

APPENDIX A

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The effect of low frequency random crossing
on heterozygosity and fixation of recombinant
homozygotes in lines developed by single seed descent.

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Keywords

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Abstract

This study examines the effects of random cross-pollination on genotypic frequencies during the development of lines by the method of single seed descent, using a combination of generation matrix methods and equilibrium prediction equations for linked loci. Results show that heterozygosity declines rapidly in early generations, as in the case of complete selfing, and declines to an equilibrium limit that is relatively insensitive to the degree of linkage and almost entirely determined by the frequency of crossing. The overall fixation frequency of recombinants is reduced by crossing but the frequency increases in successive generations to an equilibrium limit which is independent of the level of linkage and depends entirely on the frequency of crossing. The approach to the limit of fixation frequency of recombinants is extremely slow, in terms of generations, for closely linked loci and low frequency of crossing. The study then concentrates on the frequency structure of the F_8 generation to cover the time-span typically involved in practical breeding programmes using the method.