3. Movement of gibberellins in maize tissue.

Gibberellic acid applied to the distal portion of a leaf blade will cause elongation of the sheath of that leaf and also of succeeding leaves at later stages of development. This response would suggest that gibberellic acid must enter the leaf and move from the site of application to the site of action. To test whether gibberellic acid itself is moving, and to obtain data on the rate of movement, the following experiments have been carried out.

(1) An agar strip containing 15 micrograms of gibberellic acid was applied to the distal portion of the first leaf blade of a dwarf-1 seedling. After two hours the leaf blade was removed by a transverse cut 1 cm. proximal to the agar block. Four days later a detectable growth response was evident in the leaf sheath. From experiments of this kind, it would appear that gibberellic acid was moving at a minimal rate of 5 mm. per hour.

(2) To test for the actual movement of gibberellic acid, blocks of internode tissue, 2 1/2 mm. thick and 3 mm. square, were prepared and placed between two agar blocks, the upper block containing 5 micrograms gibberellic acid. Presence of gibberellic acid in the lower block was observed using the fluorescence test for gibberellic acid. Under these conditions, the maximum rate of movement was about 1 mm. per hour. The amount detected in the lower block varied with the age of the tissue, the older the tissue the greater the amount of detectable gibberellic acid. No polarity of transport has yet been demonstrated. The rate of movement is greater in the direction of the vascular bundles than at right angles to the bundles.

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4. The anatomical basis for the gibberellin response in the first leaf sheath of dwarf-1 mutants.

Under the conditions of the experiments reported here, the average final length of the first leaf sheath of dwarf-1 seedlings was found to be about one-third that of normals. Treatment of dwarf-1 seedlings with gibberellins resulted in elongation of the first leaf sheath to a length equal to that of non-treated normals.

To investigate the anatomical basis for this response, counts of parenchyma cells were made along the entire length of the first leaf sheath of treated dwarf-1, non-treated dwarf-1, and non-treated normal seedlings. Records of cell number were taken by counting number of cells per unit distance from the ligule to the base of the leaf sheath. Average cell lengths at different positions along the sheath were obtained by dividing the cell number in a unit distance by the unit distance. From preliminary observations the following statements can be made:

(1) Cells of non-treated dwarf-1 leaf sheaths were fewer in number and smaller than those of normals.

(2) Dwarf-1 seedlings treated with gibberellins had a cell number and cell length that approached the cell number and cell length of non-treated normals. In the region of the ligule, cell lengths of treated dwarfs were characteristically shorter than those of the normals. In the median portion of the sheath, cell lengths of treated dwarfs were found to be the same or greater than cell lengths of non-treated normals.

Table 1. Length of first leaf sheath, total cell number and maximum cell length within this leaf sheath for dwarf-1 and normal seedlings.*

	non-treated dwarf-1	treated dwarf-1	non-treated normal
Length of sheath	18 mm.	55 mm.	50 mm.
Total number of parenchyma cells along a linear file from the ligule to the base of the leaf sheath	248	405	437
Maximum cell length in the parenchyma of the leaf sheath	95 microns	205 microns	165 microns

* values are averages from 4 leaf sheaths.

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1. The gametophyte factor of chromosome 5.

The translocation #5L.09-9L.06 brought into one linkage group the characters shrunken, waxy, gametophyte, brittle, necrotic and red aleurone. The necrotic character is a seedling abnormality recently observed by Dr. Anderson, that causes parts of the young leaf tissue to become watery and die, and it produces zebra-like stripes of lighter green tissue in the leaves of mature plants. The gametophyte character is detected only when pollen carrying this character falls on pistils that possess an inhibitor, preventing it from effecting fertilization. This inhibitor factor seems to be dominant and at present has not been