

Frequency of crossovers from the cross $a a^{sh}/a^m Sh \times a^s sh$.

| | Total No. | $a a^m Sh$ | $a a Sh$ | $a-Sh$ | $a^m sh$ or $a sh$ | $a^s sh$ | T co | % |
|---------|--------------|------------|----------|--------|-----------------------|----------|------|--------|
| Control | 3628 | 0 | 0 | 0 | 2 | 0 | 2 | .00055 |
| EDTA | 4035 | 0 | 4 | 3 | 3 | 3 | 13 | .0032 |

4. Response of 2 alleles of an_1 to gibberellic acid.

Plants that are homozygous an_1 normally do not shed much pollen because the anthers remain encased in the glumes. Several an_1 individuals were treated at a stage comparable to shedding in a normal plant, by rubbing a spot at the base of the tassel with a glass rod coated with a lanolin paste containing 1.25% gibberellic acid. Within less than twenty-four hours that portion of the tassel immediately above the region touched with the paste appeared as a sector of normally expressed anthers that shed normal pollen. The remainder of the tassel continued to have tightly-closed florets and produced no pollen. The effect of the treatment appeared to be that of lengthening of the filaments and opening of the glumes. Similar treatment was applied to plants that were homozygous for another allele an_{6923} (a radiation induced mutant associated with bz_2). The treated plants showed an elongation of tassel parts but failed to extrude any anthers. Careful examination showed that the anthers were empty and beginning to degenerate.

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5. Chromosome 9 mapping.

Data has been accumulated for incompletely placed factors as follows:

| <u>Genes XY</u> | <u>Phase</u> | <u>XY</u> | <u>Xy</u> | <u>xY</u> | <u>xy</u> | <u>Total</u> | <u>Recombination</u> |
|---------------------|--------------|-----------|-----------|-----------|-----------|--------------|----------------------|
| Ar Bk ₂ | RS | 227 | 130 | 110 | 1 | 468 | 9 |
| Ar Em ₄ | RS | 222 | 60 | 69 | 24 | 369 | 55 |
| Ar Ms ₂ | RS | 100 | 46 | 44 | 0 | 190 | <15 |
| Ar Wx | CS | 477 | 32 | 41 | 121 | 671 | 12 |
| Au Cr | CS | 32 | 7 | 1 | 9 | 49 | 12 |
| Bf Bk ₂ | RS | 141 | 41 | 60 | 8 | 250 | 39 |
| Bf Em ₄ | RS | 117 | 65 | 68 | 0 | 250 | <11 |
| Bf Ms ₂ | RS | 157 | 55 | 46 | 7 | 265 | 38 |
| Br Wx | CS | 171 | 48 | 38 | 18 | 275 | 43 |
| Bk Gl ₁₅ | RS | 85 | 24 | 32 | 0 | 141 | <22 |

| <u>Genes XY</u> | <u>Phase</u> | <u>XY</u> | <u>Xy</u> | <u>xY</u> | <u>xy</u> | <u>Total</u> | <u>Recombination</u> |
|---------------------------------|--------------|-----------|-----------|-----------|-----------|--------------|----------------------|
| Bk Bm ₄ | CS | 597 | 152 | 180 | 69 | 998 | 44 |
| Bk Ms ₂ | RS | 93 | 31 | 34 | 2 | 160 | 27 |
| Bk V | RS | 100 | 37 | 54 | 1 | 192 | 15 |
| Bk Wx | RS | 427 | 156 | 207 | 11 | 801 | 25 |
| Bm ₄ Ms ₂ | RS | 99 | 27 | 28 | 6 | 160 | 47 |
| Bm ₄ V | RS | 131 | 31 | 23 | 7 | 192 | 54 |
| Bm ₄ Wx | RS | 351 | 96 | 87 | 27 | 561 | 52 |
| Cr Sh | CS | 30 | 3 | 11 | 5 | 49 | 30 |
| D ₃ Sh | CS | 54 | 12 | 8 | 4 | 78 | 39 |
| D ₃ Wx | CS | 66 | 0 | 3 | 9 | 78 | < 6 |
| Gl ₁₅ Wx | CB | 171 | 11 | 13 | 188 | 383 | 7 |
| Ms ₂ Wx | RS | 247 | 100 | 108 | 0 | 455 | < 11 |
| V Wx | CS | 167 | 7 | 10 | 38 | 222 | 8 |

The one backcross entry has complete four-point data as follows:

| <u>F₁</u> | <u>Parental</u> | <u>Region 1</u> | <u>Region 2</u> | <u>Region 3</u> | <u>1-2</u> | <u>1-3</u> | <u>2-3</u> | <u>1,2,3</u> | <u>Total</u> |
|--------------------------|-----------------|-----------------|-----------------|-----------------|-------------------------|------------|------------|--------------|--------------|
| + + + + | 132 149 | 10 8 | 28 30 | 13 10 | 0 0 | 0 0 | 2 1 | 0 0 | 383 |
| c sh wx gl ₁₅ | 281 | 18 | 58 | 23 | 0 | 0 | 3 | 0 | |
| | | 4.7% | 15.1% | 6.0% | | | 0.8% | | |
| | c sh 4.7 | | sh wx 15.9 | | wx gl ₁₅ 6.8 | | | | |

It is now possible to designate a map, in a gross manner, with wx at 59, ar at about 71, bk₂ at about 80, and Bf₁ at about 119. The factors d₃, gl₁₅, au, v, and ms₂ are all clustered between wx and ar; cr is between ar and bk₂, and bm₄ is to the right of Bf₁. Using parentheses to designate uncertain relative position, the map may be drawn as follows:

| | |
|---------------------------------------------------------------------------------------------------------|------------------------------------|
| wx (d ₃ , gl ₁₅ , pg ₁₂ , v, ms ₂) ar (cr) bk ₂ | Bf ₁ (bm ₄) |
| 59 | 71 80 119 |

A more adequate map must await resolution of the clustered and uncertain factors.

Notes: Allelism tests show the au₁ au₂ duplicate system to be allelic to pg₁₁ pg₁₂. A crinkly type, probably cr₂ (considered lost),

has appeared in au₁ au₂ cultures; it is not easily classified. Pollen for backcrosses has been obtained from d₃ plants by applying 1% gibberellins in lanolin to the sheaths about 3 weeks before tasselling. Independence of gl₁₀ (Sprague's) with wx (48.5% in 979 plants) and ye (49.0% in 649 plants) agrees with Anderson's report (News Letter 30: 9) for chromosome 5 instead of 9. Independence for ta with wx (48.5% in 154 plants) has been found.

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6. High-haploid line.

The line which has about 3% haploids in self progenies (see previous two News Letters) is a haploid inducer when used as male. In crosses of gl₁ egg parent by the line (stock 6) and a R^r line, maternal haploids have been found as follows:

| <u>Pollen</u> | <u>Haploids</u> | <u>Total</u> | <u>% Haploids</u> |
|-----------------------|-----------------|--------------|-------------------|
| 6 | 13 | 472 | 2.75 |
| <u>R</u> ^r | 6 | 724 | 0.83 |

Additional tests on a larger scale and tests of crosses and backcrosses involving stock 6 are in the process of analysis, and are confirmatory.

No paternal haploids have occurred in the following tests:

| <u>Cross</u> | <u>Haploids</u> | <u>Total</u> |
|-----------------------------------|-----------------|--------------|
| <u>R</u> ^r x 6 | 0 | 8,899 |
| <u>R</u> ^r x <u>gl</u> | 0 | 1,889 |
| <u>6</u> x <u>gl</u> | 0 | 46 |
| Totals | 0 | 11,534 |

7. A new recessive aleurone color factor.

A new colorless aleurone mutant which gives a good 3:1 and negative allelism tests with a₁, a₂, c and r testers has been found. It apparently segregates independently with a₂, but no other information is available on location as yet. Recessive plants of sun-red type have been obtained, and the mutant apparently has a dosage effect similar to that of c. It is tentatively designated c₂.