plants have been tested, but crosses for further tests of these and additional lines will be grown in 1976. The limited data suggest that lines with reasonably good pollen transmission can be selected. However, once the homozygote is established, this should be a problem only when transferring it into desirable inbreds.

Germination was low for many of the crosses made in 1974 because of severe frosts the first week in September. Another problem in 1974 and again in 1975 has been that many of the crosses made on the ms stock had very low or no seed set. This may be an example of cross sterility similar to that reported by M. Demerec (1929, Z.I.A.V. 50:281-291).

Similar tests are in progress for ms2, ms8 and ms10. Only those for ms2 have reached the stage where tests for pollen transmission or homozygosity for the inactivated Ms2 allele will be grown in 1976.

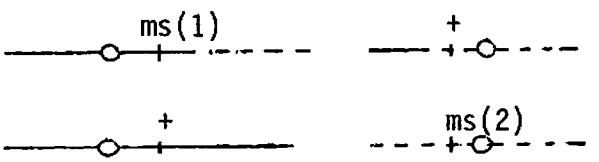
Charles R. Burnham

Other possible methods of producing "all male-sterile" progeny using genetic male sterility

One of the methods proposed for using genetic male steriles in barley for this purpose was an application of the principle involved in the balanced lethal. Plants with two very closely linked recessive male sterile genes in repulsion, when crossed on plants homozygous for both male sterile genes, would produce an "all male-sterile" progeny (Eslick, 1971, Proc. 2nd Internat. Barley Genetics Symp.: 292-297). The cross would be ms(1) ms(1) ms(2) ms(2) x ms(1) +/+ ms(2). With complete linkage the pollen parent could be maintained if grown in isolation.

A modification of this would utilize a chromosomal interchange and two different independent male sterile genes, one closely linked with one of the two breakpoints and present in the interchange chromosome, the other ms gene closely linked with the second breakpoint, but located in the normal chromosome. The cross would be:

ms(1) ms(1) ms(2) ms(2) x



All the progeny would be male sterile, half ms(1) and half ms(2). Only the ms(1) progeny would be interchange heterozygotes. In a species with directed segregation, the degree of sterility would depend on the frequency of crossing over between the centromeres and the interchange breakpoints in both chromosomes.

With complete linkage between each male-sterile gene and the breakpoint, the double heterozygote could be maintained if grown in isolation. One problem remaining would be how to produce progeny all of which would be homozygous for both male sterile genes, which is needed for efficient hybrid seed production. This might be accomplished by using certain types of multiple duplication stocks, one duplication covering one male sterile gene. For one method of producing such multiple duplication stocks, see Burnham, International Maize Symposium, 1975. It is possible that the multiple duplication stock could be used to maintain the heterozygote for both male steriles as well as for producing an all male sterile progeny homozygous for both male steriles. I am presenting this now, hoping that someone can devise workable schemes.

Charles R. Burnham