germinated and the resulting plants were grown until after tassel emergence. Again all plants were male sterile and segregated about 50% for the tassel seed characteristic.

These observations clearly showed that fertile female florets do exist on tassels where all male florets contain aborted pollen. Thus, sterility conferred by this cytoplasm is specific for male florets and is not associated with the tassel location since female florets are fertile.

Studies[1/] have shown that stamen-less tomatoes can be induced by gibberellin A_3 to form anthers and viable pollen. This report suggests that gibberellin may play a determinative part in the development of male gametophytes. Therefore, the male sterile (Texas type) and normal cytoplasmic versions of the corn inbred line T 204 were selected for treatment with plant hormone to ascertain any effect on pollen fertility. Five treatments were chosen, a control (no hormones), low GA_3, high GA_3, IAA, and kinetin and GA_3. Hormones were pipetted twice weekly into the plant whorl in 1 ml volumes. Treatments were begun shortly after the plants emerged from the ground and were terminated at the time of tassel emergence. Thirteen treatments were applied in this interval. Total amounts of hormones applied to each plant were; low GA_3, 130 ug; high GA_3, 260 ug; IAA, 130 ug; and kinetin and GA_3, 130 ug of each.

After termination of treatments, tassels were observed with regard to pollen shed. T 204 with normal cytoplasm shed its normal viable pollen regardless of hormone treatment. T 204 ms with male sterile cytoplasm shed no pollen in spite of hormone treatments. Consequently, these hormones were ineffective in altering the expected pollen fertility or sterility. GA_3 treatments did increase early height of plants, caused a yellowing in plant color and in general gave a less thrifty looking plant. The latter observations have been reported previously.

1/ Phatak, S. C., S. H. Wittwer, S. Honma, and M. J. Bukovac. Gibberellin-induced Anther and Pollen Development in a Stamen-less Tomato Mutant. Nature 209:635-636. 1966.

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2. Genetic variability for coleoptile elongation.

It has been known for years that coleoptile elongation in grasses is mediated by auxin. It is reasonable to assume that auxin production and/or regulation is under genetic control. Preliminary studies with corn, which were conducted primarily to develop experimental technique, involved a number of different inbred lines, including a sample of random inbreds of the varieties, Jarvis and Indian Chief. Due to limited seed supply, studies with inbreds have been postponed until seed increases are available. However, these studies suggested that inbred lines differ somewhat with respect to coleoptile elongation and response to exogenous IAA. Critical statistical tests of these differences were not possible, but differences were of sufficient magnitude to strongly suggest genetic differences among inbreds.

An experiment was then conducted in a varietal composite (Jarvis x Indian Chief) F_5 to provide a statistical test for genetic variability for three traits related to auxin regulation of coleoptile elongation. First, dark grown coleoptiles were measured six days after planting. Second, oat coleoptile sections, grown in the presence of corn coleoptile tips, were measured after 19 hours. Oat sections, therefore, served as a bioassay for auxin produced by the corn coleoptile tips. Last, corn coleoptile sections in vitro were provided exogenous auxin, IAA, and their response measured. The first trait gives an in vivo measure of coleoptile growth which should reflect auxin production as well as responsiveness to auxin. The second and third traits provide in vitro measurements of auxin production and responsiveness to auxin, respectively. The above description of the system is recognized to be an oversimplification and therefore, other factors contributing to growth may be confounded with our measures of auxin response.

Seeds used in these studies were treated with the fungicide thiram and planted in plastic shoe boxes on 6 layers of paper towel and covered with tissue paper. One hundred ml of distilled water were added to each box. All seed and coleoptiles were grown in a dark room maintained at approximately 72°F. This room was kept dark at all times except for a safe light which emitted non-stimulatory wave lengths. After five days growth, coleoptile length was measured on ten plants. In addition, plants whose coleoptile length was between 1.0 and 1.49 cm were selected. Three mm tips and five mm sections were cut from the coleoptiles. Five mm sections were taken by first removing the 3 mm tip and then cutting off the next 5 mm. Fifteen 3 mm corn tips were placed in a shell vial with 5 sections of oat coleoptile (5 mm long) and 3 ml of phosphate buffer (pH6.0) plus 1% sucrose. The oats were grown and coleoptiles were cut in the same manner as the corn. After 19 hours growth, oat section elongation was measured. For the third trait, 5 corn coleoptile sections (5 mm long) were placed in a Petri dish with 10 ml of phosphate buffer (pH6.0) plus 1% sucrose and 20 ug of IAA and 1 ml of water. In addition, a control was run identical to the above except no IAA was added. After 19 hours growth, corn section elongation was measured. The difference between IAA treated and the untreated sections was determined and used as a measure of response to IAA.

The genetic material consisted of progeny of randomly controlled crosses involving 36 plants used as male parents each with 2 plants used as females. The 36 male groups comprising a total of 72 full-sib families were randomly assigned to sets of 6 male groups each. The 12 families of a set were grown together in the darkroom during the same time period. Three such sets were planted on consecutive days each week, so that the entire experiment was completed within a two week period. The three sets which had been grown the first week of the experiment were then repeated on the third week to provide a measure of repeatability.

Data of each set were analyzed separately and then pooled to provide an overall analysis. For those sets which were involved in two runs, a combined analysis was computed to remove effects of Run x Family interaction.

Results from the analysis of coleoptile length indicated significant variability due to females, but variability attributable to male

differences was non-significant. Analysis of response of oat sections to corn tips and corn sections to exogenous IAA indicated that differences due to females or due to males were non-significant. These results suggest that the genetic variability of coleoptile elongation after six days in darkness is primarily non-additive genetic variance. Magnitude of genetic variability for auxin production (as assayed by oat coleoptiles) and responsiveness to auxin (as determined by exogenous IAA application to corn coleoptile sections) is insufficient to be detected by these experiments.

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1. Diffuse: a dominant pigment inhibiting gene.

A. Distribution of Diffuse in indigenous populations of Peru

At the time of the initial report on Diffuse (Brink and Greenblatt, Jour. of Hered. 1954) the gene was known to have come from Peru and was thought to be rare. A recent (January 1968) search for the Diffuse (Idf) gene in Peru has disclosed that it is not rare, but is rather widespread throughout the country. In Table 1 are listed the Districts of Peru in which the mutable form of the gene was identified. The principal source of this information was the collection of indigenous races of maize kept at the Universidad Agraria, La Molina, Peru. In addition, a search was made of rural market places, farmers' seed supplies and phenotypes of plants currently being grown.

The recovery of 23 distinct sources from 9 districts represents a minimum estimate of the distribution of Idf. Since only the mutable form of the gene in a colored pericarp background is unique enough for absolute recognition by phenotype alone, the two other forms or states of Idf, fully active and relatively inactive would have gone undetected. The disproportionately high number of locations in the Ancash Districts most likely means a more intense collecting from this region rather than a higher gene frequency. The single collection from Puno may be erroneous. The ear type expressing the Idf mutable phenotype, I was told, does not correspond to the races known from Puno and is most likely a mislabeling of the museum sample.

B. Field search for Diffuse in Peru.

While in Peru, an effort was also made to discover the presence of mutable forms of the gene by searching during or after the time of pollination for stripes on plants with colored stems. In the Cuzco region, while 97% of the plants exhibited intense plant color, no striped plants were found, nor were any totally green plants (the fully active form of Diffuse) found. The same was true for the Huancayo District--96% full pigmentation and no striping and no totally green plants.