the highest yield in the world . These trials demonstrated the potential of winter sowing throughout the Mediterranen region (1) .

Farmers desire mechanization of cultural operations in chickpea .Tall plants have been mentioned as an ideal plant type in chickpea (5) .

Recently under Sulaimani conditions it has been found that there is the possibility of growing 23 chickpea varieties in winter seasons with an average seed yield of 1312 to 1780 kg /ha and with suitable plant height , of 60cm which make them convenient for mechanical harvesting (2) .

The objectives of this study were to find out high yielding varieties survival to the cold winter prevalent in Sulaimani region with a plant height suitable for mechanical harvesting .

MATERIALS AND METHODS

For three winter seasons (1991-1994) , six chickpeas varieties (Table 1) were grown at Bakrajo field crop Research Station . A randomized complete block design with four replications was used . Plots were consisted of 6 rows each 4.0m long with spacing of 30cm between rows and 10cm between plants in rows(2) . An amount of 40Kg/ha of NP compound fertilizer 27:27 was applied during sowing (6). The experiment was sowing in the last week of November and effective germination occured on 7th, 11th and 14th Decmber for the three seasons respectively.

Data were taken on the number of the days from sowing to 50% heading, height to the first panicle from soil ground, final plant height, number of panicles, grain yield of four inner rows and 100 seed weight were recorded (7). Harvesting was done on 15th June during the three years . Monthy precipitations in mm are presented in (Table 2) .

Data were statistically analyzed and all possible comparisons among means were carried out using Duncans Multiple Range Test (8) . Averages having the same letter or the same groups of letters are not statistically different at (5%) level , also averages which are not bearing the letter are not significantly different .

Table(1): Tested chickpea varieties during the winter growing seasons (1991- 1994).

varieties	Name	Origin
1	flip 85-5c	ICARD/SAT
2	LIC 533	EGYPT
3	FLIP 85-79C	ICARDA/SAT
4	FLIP 85-90C	ICARDA/SAT
5	ILC11 34	IRAN
6	FLIP 62169 CX 7922 IL CCXIL 1922	ICARDA

Table (2): Total rainfall (mm) during the seasons(1991-1994).

MONTHES	1991-1992	1992-1993	1993-1994
OCTOBER	-	55.5	-
NOVEMBER	36.3	196.1	158.9
DECEMBER	36.0	79.9	146.8
JANUARY	159.0	179.1	159.0
FEBRUARY	124.0	98.0	224.9
MARCH	56.8	99.9	156.8
APRIL	85.0	98.3	85.0
MAY	25.9	7.8	74.5
JUN	-	-	6.4
TOTAL	523.0	814.6	1012.3

Data were obtained from the Meteorological Station at Sulaimani

RESULTS AND DISCUSSION

Analysis of variance showed that the variety number 6 was among the highest yielding varieties and non of the tested varieties significantly outyielded the variety number 6 which recorded 2928 , 2264 and 2780 Kg/ha during the three seasons rsepectively (Table3) . These results are considered high in comparison with the results reported under sulaimani conditions 752 Kg/ha , (2) and relatively close in comparison with the results reported under India conditions , 2000-3000 Kg/ha , (4).

The lowest average seed yield was 1748 Kg/ha and the highest one was 2656 Kg/ha (Table 5), this means an increase of 191-343% ,in comparison with the estimated average seed yield in Iraq , 600 Kg/ha , (2) , and an increase of 132 - 253% in comparison with the mean trials yields of spring sowing under Sulaimani conditions , (2) . These results indicated the high

yield ability of the evaluated varieties in this study for winter sowing .In addition to that none of the tested varieties surpassed the variety number 6 in terms of number of pods /plant , (Table 3) and number of branchs /plant (Table 4) . Concerning , 100 seed weight , significant differences were observed among the tested varieties (Table 3) . Variety number I significantly surpassed the rest varieties in both the two first growing seasons . Moreover , the combined analysis showed that it also significantly surpassed the rest varieties averaged overall the three growing seasons , except variety number 4 , (Table 5) .

Regarding the final plant height , significant differences were detected among the evaluatted varieties in the last growing season only , (Table 3) , in which the vaireties 1,2,5 and 6 rank first and were not significantly different . Moreover , the combined analysis was shown the same behavior (Table 5) . These results are considered good in comparison with the results reported from evaluation 23 winter chickpea varieties grown under Sulaimani conditions , in which average final plant height was 60cm (2) .

Table (3) : Means for seed yield , 100 seed weight , number of pods / plant and plant height for (6) chickpeas varieties in winter seasons (1991-1994) .

Varieties	Seed yield kg/ha	Weight of 100 seeds (g)	Number of pods/ plant	Final plant height (cm)
		1991-1992		
1	1768 b	46 .5 a	35.0 b	48.3
2	1640 b	32.3 bc	47.0 a	46.6
3	1424 b	35.3 b	35.0 b	48.3
4	1356 b	37.3 b	39.3 b	46.6
5	1800 b	34.0 b	48.3 a	48.0
6	2928 a	27.3 b	50.6 a	46.0
		1992-1993		
1	1672	38.5 a	26.7 c	76.7
2	1860	27.0 d	32.3 ab	68.3
3	1768	31.8 c	19.0 d	67.7
4	1712	36.2 b	29.3 be	65.0
5	1932	35.5 c	28.3 be	64.3
6	2264	36.0 b	36.0 a	65.0
		1993-1994		
1	1808 b	28.0 cd	39.7 bc	49.6 ab
2	2032 b	31.0 bc	46.0 ab	54.3 a
3	2240 ab	32.3 b	31.0 d	36.6 c
4	2212 ab	37.0 a	43.0 ab	39.3 bc
5	1676 b	31.3 bc	33.0 cd	56.3 a
6	2780 a	26.6 d	48.6 a	52.0 a

Table (4) : means for the height of the first pod from soil ground , number of days to (50% heading) and number of days to maturity .

Variety	Height of the first pod(cm)	No. of branchs/plant	No. of days to 50% heading	No of days to maturity
		1991-1992		
1	22.7	3.0 b	156.0 b	202.0 ab
2	23.3	3.6 b	155.bc	202.0 ab
3	23.3	3.0 b	155.0 c	201.6 b
4	21.3	3.3 b	155.0 c	202.3ab
5	20.6	3.6 b	155.0 c	202.0 ab
6	20.6	4.6 a	158.6 a	203.0 a
		1992-1993		
1	34.0 b	3.3 b	176.0 b	218.0 a
2	38.7 a	4.3 a	175.0 c	215.7 d
3	37.0 ab	4.0 ab	175.bc	216.9 c
4	34.7 b	4.0 a	177.0 a	217.7 b
5	36.7 ab	4.6 a	177.6 a	218.0 b
6	28.0 c	4.6 a	172.3 d	214.6 e
		1993-1994		
1	28.3	3.6	182.0 c	218.7
2	31.7	4.0	185.3 a	219.3
3	27.3	3.0	182.6 dc	218.3
4	24.0	3.3	181.0 c	218.7
5	26.7	3.0	186.0 a	220.7
6	29.6	4.0	184.6 ab	221.6

Although there were significant differences among the tested varieties in terms of number of days to 50% heading and maturity , but the number of the days were restricted by 3.6 , 5.3 , 5 and 1.4 , 3.4 and 3.3 for heading and maturity during the three seasons repectively (Table 4) .

On the other hand , the combined analysis showed that the variety number 6 ranks first in terms of seed yield , number of pods/ plants(2) . In addition to that,the variety number 6 possesses suitable plant height , which have been mentioned as an ideal plant type in chickpea , in which farmers desire mechanization of cultural operations in chickpea (5) .

In general the height of the first pod from soil ground for the tested varieties are relatively low in comparison with the results reported from

evaluation 23 winter chickpea varieties under Sulaimani conditions which was 35 cm (2) .

Table (5) : Effect of varieties (averaged - overall) during the three seasons ,on seed yield , weight of 100 seeds , number of pods / plant and final plant height .

Variety	Seed yield kg/ha	Weihgt of 100 seeds (g)	No of pods / plant	Final plant height (cm)
1	1748 b	23.6 a	33.8 b	58.2 a
2	1844 b	90.1 c	41.7 b	57.4 a
3	1808 b	33.1 b	28.3 e	50.8 b
4	1792 b	36.8 a	37.2 c	50.3 b
5	1800 b	32.9 b	36.5 cd	56.2 a
6	2656 a	29.9 c	45.1 a	54.1 a

Table (6) : Effect of varieties (averaged-overall) during the three season on height of the first pod , number of branches / plant , number of days to 50% heading and number of days to maturity .

Variety	Height of the first pod(cm)	No. of branches/plant	No. of days to 50% heading	No. of days to maturity
1	28.3 abc	3.3 c	171.3 bc	213.5
2	31.2 a	3.9 b	171.8 b	212.3
3	29.2 ab	3.3 c	171.2 bc	212.0
4	26.6 bc	3.5 bc	171.0 c	212.9
5	28.0 bc	3.7 bc	172.8 a	213.5
6	26.1 c	4.4 a	171.8 b	213.1

Table(7) : Effect of years (averaged-overall)on seed yeild , weight of 100 seeds ,number of pods/plant and final plant height .

Years	Seed yield kg/ha	Weigh of 100 seeds(g)	No.ofpods /plant	Final plant height (cm)
1991-1993	1816 b	35.4 a	42.5 a	47.3 b
1992-1993	1884 b	33.8 b	28.6 b	67.8 a
1993-1994	2124 a	31.0 c	40.2 a	48.0 b

Table (8):Effect of years(averaged-overall) on height of the first pod , number of branches /plant , number of days to 50% heading and number of days to maturity.

Years	Hieght of branches / plant	No. of branches/ plant	No. of days to 50%heading	No. of days to maturity
1991-1992	21.9 c	3.5 b	155.8 c	202.1 c
1992-1993	34.8 a	4.1 a	175.5 b	217.1b
1993-1994	27.9 b	3.4 b	183.5 a	219.5 a

Regarding the effects of years averaged overall the varieties , the highest seed yield was in 1993-1994 (Table 7) . This might be due to plenty rainfall available during the season (1012.3mm), the lowest seed yield was in 1991- 1992 in which the season was drought (523.0mm) relatively in comparison with the other growing seasons (Table2). significant differences were found among the seaons for all the character studied in this investigation.

From the results of this study it could be concluded that all the introduced varieties were tolerant to climatical conditions prevailing in Sulaimani region. Varieties number 1 , 2 , 5 and 6 possess a suitable plant height which make them suitable for mechanical harvesting and the variety number 6 gave the highest seed yield.

REFRENCES

1-Saxena, M.C and K.B Singh , 1987, *The Chickpea International Walling fort* , Oxen , 80 E , UK

2- Mohamad Ali , J.J , K.GAmine , and S.I. Tofiq., 1990 , "Evaluation of Some Winter Chickpea Under Dry Farming Condition" , *Basrah Jour of Agric sci* ,4 , P.:1-2 .

3- Mohamad Ali , J.J , A.A Alaka , and M.M. Said , "Abstract on chickpea.Field crop Research Station at Sulaimani " ,*Bulletin*, No. 7 , P.:10 .

4- ICRISAT ,1983 , *ICRISAT . International crops . Research Institute for the Semi Arid Tropics* , Patancheru. A.P. India , P.: 370 .

5- Bahl, P.N. , K.P. Singh. and Daljit, S. , 1984 , "Evaluation of tall chickpea genotypes for normal and late sowing" , *Indian Jour of Agric Sci* , 54 , P. : 110-113 .

6- Mohamad Ali, J.J , A.A Alaka , and M.M. said , 1991 , "Chickpea Fertilly and Plant Population Trial in rainfed regions" , *Basrah Jour of Agric Science* , 4 , P. :1-2 .

7- ICRISAT. 1984 . *ICRISAT* , Aleppo. Syria , P.: 250 .

8- Leclerg , E.L. , W.H Leonard, and A.G. Clark, 1962, *Field plot technique* , 2nd ed . Burgess Pub. Co. Minnesota , P.: 373

تقييم بعض أصناف الحمص الشتوي تحت ظروف الزراعة الجافة

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الخلاصة

أجري هذا البحث لثلاث مواسم شتوية متتالية (١٩٩١-١٩٩٤) على بعض أصناف الحمص الشتوي المستورد لتقيم كفاءتها الانتاجية وصفاتها الحقلية تحت ظروف الزراعة الجافة السائدة في السليمانية .

أشارت نتائج هذا البحث على ان الاصناف الداخلة في المقارنة كانت مقاومة للظروف المناخية السائدة في المنطقة وأنها ذات كفاءة أنتاجية جيدة كما وتتميز بطولها المناسب الصالح للحصاد الميكانيكي خاصة الاصناف ٦،٥،٢،١ علاوة على ذلك أوضحت نتائج التحليل الاحصائي المشترك بأن الصنف تسلسل ٦ يحتل المرتبة الاولى من حيث الحاصل .

هەڵسەنگاندنی چەند توخمێک لە نۆکی زستانە لە ناوچە باراناوییە کاندا

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کورتە

تاقی کردنەوەیەکی کێڵگەیی ئەنجام درا بۆ ماوەی سێ ساڵ (١٩٩١-١٩٩٤) لە وەرزی زستاندا لە ژێر سایەی کەشی ناوچەی سلێمانی بە مەبەستی هەڵسەنگاندنی شەش توخم لە نۆکی بیانی .

ئەنجامی توێژینەوەکە ڕونی کردەوە کە شەش توخمە نۆکەکە بەرهەمییان باش بوو جگە لەوەش بالایانیش گونجاو بوو بۆ درووێنەی میکانیکی بەتایبەتی توخمی ژمارە ٦،٥،٢،١ ، ئەنجامی شیتانکردنەوەی هاوبەشی هەرسێ ساڵەکە ڕوونی کردەوە کە توخمی نۆکی ژمارە ٦ بەرزترین بەرهەمی دابوو .