

(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 \underline{Hc} and \underline{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 \underline{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 ($\underline{W}_3 \underline{Hc} \underline{Hc}$), normal albino ($\underline{w}_3 \underline{w}_3 \underline{Hc} \underline{Hc}$), \underline{hc} green ($\underline{W}_3 \underline{hc} \underline{hc}$), and \underline{hc} albino ($\underline{w}_3 \underline{w}_3 \underline{hc} \underline{hc}$) 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 \underline{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 \underline{hc} 's as compared to a slight amount still persisting in normals was observed.

Higher concentrations of growth promoters and inhibitors in green coleoptiles, i.e. both \underline{Hc} and \underline{hc} , may be attributed to photosynthetic activity and/or to the pleiotropic nature of the complicated \underline{W}_3 gene. An early destruction or quick translocation of inhibitors in \underline{hc} coleoptiles may be responsible for the length of \underline{hc} gene controlled horns.

The data at hand as yet are inconclusive with regard to the biochemical and genetic complications of this study.

This work was completed in the Department of Plant Breeding of Cornell University and formed part of the Ph.D. thesis work.

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