

2. Competitive pollen tube growth in Zea mays, L.*

In the previous report (M. N. L. 1958) where pollen mixtures from yellow and white sources were tested the results suggested a relation between combining ability and pollen tube growth in those cases where cytoplasmic factors apparently were not involved. The seed resulting from these pollinations were grown the following season in paired rows and the yields determined. A highly significant positive correlation was found between superior yield and the superior color class. However, in cases where the maternal parent was genetically identical to the white component of the pollen mixture used there seemed to be a preference for self pollen, in most of the cases studied, so that a negative correlation was realized. Hence, at this stage these results must be interpreted with reserve until more information becomes available with respect to the different factors which may affect pollen tube growth. It is expected that considerable light will be thrown on this aspect when the results of the present season will become available.

Additional data have supported the previous observation (M. N. L. 1958), that, with rare exceptions, varietal pollen is superior to pollen from inbreds in competition.

* (In press, Proceedings of the First South African Congress, University of Pretoria, 1958).

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3. Quantitative genetic studies.

Maize breeding in South Africa is still in the early stage characterized by wide scale sampling of germ plasm from local open pollinated varieties as contrasted to the improvement of existing inbreds. Need for knowledge of the genetic composition of these varieties is keenly felt, therefore. Five varieties were chosen accordingly and the following investigations were carried out with them.

(a) Estimation of additive and dominant components of yield variance.

Non-selected full sib (biparental) and half sib (maternal) progenies were grown in two replications of plots each containing about 40 plants. Yield was expressed in lbs. of ears per plot. Additive (G) and dominant (D) components of genetic variance were determined by the intra class correlation method (first method) assuming that covariance of full sibs = $1/2G + 1/4D$ and covariance of half sibs = $1/4G$.

For purposes of comparison a series of biparental progenies using one pollen parent on three or four ear parents was grown in two replications for three of the five varieties. (The other two are being grown