order, but none appeared in this test. The position of $\underline{Rp_3}$ relative to $\underline{Rg}$ is, therefore, still uncertain, though it is clear the two loci are closely linked. Errors arising from contamination could be eliminated by making the above testcross in the reverse direction. However, initial attempts to use the F_1 as female parent failed because the expression of the ragged plants was so extreme that no ears were produced. Later attempts have produced a limited amount of seed. As an alternative procedure, a contamination marker is being introduced into the F_1. Neither of the latter types of testcrosses has yet been grown for scoring.

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3. Mapping studies of $\underline{Rp_4}$.

In the 1964 MNL (p. 66), Hooker and Russell reported that in plants heterozygous for T 1-4a (4S.69; 1L.51), $\underline{Rp_4}$ - $\underline{su_1}$ recombination was 22.5% (65/289); in plants heterozygous for T 4-8a (4S.59; 8L.19), $\underline{Rp_4}$ - $\underline{su_1}$ recombination was 16.8% (49/292).

A preliminary three-point test involving $\underline{Rp_4}$, $\underline{su_1}$, and $\underline{gl_4}$ suggested that $\underline{Rp_4}$ is located distally in the short arm of Chromosome 4:

$$\underline{Rp_4} \quad 42.0\ (139/331) \quad \underline{su_1} \quad 9.4\ (31/331) \quad \underline{gl_4}$$
$$\underline{Rp_4} \quad \text{——————} \quad 44.7\ (148/331) \quad \text{——————} \quad \underline{gl_4}$$

Three-point tests involving $\underline{Rp_4}$, $\underline{Ga_1}$, and $\underline{su_1}$ are as follows:

(a)

$$\frac{+\ Ga_1\ \ su_1}{+\ \ \ su_1} \times \frac{Rp_4\ +\ +}{+\ Ga_1\ su_1}$$

Ear ratio: 49 Su: 81 su

$\underline{Ga_1}$ - $\underline{su_1}$ = 49/130 = 37.7%

					Recombination:
P	+	Ga	su	66	
1	Rp	Ga	su	5	$\underline{Rp_4}$ - $\underline{Ga_1}$ = 11/118 = 9.3%
2	+	Ga	Su	41	$\underline{Ga_1}$ - $\underline{su_1}$ = 47/118 = 39.8%
1,2	Rp	Ga	Su	6	$\underline{Rp_4}$ - $\underline{su_1}$ = 46/118 = 39.0%
				118	

(b) $\frac{+\ +\ +}{+\ Ga_1\ su_1} \times \frac{Rp_4\ +\ +}{+\ Ga_1\ su_1}$

Ear ratio:

	Observed			Estimated
Su	121	-	58 =	63
su	58	+	58 =	116

Estimated Ga_1-su_1 recombination
= 63/179 = 35.2%*

				Observed			Estimated
P	+	Ga	su	41	+ 41 =		82
1	Rp	Ga	su	4	+ 4 =		8
2	+	Ga	Su	107	- 41 =		66
1,2	Rp	Ga	Su	8	- 4 =		4
				160			160

Recombination:

Rp_4 - Ga_1 = 12/160 = 7.5%
Ga_1 - su_1 = 70/160 = 43.8%*
Rp_4 - su_1 = 74/160 = 46.3%*

Combined data from (a) and (b), above:

Rp_4 - Ga_1 = 23/278 = 8.3%
(Ear ratio) Ga_1 - su_1 = 112/309 = 36.2%*
(Plants) Ga_1 - su_1 = 117/278 = 42.1%*
Rp_4 - su_1 = 120/278 = 43.2%*

*These values are based on estimated gametic frequencies of alleles at the su_1 locus.

All calculations above have assumed 100 per cent functioning of Ga_1-carrying pollen. If there was some functioning of ga_1 pollen in production of these progenies, estimates of both Rp_4 - Ga_1 and Ga_1 - su_1 recombination are too high; the Rp_4 - su_1 recombination values, however, would not be altered. The sequence of Rp_4 with respect to Ga_1 is not clearly established by these data, but it appears more probable that Rp_4 is distal to Ga_1. Rp_4 is probably not more than about 10 units from Ga_1 and may be considerably closer. Accurate mapping of Rp_4 would require testing of progeny for constitution at the Ga_1 locus, and preferably should employ a closer proximal marker (e.g., fl_2) in place of su_1. The de_1 locus, at the left end of the map, would also provide useful marking, but apparently stocks of this trait have been lost.

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