USE OF RAPD MOLECULAR MARKERS FOR GENETIC VARIABILITY STUDIES IN COMMON BEAN

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Singh et al. (1991) have shown, based on morphological traits and isoenzymes and phaseolin patterns, the existence of the Mesoamerican and Andean genetic diversity gene pools in *Phaseolus vulgaris*. Johnson & Gepts (1998) reported that the cultivated bean germplasm presents a low level of genetic diversity originated from the two gene pools when compared with their ancestors. Besides the low variability found among cultivars developed from these two gene pools, the lack of information on the genetic bases or in the original names of genotypes of the core collection may indicate a high multiplicity in the bean cultivars used as parents in breeding programs. The objective of this study was to characterize 21 elite lines (Table 1) from the Bean Regional Trials coordinated by Embrapa Rice and Beans using the RAPD technique.

Based on the genetic distance (Table 2), it was possible to develop a dendrogram and distinguish two cluster groups: group I comprised 20 germplasm (lines 1-20 of Mesoamerican origin, Table 1) and presented low genetic diversity (Table 2) and group II comprised only by the line PR 93201472 (line 21, Table 1) that has the Andean cultivar Pompadour, originated in the Dominican Republic, as one of its parents (Figure 1A e B). According to their genealogies, cultivars Carioca, Cornell 49-242, Jamapa, Tlalnepantla 64, Tara and Veranic 2, all Mesoamerican, are the most employed parents (data not showed) used to develop lines from group I. As a general conclusion, this study shows that the low genetic diversity of the twenty lines from group I may be due to the repetitive use of Mesoamerican cultivars/lines, used as gene donors, that present suitable agronomic characteristics for the bean breeding programs.

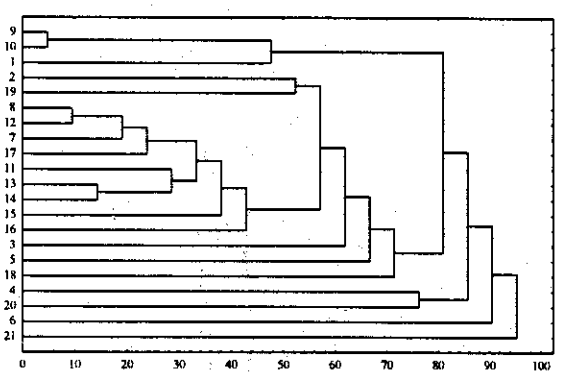
Table 1 - Seed color and crosses of the 21 elite lines of the Bean Regional Trials coordinated by Embrapa Rice and Beans.

Nr[1].	Line	Color[2]	Trial[3]	Cross
1	LR 9115398	BL	BRT 1995-96	84 VAN 18/OURO NEGRO
2	LR 9115453	BR	BRT 1995-96	LM 21303/AN 512517
3	A 774	BR	BRT 1995-96	BAT 85///A 375/G 17702//A 445/XAN 112
4	PR 9115957	BR	BRT 1995-96	CB 511687-1/GOIANO PRECOCE
5	FEB 163	RX	BRT 1995-96	A 252/XAN 105//A 373/A213///A445/XAN 112//BAT 447/A 213
6	RAO 33	RD	BRT 1995-96	BAT 1225/BAT 1136
7	LM 93204217	BL	BRT 1997-98	LM 30630//OURO/AN 512586
8	TB 94-01	BL	BRT 1997-98	CNF 5491/FT TARUMÃ
9	AN 9021334	BL	BRT 1997-98	84 VAN 18/HONDURAS 35
10	AN 9021336	BL	BRT 1997-98	84 VAN 18/HONDURAS 35
11	LM 93204303	CA	BRT 1997-98	A 285/AN 512545
12	LM 93204319	CA	BRT 1997-98	A 285/RH 20-414
13	LM 93204328	CA	BRT 1997-98	A 285/RH20-414
14	LM 93204453	CA	BRT 1997-98	MA 720943/CB 733860//AN 512545/RH 20-414
15	AN 9021470	BR	BRT 1997-98	TY 3499-3/AN 512579
16	LM 9220225	BR	BRT 1997-98	LM 21303/CB 733860
17	L 96029	BR	BRT 1997-98	A 140/BAT 332
18	LM 93203246	RS	BRT 1997-98	LM 30013/ROSINHA G-2 RMC
19	LM 93203304	RS	BRT 1997-98	HI 822510/CB 733743//LM 30013/ROSINHA G-2 RMC
20	LR 93201684	RX	BRT 1997-98	CF 880150/RAB 60
21	PR 93201472	MT	BRT 1997-98	POMPADOUR/IRAI

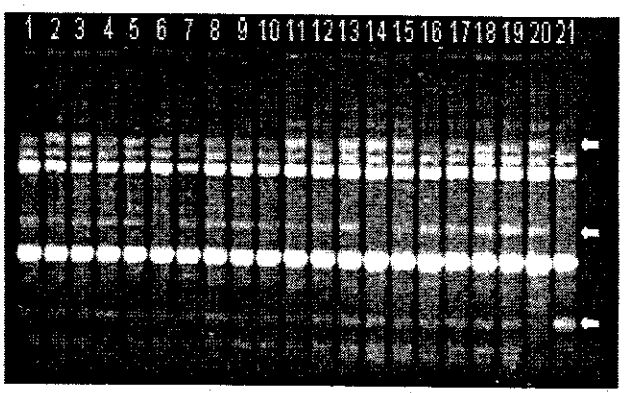
[1]Nr. = Line number; [2]BL = Black; BR = Brown; RX = Purple; RD = Red; CA = Carioca; RS = Pink; MT = Canario; [3]BRT =Bean Regional Trial..

Table 2 - Genetic distance matrix among pairs of bean elite lines from the Regional Trials coordinated by Embrapa Rice and Beans.

	1	2	3	4	5	6	7	8*	9	10	11	12	13	14	15	16	17	18	19	20	21
1. LR 9115398	0																				
2. LR 9115453	0.19	0.00																			
3. A 774	0.27	0.14	0.00																		
4. PR 9115957	0.27	0.16	0.24	0.00																	
5.FEB 163	0.31	0.20	0.14	0.29	0.00																
6. RAO 33	0.21	0.15	0.22	0.31	0.28	0.00															
7. LM 93204217	0.23	0.10	0.11	0.13	0.17	0.17	0.00														
8. TB 94-01	0.15	0.10	0.10	0.19	0.16	0.15	0.07	0.00													
9. AN 9021334	0.06	0.20	0.29	0.29	0.27	0.23	0.24	0.16	0.00												
10. AN 9021336	0.06	0.20	0.29	0.29	0.27	0.23	0.24	0.16	**0.00**	0.00											
11. LM 93204303	0.19	0.15	0.12	0.11	0.15	0.24	0.12	0.08	0.15	0.15	0.00										
12. LM 93204319	0.19	0.07	0.07	0.16	0.13	0.12	0.03	0.03	0.20	0.20	0.08	0.00									
13. LM 93204328	0.15	0.10	0.10	0.13	0.16	0.15	0.07	0.06	0.16	0.16	0.04	0.03	0.00								
14. LM 93204453	0.19	0.13	0.14	0.16	0.20	0.12	0.10	0.10	0.20	0.20	0.08	0.07	0.03	0.00							
15. AN 9021470	0.21	0.10	0.17	0.13	0.16	0.23	0.13	0.13	0.16	0.16	0.07	0.10	0.06	0.10	0.00						
16. LM 9220225	0.16	0.10	0.19	0.20	0.17	0.20	0.14	0.13	0.10	0.10	0.08	0.10	0.07	0.10	0.07	0.00					
17. L 96029	0.23	0.10	0.11	0.20	0.10	0.17	0.07	0.07	0.17	0.17	0.08	0.03	0.07	0.10	0.07	0.07	0.00				
18. LM 93203246	0.20	0.21	0.29	0.24	0.15	0.31	0.25	0.24	0.21	0.21	0.17	0.21	0.18	0.21	0.18	0.13	0.19	0.00			
19. LM 93203304	0.19	0.07	0.14	0.23	0.13	0.15	0.10	0.10	0.20	0.20	0.15	0.07	0.10	0.13	0.16	0.10	0.10	0.15	0.00		
20. LR 93201684	0.24	0.19	0.28	0.14	**0.33**	0.22	0.15	0.21	0.26	0.26	0.13	0.19	0.14	0.19	0.21	0.15	0.23	0.27	0.19	0.00	
21. PR 93201472	0.88	0.87	0.93	0.68	0.87	0.92	0.86	0.87	0.87	0.87	0.79	0.87	0.81	0.80	0.74	0.86	0.86	0.76	0.87	0.85	0.00



A



B

Figure 1A-B. Dendrogram (**A**) and DNA amplification band pattern obtained with primer OPAX03 (**B**) from the 21 Bean Elite Regional Trials lines coordinated by Embrapa Rice and Beans. Numbers of lines are as indicated in Table 1.

Acknowledgement: Ana Lilia Alzate-Marin was supported by IICA-EMBRAPA. Maria Regina Costa was recipient of an undergraduate scholarship from FAPEMIG.

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