4. Pollination with small counted samples of pollen.

In a test conducted by Y. H. Chang in 1967, counted samples of fresh pollen from A C R were carefully applied to silks of c tester ears in a large block of this genotype (i.e., contaminations would be unlikely to be C). The results were as follows (A stands for applied counted pollen grains, P for purple kernels obtained, Y for yellow contaminants, and E for 100P/A as a measure of efficiency):

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 20 | 20 | 50 | 50 | 50 | 50 | 100 | 100 | 100 | 100 | 150 | 150 | 150 | 150 |
| P | 2 | 5 | 5 | 10 | 13 | 17 | 7 | 28 | 14 | 25 | 6 | 27 | 21 | 33 |
| Y | 1 | 2 | 4 | 7 | 10 | 6 | 3 | 1 | 2 | 3 | 0 | 0 | 3 | 5 |
| E | 10 | 25 | 10 | 20 | 26 | 34 | 7 | 28 | 14 | 25 | 4 | 18 | 14 | 22 |

I carried out a similar test last summer, with W23/M14 (c c r r) as ear parent, with the following results:

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 7 | 9 | 12 | 12 | 16 | 18 | 20 | 20 | 37 | 38 | 41 | 43 | 78 |
| P | 1 | 2 | 0 | 1 | 0 | 2 | 3 | 0 | 5 | 5 | 4 | 6 | 9 |
| Y | 2 | 2 | 9 | 0 | 0 | 3 | 0 | 2 | 5 | 5 | 5 | 0 | 9 |
| E | 14 | 22 | 0 | 8 | 0 | 11 | 15 | 0 | 14 | 13 | 10 | 14 | 12 |

At these levels of pollination no "population effect" is operating, since the efficiency seems neither to decrease with higher counts nor to change with higher contamination. The most efficient one of these trials (17 kernels from 50 pollen grains) is evidence, though not proof, that more than one of each four microspores is functional. If only one microspore were functional, only 10% of random samples of 50 grains would include as many as 17 functional grains.

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5. Allelism and expression of Wh and Wc.

Linkage data have established that Wh and Wc are in the same region of chromosome 9. A test for allelism establishes that they are essentially allelic; discrimination tests indicate that Wh is slightly more expressive than Wc. Among 10 ears from the cross of +Wc/bk Wh x bk +, no clearly yellow (wild type) kernels were found in a population of 3,708 kernels. Progeny tests of 14 kernels that were the yellowest from each ear showed segregation of dominant "white" in each instance. The expression of Wc (white cap) in contrast to Wh (lemon endosperm) was not clearly distinguishable in the testcross ears, but some variation in the endosperm color was suspected, so separations were made of 10 darker yellow and 10 lighter yellow from each ear. The plants were classified for $bk_2$, which shows about 25% recombination with Wc. The darker yellow class showed a +:bk ratio of 55:36, the lighter class 46:41. In addition, among the class chosen as possible yellow exceptions (for progeny test as above) the ratio was 16:7. The separation of Wc from Wh is by no means perfect, but Wc kernels seem to be slightly more yellow. This agrees with earlier impressions of Wh versus Wc classification.

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6. Dominant dilute aleurone color factor on chromosome 7.

A factor with dilute expression has been located near in on chromosome 7; it is tentatively designated $In^D$. Progeny from $o_2$ + gl/ + $In^D$ + x $o_2$ + gl were as follows:

| + $In^D$ + | o + gl | + + gl | o $In^D$ + | + $In^D$ gl | o + + | + + + | o $In^D$ gl |
|---|---|---|---|---|---|---|---|
| 109 | 111 | 4 | 5 | 5 | 4 | 0 | 0 |

$o_2$ - $In^D$ = 0.04 $In^D$ - Gl = 0.04

The expression of $In^D$ is quite clear, even in the presence of $o_2$. Homozygotes have very faintly pigmented aleurone tissue. In homozygous pr, the aleurone color is a unique lavender. No plant color effect can be detected.

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7. The development of pigments in germinating colorless seeds.

Germinating seeds of $c_1$ tester synthesize anthocyanin pigments in the aleurone tissue. The pigments look similar to those of $A_1A_2CR$ genotype, yet less concentrated. There are some variations among $c_1$ kernels from different sources, in the sense of quantity and quality. Certain lines can develop very strong and uniform pigmentation while certain others develop little or none. Plant color genes, B and Pl, may control