The breakpoints of Inversion 2a are thus between \underline{gl}_2 and \underline{B} in the short arm and between \underline{Ht} and \underline{Ch} in the long arm. There is an indication that $\underline{lg_1}$ - \underline{gl}_2 recombination may be increased in stocks homozygous for Inversion 2a.

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2. Mapping studies of Rp3.

In the 1964 MNL (p. 66), Hooker and Russell reported that a dominant gene for resistance to <u>Puccinia sorghi</u> present in line 178 showed linkage with T 3-9c (3L.09; 9L.12). This gene later proved to be allelic to <u>Rp</u>. In the data they reported, in plants heterozygous for T 3-9c, <u>wx</u> and <u>Rp</u>3 showed 11.7% recombination (32/274).

Further efforts to determine the map position of $\frac{Rp}{3}$ yielded the following information:

- (a) In greenhouse classifications: $\underline{d}_1 \underline{Rp}_3 = 51/288 = 17.7\%$ recombination
- (b) In field classifications (255 plants): d₁ 23.1 <u>Lg</u>₃ 7.1 <u>Rp</u>₃
- (c) In greenhouse classifications (244 plants):

(d) Progeny of the following cross were scored in the field in 1967:

P
$$\stackrel{+}{Lg}$$
 $\stackrel{+}{Rg}$ $\stackrel{+}{Rg$

At right above are indicated the recombination values based on the data as recorded. However, the four wild-type plants tabulated as region 2 recombinants in the table may represent contaminants, since no contamination marker was present in the male parent and hence their origin could not be verified. The occurrence of \underline{Rg} \underline{Rp}_3 progeny would have established the

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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Mapping studies of Rp₁.

In the 1964 MNL (p. 66), Hooker and Russell reported that in plants heterozygous for T 1-4a (4S.69; lL.51), $Rp_1 - su_1$ recombination was 22.5% (65/289); in plants heterozygous for T 4-8a (4S.59; 8L.19), $Rp_1 - su_1$ recombination was 16.8% (49/292).

A preliminary three-point test involving $\underline{Rp_{l_1}}$, \underline{su}_{l_2} , and \underline{gl}_{l_3} suggested that \underline{Rp}_{l_4} is located distally in the short arm of Chromosome $\frac{1}{4}$:

Three-point tests involving Rp_{l_1} , Ga_1 , and su_1 are as follows:

(a)
$$\frac{+ \text{ Ga}_1 \quad \text{su}_1}{+ \quad \text{su}_1} \quad \text{X} \quad \frac{\text{Rp}_4 \quad + \quad +}{+ \quad \text{Ga}_1 \quad \text{su}_1} \quad \text{Ear ratio:} \quad 49 \quad \underline{\text{Su}} : \quad 81 \quad \underline{\text{su}}$$

$$+ \quad \frac{\text{Ga}_1 \quad \text{su}_1}{+ \quad \text{Ga}_1 \quad \text{su}_1} \quad \frac{\text{Ga}_1 \quad - \quad \text{su}_1}{+ \quad \text{ga}_1 \quad - \quad \text{su}_1} = 49/130 = 37.7\%$$

$$+ \quad \text{Ga} \quad \text{su} \quad 66 \quad \text{Recombination:}$$

$$1 \quad \text{Rp} \quad \text{Ga} \quad \text{su} \quad 5 \quad \underline{\text{Rp}_4} \quad - \quad \underline{\text{Ga}_1} = 11/118 = 9.3\%$$

$$2 \quad + \quad \text{Ga} \quad \text{Su} \quad 41 \quad \underline{\text{Ga}_1} \quad - \quad \underline{\text{su}_1} = 47/118 = 39.8\%$$

$$1,2 \quad \text{Rp} \quad \text{Ga} \quad \text{Su} \quad 6 \quad \underline{\text{Rp}_4} \quad - \quad \underline{\text{su}_1} = 46/118 = 39.0\%$$

$$118 \quad \underline{\text{Rp}_4} \quad - \quad \underline{\text{su}_1} = 46/118 = 39.0\%$$