

diameter, kernel rows, kernels per row, kernels per ear, rachis weight, rachis diameter and kernel length (Gupta and Kovács, Theoret. Appl. Genetics 45: 64-71, 1974 and Proc. VII Maize Sorghum Sec. EUCARPIA, 1973, in press).

It can be seen from the data in Table 1 that increasing the population density delayed female flowering time more for the o2 types than for their normal analogues and increased lodging, ear height, grain yield and raw ear yield; the increased density reduced the number of ears per plant, ear leaf area, tillers per plant, ear length, ear diameter, kernel rows, kernels per row, kernels per ear, rachis weight, rachis diameter and kernel length. However, grain yield, raw ear yield, ear length, ear diameter, kernels per row and kernels per ear are apparently less affected by density in homozygous opaque-2 populations. Increased density seems to have reduced infections due to Ustilago maydis and Helminthosporium turcicum in normal plants and increased them in opaque-2 types, and the frit fly infection was reduced less in the o2 types than in their normal analogues.

D. Gupta and I. Kovács

Additive genetic variance in opaque-2 and analogous normal triallels —All possible three-way cross-hybrids were made among six o2-converted inbred lines of maize (WF9 o2, R61 o2, N6 o2, HMv850-2 o2, C103 o2 and W187 o2) and their normal analogues. Observations on a number of characters were made on these hybrids in four replicate split-plot trials conducted during the years 1973 and 1974. Data obtained were analysed genetically using the procedure outlined by Rawlings and Cockerham (Crop Sci. 2: 228-231, 1962), and the expectations of eight components of genetic and environmental variance calculated for the o2 and normal hybrids for each year.

Variance attributable to additive and additive epistatic gene effects was expressed as a percentage of the total variance and combined over the 2 years (Table 1). It can be seen that 80.53% of the total variation observed for grain yield in the o2 hybrids was attributable to additive and additive epistatic gene effects, compared with 87.28% in the analogous normal triallel; the o2 hybrids have nearly 7% more non-additive gene effects than their normal analogues for the trait grain yield. It can further be seen that a number of characters had more variation attributable to additive and additive epistatic gene effects in the o2 forms than in their normal analogues. Thus, the days to 50% pollen-shed, days to 50% silking, total number of leaves, leaf area index, leaves above the ear, ear height, tillers per plant and yield components like drying percentage and shelling percentage had a greater proportion of their variance attributable to additive and additive epistatic gene effects if the o2 gene was present in recessive homozygous condition than if it was absent. However, plant height, water imbibition and such

Table 1. Total variation attributable to additive and additive epistatic gene effects in the o2 and analogous normal triallels.

Character	<u>o2</u>	Normal
Days to 50% pollen-shed	96.56	90.08
Days to 50% silking	96.34	83.96
Total leaves	91.63	77.80
Grain yield	80.53	87.28
Raw ear yield	88.83	88.23
Leaf area index	94.76	89.02
Leaves above the ear	93.23	90.26
Ears per plant	78.78	79.48
Plant height	91.14	93.01
Ear height	96.47	93.77
Tillers per plant*	78.11	71.08
Ear length	86.15	86.54
Ear diameter	90.13	93.25
Kernel rows	82.89	93.52
Kernels per row	76.70	85.12
Kernels per ear	78.96	85.36
Drying percentage	93.18	85.98
Shelling percentage	94.22	92.76
Rachis diameter	87.74	90.80
200-kernel weight	88.56	90.75
Kernel density	84.63	84.47
% water imbibition	72.48	80.27
Kernel length	86.92	87.42
Kernel width	83.98	92.34

*Data from one year (1973) only.

yield components as ear diameter, kernel rows, kernels per row, kernels per ear, rachis diameter, 200-kernel weight and kernel width had more variation due to additive and additive epistatic gene effects in the normal cross-hybrids than in their o2 counterparts. The proportion attributable to additive and additive epistatic gene effects appeared to be unaltered for such traits as raw ear yield, ears per plant, ear length, kernel density and kernel length.

D. Gupta

Investigation of some varietal hybrids developed at CIMMYT under our continental climatic conditions — In 1974 in collaboration with CIMMYT we studied the adaptation of 132 varietal crosses selected by CIMMYT's Dr. E. C. Johnson from many parts of the world and representing different latitudes and altitudes. The important geographical data for Martonvásár are: latitude 47°21', longitude 18°21', elevation 150 m. The general behavior of these crosses observed at Martonvásár can be summarized as follows: they have good early vigor and are very tall (3-4 m) with highly placed ears, an under-developed root system with a rather high percentage of root lodging and a significant susceptibility to stalk-rot and to Ustilago maydis.