MAJOR DRY BEANS MARKET CLASS IN BRAZIL AND PERFORMANCE OF SELECTED LARGE-SEEDED TYPES

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Brazil is the largest producer and consumer of dry bean (*Phaseolus vulgaris* L.) in the world and grows 4.4 million hectares yearly, producing about 3.4 million tons (Table 1). Demand for dry bean is increasing because of the population growth rate at 1.8% year^{-1}. To keep the annual consumption at 16 kg capita^{-1} or about 50 000 tons or equivalent to 250,000 ha of new land would have been added yearly. Small seeded bean of Meso-american race dominates 90% of the domestic market e.g. Carioca (striped bean with cream background), black and too lesser extend mulatinho (cream) and Jalo (medium size yellow bean). Brazilian grain types (except black seeded) do not belong to international market class, hence no supply is available elsewhere when import is needed for satisfying internal demand. Only carioca and to a lesser extend black color are consumed all over Brazil. To meet the domestic demand, several hundred thousand tons have to be imported from Argentine (black seeded 100 000t, and white large seeded 15 000t year^{-1}).

Small amount of medium to large seeded beans of Andean race are sold in small quantities in the local market, and consumer preference varied from one region to other. These beans command at least 50% higher price than the small seeded, and can be classified according to international market class: Cranberry/Sugarbean, Calima and Pompadour type, large yellow and white bean.

CIAT (Centro Internacional de Agricultura Tropical - Cali, Colombia) has generated different market classes bean advanced breeding lines adapted for the tropics and these lines are now available in Brazil.

The Brazilian Savannah during winter offers a suitable environment for large-scale production of beans with high input and irrigation, less insect and pest incidence. Small farmers can take the advantage of growing small quantity of these beans to supply the local market. This is a good alternative to escape the already crowded area in producing the traditional grain type among thousands of small and large farmers.

Sixty one advanced breeding lines were grouped into 5 market classes and each group was evaluated separately in a randomized block design with four repetitions in a net plot size of 10.0 m^2. The common checks are Irai (Sugar bean market class) and Jalo Precoce (Yellow market class). Group 1, White seeded (15 lines), Group 2, DRK and LRK (15 lines), Group 3, Calima and Pompadour (15 lines), Group 4, Cranberry and Sugarbean (9 lines) and Group 5, Large Yellow bean (7 lines).

The experiment was conducted with irrigation at Santa Helena, GO and at Anapolis, GO, during winter 2000 on an Oxisol and was fertilized by 400 kg ha^{-1} of fertilizer 4:30:16. Santa Helena farm is under minimum tillage system for more than 10 years. Additional N was side dressed at the rate of 18 kg ha^{-1} , 21 days after germination. Crop was irrigated with 40 mm/week and was protected against insects and diseases.

Results show that the large seeded beans are well adapted to the Savannah in winter season (May - August) agroecosystem. The incidence of diseases, angular leaf spot, rust and powdery mildew incidence was low. White mould did not proliferated because no tilled management used the *Brachiaria* as mulch that protects the soil. The main stem of almost all tested lines remained green up to physiological maturity. This may be a limiting factor for direct mechanized harvesting.

Average yields of the two sites are shown in Table 3. About 10% discount should be made considering high commercial standard. On average bean yield of these large seeded is less than those Meso-american grain type (>4t ha^{-1}) under this farm condition. The outstanding white seeded lines are: WAF 83, WAF 74 WAF 90, WAF 124 and WAF 75, which can compete with the Alubia bean from Argentine; dark and light red kidney: DRK 18, DOR 831, AFR 331, DOR 837 and AFR 329; Calima and Pompadour market class: PVD 92, AND 670, PVAD 1184, AFR 197, and PVA 992; Cranberry/Sugar bean: SUG 31, AFR 245, DOR 868, SUG 33 and CD 8117; and large yellow: BAN 30, A 195, G 9603 SIN 15 and A 463.These results showed that it is possible to produce good quality large seeded beans under tropical growing conditions during the dry season with irrigation, when nutrient and water are not limiting factors. Further studies are needed to evaluate the performance of these beans in other growing seasons (September and March planting date). Cost benefit studies should be conducted before these large-seeded beans can be recommended to farmers.

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Table 1. Bean production at each planting season in 1999*

Planting Season	Planted Area (1000 ha)	Production (1000 kg)	Yield (kg ha^{-1})	Seed color Relation**
Wet season : October - January				
	1,542.3	1,311.5	Roxo	32/60/6
Dry season : March - June				
	2,716.0	1,491.8	549	9/50/51
Winter season : June - September				
	184.0	292.0	1,592	4/96/0
Total	**4,4423**	**3,387.3**	**997**	

* Adapted from IBGE-Survey'. Pesq. Orçamento Familiar, Consumo alimentar per capita 1999. ** Seed color relation of non-black-black and non *Phaseolus*.

Table 2. Bean consumption in Brazil (kg cp-1) by region and estimated seed color and estimated seed color relation**.

Seed color	Market class	North east	Centralwest	South	Average	%
Small seeded						
Black	Black	0.52	3.39	7.90	3.94	39.00
	Carioca*	2.66	4.35	0.11	2.37	23.50
	Cream	6.09	0.34	0.25	2.22	22.04
	Purple	0.02	2.01	0.01	0.68	6.75
	Yellow	0.08	0.30	0.00	0.13	1.24
	Rosinha	0.01	0.06	0.04	0.04	0.38
Subtotal		8.86	7.06	0.41	5.44	53.91
Large seeded						
Medium yellow	Mayocoba	0.79	0.54	0.02	0.45	4.46
Large yellow		0.08	0.11	0.61	0.27	2.63
Subtotal large seeded		0.87	0.65	0.63	0.27	7.09
Total		10.25	11.10	8.94	10.11	100.00

*Carioca = Brown stripes with cream background.

Table 3. Yield of the outstanding large-seeded bean-breeding lines, grouped into five market classes.

	Market class													
	Large seeded white		Light and Dark Red Kidney			Calima and Pompadour			Cranberry and Sugar bean			Large yellow		
Lines	Yield Kg ha^{-1}	100 seed weight	Line	Yield Kg ha^{-1}	100 seed weight	Line	Yield Kg ha^{-1}	100 seed weight	Line	Yield Kg ha^{-1}	100 seed weight	Line	Yield Kg ha^{-1}	100 seed weight
WAF 83	1923	51.7	DRK 18	1954	67.6	PAD 92	2030	55.3	SUG 31	1772	44.8	BAN 30	1986	57.6
WAF 74	1852	56.1	DOR 831	1907	58.3	AND 670	1914	54.2	AFR 245	1658	43.5	A 195	1838	64.2
WAF 90	1825	51.9	AFR 331	1844	57.9	PVAD1184	1866	40.5	DOR 868	1672	43.0	G 9603	1665	49.8
WAF124	1761	61.0	DOR 837	1692	51.2	AFR 197	1637	56.8	SUG 33	1617	56.1	SIN 15	1459	25.3
WAF 75	1701	61.5	AFR 329	1705	52.6	PVA 992	1616	51.9	CD 8117	1498	36.8	A 463	1408	40.4
Exp. mean	1691			1676			1719			1637			1653	
LSD (5%)	340			331			355			266			348	
CV (%)	18			17			18			14			18	