BROWN MIDRIB IN MAIZE AND ITS LINKAGE RELATIONS

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As the name implies, the plants possessing this brown midrib character show a browning of the midrib of the leaves. The pigment usually appears when the plant has four or five leaves but has been observed to appear as early as the three-leaf stage and as late as the six-leaf stage.

The major part of the material was turned over to the writer by the Division of Agronomy and Plant Genetics in 1926, after many of the crosses had been made. The study reported here consists of a description of the character; its location in the plant; physiologic, morphologic, and biochemical studies of the character; and a study of the mode of inheritance and linkage relations.

DESCRIPTION OF THE CHARACTER

The brown midrib character reported here appeared in Culture No. 113 from Ear No. 90–4 in a one-year self-pollinated line of Northwestern Dent corn at University Farm, St. Paul, Minnesota, in 1924. The pigmentation to which this character is due has been found in the stem, the root, the leaves, the tassel, and the cob of the plant. It could not be detected in the pollen grains or in the kernels. It is present only in the lignified tissue. In the green tissues, it is masked by the chlorophyll, but it shows up in the midrib because of the meager supply of chlorophyll there. The chlorophyll can be removed by using alcohol, acetone, or acetic acid, and the brown pigment remains as it is more insoluble than the chlorophyll.

The pigmentation takes place during the growth of the cell when the cell organization is complete. It is preceded by lignin formation. The cell contents, as they appear under an oil immersion lens, contain no colored products. The pigment appears in the