Canada

AGRICULTURE CANADA
Research Station
Harrow, Ontario, CANADA NOR 160

1) Linkage tests.

Results reported by Buzzell (1974) were not conclusive as to whether or not *E3* (daylength response) and *Ep* (seedcoat peroxidase) are independent or loosely linked. Palmer et al. (1984) has shown that *Ep* is linked with *Fr1* in linkage group 12.

Using F_2 plants of 'Minsoy' x 'Hark' previously reported (Palmer et al., 1984) for seedcoat peroxidase and root fluorescence, we tested for linkage of *E3* with *Ep* and *Fr1* by testing F_3 material for response under a daylength extended to 20 h with cool white fluorescent light. In addition, the material was evaluated for resistant (*Rmd*)/susceptible (*rmd*) reaction to powdery mildew.

'Blackhawk' carries the *e3* and *Rmd* alleles and Hark the *E3* and *rmd* alleles. Both Blackhawk and Minsoy are early flowering and resistant to mildew. Therefore, an allelism test was made by crossing Blackhawk x Minsoy. For daylength response, there were 122 flowering plants and no nonflowering plants; for powdery mildew reaction there were 92 resistant plants and no susceptible plants. Minsoy appears to carry the same *e3* and *Rmd* alleles as Blackhawk.

Results (Table 1) indicate that the *E3* and *Rmd* are not linked with *Ep* and *Fr1* in linkage group 12. *E3* and *Rmd* may be loosely linked, however; further evaluations will be done to test whether or not these genes are linked or are independent.

Table 1. Results of F_2 linkage tests[+]

Genes	Number of F_2 plants					%R	SE	Phase[++]
	a	b	c	d	Sum			
	Minsoy (*ep fr1 e3 Rmd*) x Hark (*Ep Fr1 E3 rmd*)							
E3 e3 Ep ep	207	50	67	13	337	53.0	4.2	C
E3 e3 Fr1 fr1	205	51	59	21	336	45.0	3.9	C
E3 e3 Rmd rmd	177	53	50	7	287	39.3	4.9	R
Ep ep Rmd rmd	184	50	45	8	287	I		R
Fr1 fr1 Rmd rmd	183	42	46	16	287	I		R
	Harosoy (*fg3 Pc*) x L63-1097 (*Fg3 pc*)							
Fg3 fg3 Pc pc	36	13	15	4	68	45.8	9.5	R

[+]Product method, Immer and Henderson (1943).

[++]C = Coupling; R = Repulsion.

Buzzell and Palmer (1985) reported that *Fg3* and *pc* might be closely linked. The 'Harosoy' isoline L63-1097 was crossed to Harosoy; the presence of *Fg3/fg3* was determined by thin layer chromatography by using leaf samples of F_2 plants and the presence of *Pc/pc* (pubescence type) was determined by using F_2 plants and confirmed by F_3 tests grown in the greenhouse. Results (Table 1) indicate that the presence of *Fg3* in L63-1097 after five backcrosses for *pc* is a chance occurrence and not the result of a close linkage.

References

Buzzell, R. I. 1974. Soybean linkage tests. Soybean Genet. Newsl. 1:11-14.

Buzzell, R. I. and R. G. Palmer. 1985. Soybean linkage group 1 tests. Soybean Genet. Newsl. 12:32-33.

Immer, F. R. and M. T. Henderson. 1943. Linkage studies in barley. Genetics 28:419-440.

Palmer, R. G., S. L. Broich and X. Delannay. 1984. Linkage Group 12. Soybean Genet. Newsl. 11:97-99.

R. I. Buzzell
R. G. Palmer - USDA