

HYBRIDIZATION TECHNIQUE VS. SUCCESS RATE

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In the course of producing teaching materials, Williams Laboratories contracts with several local gardeners to produce hybrid peas. Payment is on a "per seed" basis, and hybridizers are encouraged to "streamline" their technique. This past year, hybridizers were asked to keep specific records to help determine the fairness of our wage policy. These records revealed the following data, which seem worth sharing with pea geneticists.

Hybridizer	Crosses attempted	Hybrid seeds produced	Seeds/ man hour	Technique in brief
1	6,430	24,604	82.0	Keel and anthers only removed; worked all day.
2	589	1,326	74.1	All petals and anthers removed; worked mostly after dark under lights.
3	3,779	3,276	39.9	All petals and anthers removed; worked mostly mornings.
4	1,500	1,570	34.9	All petals and anthers removed; worked mostly at midday.

Hybridizer 1's mature pods/cross average was 0.73 and her peas/mature pod average was 5.9, compared to averages of ca. 0.35 and 3.0 for hybridizers 3 and 4. Though we use several parent combinations, all the above data were derived using the variety 'Alderman' [a i U V r) as the female parent and the variety 'Dwarf Grey Sugar' (A I le v R) as the pollen parent.

Removing all petals may save time per cross, but definitely not time per hybrid seed produced. Our experience confirms that trauma and exposure to direct sunlight are detrimental to high success rate.

LOCATION OF B AND St IN PISUM

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In PNL 9:26-27, 1977, 1 pointed out that further cytogenetical studies of interchange trisomies would be desirable in order to establish the location of B and St in Pisum. The results of such investigations are given below.

In a backcross made by E. Nilsson between 1.85 (Extra Rapid, T[3-5]b, B St) and L48 (De Winton, N-type, b st) as the recurrent parent, he demonstrate strong linkage between the T-point and these genes (Lamm, Hereditas 34:280-288. 1948). In addition to 118 2n plants, Nilsson found 10 2n+1 plants, 8 of the genotype B st and 2 being b st. I have repeated this backcross and, besides 50 2n plants, I obtained 5 trisomies - 3 B st and 2 b St. One of the trisomic B st plants, on selfing, produced a progeny of 15 2n plants, 13 being of the genotype b st and 2 B st. The progeny also contained one 2n+1 plant of the genotype B st. With reference to Fig. 1a, 1 found that the extra chromosome in the four B st plants was the short 5³ chromosome, whereas the two b St plants contained the long 3⁵ chromosome.

In Fig. 1b, the probable pachytene configuration is illustrated. It should, however, be mentioned that chiasmata in the interstitial segment are rare. The genetic results indicate that belongs to the short and St to the long arm of chromosome 3.

In Fig. 1b, the probable location of Gp is also indicated according to my results given in PNL 9:26-27, 1977. However, according to my earlier results (PNL 8:36-37, 1976) from crosses with L84 (T[1-5]a), Gp should rather be localized in the place indicated by brackets in Fig. 1b. While considering this location as an alternative, it should be noted that trisomies never occur as the result of numerical non-disjunction if there is a chiasma in the interstitial segment (Sutton, J. Genet. 38:459-476, 1939).

In order to obtain further information concerning the location of B, St, and Gp, L83 has been crossed with a line of N-type recessive for those particular genes, but it will take some time to obtain results from backcrosses and from the progenies of 2n+1 plants. Until more facts are available, I tentatively propose that B be localized in the short and St in the long arm of chromosome 3, and Gp in the long arm of chromosome 5.

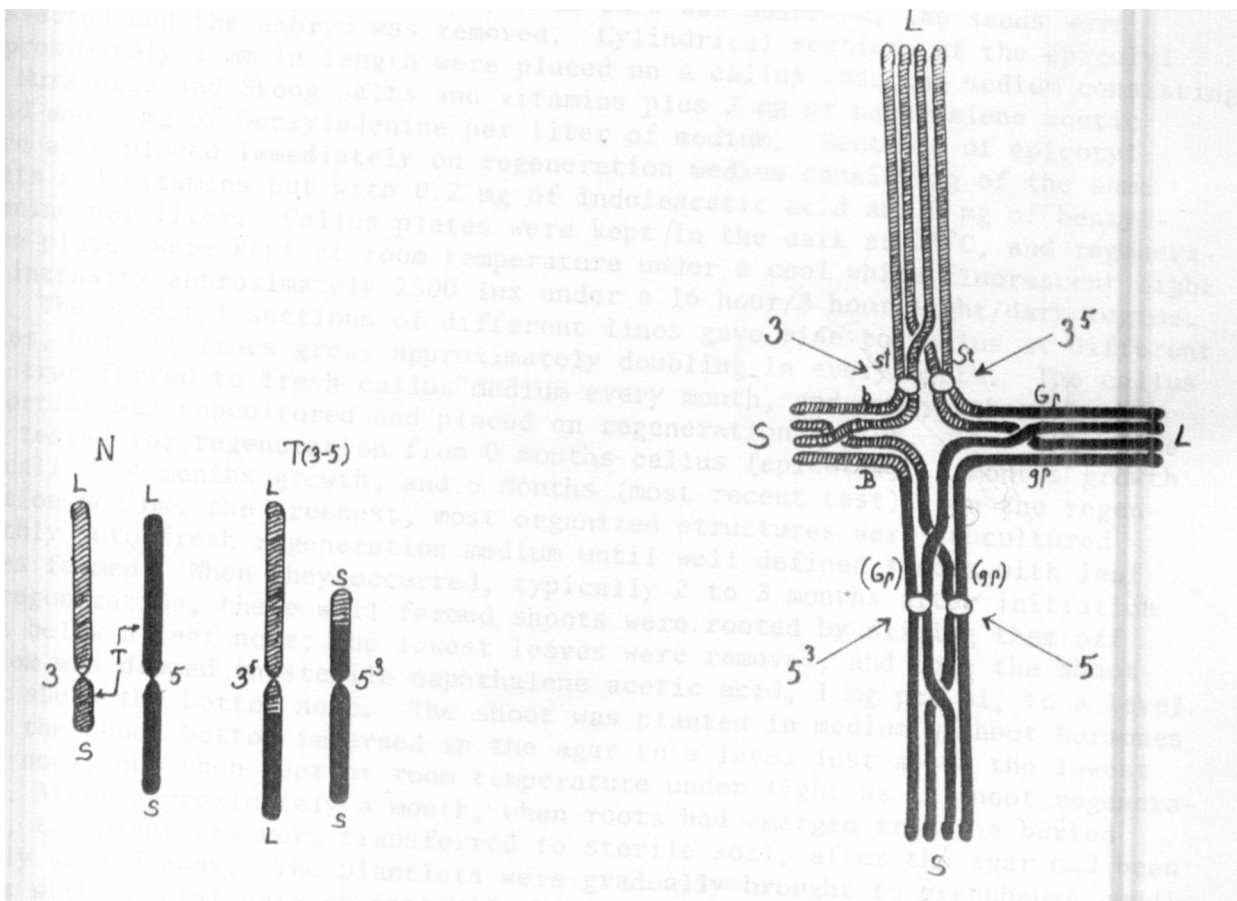


Fig. 1a. Illustration of the reciprocal translocation giving rise to the T(3-5) structure of L83. Normal type with

Fig. 1b. Probable pairing at pachytene in the translocation heterozygote of crosses between L83 and lines of the normal structure with a tentative location of B, St, and Gp.