

## 2. Linkage studies of 51 chromosome-nine translocations.

The use of wx marked chromosome-nine translocations in linkage studies has proven to be a very useful genetic technique. So far only a limited number of such translocations are being utilized, although many more chromosome-nine translocations are available for use. However, very little if anything is known about the amount of crossing over between wx and the breakpoint in these translocations, nor has the recessive wx allele been introduced into the translocated chromosomes.

For the past several years a cooperative project has been underway to determine the wx breakpoint distances for a series of chromosome-nine translocations. In the process, crossovers which incorporate the wx allele in the translocated chromosome have been obtained for most of the translocations. The F<sub>1</sub> crosses for these tests were made by E. G. Anderson (Univ. of Missouri). The testcrosses were made by E. H. Coe, Jr. (Univ. of Missouri) and the testcross progeny were grown at Iowa State Univ. and classified and analyzed by D. S. Robertson, Darrel S. English and Allen L. Millard. The latter two workers participated in this program as National Science Foundation Research Participants in the summers of 1963 and 1964, respectively.

Table 1 summarizes the linkage data for the 51 translocations so far analyzed.

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Table 1

Translocation	Chrom. 9 Break point	Non- chrom. 9 Break point	Parental Classes		Recom- bina- tion Classes		Total	% C. O.
1-9024-7	L.13	S.71	69	76	2	1	148	2.03
1-94398	S.19	L.51	113	135	7	4	259	4.25
1-94995	S.20	L.19	264	264	12	2	542	2.58
1-98129	L.27	S.53	151	166	10	3	330	3.94
1-98302	L.29	S.55	50	56	5	5	116	8.62
1-98389	L.13	L.74	182	144	4	7	337	3.26
1-98460	L.24	S.13	102	96	4	7	209	5.26
1-98918	L.20	S.21	118	124	4	4	250	3.20
2-95257	L.20	L.28	174	172	1	2	349	0.86
2-95711	L.23	S.24	168	183	5	4	360	2.50
3-9e	L.26	L.06	165	168	23	12	368	9.51
3-9g	L.14	L.40	186	180	8	13	387	5.43
3-9020-59	ctr	ctr	142	143	3	3	291	2.06
3-95775	S.24	L.09	249	256	19	6	530	4.72
3-98447	L.14	S.44	100	106	5	4	215	4.19
3-98562	L.22	L.65	63	67	3	2	135	3.70
4-9c	L.29	L.82	127	112	7	12	258	7.36
4-9d	L.17	L.12	88	66	1	28	183	15.85
4-9e	L.26	S.53	118	117	4	6	245	4.08
4-9f	L.18	L.55	35	36	2	1	74	4.05
4-9g	L.27	S.27	77	83	5	2	167	4.19
4-9004-7	L.26	L.28	148	136	4	7	295	3.73
4-94373	L.39	L.29	88	53	5	3	149	5.37

Translocation	Chrom. 9 Break point	Non- chrom. 9 Break point	Parental Classes		Recom- bina- tion Classes		Total	% C. O.
4-95657	S.25	L.33	135	104	1	3	243	1.65
5-9008-18	L.26	L.29	166	137	7	12	322	5.90
5-9020-7	ctr	ctr	102	75	8	18	203	12.81
5-94817	S.07	L.06	80	70	49	49	248	39.52
5-94871	S.38	L.71	152	128	0	1	281	0.36
5-96057	S.52	S.15	30	27	4	15	76	25.00
5-98386	S.13	L.87	407	391	8	21	827	3.51
5-98591	L.25	S.09	55	39	8	5	107	12.15
6-95454	S.75	ctr	106	158	77	13	354	25.42
6-95831	L.30	L.27	111	112	9	4	236	5.51
6-96019	L.26	L.27	36	37	4	4	81	9.88
6-96270	L.28	L.19	119	113	4	8	244	4.92
6-98536	S.81	L.18	31	42	16	12	101	27.72
7-9a	S.07	L.63	262	276	2	6	546	1.47
7-9c	L.22	L.14	177	167	8	14	366	6.01
7-9071-1	L.07	S.70	130	131	10	5	276	5.44
7-94363	ctr	ctr	182	169	1	5	357	1.68
7-96225	ctr	ctr	186	173	0	9	368	2.45
7-97074	S.80	L.03	69	90	10	42	211	24.64
7-98383	ctr	ctr	234	180	5	5	424	2.36
8-9043-6	S.34	L.17	70	62	0	1	133	0.75
8-94453	S.68	L.86	155	131	7	19	312	8.33
8-94643	L.11	S.37	157	140	4	4	305	2.62

Translo- cation	Chrom. 9 Break point	Non- chrom. 9 Break point	Parental Classes		Recom- bina- tion Classes		Total	% C. O.
8-95300	S.43	L.85	214	201	0	0	415	0.0
8-95391	S.33	L.07	188	188	3	4	383	1.83
8-96921	L.15	L.85	277	195	7	5	484	2.48
9-104303	L.26	S.44	151	149	5	5	310	3.23
9-108630	S.28	L.37	121	136	0	3	260	1.15

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1. A possible study of crossing-over on the basis of pollen traits.

The strict linkage between the waxy gene and Ga<sub>g</sub> (gametophyte factor detected by Schwartz - MNL, 25 : 30, and by myself, MNL, 31 : 40) offers a case, perhaps unique, for studying crossing-over on the basis of pollen grain characters. We have done some attempts, collecting and fixing, after different times since hand pollination was performed on plants of given genotypes.

Plants of constitution Ga Wx/ga wx, when selfed, are known to produce ears with no or very few wx kernels. The genotype Ga wx/ga Wx, on the contrary, following self-pollination, gives wx kernels with a percentage even over 45%.

When self-pollinated silk of the former type are scored for germinating pollen grains, results of the following type are obtained: