The decussation is present both in leaves and ears, and it may involve higher physiological efficiency and higher yield than in normal distichous plants having the same number of nodes. The decussate plants have the trend to subtend a high number of ears.

There is also a tendency to a helical disposition of several organs or parts of plants. The gyre of the helix may be turned to the right or to the left side.

The position of the grains in the spike may be alternate or opposed and in pairs coupled on the same peduncule, in all of the possible positions. The grains may weld together, giving rise to grains with two embryos or two endosperms. This abnormality has also been detected in normal distichous plants. The alterations in the ear are often symmetrical. An odd number of rows has been repeatedly found.

After germination of the seeds, two, three and more seedlings emerge, all coming from the same grain. The multiple germination can be predicted after inspection of the seed, owing to the presence of apparent swellings, corresponding to the preformed coleoptiles. Embryos carrying these anomalies have also been detected in seeds from normal distichous plants.

Welding, fasciation and abnormalities of this order, have been observed in leaves, stems and inflorescences. The decussate plants may give rise indistinctly to distichous, spirodistichous and decussate plants.

A program of studies is now developing in relation to these abnormalities.

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1. Peroxidase isozymes in maize; designation of locus Px_1.

Eighteen peroxidase isozymes were reported previously in several lines of maize (Hamill, Maize News Letter 41: 62, 1967). Using the same techniques of starch gel electrophoresis, 6 additional isozymes have been found, bringing the total to 24 (13 moving cathodally and 11 anodally). Twelve of these isozymes migrated to positions comparable to isozymes observed in commercial preparations of horseradish peroxidase, making this a useful reference. Plants within inbred lines of dent and sweet corn normally displayed identical isozyme patterns for a given tissue, while plants within open-pollinated varieties and diverse tropical races exhibited much variation.

Peroxidase isozyme patterns have been studied in some detail for 8 seedling tissues and 13 mature tissues. Isozyme complements varied greatly among tissues, with certain tissues showing a rather characteristic pattern. Two isozyme bands were found to be unique to mature tissues. No tissue studied had all the 24 isozymes and no tissue completely lacked peroxidase isozymes. Within tissues of any one line of maize the number of isozymes

has been found to range from as few as 4 (anther, prior to anthesis) to as many as 16 (mature leaves).

Ontogenetic studies have been initiated for leaf blades, leaf sheaths, and internodes. These tissues were studied at anthesis from the base to the top of the plant. In the leaf tissues, there was an increase in the number of peroxidase isozymes with increasing maturity; the basal leaves had approximately twice as many isozymes as the upper leaves. In contrast, all internodes had essentially the same pattern at this time. At stages prior to anthesis, this sequential change in leaf peroxidases was even more dramatic, and a similar change was also noted in internodes. Differences in peroxidase isozyme patterns appear to reflect differences in rates of tissue enlargement and development.

Genetic analyses were completed for two of the cathodal isozymes which were designated C10 and C20. Seedling roots of inbred lines commonly exhibited either C10 or C20; both isozymes were never observed together in an inbred line. The F_1 from C10 x C20 always showed both isozymes and hybrid bands were never seen. Chi square analysis showed that segregations in the F_2 and backcross populations fit 1:2:1 (32 C10 : 62 C10, C20 : 42 C20) and 1:1 (48 C10 : 55 C10, C20 and 39 C20 : 32 C10, C20) ratios respectively. Since plants lacking both bands were never observed in these F_2 and backcross progenies, and no inbreds have yet been found with both isozymes, it was concluded that the two isozymes are conditioned by codominant alleles at one locus. The locus has been designated $\underline{Px}_1$, with alleles $\underline{Px}_1^1$ and $\underline{Px}_1^2$.

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1. Genetic marker stocks adapted to the tropics.

To an increasing extent maize genetic marker stocks appear to be of interest for teaching and research activity in tropical countries. At most tropical agricultural universities and schools, maize can be planted for genetic research problems or class demonstrations any month of the year.

Corn Belt maize is generally ill adapted to the tropics, principally due to its daylength sensitivity and disease susceptibility. It is difficult enough to recover seed from genetic marker stocks under the comparatively congenial conditions in Hawaii (20° N. latitude). However, the added burden from near-epiphytotic conditions of blights and rusts in much of the tropics