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EVALUATION OF SOME IMPROVED BREAD WHEAT VARIETIES AT CHIYAKO, JIGAWA STATE, NIGERIA

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ABSTRACT

Investigations were conducted at Chiyako in Jigawa State situated in the Sudan Savanna ecological zone of Nigeria, during 2001/02 and 2002/03 dry seasons to evaluate the performance of some improved heat tolerant wheat varieties. The treatment consisted of thirteen wheat varieties laid out in randomized complete block design with three replications. The results indicated that most varieties exhibited similar characters examined while for few others they exhibited superior characters. Linfen, Gen/Rabe and Trigo produced significantly taller plants while Seri/Buc/weaver/PFau had the shortest height. Similarly Linfen had the highest number of spikelets/spike. All the varieties produced statistically similar number of tillers/plant, except Seri/Buc/weaver/PFau. Ster//TR had the longest spikes and highest number of grains/spike. Variety SeriM82 recorded the heaviest 1000-weight while Seri/Buc/weaver/PFau had the lightest grains. The results further revealed that varieties CNDO and Ster//TR had superior grain yield compared to the other varieties.

Keywords: bread wheat, sudan savanna, grain yield, Chiyako, Nigeria.

INTRODUCTION

Wheat has been cultivated in Nigeria for several centuries especially, in the northern states in the hydromorphic lowlands or valleys and watercourse in the relatively cooler area. However, Large scale production to meet local demands for bread, cakes and other confectionaries commenced after the development of irrigation schemes in 1959 at Wurno, Hadejia, Yau and Gamboru Ngala (Mustapha, 1998). Wheat production in Nigeria is mainly in the Sudan and Sahel ecological zones, which include the Chad Basin, Hadejia Jama'are River Basin and Sokoto Rima Basin. The crop is cultivated under irrigation during the cold "Harmattan" period between the months of November and February which provides the required low night temperatures ranging from 10 to 25^0C (Abbas, 1988).

Wheat demand is very high in Nigeria as a result of increasing population and urbanization, and large proportion of the demand is met through importation (Aminu-Kano and Ikwelle, 1998). Efforts to satisfy local consumption through domestic production have failed because of many technical and political problems (Mustapha, 1998). Currently some newly developed wheat varieties have been introduced into the country from CIMMYT, Mexico. These varieties need to be evaluated for their response local conditions, particularly heat tolerance, which has been observed to be a major setback in wheat production (CIMMYT, 2001). This is important in the Sudan savanna where high temperatures at the end of the dry season, and which coincides with the flowering stage of wheat, are common features and impediment to good wheat crop performance.

Thus, this study was aimed at evaluating the performance of some new bread wheat varieties under the prevailing conditions during the dry season in Jigawa State, Nigeria.

MATERIALS AND METHODS

Two irrigated field trials were conducted at Chiyako (lat. 11^0 27'N, long. 9^0 30'E) in Jigawa state situated in the Sudan savanna ecological zone of Nigeria, during 2001/02 and 2002/03 dry seasons. Textural class of the soil in the experimental site was sandy loam. The soils are slightly acidic (pH 5.4 in $CaCl_2$), low in organic carbon (4.54g/kg) low in residual phosphorus (16.3 mg/kg) and low in residual nitrogen (0.1025). The dry season (November to February/March) is rainless with minimum and maximum temperatures ranging from 12-17^0C and 32-38^0C, respectively. The period was characterized as windy with low relative humidity ranging from 8-55% and high ranging from 8-80%, respectively. The treatments consisted of thirteen semi dwarf wheat varieties laid out in randomized complete block design with three replications. Gross plot size was 5 m x 5 m while net plot was 3 m x 5 m. Seed rate 100 kg/ha was used and seeds were sown by hand drilling at a row spacing of 20 cm. sowing was done by mid-December in all the seasons. At planting, the plots were given minimum of 50 kg N, 50 kg P_2O_5 and 50 kg K_2O /ha in the form of NPK 15: 15: 15. At four weeks after planting top dress of 50 kg N/ha was applied in form of Urea. Weeds were removed manually by regular hoe weeding. Irrigation was by gravity and given at 10 days interval from sowing until three weeks to harvest when irrigation was stopped to allow for proper and faster ripening.

In both seasons crops were ready for harvesting in April. Motorized thresher was used for threshing the manually harvested crop. Data collected included plant height at harvest, number of tillers/plant, number of spikelets/spike, length of spike, number of grains/spike, grain weight/spike, 1000-grain weight and grain yield (kg/ha). The net plots were used for yield data while the discard for the other characters examined. Mean data

collected for the two seasons were subjected to analysis of variance and treatment effects were compared using Duncun Multiple Range Test (Duncan, 1955).

RESULTS

The height of the wheat varieties differed significantly (Table-1). Linfen, Gen/Rabe and Trigo produced significantly taller plants compared with Seri/Buc/weaver/PFau while the other varieties had statistically similar and intermediate values. Except Seri/Buc/weaver/PFau, all the varieties produced statistically similar number of tillers/plant (Table-1). However, the difference in the number of tillers/plant between Linfen, Opata, SeriM82, Seri/Buc/weaver/Star and Seri/Buc/weaver/PFau, was not significant. Number of spikelets/spike of Linfen was significantly higher but statistically similar with the other varieties except Molcep and Seri/Buc/weaver/Star which had the least value. The length of spike of the wheat varieties varied significantly with Ster//TR having the longest spike while the shortest spikes were produced by Molcep. However, the other varieties had virtually similar and intermediate spike lengths.

The effect of variety on the number of grains/spike is given in Table-2. Variety Ster//TR had significantly higher number of grains/spike compared with Seri/Buc/weaver/PFau while the other varieties had statistically similar and intermediate values. Variety HD2206 had statistically higher but similar grain weight/spike with CNDO, Gen/Rabe and Ster//TR, compared with the other varieties while Seri/Buc/weaver/PFau had the least values (Table-2). The 1000-grain weight of the wheat varieties varied significantly with SeriM82 having the highest value while Seri/Buc/weaver/PFau had the least value. The other varieties statistically similar 1000-grain weight values. The result also indicated that CNDO and Ster//TR had significantly higher grain yield compared to Seri/Buc/weaver/PFau while the other varieties had statistically similar and intermediate grain yields.

Table-1. Mean performance of wheat varieties at Chiyako in 2001/02 and 2002/03 dry seasons.

Treatments	**Plant height** (cm)	**Number of tillers/plant**	**Number of spikelets/spike**	**Length of spike**
Variety				
Attila/Gar/Allila	71.3ab	15.3a	16.0ab	10.0bc
CNDO	72.0ab	14.5a	15.7ab	10.2abc
Gen/Rabe	75.0a	13.8a	16.3ab	11.6abc
HD2206	71.3ab	14.6a	17.7ab	12.5ab
Kauzban	61.7ab	14.0a	16.3ab	10.3abc
Linfen	74.0a	13.4ab	19.0a	11.8abc
Molcep	68.0ab	13.8a	15.0b	8.9c
Opata	69.0ab	13.2ab	15.7ab	10.5abc
SeriM82	64.7ab	11.9ab	16.7ab	11.2abc
Seri/Buc/weaver/PFau	61.7ab	10.1b	16.7ab	11.3abc
Seri/Buc/weaver/Star	58.7b	12.1ab	8.7c	10.0bc
Ster//TR	70.7ab	15.2a	18.0ab	13.5a
Trigo	75.3a	14.2a	16.7ab	9.4bc
LSD	12.1	3.13	3.22	2.89

Means within each column followed by the same letter are not significantly different at 5% as determined by Duncan's Multiple Range Test.

Table-2. Mean performance of wheat varieties at Chiyako in 2001/02 and 2002/03 dry seasons.

Treatments	**Number of grains/spike**	**Grain weight/spike**	**1000-grain weight** (gm)	**Yield** (kg/ha)
Variety				
Attila/Gar/Allila	47.0ab	1.6bcd	11.6bc	5044ab
CNDO	53.0ab	2.1ab	13.6abcd	5467a
Gen/Rabe	53.7ab	1.7abcd	14.6abcd	4555ab
HD2206	52.7ab	2.2a	15.6ab	4944ab
Kauzban	45.0ab	1.6bcd	14.9abcd	4066ab
Linfen	44.7ab	1.5cd	12.3bcd	4022ab
Molcep	44.7ab	1.6bcd	11.9cd	4178ab
Opata	44.3ab	1.5cd	11.9cd	4044ab
SeriM82	46.7ab	1.5cd	16.9a	4200ab
Seri/Buc/weaver/P Fau	38.3b	1.4d	11.3d	3611b
Seri/Buc/weaver/S tar	50.0ab	1.7bcd	15.1abc	4177ab
Ster//TR	56.3a	2.1abc	14.7abcd	5444a
Trigo	52.7ab	1.4d	11.7cd	4344ab
LSD	13.7	0.5	3.19	1333

Means within each column followed by the same letter are not significantly different at 5% as determined by Duncan's Multiple Range Test.

DISCUSSIONS

The different responses of the wheat varieties in respect of the yield and yield components examined could be due to their varied genetic composition and adaptation to the soil and climatic conditions under which the study was conducted. Although most of the varieties showed close similarity in many yield attributes, a few were quite dissimilar. The superior performance of CNDO and Ster//TR in terms of grain yield appears to have been supported by the high values of yield attributes recorded. Miko *et al*., (2006) in a similar study had reported that varieties with high yield potentials were supported by superior values of yield attributes. The yield recorded by the varieties examined in the present trial ranges from 3611 to 5444 kg/ha which is higher than the results obtained in the same ecological zone from a similar study by Miko *et al*., (2006). The implication of these results is that farmers now have a wide range of choice to make for high yielding and heat tolerant varieties of wheat in and around the study area. Presently a major challenge facing wheat farmers is getting varieties that could adapt to growing under relatively high temperatures.

CONCLUSIONS

From the results of this study, it can be concluded that wheat varieties CNDO and Ster//TR which out-yielded the other varieties could be recommended for use under the conditions of Chiyako, Jigawa state, Nigeria.

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