

## A REVISED LINKAGE MAP OF CHROMOSOME 5 IN PISUM

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Further analysis for the orientation of linkage group V has been carried out by the use of tertiary trisomies and linkage analysis, as recommended by Lamm (6). Mitotic measurements by Blixt (1) have clearly shown that L-379 is a T(3S-5L) interchange. L-379 and L-83 have apparently the same origin and have been shown to be structurally identical by Lamm (5). Analysis of tertiary trisomies and of linkage relations of L-83 has been performed by Lamm (4). The junction of linkage group V and VII as previously proposed by Lamm (4, 7) has elicited some discussions. Linkage analysis has shown free segregation between the interchange point of Merton I (3Sp-7Sp) and gene markers wsp, tl, r, bt (3). In the latter paper, the location of the "linkage sequence" VII in the distal part in the long arm of chromosome 5 is thoroughly discussed (cf. Fig. 1). The junction of two linkage groups is, however, not so remarkable, a similar situation having been recorded in barley (2). The inversion of linkage sequence V in chromosome 5 has previously been pointed out by Lamm (6). To extend his analysis, I have performed the following cross:

L-83 x L-1458 (Gp<sub>u</sub>, Ce, Fs, T[3S-5L] x gp<sub>u</sub>, ce, fs, N-type.)

The result of this cross (Table 1a) reveals the following linkage relation:

Fs - 1.6% - Ce - 19.6% - T - 13.8% - Gp

A compilation of previous cytogenetic measurements by Blixt (1), analyses of tertiary trisomies by Lamm (8), and the values presented here (Table 1b) place the gene marker gp at 5L and thus ce most probably at 5S. Detailed arguments for this will be published in Hereditas.

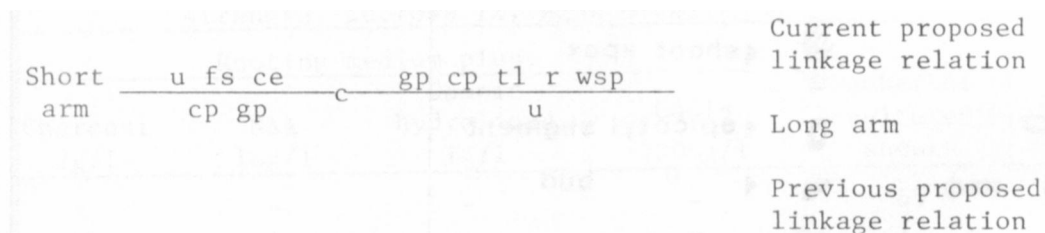


Fig. 1. Linkage relation in chromosome 5 (c=centromere).

1. Blixt, S. 1959. Agri Hort. Genet. 17:47-75.
2. Burnham, C. R. and A. Hagberg. Hereditas 42:467-482.
3. Folkeson, D. 1984. Hereditas 101:227-233.
4. Lamm, R. 1951. Hereditas 37:356-372.
5. Lamm, R. 1974. PNL 6:19.
6. Lamm, R. 1977. PNL 9:26-27.
7. Lamm, R. 1978. PNL 10:32-33.
8. Lamm, R. and R. J. Miravalle. 1959. Hereditas 15:417-440.

Table 1a. Crosses performed between L-83 and lines of normal structural type.

Cross Parental lines Genotype and karyotype References

A	L-83 x L-44	Gp, T(3S-5L) x gp, N-type	PNL 9:26-27
B	L-83 x L-1072	Gp, T(3S-5L) x gp, N-type	Lamm (unpub.)
C	L-83 x L-1458	Gp, T(3S-5L) x gp, N-type	Current values

Table 1b. Frequency, in crosses listed in Table 1a, of various types of trisomies carrying the interchange chromosomes (3<sup>s</sup>) long or (5<sup>s</sup>) short, respectively, in addition to the normal karyotype.

Cross	Gene		Extra Chromosome				Total
	Dom.	Rec.	Long (3 <sup>s</sup> )		Short (5 <sup>s</sup> )		
	+	-	+	-	+	-	
A	Gp	gp	10	1	0	3	14
B	Gp	gp	2	0	1	7	10
C	Gp	gp	5	2	3	2	12
Sum	Gp	gp	17	3	4	12	36

BSG-STAINING ARGUMENTS FOR A SHIFT IN LOGATION OF LINKAGE GROUPS II AND IV

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Because of the appearance of C-bands in the proximity of the secondary constrictions, BSG-staining, as demonstrated by Lamm (3), has become a powerful tool for identifying the satellite chromosomes 4 and 7 in mitosis as well as in meiosis. This method has recently been used by me (2) to verify the interchanges of L-111 T(3S-7S) and L-112 T(5L-7S). Further analysis has been carried out on L-108, L-114, and L-180, belonging to Lamm and Miravalle's tester set (6), and L-58, analyzed by Blixt (1), for the coordination of linkage group IV with a relevant chromosome.

The result of BSG-staining indicates that linkage group II instead of linkage group IV belongs to the short satellite chromosome viz. chromosome 4 (see table and photomicrograph).