3. Factors influencing the competition of maize pollen in pollen mixtures.

A study was made of some of the factors involved in competition in pollen mixtures (see articles by Hofmeyr and Geerthsen in M. G. C. N. L. 32:129-131 (1958), 33:99 (1959), 34:105 (1960), and this issue).

Firstly, the part played by differential germination and growth of the pollen was studied by conducting two types of experiments. In the one series, after pollination of yy ears by mixtures of equal parts of Y and y pollen, the silks were cut off at different times nl. after 4 1/2, 5, 5 1/2, 6 and 8 hours. The resulting ears were then compared for percentage yellow and white kernels to the control where the silks were not cut. The second series consisted of non-simultaneous pollinations where the one pollen type was used half an hour before or half an hour after the other. The control in this case was simultaneous pollination.

Secondly, the probable effect of extreme environmental conditions on pollen competition was investigated. Pollinations with pollen batches exposed to low temperatures (4-5°C) for 24 hours and to direct sunlight for one hour were compared to the untreated controls.

The following five pollen mixtures were used:

white		yellow
33-16	+	C217 x C56
33-16	+	C217
33-16	+	A413
K64	+	C217
K64	+	C23.

The white female parents were the single crosses E184 x K64r and M155 x K64r.

The results can be summarized as follows:

(1) The preliminary experiments showed that it takes the pollen tubes between 4 and 5 hours to grow a distance of one inch in the silks.

(2) The different pollen mixtures reacted differently to these treatments.

(3) In most cases the result could be explained on the basis of differences in the theoretical frequency distribution curves for speed of growth.

(4) In some mixtures differences in the speed of pollen tube growth were of major importance. For example, the results indicated that the average speed of growth of K64r is higher than that of C217, while there is no significant difference between K64r and C23 in this respect.

(5) Pollen antagonism was observed in some cases. The pollen of the single cross C217 x C56 exhibited a pronounced antagonistic effect on 33-16 pollen. This effect is probably more on the germination than on the growth of the 33-16 pollen.

(6) Exposure to cold and direct sunlight altered the competition in some mixtures. In the case of 33-16 + C217 x C56 both treatments favored the 33-16 pollen, probably by reducing the antagonistic effect. The cold treatment favored K64r in both mixture K64r + C217 and mixture K64r + C23. These two treatments did not alter the competition between 33-16 and A413 significantly.

W. J. van der Walt
Department of Genetics
and Transvaal Region
Department of Agriculture

4. Secondary transpositions of Modulator.

As noted in the M.G.C.N.L. 31:144, limited data suggested that the positional stability of transposed-Modulator might be dependent on its proximity to the P locus.

A study has been undertaken to see if this is in fact the case.

A number of heterozygous light variegated ears were grown and the resulting plants pollinated by a South African inbred, T2, with colorless pericarp. The linkage of tr-Mp and P was determined by observing the proportions of light and medium variegated plants which resulted from the kernels of each ear (a family). A number of pollinated ears from each family was planted the following season and again the linkage relations of P and tr-Mp determined in each case. The crossover value between P and tr-Mp for each family was compared with that of the family from which the parental ear was taken to determine if a secondary transposition of Mp had occurred. A move was considered to have occurred if the new crossover value did not fall within the 95% confidence limits about the parental value, or in cases where this test could not be applied, where P according to the Chi-square distribution was less than .05.