

Further Results of Linkage Studies in Cucumis sativus L.

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Following earlier research (1), linkage studies for 5 pairs of genes have been continued at the Institute for Horticultural Plant Breeding (IVT). Involved were the marker genes short petiole (sp), little leaf (ll), glabrous (gl), compact (cp), umbrella leaf (ul) and long hypocotyl (lh). The mutants are designated as in the list in the 1985 CGC report.

The 3 pairs sp/ll, gl/ll and sp/cp segregated independently (Table 1). Although the number of F₂ plants was small for the pair sp/ll the chi-square values were low for both the monogenic segregation and the digenic segregation (linkage test). The F₂ population from the pair gl/ll had too many individuals of the gl genotype but the X₃ in the test of independence was satisfactorily low. The X₃ in the combination sp and cp indicated a very good fit to independent segregation.

A weak linkage was found between the genes sp and ul. The recombination percentage was calculated as 36%. However, this result should be considered with caution, because during the winter season, when the test was done, it is hard to distinguish between normal and umbrella leaf (ul). There were too many plants of the ul genotype in the F₂ population. A strong linkage was calculated for the gene pair sp/lh. The recombination percentage was 18%.

It is remarkable that, of all the gene loci studied, only a few are in the same linkage group. The localization of the genes is to be continued.

Literature Cited

1. Nijs, A.P.M. den and I.W. Boukema. 1983. Results of linkage studies and the need for a cooperative effort to map the cucumber genome. Cucurbit Genetics Coop. Rpt. 6: 22-23.

Table 1. Segregation and size (N) of F₂ populations for linkage test, recombination percentage₂ and calculated chi-square ratio for the 9:3:3:1 ratio (X) for 5 pairs of genes.

Gene pair	Segregation				N	%	X ₃ ²
	++	+-	-+	--			
<u>sp/ll</u>	73	23	16	12	124	50	2.95*
<u>gl/ll</u>	79	25	49	9	162	50	1.16*
<u>sp/cp</u>	145	38	56	18	257	50	0.45*
<u>sp/ul</u>	97	81	47	14	239	36	8.73
<u>sp/lh</u>	131	54	47	13	245	18	69.24

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Significant at P = 0.05