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if the mother is a carrier. These possible factors can be considered only if the data collected are complete.

SUMMARY

1. Two family histories of hemophilia are presented, one of which is typical, the other atypical.
2. The typical history shows hemophilia in some of the males of several generations.
3. The atypical history shows hemophilia limited to two male members of the same sibship.
4. The atypical distribution of hemophilic males in this second history can be explained by the fact that the maternal aunts of the mother, whom we assume to be a carrier, did not produce children; only the non-hemophilic uncles produced children, and these children would not be expected to receive a hemophilia gene.
5. The second history shows the importance of obtaining as complete data as possible in a genetic study, particularly if the history is reported as negative.

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THE RELATIVE DEGREE OF EXPRESSION OF THE GENE DWARF-2 IN MESOCOTYL AND COLEOPTILE OF MAIZE

ANGELINE DOMINGUEZ
University of Minnesota

ABSTRACT

While the action of the gene d_2 in the homozygous recessive state in maize may be readily recognized because of the extreme dwarfing of the plants, it has not been known whether it has the same quantitative effect on the various organs of the plant. Two seedling organs were chosen as the basis for an investigation of this problem. One organ is the mesocotyl or underground stem of the seedling; the other is the coleoptile or sheathing above-ground leaf.

Maize seedlings segregating for d_2d_2 were grown at a constant temperature and humidity in the dark. Measurements were made of the length of the mesocotyls and coleoptiles at three stages of development (59, 135, and 329 hours). The normal mesocotyls averaged 5.3 times the length of the dwarf-2 mesocotyls, while the normal coleoptiles averaged 2.2 times the length of the dwarf-2 coleoptiles.

It is concluded that the gene d_2 in the homozygous recessive state has a greater quantitative expression in the mesocotyl than in the coleoptile of maize.

THE HORMONE CONTENT OF MAIZE IN RELATION TO THE DEGREE OF HETEROSIS

G. S. RABIDEAU, K. W. WANG, AND E. C. ABBE
University of Minnesota

ABSTRACT

The development of heterosis in later developmental stages is marked in many maize hybrids. The purpose of this investigation was to ascertain whether or not there was a greater concentration of plant growth hormone in the hybrid maize kernel, a fact which might possibly explain the increased vigor of these plants over their parental strains. To this end, seeds from four inbred strains of maize and their six hybrid crosses were extracted according to the method of Avery et al after soaking in tap water for a 20 hour period. These extracts were concentrated to a definite volume, mixed with an equal volume of 3 per cent agar, and cast into rectangular blocks. These blocks were applied unilaterally to twice decapitated Avena coleoptiles under standard conditions of temperature, red light, and saturated humidity. After 1½ hours, a shadow photograph was taken of the degree of coleoptile bending. The degree of bending of coleoptiles under these conditions has been shown by Went to be proportional to the amount of plant hormone present.

No correlation was found between the amount of growth hormone present in the kernel and its degree of heterosis. It is concluded that if the amount of growth hormone in the kernel is proportional to the amount available to the embryo, then there is no relationship between the amount of growth hormone at this stage of development of the maize plant and its subsequent degree of hybrid vigor.

THE ORIGIN AND DEVELOPMENT OF THE STEM UNIT IN *ANACHARIS*

MARGARET POLLOCK
Central High School, Duluth
and
ERNST C. ABBE
University of Minnesota

ABSTRACT

This study of the water plant *Anacharis* deals with two aspects of the ontogeny of its stem. First, is a qualitative study of the succes-

sion of meristems involved in the formation of a stem unit; second, is a quantitative analysis of the behavior of the rib meristem as related to internode development.

The stem unit originates when the first cycle of leaf primordia becomes recognizable. It consists of a block meristem derived primarily from the corpus of the shoot apex, and of a plate meristem external to this derived from the tunica of the shoot apex. The stem unit at this time is a node only.

The subsequent changes in structure of the next seven to thirteen stem units are primarily associated with increase in cell number laterally and cell size. There becomes distinguishable in the seventh to the thirteenth stem unit a transverse layer one cell thick of relatively large cells separated by intercellular spaces. Each of the cells of this layer will be represented in the mature stem unit by a longitudinal file of cells which has developed as the result of the activity of a rib-meristem. The cells of this layer are therefore designated rib-meristem initials. The intercellular spaces initiated in this layer become more pronounced during ontogeny and are present as the internodal lacunae of the mature stem. The internode of the mature stem (exclusive of the vascular system) is composed of these files of parenchyma cells and the associated lacunae. The node of the mature stem is essentially the equivalent of the cells of the seventh to thirteenth stem unit exclusive of the rib meristem initials.

A quantitative study of the increase in length of the internode from the origin of the rib-meristem initials to maturity of the internode may be summarized in the form of the familiar sigmoid curve for growth. The initial phase of the curve is a long one, acceleration being gradual, followed by a phase of rapid acceleration, and completed by a phase of deceleration. The two morphogenetic factors which interact to produce the elongation of the internode are increase in both cell number and size.

The phase of gradual acceleration of internode elongation is the expression of a period of rapid acceleration in cell multiplication, cell size remaining static; the phase of rapid acceleration of internode elongation is a compound of rapid acceleration of cell elongation and a deceleration of cell multiplication; the phase of deceleration of internode elongation is wholly the result of deceleration of cell elongation, cell number remaining static.

In summary, the ontogeny of the *Anacharis* stem unit is a diagrammatically simple example of the interaction, both qualitatively and quantitatively, of morphogenetic factors.