



IAC Jabola and IAC Esperança: common bean cultivars for market niches

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Received 17 March 2009

Accepted 15 June 2009

ABSTRACT - In Brazil, the trade of common beans with specialty grains such as Jalo, Bolinha, Jabola, Vermelho, Rajado, Branco, Pintado and Canário is still considered a niche market when compared to the carioca and black grain types. However, the cultivation of these beans has proved promising as an alternative income source for farmers, since it offers a differentiated and more valuable product. IAC-Jabola and IAC-Esperança were developed by the Instituto Agronômico Campinas (IAC) in view of their excellent grain type, plant size and higher mean yield than the standard control Jalo Precoce. The IAC had these cultivars registered in MAPA/RNC based on results of 24 VCU trials in 2005/2006/2007, in the state of São Paulo. The yield of IAC Jabola was 2124 kg ha⁻¹, 2336 kg ha⁻¹, and 2558 kg ha⁻¹, in the rainy, dry and winter seasons, respectively. The IAC-Esperança produced 1718 kg ha⁻¹, 1545 kg ha⁻¹, and 2263 kg ha⁻¹ in the rainy, dry and winter seasons, respectively.

Key words: *Phaseolus vulgaris* L., common bean, grain yield, genetic improvement.

INTRODUCTION

The diversity of bean color and size is considered high, although this is not exploited for the market in Brazil. The reason is that the Brazilian consumer prefers carioca and black grains. Other grain types such as Jalo, Bolinha, Rajado, Pintado, Rosinha, Vermelho, and Branco are not consumed very much, which reduces the demand and limits supply. Nevertheless, these grain types have achieved higher prices on the market than

the carioca and black types, since the trade occurs on specialized markets and often in alternative packaging.

The genetic improvement and registration of the cultivars IAC-Jabola and IAC-Esperança represent an attempt to reanimate the grain types (genetics) and consumption habits of the Brazilian population. Until 1970, prior to the release of the cultivar Carioca or Carioquinha by the IAC, the special grain types of Rosinha, Mulatinho, Jalo, Bolinha, Jabola, Vermelho, Rajado, Branco, Pintado, Canário, and Roxinho

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predominated, apart from black. Consumption was therefore diversified and based on regional and family preferences. The cultivar Carioca was fundamental for the crop development, since it made growth and development possible at the level of agricultural production, industrial processing (packaging industry / market and machinery / agricultural implements) and of the different production systems, with stable product quality and supply in all months of the year. Moreover, due to the agronomic and culinary qualities, it was quickly adopted by farmers and consumers of all Brazilian states, contributing to a reduced diversity of consumption of other grain types.

The genetic improvement in Brazil of these special beans is still considered small and recent compared to the carioca and black types. The cultivars IAC-Jabola and IAC-Esperança were developed by the Instituto Agronômico Campinas - IAC to supply farmers and companies in search of a more valuable product differentiated from carioca and black beans and also to consumers who prefer grains of alternative bean types. The grain quality, yield potential and resistance to anthracnose of IAC-Jabola and IAC-Esperança are excellent.

GENETIC ORIGIN AND DEVELOPMENT

The IAC - Jabola was derived from a cross made in Instituto Agronômico de Campinas, state of São Paulo, in 1999, between the cultivars Jabola (Accession of IAC Germplasm) and IAC Carioca - Tybatã. This cross was advanced by the genealogical system, and named Gen 99TG34. After plant selections in this crossing until the rainy season in 2001, line Gen 99TG34-50 with Jalo grain was identified.

The IAC - Esperança was originated by the cross

Jalo Itararé x IAC Carioca - Eté at the IAC, SP, in 1999. This cross was advanced in the pedigree system, and named Gen 99TG28. After plant selections in this crossing until the rainy season in 2001, line Gen 99TG28-68 with rounded grain was identified.

In the rainy growing season of 2005 the lines were included in the VCU testing of 2005/2006/2007 for special grain of the state of São Paulo (Chiorato et al. 2007). Due to the plant traits, the grain size and color, disease resistance, yield and yield stability, the line 99TG34 Gen-50 was named IAC Jabola and lineage 99TG28 Gen-68 was designated IAC-Esperança, and genetic seed production was initiated in 2008.

GRAIN YIELD POTENTIAL

The production potential of IAC-Jabola and IAC-Esperança, observed in 24 VCU trials with 15 genotypes, was 3966 kg ha⁻¹ and 3292 kg ha⁻¹. The mean yield in these trials for 'IAC-Jabola' was 2124 kg ha⁻¹, 2336 kg ha⁻¹ and 2558 kg ha⁻¹ in the rainy, dry and winter seasons, respectively. For 'IAC-Esperança' yields were 1718 kg ha⁻¹, 1545 kg ha⁻¹ and 2263 kg ha⁻¹ in the rainy, dry and winter seasons, respectively. The mean yields of the comparative standard 'Jalo Precoce' were 2160 kg ha⁻¹, 2028 kg ha⁻¹ and 2211 kg ha⁻¹ in these seasons (Table 1).

The mean yield of cultivar IAC-Jabola in 24 environments was significantly higher than of standard cultivar Jalo Precoce, justifying its registration by the IAC (Table 1). The mean yield of IAC-Esperança however was significantly lower than of the control and its registration was based on anthracnose-resistance, high grain quality with clear broth color and rounded grain, which was so far not available on the official seed market and also in view of the high value obtained in market niches in Brazil.

Table 1. Yield (kg ha⁻¹), coefficient of experimental variation (CV%) and minimum significant difference (Dunnett-5%) compared to the control mean (T), per growing season and combined seasons, in the VCU trials for common bean of the state of São Paulo 2005/2006/2007

Common bean cultivars	Growing season			Mean 2005/2006/2007 (kg ha ⁻¹)
	Rainy (9 environments)	Dry (8 environments)	Winter (7 environments)	
Jalo Precoce (T)	2160	2028	2211	2131
IAC-Jabola	2124	2336*	2558*	2321*
IAC-Esperança	1718*	1545*	2263	1819*
Mean ¹ (kg ha ⁻¹)	2268	2142	2372	2256
C.V.(%)	16.69	16.55	16.62	16.64
DMS (kg ha ⁻¹)	290	288	343	175

¹Experimental mean containing 15 cultivars and lines with a coefficient of variation below 25%

* Dunnett Test (5%) compared to the standard cultivar (Jalo Precoce)

OTHER TRAITS

IAC-Jabola has an indeterminate growth habit, semi-erect plants (type II) with long vines, anthracnose-resistance and 1000-seed weight of 335 grams. The cycle from emergence to physiological maturity lasts 96 days, the flowers are uniform pink and pods beige.

IAC-Esperança has a semi-erect growth habit (type II) with long vines, anthracnose-resistance and 1000-seed weight of 343 grams. The cycle from emergence to physiological maturity lasts 96 days, the flowers are uniform pink and the pods beige.

The mean cooking time (min) for the cultivars IAC-Jabola (24.79) and IAC-Esperança (24.46) was lower than of cultivar Jalo Precoce (28.05). The grains remained intact and the broth quality at the end of the cooking time was excellent. The protein content varied with the environment, with a mean protein percentage in the

grains of IAC-Jabola and IAC-Esperança of 20.99% and 20.64%, respectively (Table 2).

TECHNICAL RECOMMENDATIONS AND SEED PRODUCTION

The IAC- Jabola and IAC-Esperança are recommended for planting, according to the ecological zoning of the State of São Paulo, for the three growing seasons. A row spacing of 50 cm and 10 plants per meter was used, for a total of 200000 plants per hectare.

The Agronomic Institute - IAC is in charge of the seed production of these cultivars. IAC- Jabola and IAC-Esperança were registered on 03/28/2008 by the MAPA/RNC as no. 22629 and no. 22627 and the application for protection of these cultivars is being analyzed by the MAPA/SNPC.

Table 2. Technological/nutritional quality: mean values of cooking time in minutes in the Mattson cooker (Proctor and Watts, 1987) (TC) and protein content (PC) in percentage, in common bean grains in the VCU trials for the state of São Paulo in 2005/2006/2007

Common bean cultivars	Growing season						Mean2005/2006/2007	
	Águas (6 environments)		Dry (6 environments)		Winter (6 environments)		TC	PC
	TC	PC	TC	PC	TC	PC		
Jalo Precoce (T)	27.61	22.85	27.91	23.59	28.64	22.72	28.05	23.05
IAC-Jabola	23.88	20.58	24.95	20.88	25.53	21.52	24.79	20.99
IAC-Esperança	23.42	19.87	26.47	20.87	23.50	21.18	24.46	20.64

ACKNOWLEDGEMENTS

The authors thank the CNPq for the award for Excellence in Research and FAPESP for financial support for the performance of part of this research.

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