3. Random self-fertilization in a finite population of autotetraploids.

Wright (1938)* has derived the formula for determining F, the coefficient of inbreeding, for a finite population of monoecious autopolyploid individuals with random self-fertilization. In working with autotetraploid maize, the need arose to extend his formula to take into consideration alpha, the coefficient of double reduction. Double reduction does occur in autotetraploid maize, and therefore would contribute to inbreeding. The inclusion of alpha, double reduction, leads to the formula,

$$P_n = \frac{1}{6N} \left\{ (8N - 3 - 2N\alpha) P_{n-1} - (1 - \alpha)(2N - 2) P_{n-2} \right\}$$

where P is the panmictic index and is equal to 1 - F, N is the number of monoecious autotetraploid individuals, and n is the generation. When alpha equals zero, the above expression reduces to Wright's formula,

$$P_n = \frac{1}{6N} \left\{ (8N - 3) P_{n-1} - (2N - 2) P_{n-2} \right\}$$

If N equals one, complete self fertilization occurs.

C. S. Levings III

*Wright, S. The Distribution of Gene Frequencies in Populations of Polyploids, P.N.A.S. 24:372-377. 1938.

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Proposal: It is proposed that a collection of digital computer programs of value to practicing maize geneticists be started and maintained. Such a collection might encompass programs suitable for:

1. field notebook production, and plot arrangement and layout
2. statistical reduction of plot data
3. useful data manipulative procedures for geneticists (both common and somewhat uncommon).

The Computer Center, Ohio University volunteers to be the repository and distributive center for this, if desired. It should be noted, however, that a strong research effort in maize genetics is not extant here.