INHERITANCE OF THE DARK GREEN SEEDCOAT COLOR IN GARDEN PEAS

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I pointed out in 1980 (3) that further genetical analyses of seedcoat characters in garden peas would be desirable in order to establish whether a new gene is responsible for the determination of the seedcoat color. Reciprocal crosses were made between cultivars with white and dark green seedcoats. The results indicated a 3:1 monohybrid segregation, which other authors may have failed to recognize because the seedcoat is maternal tissue and is determined by the maternal genotype. The seedcoat is white (or light green) if the female parent has a white (or light green) seedcoat and it is dark green if the maternal seedcoat is dark green. Although the segregation of the cotyledon character is distinguishable within one pod, the seedcoat color is not.

Our genetic analyses led us to believe that we were working with a new gene for testa color. Then, however, we conducted identity tests with two lines from the Weibullsholm collection (WL 2133 and WL 1395) and with the cultivars 'Esmeralda' and 'Sublima' (our new variety with dark green seedcoat). WL 2133 is homozygous for the gene dp first described by Marx (2) and WL 1395 is homozygous for gla first described by Lamprecht (1). WL 1395 has a white seedcoat. Crosses between WL 1395 and Esmeralda (with a white seedcoat) produced peas with white or light green seedcoats in all progenies. Segregation for testa color in progenies of the crosses "light green (female) x dark green (male)", "dark green (female) x dark green (male)" and their reciprocals are given in Table 1. The results show agreement between observed and expected values. The complementary test with the recessive factor (dark green x dark green) showed no segregation for light seedcoat colors. There were no differences between WL 2133 and Sublima. This indicates that the dark seedcoat color is part of range of characteristics covered by the action or dp. Therefore the description for dp, viz. deep green pod color, should be modified and extended to include its effect on seedcoat color.

1. Lamprecht, H. 1959. Agri Hort. Genet. 17:1-8.
2. Marx, G. A. 1970. PNL 2:19-
3. Wende, E. 1980. PNL 12:74.

Editor's Note

It appears that the author of the above article expended considerable time and effort needlessly simply because the gene description for gene dp is incomplete. I am personally responsible for this negligence and, quite likely, for other incomplete or misleading descriptions as well. In my 1970 article (PNL 2:19), I mentioned the effect of dp on flower, pod, and seed color, but the gene description (PNL 10:88, 1978) mentions only the effect on pods. This example illustrates the need for accurate and complete descriptions. We hope that Pisum workers will bring such faulty gene descriptions to our attention so that corrective actions can be taken.

Table 1. Segregation for testa color in progenies of crosses "light green ♀ x dark green ♂", x "dark green ♀ x dark green ♂ " and reciprocals.

Lines Progenies	Generation Seed	Generation Testa	Number of plants Light green testa	Number of plants Dark green testa	Number of plants Total	Chi square (3:1)	
WL 1395	P_1		20		20		
Sublima	P_2			22	22		
WL 1395 x Sublima	F_1	$P_1 \times P_2$	2		2		
	F_1	F_1	15		15		
	F_3	F_2	24	7	31	0.10	70
Reciprocal Sublima x WL 1395	F_1	$P_2 \times P_1$		2	2		
	F_1	F_1	10		10		
	F_3	F_2	21	10	31	0.87	30
WL 2133 x Sublima	F_1	$P_1 \times P_2$		5	5		
	F_1	F_1		18	18		
	F_3	F_2		63	63		
Reciprocal Sublima x WL 2133	F_1	$P_2 \times P_1$		5	5		
	F_1	F_1		24	24		
	F_3	F_2		67	67		
WL 2133	P_1			22	22		
Esmeralda	P_2		9		9		
WL 2133 x Esmeralda	F_1	$P_1 \times P_2$		4	4		
	F_1	F_1	33		33		
	F_3	F_2	61	18	79	0.21	50
Reciprocal Esmeralda x WL 2133	F_1	$P_2 \times P_1$	4		4		
	F_1	F_1	12		12		
	F_3	F_2	52	16	68	0.08	70
Sublima	P_1			22	22		
Esmeralda	P_2		9		9		
Sublima x Esmeralda	F_1	$P_1 \times P_2$	3		3		
	F_1	F_1	24		24		
	F_3	F_2	60	20	80	0.00	1
Reciprocal Esmeralda x Sublima	F_1	$P_2 \times P_1$	2		2		
	F_1	F_1	18		18		
	F_3	F_2	53	14	67	0.60	3