LINKAGE DATA FOR dne AND CHROMOSOME 3 MARKERS b AND st.

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Locus dne (die neutralis) was reported (1) to show strong linkage with st but the relative position on chromosome 3 was not established. F3 progenies have now been used to genotype 31 day-neutral (dne/dne) segregates from a cross between lines L31 (b Dne st) and K218 (B dne St) and to determine the constitution of the gametes which united to form these F2 plants. The gamete pool consisted of 42 gametes with genotype B dne St, 17 with genotype b dne St, and 3 with genotype B dne st. This enables construction of the following map relationships for chromosome 3:

The above method of determining the linkage relationships was adopted because the F2 data gave no clear resolution of the issue. The mutant allele dne had arisen in the repulsion phase with markers B and St (see 1) and repulsion phase crosses are grossly inefficient in dealing with close linkages (2). By growing 16 F3 progeny from each F2 plant of genotype dne/dne it was possible to ascertain with reasonable certainty the constitution of the two gametes which united to form that F2 plant. For example, if an F2 plant of genotype B/- dne/dne St/- gave in F3 11 B/- dne/dne St/- and 5 *b/b*_ dne/dne St/- plants we can be about 99% confident that it was homozygous St/St and its constitution was 15 dne St/b dne St. Thus it was derived from one grandparental type gamete and one gamete recombinant for loci b and dne. In this way a profile of the dne sub-set of F1 gametes could be established and the crossover values determined without recourse to the Product Ratio or Maximum Likelihood methods.

1. King, W. M. and I. C. Murfet. 1985. Ann. Bot. 56:835-846.
2. Mather, K. 1963. The Measurement of Linkage in Heredity. Methuen, London.