possess a new white endosperm gene, these will then be tested against our white-albino mutants to determine if any of these loci are involved.

Donald S. Robertson

2. Chlorophyll, carotene and xanthophyll production in pastel-8549, pastel-4889 and pastel-8686 grown at high and low temperatures.

Chlorophyll, carotene and xanthophyll levels were determined for the following white endosperm-pastel (pale green) mutants and their F_1's with available albino alleles after growing under a light intensity of 1400 foot candles and at temperatures of 22° C and 37° C.

Mutant	Chromosome
pastel-8549	6 (y_1 allele)
pastel-4889	7
vp_9 (albino allele) / pastel-4889	7
pastel-8686	3
w_3 (albino allele) / pastel-8686	3

Homozygous pastel and F_1's with albino alleles are possible for the latter two loci. The pollen parents for the F_1's were selfed and served as the source of the homozygous pastels. For each mutant and F_1 tested, seed was separated on the basis of endosperm color into normal (yellow) and mutant (white) classes and a sample of each was planted in rows in sand and grown under the above conditions of light and temperature. Plants were grown for 7 days at 37° C and 13 days at 22° C before harvesting. The methods of extracting the pigments and determining concentrations are described by Robertson and Anderson (Temperature sensitive alleles of the y_1 locus in maize. Jour. of Hered. 52:53-60. 1961). The pigment concentrations for each mutant are given in Table 1 and the percentage of pigments in the mutant as compared to that in the normal siblings at the two temperatures is given in Table 2.

Table 1. Chlorophyll, carotene and xanthophyll levels for normal and pastel seedlings. (mg/gfw is milligrams per gram fresh weight.)

		Normal			Mutant		
Mutant	temp. °C.	chlorophyll mg/gfw	carotene mg/gfw	xanthophyll mg/gfw	chlorophyll mg/gfw	carotene mg/gfw	xantho. mg/gfw
pas-8549	37	2.373	.0777	.0621	.329	.0517	.0140
	22	2.551	.0531	.0702	1.737	.0489	.0453
pas-4889	37	2.708	.0755	.0731	1.189	.0391	.0243
	22	2.746	.0573	.0746	.536	.0129	.0297
vp_9 F_1/ pas-4889	37	2.568	.0873	.0586	.429	.0121	.0254
	22	2.575	.0809	.0960	.203	.0082	.0147
pas-8686	37	2.860	.0787	.0407	1.704	.0483	.0589
	22	2.477	.0658	.0407	.275	.0052	.0183
w_3 F_1/ pas-8686	37	2.411	.0903	.0670	.550	.0128	.0306
	22	3.546	.1105	.0780	.100	.0024	.0100

Table 2. The $\frac{\text{mutant}}{\text{normal}}$ values for chlorophyll, carotene and xanthophyll.

Mutant or cross	Temp. in °C.	% $\frac{\text{mutant}}{\text{normal}}$ Chlorophyll	% $\frac{\text{mutant}}{\text{normal}}$ Carotene	% $\frac{\text{mutant}}{\text{normal}}$ Xanthophyll	% $\frac{\text{mutant}}{\text{normal}}$ Total carotenoid
Pastel 8549	22°	68.1	91.9	34.3	59.1
	37°	13.9	66.7	22.6	47.1
Pastel 4889	22°	19.5	17.2	50.9	32.1
	37°	43.9	51.7	31.6	42.6
vp9/Pastel 4889	22°	7.9	10.1	15.3	12.9
	37°	16.7	13.9	54.5	28.0
Pastel 8686	22°	11.1	7.8	44.9	22.0
	37°	59.6	61.4	164.9	93.7
w3/Pastel 8686	22°	2.8	2.3	12.8	6.6
	37°	22.8	14.1	45.7	27.6

In these three mutants the concentrations of all three of the chloroplast pigments have been affected. The pigment levels of pastel$_{8549}$ more closely approximate those of normals when grown at 22°C than at 37°C. This is in agreement with previous experiments with this mutant grown at 115 foot candles (Robertson and Anderson, Temperature sensitive alleles of the y_1 locus in maize. Jour. of Hered. 52:53-60. 1961). Pastel$_{8686}$ and pastel$_{4889}$ behave in an opposite manner with more normal appearing phenotypes observed at high temperature than low temperatures. Of the latter two mutants, pastel$_{8686}$ more closely approximates normality than does pastel$_{4889}$.

In comparing the results of each homozygous pastel with those of the F_1 between that pastel and the appropriate albino, it can be seen that neither the albino or pastel alleles of the two loci show complete dominance with respect to the other under these experimental conditions.

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1. Defective endosperm factors in maize teosinte derivatives*.

Other allelism tests have been carried out among stocks possessing de^t factors. Allelism has been confirmed for de^{t3} and de^{t5}, and established for the latter and de^{t16}.

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