



Superiority of an on-farm conserved land variety, "Meerut Yellow" over improved composite varieties of maize — *in situ* conservation of agro-biodiversity

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Although green revolution largely solved the food problems of India despite alarming growth of population, ecologist did not consider this green revolution as environment friendly. With the introduction of high yielding varieties (HYV), the fertile soil has rapidly been covered with these HY varieties, so that the locally well-adapted on-farm conserved land varieties were relegated to marginal land and harsher environments. Yield and quality of these improved varieties could not be sustained and therefore, these varieties periodically required replacement. However, the technology of high yielding/hybrid varieties discriminates against resource-poor farmers and can be grown only by resource-rich farmers who could afford to purchase fertilizer, pesticides and other inputs required for the cultivation of these varieties. In the present paper it has been demonstrated that an on-farm conserved land variety of maize can be superior in yield to the recently developed improved varieties, suggesting that conservation of such varieties is essential to promote evergreen revolution and to ensure food security.

Five improved varieties of maize viz. Surya, Naveen, Kanchan and D-765 were evaluated with Meerut Yellow (Bulandshahr local), which is an on-farm conserved land variety of maize that is well adapted and popular in some parts of Bulandshahr and Meerut districts of western Uttar Pradesh. The land variety had long and slender cobs well filled with grains. The experiment was conducted in RBD with three replications for two years (Kharif 1993 and Kharif 1994) at Crop Research Centre of Western Campus of G.B. Pant University of Agri. and Technology, Modipuram, Meerut. On-farm demonstrations/experiments were also conducted for four years (Kharif 1992, 1993, 1994 and 1995) at research station of G.B. Pant University of Agri. & Technology located at Bulandshahr. In these trials the variety D765 was not included.

Results of varietal experiments (Table 1, 2) suggest that the yield of Meerut yellow was statistically higher than that of Naveen, Kanchan and D-765, and was at par with that of Surya and Shweta. The results of demonstrations conducted at Bulandshahr also supported yield superiority of the land variety "Meerut Yellow". Only Naveen gave higher yield, and that too only during Kharif 1995.

Table 1. Fresh weight of mature cobs (q/ha) obtained from varietal trials conducted at Western Campus, Modipuram

| Variety | Mean Yield |
|---------------|------------|
| Surya | 66.43 |
| Naveen | 61.17 |
| Shweta | 67.47 |
| Kanchan | 53.38 |
| D-765 | 58.73 |
| Meerut yellow | 67.06 |
| Mean | 62.79 |
| C.D. (5%) | 5.07 |

Maximum area under maize cultivation in Western Uttar Pradesh is in the district Bulandshahr. Newly improved varieties viz. hybrids and composites were introduced in this conventional maize growing area during green revolution era. None of these green

Table 2. Grain yield (q/ha) obtained from demonstrations conducted at Research farm of G.B. Pant University of Agri. & Technology located at Bulandshahr

| Varieties | Years | | | |
|---------------|-------|-------|-------|-------|
| | 1992 | 1993 | 1994 | 1995 |
| Surya | - | 18.00 | 12.30 | - |
| Naveen | 22.85 | 21.50 | 9.61 | 25.00 |
| Shweta | 25.00 | 20.00 | 9.23 | 22.00 |
| Kanchan | 21.42 | 22.00 | 14.61 | 19.00 |
| Meerut Yellow | 25.00 | 24.50 | 19.23 | 22.00 |

revolution varieties of maize had an edge over the locally adapted on-farm traditionally conserved land variety "Meerut Yellow". This land variety could sustain productivity and maintained the traditional area under its production over decades while the other so called high yielding varieties of maize disappeared within a short span of time.

One of the major reasons of this land variety competing with other newer varieties is its highly location specific adaptation. The higher yields of the variety could be explained on the assumption that gene complexes governing negative heterotic effects for response pattern under conditions of stress i.e. low input agriculture [4] perhaps had been linked in an irreversible pattern [2]. It appeared that in this case heterosis has been exploited naturally both for higher yields and adaptation reactions [3]. The variety is being cultivated on large scale in the region. Therefore, chances of inbreeding depression are completely eliminated [1]. Perhaps due to these reasons the variety sustained over decades in Bulandshahr and some parts of Meerut district of Western Uttar Pradesh. But in the recent past the area under this variety has been drastically reduced. Now farmers prefer cultivation of rice in place of maize in the Kharif season. The only reason behind it seems to be higher returns from the rice crop. Farmers who conserved the land variety now feel that cultivation of maize crop by them is responsible for their poverty. Now only resource-poor farmers are cultivating maize in the area. To prevent such land races from going to the gene bank for conservation, revitalization of on-farm traditionally conserved land varieties like "Meerut Yellow" through social recognition

of farmers' contributions and creation of an economic stake through decision with political will is required [5]. Superiority of the variety has been proved by several workers. The author felt concerned while visiting the area and had discussions with the farmers of the area. Further, the matter assumed importance in the context of *in situ* conservation of agro biodiversity. It is a global call for the research workers, farmers and policy makers to conserve such varieties to fulfill the dream of the evergreen revolution in order to ensure food security in future.

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References

1. **Allard R. W.** Principles of plant breeding. Johan Wiley and Sons, Inc. New York, pp. 213-233.
2. **Jones D. F.** 1917. Dominance of linked factors as a means of accounting for heterosis. *In: Proc. Nat. Acad. Sci. Wash.*, **3**: 310-312.
3. **Singh D.** 1996. Development of breeding methodology to exploit agronomical manipulations for efficient use of agriculture resources. *In: Proc. (abstracts) of 2nd Int crop Sci. Congress (17-24 Nov. 1996)*, pp 390.
4. **Singh D. and Gupta P. K.** 1985. Selection of diverse genotypes for heterosis in yield and response in *toria* (*Brassica campestris* L.) *Theor. Appl. Genet.*, **69**: 515-517.
5. **Swaminathan M. S.** 1996. Towards an evergreen revolution. *In: Souvenir 2nd Int. Crop Sci. Congress (17-24 Nov. 1996)*, pp 29-35.