

this might be a method of obtaining a line homozygous for the interchanges present in both rings of 10 chromosomes. This I have been unable to do by conventional breeding methods (see following note). I hope to repeat this phase of the experiment but if anyone wishes to try it also, they will have my best wishes for success.

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5. Progress report on establishing a line with all chromosomes interchanged.

As reported earlier, we have the following stocks which will produce large rings when crossed with normal: (1) T1-5-6-7-8, (2) T3-2-4-9-10, (3) T3-2-4-6-8, (4) T5-7-1-9-10, and (5) T5-7-1-9-10-8. Crosses of #1, 2, 3, and 4 with normal give a ring of 10 + 5II. The cross of #5 with normal gives a ring of 12. These F_1 's are highly sterile but will set seed from self-pollination. The cross of (5) x (3) gives a ring of 20. The crosses of (1) x (2) and (3) x (4) produce plants with 2 rings of 10 which do not shed pollen although the anthers have a few normal appearing pollen grains. Plants obtained by backcrossing these F_1 plants to either parent should include some that are homozygous for the interchanges from the recurrent parent and heterozygous for the interchanges from the other parent. Their progeny from self-pollination should include plants homozygous for both groups of interchanges. These could then be x-rayed to combine them in a single line that would produce a ring of 20 when crossed with normal stocks.

Plants with 2 rings of 10 do not shed pollen, but, when backcrossed as ♀ to either parental ring of 10 homozygote, they have 0 to 7 or 8 seeds.

In 1972, we grew 800 seeds from those backcrosses and in the last two years have checked testcrosses of 66 fertile second generation descendants from those produced in previous years. No plant has been found that had all the interchanges from both multiple interchange parents.

This past summer, certain of the testcrosses did not shed pollen, but cytological examination shows that ones with the highest number of interchanges had only a ring of 10 + 2 rings of 4 + 1II. What apparently happens is that crossovers occur between homologous differential segments in the chromosomes in each ring of 10 in the F_1 with 2 rings of 10,

producing combinations with fewer interchanges. Ghobrial (Ph.D. thesis, 1968) reported for the 5-7-1-9-10 ring, that 24% of the progeny from N x ring of 10 crosses had smaller rings ranging from a ring of 4 to a ring of 8. It would be helpful in planning the backcrosses if similar information were available for the other rings of 10.

Thus far, not enough fertile descendants from the backcrosses have been tested to insure including one that has all the interchanges that are present in the 2 rings of 10. Tests of another group of normals will be made this coming summer.

Another approach, that of adding a T8-10 interchange to T6-3-2-4-8, has not been completed. When and if it can be completed, the cross of T6-3-2-4-8-10 with 5-7-1-9-10-8 (the T8-10 here is the same one I am trying to add to T6-3-2-4-8) should produce an F_1 with 2 rings of 10, in which random segregation should include a viable combination that has all the interchanges. Again, there is the problem of undesired crossovers as well as the problem of increasing the spore with the desired combination when it does occur.

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6. Interchanges not in the ARS, 1961 list, and changes needed in certain of the information in that list.

<u>Translocation</u>	<u>Symbol</u>	<u>Listed (Longley 1961)</u>		<u>New information,</u>	
		<u>ratio</u>	<u>ratio</u>	<u>breakage points,</u>	<u>etc.</u>
*1-2	a			1L.5	2L.4
1-5	8347	1S.84	5L.51	1	2
1-5	018-5	1S.53	5L.52	1	2
1-5	6899	1S.32	5S.20	1S.37	5L.11
1-5	055-4	1S.32	5L.31	1	8
1-5	040-3	1S.17	5L.61	1	2
1-5	024-5	1S.09	5L.98	1	2
1-5	8782	1 ctr.	5 ctr.	1S.02	5L.01
1-5	4331	1L.03	5S.02	7	10
1-5	e	1L.03	5L.09	1S.08	5S.16
1-5	6178	1L.04	5L.05	1	2
1-5	7219	1L.15	5S.19	1S.15	5L.33
1-5	48-34-2	1L.19	5L.76	1	4
1-5	8388	1L.30	5S.25	1	2
1-5	a	1L.52	5S.42	1L.58	5L.45
1-5	8041	1L.80	5L.15	1L.80	5S.10
1-6	e	1S.37	6L.21		6S
1-6 (with 1-2)	5537	1S.31	6L.22		ring of 6 only

*Stocks only at Minnesota, not in Longley, 1961 list.