Dr. Grogan while he was at Mississippi State University, and he recently brought back the K-6 mutant from South Africa. K-5 behaves as a recessive gene, and Dr. Grogan observed K-6 to be partially dominant in some background genotypes.

We are converting seven inbred lines to the five new mutants along with the original knotted leaf mutant. Expressivity and penetrance of these mutants has been very unpredictable and appears to be highly affected by the environment. After we complete transferring these mutants into the same background genotypes, expressivity and penetrance studies are planned.

M.S. Zuber

Bz dosage effect on glucosyltransferase levels — In a previous note (MGNL 42:134) the presence of an enzyme uridine diphosphoglucose quercetin glucosyltransferase in maize pollen was reported. The enzyme catalyzes the addition of glucose to cyanidin or quercetin. In a second note enzymatic activity (MGNL 42:134) was found to depend on the presence of dominant Bz. Since that time the transferase has been extracted from mature seeds and seedlings of genotypes ranging from homozygous dominant to homozygous recessive. Table 1

Table 1. Glucosyltransferase activity.

Tissue and genotype	Specific activity[1]
Pollen Source	
Bz Bz	210
Bz bz	102
bz bz	0
Seedling[2]	
Bz Bz	308
Bz bz	157
bz Bz	151
bz bz	0
Embryo[2,3]	
Bz Bz	117
Bz bz	57
bz Bz	50
bz bz	0
Endosperm[3,4]	
Bz Bz Bz	2850
Bz Bz bz	921
bz bz Bz	484
bz bz bz	0

[1]Specific Activity = µgms. Isoquercitrin produced/hr/mg of protein.

[2]Heterozygotes derived from reciprocal crosses between homozygous strains; ♀ parent listed first.

[3]Endosperm and embryo samples derived from the same seeds.

[4]Heterozygotes derived from reciprocal crosses between homozygous strains; ♀ origin listed in first two symbols.

includes data for the various sources of enzyme and different genotypes. All enzymes are crude extracts except the seedling enzymes, which have been subjected to Sephadex G-50 gel filtration.

The data are quite conclusive in showing the same ratios for dosage of the dominant gene with specific-activity levels. The only exception to this is found in the homozygous dominant endosperm, where the gene dosage ratio is 3:2:1:0 and the specific activity ratio is essentially 6:2:1:0. The zero values for the homozygous recessive samples are real inasmuch as our procedures eliminate any contaminating nonspecific glucosyltransferase activity. In conclusion, Bz is clearly responsible for the glucosyltransferase activity and the activity follows a gene dosage ratio.

R.L. Larson and E.H. Coe, Jr.

Complex Glucosyltransferase Activity — Refinement of the purification processes for the glucosyltransferase (This MGNL, Larson and Coe) have led to several interesting discoveries: (1) non-specific contaminating glucosyltransferase activity could be eliminated; (2) the transferase exists in a complex with an as-yet-undetermined number of carbohydrate metabolizing enzymes; and (3) the complex appears to be large, with properties similar to an enzyme having a molecular weight in excess of 5×10^6.

Attempts to purify the transferase have yielded about a 40-fold purification and any efforts to improve on this have failed. Gel filtration using Sephadex G-50 or Bio-Gels A-.5m through A-15m all yield a single protein peak that elutes immediately following the void volume for that column. Centrifugation of the crude enzyme extract in water at 160,000 xg for 2 hours resulted in a 12 fold purification of the transferase, which remained in the supernatant. Centrifugation of this supernatant at 160,000 xg for 64 hours led to sedimentation of the enzyme complex and a supernatant devoid of any enzyme activity. This evidence strongly suggested a complex with possibly more than one enzymatic activity present. Acid phosphatase activity had been identified in our preparations prior to this time and subsequent studies have led to the identification of other activities.

Speculation as to what activities might be found associated with the transferase have focused on synthesis of the UDPG needed in the transferase reaction. Thus the enzymes assayed in the preparation included UDPG pyrophosphorylase for synthesis of the UDPG and enzymes needed to yield substrates for this reaction. These latter include nucleotide diphosphate kinase (UTP synthesis) and enzymes involved in synthesis of glucose-1-phosphate. The source of glucose remains a question as evidence has been obtained for phosphorylase activity that would