

4. Tassel-in-the-seed from Gaspé Flint?

The earliest flowering plants in the  $F_2$  and  $F_3$  of the cross Gaspé Flint by Amecameca teosinte have<sup>2</sup> between five and seven leaves, the embryonic leaf number of corn as reported by Sass and others. The main stalk of these plants is in full bloom at the 'thinning stage' when only a foot high and about three weeks old. Then, as also reported by Brawn for his id id Gaspé Flint plants, the basal tillers begin to elongate and ultimately reach a height of about ten feet when they flower during short days six weeks later on. As suggested by Brawn for his id material, the primordial tassel was probably already induced if not differentiated in the seed at planting time, having been laid down during the short days of the previous Fall. This 'Gaspé trait' is dominant, simply inherited and may have economic value in the breeding of teosinte for the North. Such a Gaspé teosinte would produce two crops of seed, a Spring crop and a Fall crop. It is possible that the 'Spring crop' seed formed during long days would not have 'tassel-in-the-seed'. During the long days of Summer, it would tiller profusely or, if perennial, develop rhizomes.

Longitudinal sections will be cut from the embryos from the Gaspé Flint-teosinte lines to study the growing point.

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5. The corn grass and teopod loci involve phase change.

The switching from one phase of growth to the next is usually rather abrupt in typical corn as it is with other plants. That is the organs of the phytomer (internode, leaf, axillary bud and prophyll) attain a distinct form which is characteristic for the juvenile, mature vegetative, pistillate-floral and staminate-floral modes of their expression. The time of phase change is usually programmed for a certain point in development although in certain genotypes the external environment may trigger the switching as, for example, in short day corn.

In contrast to normal, phase change in corn grass, and to a lesser extent in teopod, is a gradual process. The narrow bloomy leaves of the juvenile phase integrate into the broad pubescent leaves of the adult vegetative phase followed by a gradual transition into the two forms of floral development. Although variability is common, the tendency is for an intergradation between solitary vegetative branches at the base of the plant to paired spikelets near the apex of the plant. The various intergrading forms as evidence of homologies between vegetative and floral phytomers have been described elsewhere (Galinat, 1959, Bot. Mus. Leaf., Harvard U.).

A recognition that the corn grass and teopod loci are involved in phase change may lead to a better understanding of the genetic control of differentiation in corn.

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#### 6. Somatic mosaicism in corn grass.

Several features of corn grass (Cg gene) seemed at first to be evidence that phase change in this mutant at least was primarily 'physiological' and, therefore, to cast doubt on the suggestion of Brink that phase change involved a somatic paramutational process. Not only is the phase change gradual in corn grass, as if following some physiological gradient, but the length of shank on which an ear is borne is usually related to how 'vegetative' the ear becomes. Ears with short shanks are usually more vegetative as if they were precociously thrust into ear formation before the vegetative phase had run its course.

However, somewhat to our surprise, the first experiment designed to detect the possibility of mutational phase change in corn grass seemed to reveal it. The first and second ears of a line of corn grass apparently homozygous for the Cg gene were pollinated by a normal inbred, A 158. The hybrid progenies from the two ears were grown the following year and there were differences reflecting the differences in the two parental Cg ears from one plant. The classifications were made on a basis of five types of terminal inflorescences. Type one was completely proliferated with no functional spikelets. Type three had a single spike male region subtended by leaves and one or more sub-tassel ears. Type five was normal, at least in regard to the tassel.

Although the data are still limited, the differences in tassel types between the progenies of vegetative and normal ears from a single plant are consistent (Table 1) and are significant ( $P = <.01$ ).

Table 1  
Frequency distributions for hybrid progeny from two types of corn grass ears borne on a single plant.

Parental Type	Tassel Types					Totals
	1	2	3	4	5	
Vegetative ear	6	16	16	9	7	54
Normal ear	0	4	15	17	22	58

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