
SOME OBSERVATIONS ON SEGREGATION AT THE "C" LOCUS
IN *Phaseolus vulgaris*

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Fifteen crosses among various Plant Introduction lines were analyzed for the inheritance of seedcoat pattern caused by the "C" locus. Six alleles of this locus were found in the material studied: C, c, C^r, Cst, C^m, and C^{rho}.

All crosses in which only the color alleles, C, c, and C^r, were segregating produced expected results in the F₂, segregating into 1 of the darker solid color; 2 mottled in the darker and lighter color; 1 of the lighter solid color. The parents involved were:

<u>P.I. number</u>	<u>Genotype</u>
310455	CC
361438	CC
313437	cc
361433	cc
361436	cc
361445	C ^r C ^r

When F₂ populations were analyzed which involved one of the pattern genes (Cst, C^m, or C^{rho}), the segregations observed were as expected with 1 homozygote with the pattern over a buff background; 2 heterozygotes with the pattern over a background determined by other genes present; 1 solid colored. The colors of the solid-colored seeds are the same as the background colors of the heterozygotes. The pattern genes produce the same colors as the C^r gene. Parents carrying these pattern genes were:

<u>P.I. number</u>	<u>Genotype</u>
358188	C st C st (striped)
370549	C st C st
353532	C ^m C ^m (mottled)
361515	C ^m C ^m
339529	C ^{rho} C ^{rho} (rhomboid, appearing dotted)
361420	C ^{rho} C ^{rho}

The above results agree with those reported by Prakken (1970 and later). However, Prakken has also reported that when two of the pattern genes are segregating, the F₂ should segregate into 1 with one pattern; 2 with both patterns; 1 with the other pattern with all the patterns in the same color over a buff background. Our results do not agree with this prediction of Prakken's. We found that when two pattern genes were present in the same genotype, it was possible to see both patterns in slightly different colors. Our results are as follows:

	Homozygous phenotype	Heterozygous phenotype	Homozygous phenotype
Parents:	361515 (C ^m) x 370549 (C st)		
Pattern:	Striped	Striped/mottled	Mottled
Observed No.:	276	560	420
Colors:	Blackish	Blackish/blackish brown	Blackish brown
	Brownish	Brownish/greenish brown	Greenish brown
	Orangish	Orangish/reddish	Orange red
	Pale red	Pale red/lilac red	Lilac red
Parents:	358188 (C st) x 361420 (C ^{rho})		
Pattern:	striped	Striped dotted	Dotted
Observed No.:	100	140	72
Colors:	Blackish	Blackish/dark purple	Dark purple
	Brownish	Brownish purple/dark purple	Dark lavender
	Blackish brown	Blackish brown/brownish brown	Brownish
	Orange red	Orange red/reddish	Reddish
Parents:	339529 (C ^{rho}) x 353532 (C ^m)		
Pattern:	Dotted	Dotted/mottled	Mottled
Observed No.:	120	243	125
Colors:	Reddish	Reddish/lighter reddish	Reddish

In all three of these crosses, the expected 1:2:1 ratio for the one gene pattern segregation was found. The only discrepancy was that the heterozygotes showed both patterns in slightly different colors. One cross (PI 361445 x PO 370549) involving the alleles Cst and C^r also showed a similar slight difference in color between the stripes and the background color in the heterozygotes. The conclusion is that, although these pattern alleles of the C locus do cause very similar color, as has been reported by Prakken, there is enough difference so that the two different colors can be distinguished when both alleles are present in the same genotype.

References

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