

been presented in Table 1. There is a remarkable heterosis for earliness in the heterozygous hybrids as measured both by the days to 50% male flowering (96 percent of the parents) and the moisture content at harvest (95 percent). Further, it can be seen in Table 1 that there is a favorable heterosis for dry grain yield, the mean heterosis index of the hybrids being 145.4 percent of the parental lines. In other words the heterozygous hybrids demonstrate an average dry grain yield of 1.45 times that of their related opaque-2 and normal parental lines. Likewise, the 1000 grain weights demonstrate a considerable heterosis, at least for the normal grains (104%) obtained on these heterozygous hybrids.

On the basis of Mendel's law of segregation, such opaque-2 heterozygous hybrids are expected to yield a mixture of opaque and normal grains. The opaque grains are expected in the following ratios in the types of crosses mentioned below.

Possible combinations	Ratio of opaque grains
(W64A x WF9) x N6 $\frac{o_2}{o_2}$	25%
(W64A x WF9 $\frac{o_2}{o_2}$ ) x N6 $\frac{o_2}{o_2}$	50%
(W64A x WF9 $\frac{o_2}{o_2}$ ) x (A632 $\frac{o_2}{o_2}$ x A636 $\frac{o_2}{o_2}$ )	50%
(W64A x WF9 $\frac{o_2}{o_2}$ ) x Opaque variety	50%

Breeding of such heterozygous opaque-2 hybrids is, thus, suggested as an alternative breeding procedure for developing modified opaque-2 hybrids.

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### 3. Comparison of some properties of the heterozygous opaque-2 hybrids and their normal analogues.

We studied the yielding ability as well as the earliness properties (days to 50% male flowering time and the moisture content) of the commercial hybrids 156 x N6 and 156 x B14 and their heterozygous opaque analogues. The results are summarized in Table 1.

Forty plants from each hybrid were examined individually for maturity and dry grain yield. From the Table 1 it can be stated that the values of two earliness properties, days to 50% male flowering and the moisture content at harvest, do not lead to the same conclusions in comparisons of the normal and the heterozygous opaque analogues. Data on flowering time

Table 1  
 Comparison of the heterozygous opaque hybrids 156 x N6  $\alpha_2$  and 156 x B14  $\alpha_2$   
 and their normal analogues (Martonvásár, 1973)

Combinations	Days to 50% male flowering	Moisture content %	Shelling percentage	Dry grain yield per plant g	1000 grain weight g	
					Normal	Opaque
156 x N6	76.1	30.6	84.1	211.7	257.3	-
156 x N6 $\alpha_2$	76.7	32.8	83.0	202.4	251.4	247.7
156 x B14	77.3	33.1	85.2	231.9	321.3	-
156 x B14 $\alpha_2$	77.6	36.8	84.2	223.4	317.9	304.8
Ratio in percentage of the normal hybrids						
156 x N6	100.0	100.0	100.0	100.0	100.0	100.0
156 x N6 $\alpha_2$	100.8	107.2	98.7	95.5	97.7	-
156 x B14	100.0	100.0	100.0	100.0	100.0	100.0
156 x B14 $\alpha_2$	100.4	111.2	98.8	96.3	98.9	-

show little if any difference between the normal hybrids and the heterozygote opaque forms. However, the moisture content of the heterozygous opaque hybrids is higher by 2.2 and 2.7% than in the normal forms. These data prove that only the "days to 50 percent male flowering" is not usable as an index of the earliness of the hybrids.

It is remarkable that the yielding ability of the normal and the heterozygous opaque single crosses is practically the same. The difference in the case of 156 x N6  $\underline{o_2}$  is 4.5 percent, while in the case of 156 x B14  $\underline{o_2}$  it is 3.7 percent. These properties are supplemented by the expected increase in lysine content, by nearly 25 percent, due to 25%  $\underline{o_2}$  grains among the normals.

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#### 4. Evaluation of heterozygous opaque hybrids of the Mv Syn A-3 $\underline{O_2}$ sublines.

The Syn A-3 opaque-2 inbred line was developed from the open pollinated variety, Illinois Synthetic A  $\underline{o_2}$ . The sublines of Syn A-3, which are related to each other, were selected from their large population and crossed with the normal unrelated tester N6. The heterozygous opaque single hybrids of different Syn A-3 sublines were planted in comparative yield trials in two replications, with 40 plants per plot in 80 x 30 cms spacing. In the experiment with heterozygous opaque hybrids we used two standards. One of them was the Mv Syn A x Syn B opaque varietal hybrid and the other was the normal hybrid of 156 x B14.

Data on the most important properties of heterozygous opaque single crosses are summarized in Table 1. The data show considerable differences both in the moisture content at harvest and yielding ability, as well as the 1000 grain weight of the tested hybrids. The moisture content at harvest (earliness) varied from 29.4 to 33.1 percent showing a 3.7% difference. Similarly remarkable is the finding that the mean value of the moisture content in the heterozygous opaque hybrids is less by 15.6 percent than the same value in the opaque varietal hybrid and is 5 percent less than in the normal standard single cross.

The greatest differences were found in the yielding ability of the Syn A-3  $\underline{o_2}$  sublines. The lowest yield was 92.1 percent of the opaque