

THE IMPACT OF NUCLEAR-PLASMA GENE INTERACTION GOVERNING HETEROSIS IN WHEAT (*TRITICUM AESTIVUM* L.)

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Abstract : The present investigation consists of 28 genotypes of wheat, which were procured from Wheat Breeding Programme, Directorate of Research, Sam Higginbottom Institute of Agriculture, Technology and Sciences, (Deemed to be University), Allahabad, UP, India. The experiment was conducted during *Rabi* 2008-10 in RBD having three replications. The data were recorded on twelve characters to study the variability, heterosis and contribution of plasma gene determining the heterosis. The significant mean sum of squares for all the 12 characters indicated the presence of substantial amount of variability. *Per se* performance for grain yield and its components depicted that genotypes GIANT-3, AAI-347 and RAJ-4026 was found to be best for introduction of male sterility either through chemical hybridizing agent (CHA) or through transfer of ms gene from the wild sources or alien genes through biotechnological techniques in hybrid breeding programme in wheat. This hybrid showed highest positive significant heterobeltiosis (hb) and economic heterosis (he) values for grain yield per plant, number of grains per spike, number of effective tillers per plant and biological yield due to plasma gene effect in reciprocal crosses. The highest heterobeltiosis (hb) and economic heterosis (he) value for grain yield per plant was depicted by direct cross GIANT-3 x AAI-347 and reciprocal cross PBW-343 x GIANT-3.

Keywords: Heterosis, male sterility, nuclear gene, plasma gene, wheat.

REFERENCES

- Ansari, K.A., Ansari, B.A. and Amanullah, Khund** (2005). Extent of heterosis and heritability in some quantitative characters of bread wheat. *Indus J. of Plant Sci.* 3 (2): 189-192.
- A. Dehdari, A. Rezai and S.A.M. Mir Mohamadi Maibody** (2006). Nuclear and Cytoplasmic Inheritance of Salt Tolerance in Bread wheat plants based on ion content and biological yield. *Iran Agricultural Research, Vol. 24, No. 2 and Vol. 25, No. 1*:
- Cattaneo, M. and Boggini, G.** (2006). Genetic variability between and among bread wheat varieties realized by *Nazareno Strampelli*. *Italus-Hortus*. 13 (II): 355-35.
- Dwivedi, A.N., Pawar, I.S., Sashi, Madan** (2002). Variability parameters and character association between yield and quality attributing traits in wheat. *Harayana Agri Uni, J of Res.* 32 (2): 77-80.
- Farooq, Jahanzeb. Habib, Imran, Khaliq, Ihsan and Nawaz ur Rehman, M.S.** (2005). Manifestation of heterosis and heterobeltiosis for some polygenic characters in bread wheat. *Indus J. of Bio Sci.* 2 (1): 36-42.
- G.S. Sharma and R. B. Singh** (1978). Heterosis and inbreeding depression in crosses of wheat varieties of different height group. *Indian J. Agroc. Sci.*, 48: 510-515.
- G.W. Darrel and L. L. Charles** (1970). Hybrid vigour in hard spring wheat crosses. *Crop Sci.* 10: 220-223.
- Hassan, Ghulam, Mohammad, Fida, Khalil, I.H. and Raziuddin** (2006). Heterosis and heterobeltiosis studies for morphological traits in bread wheat. *Sarhad J. of Agri.* 22 (1): 51-54.
- Hussain, Fida, Hussein, Makhdoom, Iqbal,-M.M; Akhtar, M.A., Zulkiffal, M. and Riaz, ud. Din** (2007). Heterosis studies in wheat crosses. *J. of Agri Res Lahore.* 45 (4): 337-343.
- Rafat-Sultana; Malik, S. K.** (2005). Genetic variability and character association between yield and yield attributing traits in bread wheat (*Triticum aestivum* L. Em. Thell). *Annals of Agri Res;* 26 (1): 118-125.
- Robertson and K. J. Frey** (1984). Expression of nuclear-cytoplasmic interactions and heterosis in quantitative traits of oats. *Euphytica* 36: 877-886.
- Sharma, A.K., Garg, D.K.** (2002). Genetic variability in wheat (*Triticum aestivum* L.) crosses under different normal and saline environments. *Annals of Agri. Res,* 23 (3): 497-499.
- Singh, S.K., Singh, A., Singh, P., Singh, S. and Singh, B.N.** (2007). Heterosis over economic parent under the Line x Tester design in wheat (*Triticum aestivum* L.). *Flora and Fauna Jhansi.* 13 (1): 76-82.