Pak. J. Bot. 33 (special issue) 2001

YIELD POTENTIAL OF EXOTIC WHEAT GENOTYPES UNDER TANDO JAM CONDIOTNS

ABDUL SATTAR GHANGHRO, *RAHMATULLAH QURESHI, **A.W.BALOUCH, **M.A.JAVED AND ***M.I.SOHU

Agriculture Extension, District Sukkur.

Abstract

An experiment was conducted to asses the yield potential of six exotic genotypes (INIA/A, TAN "S", GEN, GALVEZ, TUI "S" and KAUZ "S") along with three commercial varieties (PAVON, ZA-77 and MEHRAN-89) of bread wheat [(*Triticum aestivum* L.) 2n=6=42] at Tando Jam. Significant ($P \leq 0.05$) differences were observed for grain yield per hectare amongst all the genotypes. The genotype INIA/A produced the highest yield (4500 Kg/ha) followed by TAN "S" (4137 Kg/ha) and KAUZ "S" (3387 Kg/ha). The INIA/A showed an increase of 44% in grain yield over the commercial variety MEHRAN-89. The results indicated that exotic wheat genotypes have promising yield potential under Tando Jam Conditions.

Introduction

Wheat (*Triticum aestivum* L.) is one of the most important food grain of the world. It is the staple cereal of Pakistan where it is cultivated since prehistoric times. Pakistan has an ideal geographical location, sound natural resources and favorable environmental factors but still unable to meet the need of wheat as an average consumption of wheat is 80-90 % in every meal. So a large amount of money spends on the import of wheat by government in every year.

There are so many reasons that affect in low yield. But besides these factors it is tried to achieve more yield by comparative study of different genotypes. The yielding ability of genotypes is difficult to establish superiority for an environment. Consequently, release of genotypes with consistent performance over a range of environment is important to achieve stable production in the province. A study of different genotypes of wheat used to confirm the yield and yield component (Busch and Frohberg 1976; Eberhart and Russell, 1966). However some workers have used unilocation trials providing different environments such as planting cultivars at different dates of using various spacing, doses of fertilizers, irrigation levels and planting arross years (Luthra *et al,* 1974; Malik and Rajper 1984; Saini *et al.*; 1977). Keeping in view the importance of Wheat Crop, investigation was planned to asses the importance and shortage of irrigation water in the country since last few years.

Materials and method

Nine wheat genotypes of different origin were evaluated at Tando Jam during winter 1997-98 to asses the yield potential of six exotic genotypes (INIA/A,TAN"S", GEN, GALVEZ, TUI "S" and KAU "S") along with three

*Department of Botany, Shah Abdul Latif University Khairpur, **Nuclear Institute of Agriculture Tando Jam, ***Sindh Agriculture University, Tando Jam.

commercial varieties (PAVON, ZA -77 and MEHRAN-89). All the genotypes were tested under Tando Jam conditions by giving total two number of irrigation; first irrigation was applied after 25 days of sowing and second at flowering stage.

The experimental design for yield trial was a randomized complete block with four replications with plot size of 4 x 2 m. The sowing was done with the help of single coulter hand drill in rows 25cm apart at the seed rate of 100 Kg/ha. The fertilizer dose 100x50 NP Kg./ha was applied. Full dose of P_2 0_5 in the form of SSP and half dose of nitrogen in the form of urea was given at the time of 50% heading all other required cultural operations were used uniformly till the crop maturity. At maturity data on plant height cm. Days to maturity, Tiller Nos per m^2 weight (g), and grain yield Kg/ha were recorded and data were analyzed following Gomes method.

Results and dicussion

The analysis of variance showed highly significant differences among genotypes (Table 1.). According to Analysis of variance the mean squares differed significantly ($P \leq 0.05$) for all the traits except plant height and days to maturity. Variation categorically were observed with parameters and spare ranges existed from 88.16 to 95.16 (cm) for plant height, 123 to 127 number of days upto maturity, 230 to 472 for tiller numbers per m^2 10.66 to 8.10(cm) for spike length, 16.19 to 22.19 for spikelets per spike, 40.62 to 52.36 for number of grains per spike, 38.15 to 45.919 (g) for 1000 grain weight and 2287 Kg/ha for grain yield.

Therefore the increased plant yield of selected genotypes may be linked to the altered plant morphology associated with increased grain yield with the increase of tiller number per m^2 spikelets per spike, grains per spike and weight of 1000 grains. The plant morphology accompanying with such modification in quantitative treats has achieved great importance to make the plants fit in the mathematical models, for increasing the plant yield. It is identified the increase of tiller numbers, number of spikelets per spike and also seed index. Among the genotypes the genotype INIA/A had produced higher tiller numbers per m^2 (472), nos. of spikelets per spike (22.95), number of grains per spike (52.36), 1000 grains weight (45.91 grams) and grain yield (4500 Kg/ha) than eight other genotypes except spike length, the spike length (10.58 cm) of check variety was higher than the all genotypes. Where as the grain yield of INIA/A had 44, 39, 12, 3.8, 25 and 11% increase over TAN "S", GEN, GALVEZ, TUI "S", KAUZ "S" and ZA-77 respectively.

Significant achieved in Wheat improvement for yield and yield component have reported for plant height (Chaudhry *et al.*, 1975; Bajwa *et al.*, 1985; Gurdev *et al.*, 1986), spike length (Nanda *et al.*, 1982), number of spikelets per spike (Zia and Choudhry, 1980), number of grains per spike (Walton, 1971; Magdadi, 1990), number of tillers per m^2 (Rajput *et al.*, 1983), grain yield (Joshi and Singh, 1983). In the present it is confirmed that among the nine genotypes INIA/A had produced significantly higher yield.

Table 1. Performance of different Wheat genotypes for yield and yield components.

Name of genotypes	Plant height at maturity (cm)	Days to maturity (Nos.)	Tiller Nos. Per m2 (Nos.)	Spike length cm	Spikelets per spike (Nos.)	Grains per spike (Nos.)	1000 grains weight (g)
INIA/A	82.66	123	472a	9.05bcd	22.94a	52.36a	45.91a
TAN"S"	88.16	127	444b	9.03bcd	20.34b	47.82ab	45.22a
GEN	91.57	127	331f	8.70cd	17.02ef	40.62c	38.15d
GALVEZ	90.33	125	324g	9.98ab	19.34bcd	43.75bc	38.99d
TUI"S"	88.41	126	344e	7.62e	17.62e	41.14c	40.89cd
KAUZ"S"	90.89	125	372c	8.10de	16.19f	43.08bc	41.31bcd
PAVON	95.16	127	271h	10.66a	18.79d	47.91ab	40.15cd
ZA-77	88.74	126	355d	9.83abc	18.95cd	43.58bc	44.61abc
MEHRAN-89	89.08	127	230i	10.58a	20.04bc	45.67bc	45.40a
DMR test at (0.5%)	N.S.	N.S.	7.08	1.14	1.14	4.94	4.07

Mean followed by the same letters are not significantly different from each other at 0.5% level.

References

Bajwa, A..M., N. Khan and Amanullah. 1985. Genetic analysis of some agronomic traits and proteins in Wheat. *Pak. J. Agric. Res.*, 23(4):239-244.

Busch, R.H., J. Hammond and R.C. Frohberg. 1976. Stability and performance of hard red spring Wheat bulks for grain yield, *Crop Sci., 16:* 256-259.

Chaudhry, A..R., K.P. Sinolinding and M.A. Khan. 1975. Diallel analysis of yield and components of yield in Wheat under irrigation and moisture stress, *Pak. J. Agric. Sci...* 12(1): 1-5.

Eberhart, S.A. and W.A. Russell. 1966. Stability parameters for comparing varieties. *Crop Sci...* 6: 36-40.

Finlay, K.W. and G.N. Wilkinson. 1963. The analysis of adaptation in plant breeding programme. *Aust. J. Agric. Res.*, 14: 742-752.

Gurdev, S., G.S. Bhullar. 1986. Inheritance of plant height days to heading, spike length, peduncle length spikelets per spike in a spring wheat crosses. *Ind. J. Genet. And pl. B...* 44(3): 522-527.

Joshi N.L. and H.G. Singh. 1983. Performance of wheat varieties under limited irrigation, *Ind. J. Agric. Res.*, 17(3): 159-162.

Luthra, O.P., R.K. Singh and S.N. Kahar. 1974. Comparision of different stability models in wheat. *Theor. and Appl. Genet., 45:143-149.*

Magdadi, H.M. 1990. *Evaluation of several wheat genotypes for grain yield and other agronomic characteristics under field and green house conditions.* Jordan Univ. Amman, Dept. of Plant Production, 139.

Malik, A.J. and M.M. Rajper. 1984. Significance of genotypes x environment interaction in breeding of spring wheat (*Triticum aestivum* L.) number of grains per spike, seed index and grain yield parameters *J. Agric. Res., 22*(4): 351-354.

Nanda, G.S., P. Singh and K.S. Gill. 1982. Epistasis additive and dominance variation in triplet test cross of bread wheat (*triticum aestivum* L.), *Theor. and Appl. Genet.*, 62(1): 49-52.

Rajput, P.K., M.J. Rajput, A..S. Arain, S. Mangi and K.M. Kalwar. 1983. Performance of semi-dwarf wheat under different irrigation levels. *Pak. Agric.*, 7(1): 23.

Saini, M.L., B.S. Johar and , R.K Solanki. 1977. Genotype x environment inter action for seed yield in clusterbean. *Ind. J. Agric. Sci.*, 47(7): 347-354.

Walton, P.D. 1971. The genetics of yield in spring wheat (*Triticum aestivum* L.). *Canadian J. Genet. Cytol.*, 13(1): 110-114.

Zia, M.K. and A..R. Choudhry. 1980. Gene action for yield components in wheat. *Pak. J. Agric. Sci.*, 17(1-3): 87-92.