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Genomic analysis of phytohemagglutinin-deficient *Phaseolus vulgaris* cultivars

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Part of the bean collection maintained at the Centro Ricerche Orticole, Minoprio, Italy, has been screened for cultivars lacking phytohemagglutinin (PHA), the second most abundant protein in bean seeds. Among 160 cultivars screened, 8 resulted PHA-deficient, judging from their low erythroagglutinating activity and the lack of proteins recognized by immunoglobulins specific for PHA (Table 1).

TABLE 1.

Cultivar or accession number	Origin	Germplasm collection
Degli Ortolani	Italy	CRO
Heidi	USA	CRO
S. Fiacre verde	France	CRO
3067	Italy	CRO
3628	Italy	CRO
103221	Italy	GI
103249	Italy	GI
107181	Spain	GI

CRO: Centro Ricerche Orticole, Minoprio, Italy
GI: Germplasm Institute, CNR, Bari, Italy

Tests of allellism among these cultivars were made. In no cases synthesis of PHA was restored in the F_1 progeny.

The presence of PHA genes on the DNA of these mutants was investigated using cDNA probes for the two PHA subunits. Positive hybridization was obtained for all cultivars, ruling out the possibility of major deletions of the PHA genes. Most interestingly, the hybridization patterns were identical for all cultivars and also identical to the pattern of cv. Pinto III, a well characterized PHA-deficient cultivar. This suggests that the *P. vulgaris* PHA-deficient cultivars investigated originated from a common mutant progenitor.