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

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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.

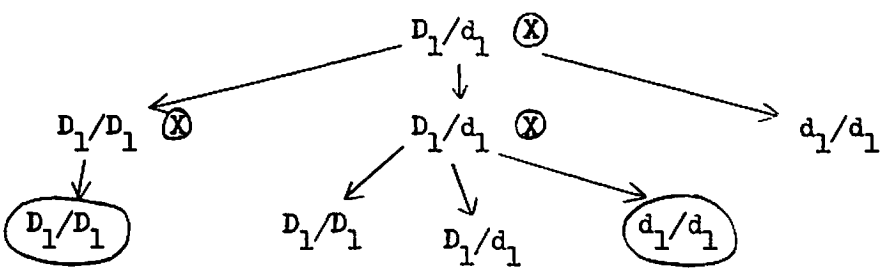


Figure 1.

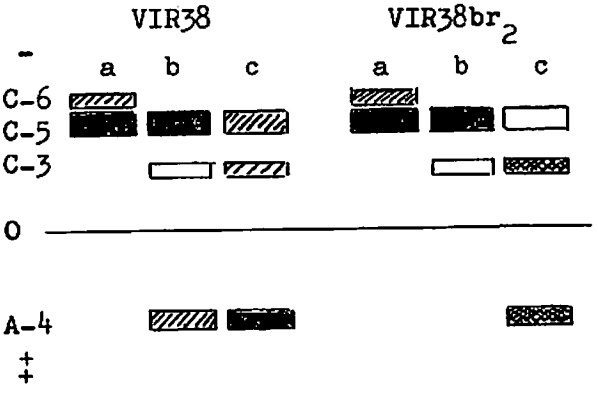
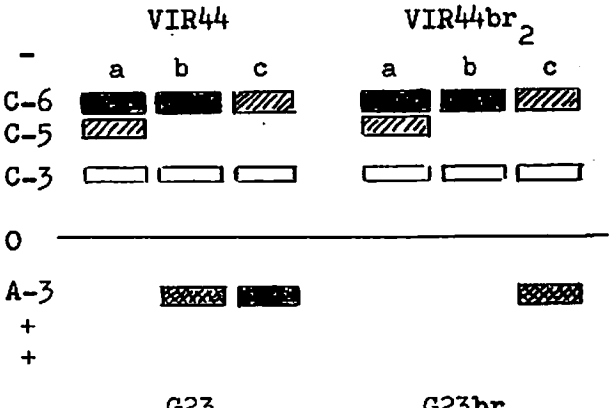
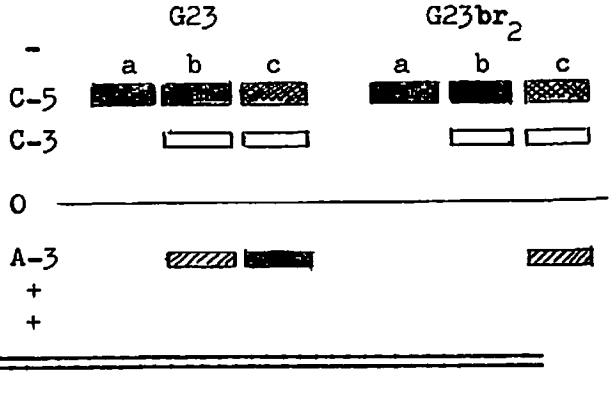
Plants encircled in this scheme were analyzed. Peroxidase activity and isozyme patterns of peroxidases were investigated in small underdeveloped, growing and mature internodes. The plants were studied at the stage of the formation of the third internode, when the growing internode was about half as long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

Table 1

The change in peroxidase activity and patterns of peroxidase isozymes in the course of internode development in semidwarf and normal plants

a-small underdeveloped internode; b-growing internode; c-mature internode.

(Activity $=\Delta D_{550-660mu}$/sec/ug protein)

Number of plant	a	c	Patterns of peroxidase isozymes
VIR 38			
1	56.6±1.5	73.2±1.6	
2	51.7±2.0	96.5±2.6	
VIR 38 br_2			
3	37.0±0.6	72.0±1.8	
4	45.8±1.8	73.5±2.9	
5	36.3±0.8	64.4±1.4	
VIR 44			
6	15.7±1.3	21.4±1.3	
7	18.3±0.9	52.4±1.5	
8	16.8±0.6	29.4±2.5	
VIR 44 br_2			
9	25.8±1.2	111.7±5.1	
10	22.6±0.9	107.6±4.0	
11	18.2±0.5	109.2±5.4	
G 23			
12	8.8±0.3	25.8±0.8	
13	10.6±0.9	37.1±1.7	
G 23 br_2			
14	17.9±0.7	29.7±1.2	
15	12.7±0.3	36.7±1.0	
16	14.8±0.5	25.0±0.9	

of peroxidase isozymes after starch gel electrophoresis was carried out with benzidine. Enzyme activity was tested by following the rate of benzidine oxidation at 550-660 mu (yellow light filter). The results were calculated as the change of optical density/sec/ug protein.

Data on enzyme activity and patterns of peroxidase isoforms are given in Tables 1 and 2. As a rule, internode growth in normal, semidwarf and dwarf plants is associated with increased peroxidase activity (Tables 1 and 2). In the mature internode peroxidase activity is maximal and is determined by plant genotype. The influence of the mutation $\underline{br}_2$ on peroxidase activity in the mature internode also depends on plant genotype. The mutation $\underline{d}_1$ increases enzyme activity in the mature internode by more than two times. The mutation $\underline{d}_2$ suppresses changes in peroxidase activity in the course of internode development.

15 zones are observed on the electrophoregrams of maize internodes. The schemes depict only those zones which change in the process of internode growth (Tables 1 and 2). Zones A-3 and A-4 correspond to two alleles at one locus not linked with $\underline{d}_2$ (our unpublished data). These zones change quite similarly during growth. In all normal plants, internode growth is associated with decreasing staining intensity of zones C-5 and C-6, on the one hand, and increasing staining of zones C-3, A-3, and A-4 in growing and mature internodes, on the other hand. In all the semidwarf plants, zones A-3 and A-4 are observed only in the mature internode. The influence of this mutation on the expression of zones C-3, C-5, and C-6 depends on plant genotype. In $\underline{d}_1/\underline{d}_1$ mutants, zone A-3 again appears only in the mature internode, while zone C-5 does not change during development. In $\underline{d}_2/\underline{d}_2$ mutants, isozyme patterns do not change during the growth of the internode (Table 2).

Thus semidwarf and dwarf plants differ sharply from normal plants in the regulation of the pattern of peroxidase isozymes in the course of internode development.

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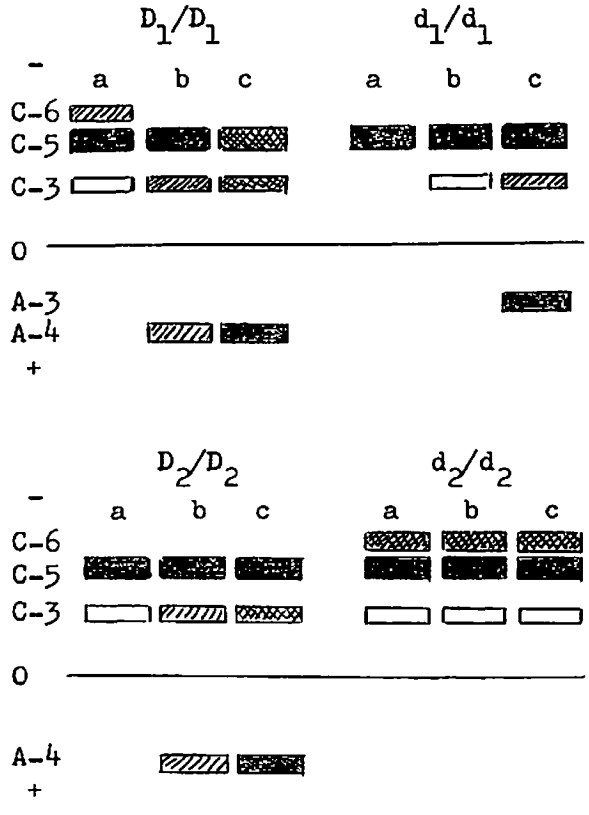
Table 2

The change in peroxidase activity and patterns of peroxidase isozymes in the course of internode development in dwarf $\underline{d_1}/\underline{d_1}$ and $\underline{d_2}/\underline{d_2}$ plants and their normal sibs

a-small underdeveloped internode; b-growing internode; c-mature internode.

(Activity=$\Delta D_{550-660mu}$/sec/ug protein)

Number of plant	a	c	Patterns of peroxidase isozymes
D_1/D_1			
1	19.7±0.5	50.6±2.3	
2	33.9±1.6	41.3±1.5	
3	28.2±0.8	52.6±2.5	
d_1/d_1			
4	17.6±0.6	75.0±5.1	
5	31.4±1.6	68.4±3.0	
6	26.2±0.8	71.4±1.6	
D_2/D_2			
7	21.0±0.4	84.0±3.2	
8	13.4±0.7	74.3±1.5	
9	13.8±0.7	140.0±6.4	
d_2/d_2			
10	28.6±0.8	26.5±1.4	
11	22.4±0.6	18.4±0.5	
12	30.6±0.9	27.8±0.9	



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