IV. REPORTS FROM COOPERATORS

AGRICULTURAL RESEARCH INSTITUTE
Hungarian Academy of Sciences
Martonvásár, Hungary

1. Cold tolerance of opaque-2 versus normal maize with and without fungicidal seed treatment.

Analysis of various o_2 recessive homozygous genotypes for their ability to tolerate low temperatures at the time of germination in comparison with their normal analogues is underway. The cold tolerance of these genotypes is examined in the laboratory by means of the procedure developed at this institute by Herczegh (1970) described briefly below. Ten seeds in 5 replicates each are sown 5 cm deep in soil from a maize field in plastic boxes, watered equally and kept at 8°C in incubators for 10 days and at 14°C thereafter. The emergence is recorded daily till about the 32nd day. The percent emergence of a given genotype on a particular day is divided by the number of days since starting incubation and the quotient is termed the CT value. This was calculated for each genotype every day and only the maximum CT value observed for a given genotype is used in calculating the overall averages.

The CT values of these genotypes were also determined after treatment with Quinolate V4X, an experimental fungicide manufactured by Budapesti Vegyimüvek under a French license.

A brief summary of the results obtained on CT values of 21 o_2 genotypes and their normal analogues, with and without seed treatment with 0.2% Quinolate V4X, has been presented in Table 1. It will be seen that the o_2 recessive homozygotes show only 44 percent tolerance of low temperatures in comparison with their normal counterparts, indicating pleiotropic effects of this mutant gene. The CT value of the o_2 genotypes improved by 34 percent following treatment with Quinolate V4X, whereas the increase was only 8 percent in the case of the normal counterparts. However, the performance of the o_2 types, even after fungicidal treatment of the seeds, was only 55 percent of the normal, a far poorer response.

Table 1

Averages of cold tolerance (CT) values of 21 opaque-2 and normal genotypes treated with 0.2% Quinolate V4X and the control

Type	Control	Treated with Quinolate V4X	Treated as % of control
Opaque-2	1.38	1.85	134.02
Normal	3.11	3.36	108.22
Opaque-2 as % of normal	44.37	55.06	

The results presented above seem to demonstrate that the o_2 gene alters the seed anatomy in such a way that the physiology of the kernel is greatly influenced. This might be due in part to a greater thickness of the pericarp in o_2 recessive homozygotes as was demonstrated in our earlier studies (Gupta and Kovács, 1973).

References:

Gupta, D. and I. Kovács (1973) Pericarp thickness in opaque-2 maize (Zea mays L.) and its normal analogue. Acta Agronomica 22: 400-405.

Herczegh, M. (1970) Some problems of cold tolerance. In: Some methodological achievements of the Hungarian hybrid maize breeding, pp. 271-281 (Kovács, I. ed.), Akadémiai Kiadó, Budapest.

D. Gupta
I. Kovács

2. A study on some characteristics of the heterozygous opaque-2 sister line crosses.

All of the parents of the opaque-2 heterozygote sister line crosses included here are of American origin, except for the line 156, which was developed by Dr. E. Pap from "Mindszentpusztai," a yellow dent improved open pollinated variety. Heterosis has been expressed as "heterosis index," which is a ratio of the observed value of the sister line hybrid to the average of its two parents.

Observations on some of the characters of the related normal and opaque-2 inbred lines and their $+/o_2$ heterozygote sister line hybrids have