leaf spots; if not classified early, the leaf splits and the stripe is not noticeable). The pale green seedlings and double tassels have shown up in progenies involving lethal leaf spot stripe, whose inheritance is not yet known.

6. We have sent seedstocks of *lls* to the Maize Coop.

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Non-Mendelian inheritance of an aleurone pigment inhibitor

In the progeny of a cross between a *C Sh bz-x3m Wx/C Sh bz-x3m Wx* ear parent and a *C sh bz wx* tester stock, colorless kernels and kernels variegated for *bz-x3m* and colorless tissue were produced. The numbers on the main stalk ear were 221 *bz-x3m*, 84 variegated and 58 colorless, and on a tiller ear, 167 *bz-x3m*, 81 variegated and 21 colorless.

Among the progeny of the reciprocal cross in which the *bz-x3m* stock was used as the pollen donor, no variegated or colorless kernels were observed. It was suspected that the factor responsible for the mutant phenotype was cytoplasmic rather than nuclear since it appeared to be transmitted only through the female gametophyte.

Some of the colorless, variegated and *bz-x3m* sibs were planted this past summer and used in a number of different crosses. Table 1 lists the progeny obtained when these individuals were used as female parents. From the first two crosses it

Table 1. Progeny obtained in self pollinations or out crosses of colorless individuals and their variegated or full color sibs when used as female parents.

Cross	Parental phenotype	Progeny phenotypes		
		Full color	Variegated	Colorless
4322-2 self	colorless	186	*	235
4322-4 self	colorless	141	19	209
4317-3 self	variegated	273	*	120
4318 self	variegated	102	*	237
4316-2 x 4068a	variegated x bronze	312	115	29
4316-3 x 4068a	variegated x bronze	365	*	23
4319-6 x 4068a	*bz-x3m* x bronze	368	*	176
4320 x 4068a	*bz-x3m* x bronze	336	140	45
4316-1 x 3991s	variegated x red	299	98	4
4322 x 4068a	colorless x bronze	383	*	20

*On some ears where the full color pigment was bronze, the full color and variegated phenotypes were difficult, if not impossible, to distinguish; in these cases both types are listed under full color.

can be seen that the colorless trait is not true breeding, a pattern which would be expected if the factor responsible were cytoplasmic. Full color and mosaic kernels as well as colorless ones appear in the progeny of self pollinated colorless individuals but in no apparent ratio. Similar results were obtained in self pollinations of the variegated types. In crosses of either the colorless or variegated individuals with a bronze stock, the colorless and mosaic phenotypes segregated but at an apparently low frequency.

When full color *bz-x3m* sibs of the colorless types are used as female parents in outcrosses to a bronze stock, the colorless and variegated phenotypes appear

among the progeny in varying numbers, sometimes as high as in self pollinations of variegated individuals.

In crosses of colorless or variegated females with red (Bz) males, the colorless and mosaic phenotypes appear but at much lower frequencies than in self pollinations or outcrosses to bronze. One example (4316-1 x 3991s) is included in Table 1. In some cases, no colorless kernels and only a few variegated ones are observed.

In reciprocal crosses using the colorless or variegated individuals as pollen donors, the appearance of colorless or variegated progeny does in fact occur but is dependent upon the stock used as the ear parent. Of three different bronze families used as females in these crosses, one exhibited the colorless character but the other two produced only full color progeny. The one red stock employed as a female parent yielded only the full color phenotype in the offspring.

When transmission of the character through the pollen is observed, it occurs in unpredictable ratios as in the reciprocal crosses. These inheritance patterns indicate that a cytoplasmic factor is apparently not responsible for the colorless trait.

When the mutant phenotype first appeared, it was thought that bz-x3m was somehow involved because of the color/colorless mosaics. Such kernels indicate an instability of some sort. This relationship, however, does not exist since ears have been recovered which segregate for the colorless and variegated phenotypes but which cannot contain bz-x3m or an element derived from it. The same results indicate that transmission of the colorless phenotype does not necessarily involve sexual reproduction. These observations are described below. Among the offspring of plants which were not related to the colorless individuals but which were in the same field, colorless and variegated kernels appeared. These progeny were from self or sib pollinations of several C sh bz wx lines and from crosses of these lines to other full color stocks. The colorless and variegated frequencies were generally not as high as in progeny of mutant individuals and varied substantially from one ear to another. There appeared to be no relationship between the location of a plant in the field with respect to the colorless types and the frequency of colorless or variegated kernels on the ear. In many cases, fertilization by mutant pollen could be thoroughly ruled out since some of these lines flowered after the colorless stocks and their relatives had completely shed their pollen.

It was also noted that colorless kernels were appearing in a number of open pollinated plants which were homozygous for full color genes. Since there were no stocks in the field carrying C-I, it was concluded that the same factor responsible for the colorless trait in the controlled pollinations was producing white kernels in the open pollinated individuals.

The transmission patterns of the colorless trait suggest that a virus may be responsible. If this proves to be the case, there are two mechanisms which could explain the colorless phenotype. Either the virus has the ability to somehow block the metabolic pathway leading to anthocyanin production in the aleurone; or it carries genetic information for pigment inhibition which is becoming incorporated into the maize genome.

Identification of a virus as the agent and distinction between the two possibilities await further data.

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A preliminary study on chiasmata frequency in two races and two single hybrids of maize

Variability in a maize population is known to be due to many factors, one of the most important of which is the recombination which is basically determined by