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IDENTIFICATION OF SUPERIOR F_1 WHEAT HYBRIDS

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Abstract

An experimental material consists of 130 F_1's wheat hybrids (10 Cytoplasmic male sterile and 13 varieties of wheat used as testers). These 130 F_1's were planted in a Randomized Complete Block Design with two replications. Thirty hybrids having high value than the average mean value in regards to above 5 parameters.

Key words : Wheat (*Triticum aestivum* L.), randomized complete block design (RCBD), yield, wheat hybrids.

Introduction

Wheat (*Tritium aestivum* L.) belongs to the family poaceae of self pollinated with 2n = 42 and its origin is to be Middle East region of Asia. Wheat is the second most important food crop next to rice consumed by nearly 35% of the world population and providing 20% of the total food calories (Singh *et al.*, 2011). In this context, exploiting hybrid vigour at commercial level through development of hybrid wheat is considered promising. The development of commercial hybrid wheat remains of great interest, and a key to success will be to improve hybrid production efficiency for which findings better source of male sterile cytoplasm is a critical requirement. Expression of an adequate vigour of F_1 hybrid in important economic properties, yield and quality included is one of the fundamental preliminary conditions for the successful use of hybrids in wheat (Tiwari *et al*., 2009).

Materials and Methods

The experiment was carried out under Wheat Improvement Project, Department of Plant Breeding and Genetics at Seed Breeding Farm, College of Agriculture, J.N.K.V.V., Jabalpur (Madhya Pradesh), India. The experimental material consists of 130 F_1's wheat hybrids (10 Cytoplasmic male sterile and 13 varieties of wheat used as testers). These 130 F_1's were planted in a Randomized Complete Block Design with two replications. Each plot was accommodated in a single row of 1.5 m length, with row to row distance of 23 cm. The sowing was done on 25th November 2009 by hand in rows.

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Results and Discussion

The identification of superior hybrid were based on 5 characters *viz*., yield per plant, number of tillers/plant, spike length, number of grains per spike and test weight.

Thirty hybrids having high value than the average mean value in regards to above 5 parameters were listed and out of them top six hybrids were designated as superior F_1 hybrids *viz*., JWH-10/JW-3020, JWH10/DBW17, JWH-10/MP-3269, JWH-16/JW-3020, JWH-23/HI-1544 and JWH-23/PBW-343.

Table 1: F_1's Cross combination included in study.

S. no.	JWH-1 × Testers	S. no.	JWH-4 × Testers
1.	JWH-1 × HI – 1531	1.	JWH-4 × GW-366
2.	JWH-1 × Lok-1	2.	JWH-4 × WH-147
3.	JWH-1 × GW-366	3.	JWH-4 × JW-3020
4.	JWH-1 × HI-1544	4.	JWH-4 × Lok-1
5.	JWH-1 × JW-3211	5.	JWH-4 × HI-1544
6.	JWH-1 × GW-273	6.	JWH-4 × GW-322
7.	JWH-1 ×wh-147	7.	JWH-4 × HI-1531
8.	JWH-1 × JW-3020	8.	JWH-4 × JW-3211
9.	JWH-1 × DBW-17	9.	JWH-4 × DBW-17
10.	JWH-1 × JW-3173	10.	JWH-4 × JW-3269
11.	JWH-1 × GW-322	11.	JWH-4 × JW-3173
12.	JWH-1 × PBW-343	12.	JWH-4 × GW-273
13.	JWH-1 × MP-3269	13.	JWH-4 × PBW-343
	JWH-5 × Testers		**JWH-8 × Testers**
1.	JWH-5 × Lok-1	1.	JWH-8 × JW-3211
2.	JWH-5 × GW-366	2.	JWH-8 × GW-322
3.	JWH-5 × JW-3211	3.	JWH-8 × PBW-343
4.	JWH-5 × HI-1531	4.	JWH-8 × JW-366

Table 1 continued...

Table 1 continued...

5.	JWH-5 × JW-3173	5.	JWH-8 × DBW-17
6.	JWH-5 × JW-3269	6.	JWH-8 × JW-3173
7.	JWH-5 × GW-273	7.	JWH-8 × Lok-1
8.	JWH-5 × HI-1544	8.	JWH-8 × HI-1544
9.	JWH-5 × GW-322	9.	JWH-8 × WH-147
10.	JWH-5 × JW-3020	10.	JWH-8 × JW-3269
11.	JWH-5 × WH-147	11.	JWH-8 × JW-3020
12.	JWH-5 × DBW-17	12.	JWH-8 × HI-1531
13.	JWH-5 × PBW-343	13.	JWH-8 × GW-273
	JWH-10 × Testers		**JWH-14 × Testers**
1.	JWH-10 × DBW-17	1.	JWH-14 × JW-3173
2.	JWH-10 × WH-147	2.	JWH-14 × PBW-343
3.	JWH-10 × Lok-1	3.	JWH-14 × GW-366
4.	JWH-10 × GW-322	4.	JWH-14 × JW-3269
5.	JWH-10 × HI-1544	5.	JWH-14 × HI-1544
6.	JWH-10 × HI-1531	6.	JWH-14 × JW-3211
7.	JWH-10 × JW-3020	7.	JWH-14 × Lok-1
8.	JWH-10 × GW-273	8.	JWH-14 × HI-1531
9.	JWH-10 × GW-366	9.	JWH-14 × GW-273
10.	JWH-10 × JW-3211	10.	JWH-14 × JW-3020
11.	JWH-10 × JW-3173	11.	JWH-14 × GW-322
12.	JWH-10 × PBW-343	12.	JWH-14 × WH-147
13.	JWH-10 × JW-3269	13.	JWH-14 × DBW-17
	JWH-16 × Testers		**JWH-17 × Testers**
1.	JWH-16 × JW-3020	1.	JWH-17 × HI-1531
2.	JWH-16 × DBW-17	2.	JWH-17 × GW-322

Table 1 continued...

3.	JWH-16 × Lok-1	3.	JWH-17 × PBW-343
4.	JWH-16 × JW-3269	4.	JWH-17 × JW-3173
5.	JWH-16 × HI-1544	5.	JWH-17 × Lok-1
6.	JWH-16 × JW-3211	6.	JWH-17 × JW-3020
S. No.	**JWH-1 × Testers**	**S. No.**	**JWH-4 × Testers**
7.	JWH-16 × HI-1531	7.	JWH-17 × DBW-17
8.	JWH-16 × WH-147	8.	JWH-17 × JW-3269
9.	JWH-16 × GW-366	9.	JWH-17 × JW-3211
10.	JWH-16 × PBW-343	10.	JWH-17 × GW-366
11.	JWH-16 × GW-322	11.	JWH-17 × WH-147
12.	JWH-16 × GW-273	12.	JWH-17 × GW-273
13.	JWH-16 × JW-3173	13.	JWH-17 × HI-1544
	JWH-20 × Testers		**JWH-23 × Testers**
1.	JWH-20 × HI-1531	1.	JWH-23 × GW-322
2.	JWH-20 × GW-322	2.	JWH-23 × JW-3211
3.	JWH-20 × PBW-343	3.	JWH-23 × HI-1544
4.	JWH-20 × JW-3173	4.	JWH-23 × Lok-1
5.	JWH-20 × Lok-1	5.	JWH-23 × JW-3269
6.	JWH-20 × JW-3020	6.	JWH-23 × GW-273
7.	JWH-20 × DBW-17	7.	JWH-23 × PBW-343
8.	JWH-20 × JW-3269	8.	JWH-23 × JW-3020
9.	JWH-20 × JW-3211	9.	JWH-23 × DBW-17
10.	JWH-20 × GW-366	10.	JWH-23 × JW-3173
11.	JWH-20 × WH-147	11.	JWH-23 × HI-1531
12.	JWH-20 × GW-273	12.	JWH-23 × GW-366
13.	JWH-20 × HI-1544	13.	JWH-23 × WH-147

Table 3 : Identification of superior F_1 hybrids.

Hybrids	YPP	NTPP	SL	NGPS	TGW
JWH-1 × HI-1531	32.5	12.5	12.06	57.4	29.8
JWH-1 × GW-322	30.9	15.1	12.23	55.6	27.25
JWH-1 × WH147	22.9	20.3	12.10	65.50	28.15
JWH-1 × PBW-343	22.3	17.05	12.63	57.60	25.55
JWH-1 × MP-3269	25.95	23.90	13.34	55.30	29.05
JWH-4 × HI-1544	26.7	17.45	14.05	57.20	34.8
JWH-5 × GW-322	22.35	9.45	12.5	49.4	26.55
JWH-5 × MP-3269	22.9	12.10	12.4	67.0	27.7
JWH-8 × GW-366	22.5	7.15	13.22	55.10	40.40
JWH-8 × PBW-343	22.8	12.35	12.18	45.5	35.90
JWH-10 × HI-1544	27.8	12.25	9.9	41.85	42.50
JWH-10 × JW-3211	24.55	12.45	10.7	53.35	41.15
JWH-10 × JW-3020	34.10	11.1	10.5	50.5	47.60
JWH-10 × DBW-17	32.15	13.8	10.29	65.45	40.35
JWH-10 × JW-3173	26.25	11.5	9.22	61.0	38.9
JWH-10 × PBW-343	26.15	14.75	9.7	55.0	42.50
JWH-10 × MP-3269	32.25	6.25	9.7	65.1	39.10
JWH-14 × WH-147	28.10	20.9	11.2	50.1	47.15
JWH-16 × JW-3020	32.80	7.9	12.05	57.35	38.55

Table 2 continued...

Table 2 continued...

JWH-16 × JW-3173	22.2	24.2	12.6	65.15	41.9
JWH-16 × PBW-343	26.0	10.2	10.9	45.5	34.5
JWH-17 × HI-1544	24.15	23.1	13.8	53.7	36.5
JWH-17 × DBW-17	25.85	33.3	13.39	53.7	21.75
JWH-20 × GW-366	26.10	36.65	11.03	48.10	35.45
JWH-20 × HI-1544	25.25	15.35	12.7	51.20	31.55
JWH-20 × DBW-17	23.9	28.25	12.99	55.30	45.63
JWH-23 × GW-366	28.05	30.10	11.45	56.90	31.65
JWH-23 × HI-1544	32.78	6.85	12.81	61.6	41.65
JWH-23 × WH-147	25.10	21.35	13.15	51.37	31.35
JWH-23 × PBW-343	32.7	22.10	12.62	54.45	42.30

Yield per plant – YPP, Number of tillers/plant – NTP, Spike length– SL, Number of grain/spike – NGPS and 1000 grain weight – TGW.

References

Araki, H. (1990). Studies on the practical use of hybrid wheat using cytoplasmic male sterility. *Bulletin of the Kyushu National Agricultural Experiment Station*, **26(2)** : 115-165.

Deswal, R. K., S. S. Grakg and K. K. Berwal (1996). Genetic variability and characters association between grain yield and its components in wheat. *Annals Biol. Ludhiana*, **12(2)** : 221-224.

Major, D. J. (1980). Environmental effects on flowering 1-15. In : W.R. Fehr and H.H. Handley (ed.) Hybridization of crop plants. ASA and CSSA, Madison, WI.

Martin, A. C., S. G. Atienza, M. C. Ramirez, F. Barror and A. Martin (2009). Chromosome engineering in wheat to restore male fertility in the MSH1 CMS system. *Mol. Breeding*, **24** : 397-408.

Mc William, J. R., H. Ikehashi and S. K. Singha (1995). Progress in hybrid rice in India. *Int. Rice Comm. H.L.*, **44** : 80-86.

Pickett, A. A. (1993). Hybrid wheat: result and problems. *Adv. Plant Breed., Suppl. J. Plant Breed.,* **15** : 1-259.

Singh, S. K. and R. M. Singh (2011). Variability and character association among floral traits and yield in Bread wheat (*Triticum aestivum*). *Indian J. Plant Genet. Resour*., **14(2)** : 199-201.

Singh, S. K., D. Singh, R. Chatrath and B. Mishra (2008). Prospects of hybrid wheat research in India. *J. Wheat Res*., **2(1)** : 7-19.

Tiwari, V. N. and G. S. Rawat (2009). Variability and correlation studies between grain, yield and its components in segregation generations of aestivum wheat. *Bhartiya Krishi Anusandhan Patrika*, **8(1)** : 19-24.

Virmani, S. S. and I. B. Edwards (1983). Current status and future propects for breeding hybrid rice and wheat. *Adv. Agron*., **36** : 145-214.