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CROSSABILITY OF SOME WHEAT CULTIVARS WITH *HORDEUM BULBOSUM* L.

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ABSTRACT

Out of six Indian wheat varieties crossed with *Hordeum bulbosum* L., only in C 591 four seeds were formed; three embryos were cultured and one plant was obtained.

Key words: *Triticum aestivum*, *Hordeum bulbosum*, embryo culture, incompatibility.

Haploids in wheat (*Triticum aestivum* L.) have been produced by using two techniques, the *Hordeum bulbosum* system and anther culture. The *H. bulbosum* exploits the phenomenon of chromosome elimination in intergeneric and interspecific hybrids [1, 2]. Most of the genotypes of wheat so far investigated, however, show incompatibility with *H. bulbosum* [3, 4] due to the genetically controlled dominant genes located on wheat chromosomes 5B and 5A. The wheat genotypes carrying these genes are not crossable with *H. bulbosum*. Many of the European and Japanese genotypes have been screened for their crossability with *H. bulbosum* [5, 6], but no information is available on Indian wheats. As crossability of wheat with *H. bulbosum* is the first step towards haploid production, a survey of the Indian wheat varieties for their crossability genes with *H. bulbosum* is essential for haploid production.

Seven spring wheat varieties, namely, C 591, Kalyan Sona, NP 836, NP 852, HD 2428, HD 2329 and Chinese Spring, and two European winter wheat varieties, Mara and Cappelle-Desprez, were taken for the investigation. The wheat plants along with *H. bulbosum* (4x) were grown in pots in greenhouse under natural conditions. Extra light was provided to winter wheats and *H. bulbosum* to induce flowering in time. The wheat ears were emasculated after removing the central florets of each spikelet and apical and basal spikelets to achieve uniform maturity. The emasculated ears were covered with bags and hand pollinated with freshly collected *bulbosum* pollen on the fourth day of emasculation. The pollinated ears were sprayed with 75 ppm solution of gibberellic acid on the following day and then the bags were replaced with butter paper bags. The number of seeds (immature embryos) were scored three weeks after pollination. The 18-day-old embryos were excised and cultured *in vitro* as per method of Simpson and Snape [7].

Out of the nine wheat varieties crossed with *H. bulbosum*, only Chinese Spring and C 591 produced seeds (Table 1). The others did not show any sign of embryo development after pollination. This suggests that the varieties which did not set any seed on crossing with *H. bulbosum* may carry alleles for incompatibility at the Kr1 and Kr2 loci. It has been reported that most of the American and European wheats are not crossable with *H. bulbosum* [4], while the varieties of Asian origin, especially the Japanese and Chinese genotypes, possess cross-compatibility genes [6–8]. Seed setting in the cross- compatible cultivars in this study was comparatively lower than reported for some of the Japanese varieties (0–45.9%). Seed setting is dependent on the genotype of the parents as well as the technique used. Out of three embryos of C 591 cultured, one gave rise to a plant, and three plants of cv. Chinese Spring were obtained from seven cultured embryos.

Table 1. Cross[illegible]y of wheat varieties with *Hordeum bulbosum* (4x)

Genotype	No. of florets pollinated	No. of grains set	Seed set, %
Chinese Spring	66	8	12.1
C 591	48	4	8.3
Kalyan Sona	74	0	0
NP 852	84	0	0
NP 836	60	0	0
HD 2428	112	0	0
HD 2329	117	0	0
Mara	128	0	0
Cappelle-Desprez	96	0	0

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