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

yield glucose-1-phosphate from starch and inorganic phosphate. In addition phosphohexoisomerase activity (fructose-6-phosphate⟶glucose-1-phosphate) and phosphoglucomutase (glucose-6-phosphate⟶glucose-1-phosphate) have been identified in our preparations. These enzymes would suggest possible utilization of sucrose as a source of glucose-1-phosphate, however the enzymes needed to cleave sucrose or sucrose phosphate to its monosaccharide components have not been identified. These activities have been identified chromatographically or by coupling the reactions with UDPG dehydrogenase or glucose-6-phosphate dehydrogenase. The activities described have been identified in pollen, seedling and seed preparations.

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Inheritance of susceptibility and tolerance to Leaf Freckles and Wilt (Corynebacterium nebraskense) of corn — A six-line diallel in 1973 and a seven-line diallel in 1974 were evaluated for reaction to Leaf Freckles and Wilt (LFW) disease, Corynebacterium nebraskense, in an effort to determine the mode of inheritance of resistance. Four resistant inbreds (B37, N10, N6 and H49), one intermediate (PC81) and one susceptible (B14A) comprised the 1973 experiment. Susceptible inbred A632 was added to the diallel in 1974.

The 1973 experiment was grown in two replications at each of three locations, Lincoln, Holdrege and Holbrook, in Nebraska. The latter two were planted on sites heavily infected with LFW in 1972 and were expected to become naturally infected. The Lincoln plots were artificially inoculated three times with a mixture of six isolates of the bacterium, and the Holdrege plots were inoculated once when no disease appeared by pollination time. Disease readings from individual plants in a plot were recorded on a 0 to 4 scale (0 represents no disease and 4 represents dead plant tissue) one to four weeks after inoculation in Lincoln and prior to desiccation at Holdrege and Holbrook. Means were computed for a maximum of 40 plants per plot. Considerable variation between inoculation dates was observed in Lincoln in terms of the overall disease level in the experiment, apparently due to environmental conditions following inoculation. Hot, dry environments at Holdrege and Holbrook resulted in very little disease development, even with the artificial inoculation at Holdrege.

The 1974 experiment was grown in two replications at Lincoln, and the plants were artificially multi-needle inoculated (See Calub et al., Crop Science 14:716-718, 1974) in the seedling stage with only the most virulent isolate rather