

Effects of Reciprocal Crossing on the Cooking Time of Dry Bean

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Introduction

The cooking time of dry beans has been of great concern by the plant breeders in Brazil. Many researchers have observed variability for this character (Costa et al., 2001) and obtained some information on its genetic control (Hosfield, 2001; Belicus et al., 2001 and Elia et al, 1996). Much has been discussed in respect to the influence of the tegument on the water absorption by the grain and consequently its cooking ability (Elia et al, 1996). Nevertheless, it has not been cited if the cooking time is dependent only on the tegument or if it also depends on the embryo, and specially on the cotyledon's constitution. Such findings would be of great relevance to breeders due to the fact that the characteristics related to the tegument belong to a different generation of the embryo and cotyledons which show xenia effect. This experiment was carried out aiming to check the contribution of the integument characteristics' and or cotyledons on the cooking ability of beans.

Material and Method

Crossing were made between C1-107 as the female parent and Carioca-80, Amarelinho and G2333 as the male parents as well as the reciprocals. While the F₂ generation has been obtained, more crossings were repeated aiming to obtain the seeds of the parents, F₁ and F₂ with the same age. Three months after the harvesting of those generations, the cooking test was set up using the JAB-77 minor type experimental cooker. Average and variance of each population and generation were estimated.

Result and Discussion

C1-107 line had the fastest cooking time (Table 1), as previously shown by Costa et al. (2001). It can be inferred that the cooking time of F₁ generation was similar to the line used as female, both in cross and its reciprocal. However, the F₂ average was similar to the parent of longer cooking time. Considering the fact that in the F₁ generation, the tegument comes from the female parent and the F₂ generation corresponds to the F₁ generation, it can be concluded that the characteristics associated to the tegument are responsible for the beans cooking time. Later evaluations will be made in order to confirm these results.

Table 1: Averages, Variances and the number of grains evaluated for the cooking time in minutes, for the following crossings: CI-107 x G2333, CI-107 x Amarelinho, CI-107 x Carioca-80 and their reciprocals.

		Averages	Variances	Grain Number
Parents	CI-107	39,3077	44,7308	13
	G2333	51,0769	78,9103	13
F ₁ * Generation	♀CI-107 x G2333 ♂	39,4211	142,5906	19
	♀G2333 x CI-107 ♂	52,6471	170,8414	34
F ₂ Generation	♀CI-107 x G2333 ♂	48,9357	136,9239	140
	♀G2333 x CI-107 ♂	50,5360	204,8152	125
Parents	CI-107	36,5000	54,4545	12
	Amarelinho	50,2000	89,2000	05
F ₁ * Generation	♀CI-107 x Amarelinho ♂	34,2353	100,8520	34
	♀Amarelinho x CI-107 ♂	46,4000	282,8333	25
F ₂ Generation	♀CI-107 x Amarelinho ♂	52,4643	359,8180	84
	♀Amarelinho x CI-107 ♂	60,7067	389,1020	75
Parents	CI-107	35,6250	63,6359	24
	Carioca-80	52,4000	96,2571	34
F ₁ * Generation	♀CI-107 x Carioca-80 ♂	34,3333	39,2941	18
	♀Carioca-80 x CI-107 ♂	52,4000	96,2571	15
F ₂ Generation	♀CI-107 x Carioca-80 ♂	46,4238	291,6058	151
	♀Carioca-80 x CI-107 ♂	50,7329	261,2040	146

* Generation related to the embryo.

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