Pachytene pairing in another translocation heterozygote, $3L^{111}$/ T3-8h, was also analyzed. Three major types were found: (1) complete asynapsis or asynapsis in each arm of the cross-shaped configuration in the segments adjacent to the breakpoint (Fig. 3), (2) complete homologous pairing throughout the cross-shaped configuration (Fig. 4) and, (3) partly homologous pairing and partly asynapsis. The observed frequently of each of the three types was about 1 : 1 : 1.

From the above observation the following conclusion is drawn: Heterochromatin, when present in a huge amount heterozygously, prevents pairing of homologous chromomeres or ordinary chromosome segments in the region adjacent to it, but it does not affect homologous centromeres, indicating that different mechanisms are involved in the synapsis of chromomeres and that of centromeres during meiotic prophase.

Yasuo Ohta

LAWRENCE UNIVERSITY
Appleton, Wisconsin

1. Evidence for the influence of B-chromosomes on the recovery of Dp-Df chromosomes.

The recovery of duplicate-deficient (Dp-Df) chromosomes in the megaspores of plants heterozygous for Inversion 3a (breakpoints 3L.40-.95) was reported by Rhoades and Dempsey (Amer. J. Bot. 40:405-424). They demonstrated that Dp-Df chromosomes arise following crossing-over between two genes within the inverted region and subsequent bridge breakage. Recovery of Dp-Df strands was measured by inequality of reciprocal crossover classes since these chromosomes contribute to only one of the classes. Once isolated, they were followed by decreased transmission of the deficient chromosome. In their study, Rhoades and Dempsey found no difference in crossing over in megasporocytes and microsporocytes when a correction was made for the Dp-Df chromosomes in the functional megaspores.

Further studies of In 3a heterozygotes have shown that inequality of reciprocal crossover classes is not always observed, suggesting that

Table 1

Reciprocal testcross data from plants heterozygous for In 3a and carrying one or more B chromosomes. The normal 3 derived from inbreds KYS or L-289.

Female Parent		(0) Gl Lg A	(0) gl lg a	(1) Gl lg a	(1) gl Lg A	(2) Gl Lg a	(2) gl lg A	(1-2) Gl lg A	(1-2) gl Lg a	Σ	Recombination % Gl-Lg	Recombination % Lg-A
gl a k lg In 3a / Gl Lg k A (L-289)		853	771	95	85	26	7	8	17	1862	11.0	3.1
	**	853	771	95	85	7	7	8	8	1834	10.7	1.6
gl a k lg In 3a / Gl Lg k A (KYS)		454	500	72	85	13	4	4	5	1137	14.6	2.3
	**	454	500	72	85	4	4	4	4	1127	14.6	1.4
Male Parent												
gl a k lg In 3a / Gl Lg k A (L-289)		566	488	74	82	4	6	4	6	1230	13.5	1.6
gl a k lg In 3a / Gl Lg k A (KYS)		496	496	99	86	5	5	8	2	1197	16.3	1.7

**Corrected strand frequencies with presumed Dp-Df chromosomes removed.

Table 2

Reciprocal testcross data from plants heterozygous for In 3a and lacking B chromosomes.

Female Parent	(0) Gl lg a	(0) gl Lg A	(1) Gl Lg A	(1) gl lg a	(2) Gl lg A	(2) gl Lg a	(1-2) Gl Lg a	(1-2) gl lg A	Σ	Recombination % Gl-Lg	Recombination % Lg-A
k10 Gl a k lg In 3a / k10 gl Lg K A N	1016	1024	92	107	3	1	4	5	2252	9.2	0.6
K10 Gl a k lg In 3a / k10 gl Lg k A N	188	193	62	62	2	3	2	4	516	25.2	2.1
Male Parent											
k10 Gl a k lg In 3a / k10 gl Lg K A N	291	254	31	43	2	2	4	5	632	13.1	2.1
k10 Gl a k lg In 3a / k10 gl Lg k A N	177	133	21	37	5	0	1	4	378	16.7	2.6

Reciprocal testcross data from plants heterozygous for In 3a segregating a and lg (including above data).

	Female Parent (0) lg a	(0) Lg A	(1) lg A	(1) Lg a	Σ	Recombination % Lg-A	Male Parent (0) lg a	(0) Lg A	(1) lg A	(1) Lg a	Σ	Recombination % Lg-A
k10 a k lg In 3a / k10 Lg K A N	4206	4195	30	31	8462	0.7	728	780	21	32	1564	3.4
k10 a k lg In 3a / k10 Lg k A N	882	938	5	7	1832	0.7	214	154	9	1	378	2.6
K10 a k lg In 3a / k10 Lg k A N	929	869	22	31	1851	2.9						

Dp-Df chromosomes are not invariably recovered in the megaspores. Moreover, in plants showing equivalence of crossover classes, the recombination frequency in microsporocytes is higher than in megasporocytes.

Plants homozygous for the genes gl lg a and heterozygous for In 3a were crossed to inbreds KYS and L-289. Data from reciprocal testcrosses of the F_1 plants are shown in Table 1. Equivalence of the Lg a and lg A crossover classes is found in crosses using the inversion heterozygote as pollen parent. On the other hand, when the F_1 is used as egg parent, the crossover classes are not equal; the excess of Lg a over lg A crossovers is due to the functioning of Dp-Df chromosomes. Recovery of Dp-Df types in the megaspores artificially increases the recombination values in megasporocytes. If it is assumed that reciprocal crossover strands are produced in equal numbers in microspores and megaspores, and if the presumed Dp-Df chromosomes contributing to one of the classes are removed, the recombination frequencies are essentially the same in male and female inflorescences.

The testcross data in Table 2 are from inversion heterozygotes produced in the following cross:

$$\frac{\text{K10}}{\text{k10}}\ \frac{\text{gl Lg K A}}{\text{Gl Lg k A}} \quad \text{X} \quad \frac{\text{k10}}{\text{k10}}\ \frac{\text{Gl a k lg In 3a}}{\text{Gl a k lg In 3a}}$$

The equality of Lg a and lg A classes in the megasporocytes indicates that, in plants heterozygous for In 3a, Dp-Df chromosomes are not always recovered. In addition, crossover values are consistently lower in the megasporocytes than in the microsporocytes. Comparisons can be made only between plants with the same constitution with regard to K10 and K3, since these knobs are known to affect crossing over.

Preliminary evidence suggests the difference between these tests can be accounted for by the presence of supernumerary B chromosomes. Plants showing similar crossover values in male and female flowers and recovery of Dp-Df chromosomes in megaspores carry at least one B-chromosome, while plants producing different recombination values in microsporocytes and megasporocytes and equality of reciprocal crossover strands have no B-chromosomes.

Further experiments to test the effect of B-chromosomes on the recovery of Dp-Df chromosomes and recombination in inversion heterozygotes are underway.

Karl Rinehart