Patterson's duplicate-deficient method because his method would lead to homogeneity of cytoplasms since the duplicate-deficient chromosome is not transmissible through the pollen. Obviously, the duplicate-deficient chromosome is not backcrossed into inbred lines, but the translocation is. The translocation is both male and female transmissible. The duplicate-deficient chromosome is extracted later.

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1. Relation of hydroxamic acid content (DIMBOA) to resistance to Helminthosporium turcicum.

In 1959, the cyclic hydroxamic acid 2,4-dihydroxy-7-methoxy-1,4-benzoxazin-3-one (DIMBOA) was first reported in maize and has since been directly implicated in resistance to several pathogens. DIMBOA occurs naturally in the glucosidic form and is converted to the fungitoxic aglucone through mycelial penetration or mechanical injury.

The objectives of this study were to determine the amount of DIMBOA in thirteen inbred lines of corn utilizing the colorimetric procedure of Hamilton and to correlate DIMBOA concentration with resistance to Helminthosporium turcicum (northern corn leaf blight). Eleven inbred lines of maize obtained from R. Hallauer, Ames, Iowa, plus the two genotypes BxBx and bxbx obtained from R. H. Hamilton at Penn State University were used in this study. The bx allele designates plants deficient in DIMBOA whereas Bx is the normal allele. All of the eleven inbred lines were assumed to be carrying the Bx allele. Plants were grown in the greenhouse to 60-76 cm extended leaf height (height of the youngest leaf fully extended) for the colorimetric analysis for DIMBOA. One to two gram samples of whorl tissue were collected and extracted in ethanol. The extracts were concentrated and chromatographed by method of thin layer chromatography. Areas of spots containing DIMBOA were removed, eluted in ethanol, centrifuged and decanted into a cuvette. Upon addition of $FeCl_3$, a blue color developed which was analyzed colorimetrically

and plotted against a standard curve (from purified DIMBOA). Concentrations were expressed as mg DIMBOA/g fresh weight. Seedlings were grown under the same greenhouse conditions to 60-76 cm height for inoculation with H. turcicum. Plants were placed in an inoculation chamber, inoculated and incubated for 18 hrs. at 68°F. and 100% humidity. The degree of infection was determined on the youngest expanding leaf of each plant five days after inoculation. Percent leaf infection was calculated with the use of a transparent grid that estimated area of leaf lesions relative to the total area of the leaf.

Results showed mean concentrations of DIMBOA to range from 0.66 mg to 0.06 mg with the exception of the bxbx genotype which contained a concentration of DIMBOA below the limits of detection by this method. Percent leaf infection varied from 8.24 to 19.04 percent. A significant negative correlation ($r = -0.61$) was obtained between these two traits indicating that inbred lines of maize with high concentrations of DIMBOA generally have improved resistance to H. turcicum.

We have recently developed a more rapid procedure for analysis of DIMBOA which should be useful in breeding programs.

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1. Water-insoluble protein electrophoresis: a potential tool for maize gene product analysis.

Most of the work that has been reported on genetic variation at the protein level has involved water-soluble proteins, especially isoenzyme systems. There exists, however, in plant and animal cells alike, a large fraction of protein which is water-insoluble. Because of the problems inherent in handling this material and in finding a suitable solvent system that can be maintained throughout separation and analysis, e.g., in a gel electrophoresis system, little work has been done with