

DEPARTMENT OF GENETICS  
UNIVERSITY OF CAMBRIDGE,

Whittingehame Lodge,  
44, Storey's Way,  
Cambridge.

21st. May 1947.

Dear Panse,

Thank you for your letter of May 8th. I see your difficulty about the effective numbers as you have estimated them, and quite agree that these are quite unrealistic. I think, however, you should have considered whether other causes beyond the number of factors in the parent F2 plant may not have produced variability in the individual F3 progenies. In fact, I have often advised a chequer board plantation involving parental or F1 or other genetically uniform material planted in alternate plots with F2, in order to obtain early and independent information as to the genotypic variability in the F2.

Using the material which you actually have for the experiment, the only suggestion I can make is that you should take the 75 values which you have from growing the 25 families in triplicate plots, and estimating the variance within each plot of 10. These 75 values can then be analysed, giving 2 degrees of freedom for differences between <sup>blocks</sup> ~~plots~~, 24 for differences between families and 48 for interaction, or ~~effect of the~~ error in the estimation of the F3 variance. This error will include the pure error of random sampling due to estimating a variance from <sup>10</sup> ~~25~~ values only. So that you only have to subtract the mean square from the 48 degrees of freedom from the mean square for the 24 to obtain an unbiased estimate of the true variance among F3 variances. This

estimate should, I suppose, be divided by three, as you will have used the mean of estimates from three plots. Perhaps if you do this your estimates will come more reasonable, but there may be other sources of trouble which I have not thought of. I do think, however, that at every stage it is worth while taking all possible precautions to form a just idea of the amount of genotypic or, what is <sup>mean</sup> really the same thing, of genetic variance, and that this is the principal improvement to be expected in the near future in practical plant breeding.

With best wishes,

Yours sincerely,

Fisher  
44, Storey's Way,  
Cambridge,  
England.

Dr. V.G. Panse,  
Institute of Plant Industry,  
INDORE,  
Central India.