

Determinacy of Growth Habit In Common Bean, *Phaseolus vulgaris* L.

Shree P. Singh, Carlos Germán Muñoz, and Henry Terán
CIAT, A.A. 6713, Cali, Colombia

Is determinacy of growth habit in common bean always a recessive trait? May be not. We attempted to improve indeterminate great northern, pinto, and pink cultivars (Blanco INIA, Othello, and Viva) of the Durango race grown in North America by crossing them with early maturing and/or upright determinate genotypes (A 195, A 475, and Taylor) from the Nueva Granada race. But, contrary to our previous experiences and published reports (Bliss, 1971), we observed that all F_1 hybrids were of the determinate (Table 1), and not of the expected indeterminate, growth habit (Singh, 1982).

The determinate genotypes used in the crosses possessed six to eight internodes on the main stem before their terminal bud transformed and terminated in an inflorescence. In contrast, the indeterminate cultivars had 13 to 15 developed internodes, and their terminal buds senesced while still vegetative. The F_1 hybrids between these determinate and indeterminate genotypes produced 13 to 15 internodes, but their terminal bud eventually developed into an inflorescence, unlike in the indeterminate parents.

This dominant determinacy trait, if heritable and breeds true, may be useful for developing tall, early maturing, determinate cultivars with 12 or more productive nodes on the main stem. Thus, hopefully, these would be higher yielding, more suitable for direct mechanical harvesting, and more stable yielding under stressful environments than are determinate cultivars of the Durango race, such as Agate, Early Ray, and Lime Light currently available in North America, and other races of common bean.

Effects of photoperiod and temperature, and their interaction on expression and stability of this dominant determinacy, are unknown at the moment. The exact nature of its inheritance also needs to be determined.

References

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Table 1. Some characteristics of determinate and indeterminate common bean genotypes and their F₁ hybrids evaluated at CIAT-Quilichao, Colombia, 1995.

Identification	Growth habit ^a	Origin	Color	Seed	Size	Race ^b
Parents						
Blanco INIA	III	Chile/USA	White		Medium	Durango
Othello	III	USA	Pinto		Medium	Durango
Viva	III	USA	Pink		Medium	Durango
A 195	I	CIAT	Cream		Large	Nueva Granada
A 475	I	CIAT	Purple mottled		Large	Nueva Granada
Taylor	I	USA	Cream mottled		Large	Nueva Granada
F₁ hybrids						
A 195 x Othello	I					
A 195 x Viva	I					
A 475 x Blanco INIA	I					
Othello x Taylor	I					

F₁ hybrids

A 195 x Othello

A 195 x Viva

A 475 x Blanco INIA

Othello x Taylor

^a Growth habit I = determinate, and III = indeterminate, prostrate semiclimbing.
^b According to Singh et al., 1991.