Addendum:

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1. Tassel ear induction by loss of apical dominance.

During the summer of 1960, while working in the Maize Breeding program of the Rockefeller Foundation in coordination with the Indian Agricultural Research Institute, Pusa, New-Delhi, we noticed certain after effects on the corn borer (Chilo) attacked plants. The chief observation was the loss, by severe injury to the main growing point, of the stem under acute cases of borer damage, very often resulting in tillering. These tillers usually matured relatively late, probably due to the age effect, but there was also a predominance of tassel ear formation. It is this second part of the observation which attracted special attention.

The tillering appears to be caused by a shift in the apical dominance phenomenon as a result of a physiological upset in hormonal balance, which in turn might also cause tassel ear development. The following lines of work on this project are being pursued:

(a) Anatomical differences in gross organization of tissues and internal structures of both the main stem tips of plants and the meristematic apical tips of induced tillers are being compared with the meristematic structure of a genetically controlled tassel ear type and normally tillering material.

(b) The bioassay of growth substances in all four types of material and graphic representation with Rf values for comparisons are being carried out in order to correlate the artificial changes with the truly genetic type.

(c) The probable biochemical differences in terms of growth promoting and growth inhibiting substances as measured by peaks which indicate concentrations of substances and by Rf values, are being considered. The arrangement and equipment for detailed chromatographic spotting and identification of biochemicals involved are lacking.

(d) Artificial injury to normal plants will be compared with corn borer injury in order to ascertain indirectly that no toxic or toxin like substances are involved that might have caused tassel ear development after borer injury.

(e) Studies on physiological genetic effects of photoperiodism on tassel ear induction have been undertaken.

(f) The physiologically induced tassel ear, as well as the genic type, may represent reversions needed for survival and their significance as a possible stage in the evolutionary line is being explored.

(g) If possible, the above mentioned tests will also be carried out in different races of maize that have been thought by the Wellhausen group in Mexico to be involved in the evolutionary development of modern maize.

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2. Preliminary investigations on the endogenous growth substances in Hc _ and hc hc coleoptile.

It was felt that the horn-like outgrowth(s) on the subterminal tip of the coleoptile described in M. N. L. 34 (page 25) may be controlled by internal growth regulating substances. The oat mesocotyl bioassay method standardized by Nitsch (Pl. Physiol. 31:94-111. 1956) was used to determine the auxin production and breakdown in hc as compared to normal coleoptiles. The attempt was made to explain this single gene-controlled proliferation on the coleoptile tip through variations in concentrations of growth substances during the growth period.

In one experiment normal green ($W_3$ _ Hc Hc), normal albino ($w_3$ $w_3$ Hc Hc), hc green ($W_3$ _ hc hc), and hc albino ($w_3$ $w_3$ hc hc) coleoptiles were fixed in methanol one week after the seeds were placed in the germinator. Histograms with Rf values on the ordinate and total length of oat mesocotyl sections on the abscissa indicate two broad regions of growth peaks, i.e. at Rf .05-.10 and .20-.25, and one region of inhibitor action, i.e. at Rf .65-1.0 in all four types of material. The only apparent difference seems to be a slightly greater quantity of growth substances in the green than in the albino type of both normal and horn-like coleoptiles.

In another bioassay test green normal and green hc coleoptile tips after two weeks of seed soaking in the germinator, i.e. at a stage when the first leaf was about to emerge and the coleoptile had reached maximum length, were similarly bioassayed and histogrammed and a suggestion of differential peaks is shown at this stage. Complete absence of inhibitor action in hc's as compared to a slight amount still persisting in normals was observed.

Higher concentrations of growth promotors and inhibitors in green coleoptiles, i.e. both Hc and hc, may be attributed to photosynthetic activity and/or to the pleiotropic nature of the complicated $W_3$ _ gene. An early destruction or quick translocation of inhibitors in hc coleoptiles may be responsible for the length of hc gene controlled horns.