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1. Polymorphism of isozyme pattern of catalase in the endosperm of diploid maize strains.

Catalase in the endosperm of maize is controlled by two loci $\underline{Ct_1}$ and $\underline{Ct_2}$ (1). Occasional aggregates of different subunits result in 2-5 isozymes. However, there are strains in which only one locus ($\underline{Ct_1}$) functions in the endosperm and only one isozyme is displayed.

In 1973 we investigated the isozyme pattern of catalase in 10 strains in the endosperm of self-pollinated maize plants grown from seeds analyzed in 1972. The isozyme pattern of 5 strains did not change, the quantity of isozymes in 3 strains increased from 1 to 4-5, the quantity of isozymes in one strain increased from 3 to 5 and the quantity of isozymes in another strain decreased from 5 to 3.

In various strains having 5 isozymes, the nature of the isozyme pattern may be different. Three possible types of pattern are indicated in Figure 1. The isozyme pattern may be symmetrical to isozyme 3 (Fig. 1b) and also may be asymmetrical (Fig. 1a,c). In the latter, the intensity of the isozyme stain may be weakened either in the direction from isozyme 2 to 5 or on the contrary from 5 to 2. However, it should be noted that brightness of isozyme 1, consisting of only subunits of $\underline{Ct_1}$ type, is not varied. In all three cases it remains the brightest.

Sometimes variations of the isozyme pattern are observed in various plants of the same strain. Three possible types of pattern in 5-catalase strains are presented in Figure 2.

Thus, the locus $\underline{Ct_1}$ may be considered as the main one, as its products are always found in the endosperm. Different alleles of the locus $\underline{Ct_1}$ provide the presence of various electrophoretic variants of catalase in the endosperm (2). The products of the $\underline{Ct_2}$ locus are not always displayed in the endosperm. On the basis of the described polymorphism, it may be assumed that there are different alleles at the $\underline{Ct_2}$ locus controlling the synthesis of the catalase subunits differing in their physical-chemical characteristics. The relative frequency of the two types of subunits provides both the variation of the isozyme catalase pattern in

different strains and the variation within one strain depending on the environment.

References:

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(2) Scandalios, J. G. 1969. Biochem. Genet. 8(1):37.

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2. Analysis of internode peroxidase in genetically determined dwarf forms of maize.

At present, evidence indicates that peroxidase and growth regulators interact (1,2,3,4).

Herein is presented an attempt to differentiate peroxidase isozymes by the degree of their involvement in the development and growth of maize internodes. This study was carried out on three maize lines carrying the mutation $\underline{br}_2$ or the normal analogue, as well as dwarf $\underline{d}_1/\underline{d}_1$, $\underline{d}_2/\underline{d}_2$ plants and their normal sibs. Because $\underline{d}_1/\underline{d}_1$ and $\underline{d}_2/\underline{d}_2$ plants have no pollen, dwarf plants were obtained by self-pollinating heterozygous $\underline{D}_1/\underline{d}_1$ and $\underline{D}_2/\underline{d}_2$ plants and normal plants by self-pollinating homozygous $\underline{D}_1\underline{D}_1$ and $\underline{D}_2/\underline{D}_2$ plants. The scheme used for the identification of $\underline{d}_1/\underline{d}_1$ and $\underline{D}_1/\underline{D}_1$ homozygous plants is shown in Fig. 1.

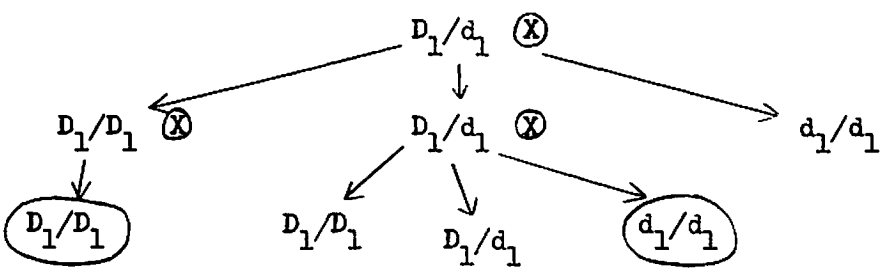

Figure 1.

Plants encircled in this scheme were analyzed. Peroxidase activity and isozyme patterns of peroxidases were investigated in small underdeveloped, growing and mature internodes. The plants were studied at the stage of the formation of the third internode, when the growing internode was about half as long as the internode which has developed before it. The staining