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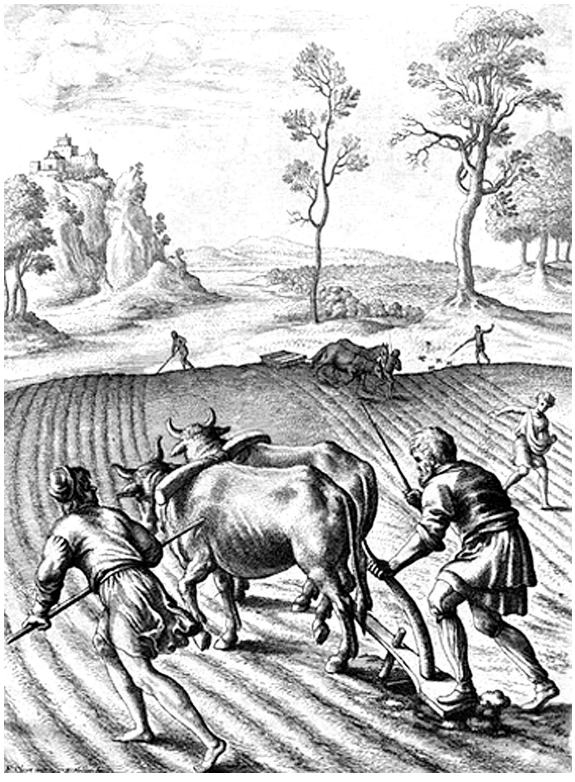

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Studies on Some Hexaploid Wheat Varieties (*Triticum aestivum* L.) under the Agro-ecological Conditions of District Poonch, Azad Kashmir

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Abstract: Hexaploid wheat has the largest cultivation area among all other crop plants, due to its adaptability to different agro-climatic zones. To cater for the requirements of varied regional breeding programs a screening trial was conducted, in which six hexaploid wheat genotypes were executed for their adaptability under the agro-ecological environment of district Poonch, Azad Kashmir. Punjab-96, khyber-87 and pirsabak-91 have shown maximum plant height, number of spikelets/plant, spike length and 1000 grains weight. Increase in number of tillers/plant was only reported for variety Punjab-96. In this study only Punjab-96 was recommended for general cultivation in district Poonch, Azad Kashmir.

Key words: Hexaploid wheat, agro-ecological, Punjab-96, khyber-87, pirsabak-91, Poonch, Azad Kashmir

Introduction

Bread wheat (*Triticum aestivum* L.) is the world's leading cereal crop. It is a staple food grain of Pakistan grown over about 39% of its cropped area. It is a principal source of protein for our population and its stem is a feed for livestock. It is used for making bread, flour confectionery products like cookies, cakes, crackers and breakfast cereals etc. Its diversity of uses, nutritive content and storage qualities have made wheat a staple food for more than one third of the world population. The total number of wheat accessions around the world has been estimated to be in excess of 450,000. A major collection was made at the Institute of Plant Industry, Petersberg, Russia. Germplasm collections are also held at the United States Department of Agriculture, National Seed Storage Laboratory, Fort Collins, Colorado and into the International breeding programme of CIMMYT in Mexico (Harlan, 1976)

Extension efforts are underway to explore the accessions in different wheat germplasm collections around the world so as to assist the breeders in locating genes for specific breeding purposes (Sears, 1981). The eroding genetic base of the cultivated wheat has led workers to investigate the possibilities of utilizing the genetic variations present in the wild relatives (Feldman and Sears, 1981). These wild gene pools contain many economically important genes that might be transferred to cultivated wheat and cause important genetic variation in the plant material (Feldman, 1983; Sharma and Gill, 1983).

Since the pioneer work of Sears (1956) several genes have been transferred into cultivated wheat. Sharma and Gill (1983) reported a large number of alien genes for disease resistance introduced from wild species. Similarly, Mc Intoch (1983) in the catalogue of the gene symbols lists many of the introduced genes actually ascribes symbols to them. Avivi (1978, 1979) reported a very high increase in grain protein percentage. The percentage of insuline reported was as high as 30%. Some of the genes involved in transfer to hexaploid wheat resulted in an increase of 5-7% of grain protein without loss of yield (Avivi *et al.*, 1983; Levy and Feldman, 1986).

Wild species such as *Triticum kotschyii* may contain genes for drought and salt tolerance. The ability to introduce such characters into cultivated wheat will greatly increase the value of the crop or increase its range of cultivation so that it may grow in conditions that are currently impossible. The vast gene pools of the wild relatives of cultivated plants contain many economically important genes that can be transferred to crops and utilized for breeding purposes (Feldman, 1983).

Studies were arranged to investigate, compare and contrast the wheat genotypes under the agro-ecological environment of district Poonch, Azad Kashmir, where the agriculture is entirely dependent on rainfall, which is 1400 mm/annum and most of the area is hilly with low temperature and frost during winter season having altitudes ranging from 4000 to 7000 feet. Major crops in the region are wheat and maize but their performance is quite poor due to traditional agriculture system and non-availability of cultivated varieties and hybrid seeds. Therefore most of the crops including wheat are grown just to feed the dairy cattle. It is therefore, the need of time that the farmer of this area gets full benefit of his efforts to grow wheat crop. For that purpose the research has been conducted to screen wheat genotypes with tremendous potential of variable genes. This can be used in further breeding programs to enhance the quality grain production.

Materials and Methods

Experiments were performed in the research fields of the Department of Plant Breeding and Genetics, University College of Agriculture Rawalakot, Azad Kashmir during the year 2001. In this study six wheat varieties were analyzed for their genotypic comparison for different characteristics. The varieties analyzed were Punjab-96, khyber-87, pirsabak-91, pasban-90, sogat-90 and rawal-87. Seeds of these varieties were provided by wheat program PARC Islamabad. The experiment was laid in a randomized complete block design (RCBD) in split plot fashion (Fisher, 1951). Each field was divided into 24 plots (beds) comprising of 4 replications with 6 varieties. Each plot being 2 m long and 1.80 m in width having seven rows. Morphological data was recorded on the characters like plant height, number of spikelets/spike, number of tillers/plant, spike length and 1000 grains weight (cm). The data were analyzed statically for analysis of variance adopting Steel and Torrie (1980) procedure.

Results and Discussion

Strategies for increasing the efficient utilization of genetic resources emphasize the need for an interdisciplinary approach with full participation of plant breeder and geneticists. Identification of wheat genotypes removes barriers leading to the collection of information. A highly significant difference in plant height was found among genotypes. Maximum plant height was observed by Punjab-96 (89-72) followed by khyber-87 (74.92), pirsabak-91 (72.57), pasban-90 (71.00) and soghat-90 (70.32) (Table 1). Minimum plant height was recorded by rawal-87 (66-95-Table 1). These results are in accordance with those of Ali (1994). Punjab-96 produced comparatively high amount of spikelets/spike as compared to other varieties. Pirsabak-91 and khyber-87 produced same number of spikelets as compared to others (Table 1). The difference in spikelets number is also reported by Johnson *et al.* (1986) and Hussain (1983); Cheema *et al.* (1987) and Siddique (1989).

Number of tillers reported by variety Punjab-91 differ significantly from all other genotypes by producing 14.92 tillers/plant. All other genotypes produced 7-9 tillers/plant (Table 1). These results are in conformity with those of Nawaz (1985) and Khan (1990).

Maximum spike length was produced by punjab-96 (11.22 cm). Spikes produced by khyber-87 and pasban were same in length, while much reduced by variety rawal-87 (Table 1). Results were supported by the findings of Arshad (1988) and Yousuf (1999). Weight of grains is an important component which directly correlates with the yield of a crop plant. Grain size of the varieties Punjab-96, khyber-87 and pirsabak-91 was quite similar, having 1000 grains weight ranging from 39-42 g. Pasban-90 and

Table 1: Statistical interpretation of different parameters of *Triticum aestivum* L.

Genotypes	Plant-height (cm)	No. of spikelets/ spike	No. of tillers/ plant	Spike-length (cm)	1000 grains weight (g)
Punjab-96	89.72a	19.87a	14.92a	11.22a	42.79a
Khyber-87	74.92b	18.02b	9.77b	10.72ab	42.24a
Pirsabak-91	72.57bc	17.62bc	8.97bc	10.32ab	39.33ab
Pasban-90	71.00c	17.17c	8.17bc	9.67bc	36.91bc
Soghat-90	70.32c	16.92c	7.95bc	9.12c	34.04c
Rawal-87	66.95c	15.92c	7.57c	8.95c	33.75c
S.E	0.38	0.10	0.25	0.15	0.51

Means having common letters do not differ significantly at 5% probability level.

pirsabak-91 produced low in numbers and to some extent reduced sized seeds, therefore, 1000 grains weight was reduced up to 33-36 g by rawal-87 (Table 1). Similar results were reported by Ali (1999) and Hussain (1989).

It was concluded that the overall performance of Punjab-96, Khyber-87 and pirsabak-91 is satisfactory. In this experiment Punjab-96 exhibited an extra-ordinary performance by producing an increased number (14.92) of tillers/plant as compared to other varieties. Therefore, Punjab-96 was recommended for general cultivation, especially in Azad Kashmir.

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