

# Fruit Color Inheritance in Crosses of a Striped Accession with Two Light-Colored Accessions in *Cucurbita pepo*

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Stripes on the exterior of the fruit of *Cucurbita pepo* are conferred by alleles at the *l-1* locus (3, 4). When both an allele for striping and the dominant *L-2* allele occur in the same genotype, stripes are present on the fruit from anthesis through fruit maturity (5). In *l-2/l-2* plants, stripes are not visible on young fruits, but become visible at intermediate age (15 -18 days past anthesis) in the presence of the dominant *Pl* allele. Plants of genotype *l-2/l-2 pl/pl* have light-colored, non-striped fruits, even if they carry an allele for striping (2, 7).

'Cocozelle' is a well-known cultivar of *C. pepo* subsp. *pepo* Cocozelle Group and bears fruits that have broad, contiguous dark stripes alternating with narrow light stripes. Broad, contiguous stripes are conferred by the *l-1<sup>BSI</sup>* allele (3). As the stripes are clearly visible from anthesis through fruit maturity, 'Cocozelle' apparently carries the dominant *L-2* allele (5), but direct evidence confirming this has not been presented. Also, it is not known if 'Cocozelle' carries the dominant or recessive allele of gene *pl*. In order to investigate these issues, 'Cocozelle' was crossed with two light-fruited accessions, 85a-30-45 (1), genotype *l-1/l-1 l-2/l-2 Pl/Pl*, and 'Sihi Lavan' (*C. pepo* subsp. *pepo* Vegetable Marrow Group), a cultivar from Israel which carries an allele for striping at the *l-1* locus and genotype *l-2/l-2 pl/pl* (2). All three accessions are *d/d*, that is, do not carry the dominant and epistatic allele *D* for dark stems and dark intermediate-age fruits (6).

The striping of 'Cocozelle' is dominant to the plain light color of accession 85a-30-45 (Table 1). The  $F_2$  and backcross progenies segregated to four fruit-color phenotypes: broad, contiguous dark stripes alternating with narrow, light type 2 stripes; broad,

contiguous light type 1 stripes alternating with narrow, plain light stripes; light type 2; and plain light. The  $F_2$  segregated to these four phenotypes in accordance with a 9:3:3:1 ratio and the backcross segregated to a 1:1:1:1 ratio, indicative of independent assortment of two genes. Thus, the genotype of 'Cocozelle' is indeed *l-1<sup>BSI</sup>/l-1<sup>BSI</sup> L-2/L-2*.

The  $F_2$  also segregated in accordance with a 36:9:12:7 ratio. This ratio would be expected if 'Cocozelle' was *pl/pl* rather than *Pl/Pl* (2). Thus, from the data presented in Table 1, it is not possible to determine the allelic state of 'Cocozelle' with regards to the *pl* gene.

When 'Cocozelle' was crossed with the plain light 'Sihi Lavan', the  $F_1$  plants were striped, as expected for dominance of striped over plain light (5). Of the 119  $F_2$  plants observed, 107 had striped fruits and 12 had plain light fruits. This result is not in accordance with the 3:1 one-gene ratio ( $\chi^2 = 14.12$ ,  $P < 0.01$ ). However, this result is in reasonable accordance with the 15:1 two-gene ratio ( $\chi^2 = 2.985$ ,  $P = 0.08$ ). 'Sihi Lavan' carries a gene for striping (7) but has genotype *l-2/l-2 pl/pl* (2) and this could account for the fit to the 15:1  $F_2$  ratio if 'Cocozelle' is *L-2/L-2 Pl/Pl*.

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Table 1. Intermediate-age (15—18 days past anthesis) fruit color in the cross of ‘Cocozelle’ and accession 85a-30-45 (*d/d l-1/l-1 l-2/l-2 Pl/Pl*).

Generation & Description	Number of plants					Expected ratio	$\chi^2$	<i>P</i>
	Total	Striped, D/LT2*	Striped, LT1/PL**	Light Type 2	Plain light			
Cocozelle	14	14	0	0	0	—	—	—
85a-30-45	14	0	0	0	14	—	—	—
F <sub>1</sub> , P <sub>1</sub> × P <sub>2</sub>	25	25	0	0	0	—	—	—
F <sub>1</sub> , P <sub>2</sub> × P <sub>1</sub>	11	11	0	0	0	—	—	—
F <sub>2</sub> , (P <sub>1</sub> × P <sub>2</sub> ) ⊗	51	31	7	9	4	9:3:3:1	1.113	0.77
						36:9:12:7	0.670	0.88
F <sub>2</sub> , (P <sub>2</sub> × P <sub>1</sub> ) ⊗	49	26	8	8	7	9:3:3:1	5.458	0.13
						36:9:12:7	0.923	0.82
F <sub>2</sub> , Total	100	57	15	17	11	9:3:3:1	4.533	0.21
						36:9:12:7	0.239	0.97
BC <sub>1</sub> , P <sub>1</sub> × F <sub>1</sub>	21	21	0	0	0	—	—	—
BC <sub>1</sub> , P <sub>2</sub> × F <sub>1</sub>	101	31	19	25	26	1:1:1:1	2.881	0.42

\*Striped: Dark on Light type 2 background

\*\*Striped: Light type 1 on Plain light backg

## Literature Cited

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