SITE-SPECIFIC SELECTION OF COMMON BEAN (*Phaseolus vulgaris* L.) CULTIVARS

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INTRODUCTION

Genotype x environment interaction is one of the main constraints in the plant breeding environment since its existence results in a decrease of genotypic performance when submitted to a given distinct location from where this genotype has been selected. In order to counteract the effects of this interaction, the common bean breeding research team of Embrapa Clima Temperado designed, in the early 90s, the Common Bean Demonstration Units System – SUDF (Villela et al., 2016), which is comprised of common bean cultivars released by Brazilian research institutions dealing with common bean breeding. Common bean production in Brazil is under temporal changes in area and volume as the commercial value of commodities changes and production systems acquire distinct components, also as an adaptation process to the market. In Rio Grande do Sul State, where common bean production is traditional since the early 1900's, the soybean production has had a significant increase in the last ten years, mainly due to the growth of the international market. As a result, in traditional growing areas, common bean has been replaced by soybean production and moved to the region where apple production has attained a significant increase in the last twenty years. This region, known as "Campos de Cima da Serra", is nowadays the main area of common bean production. Aiming to identify common bean cultivars suited to the environmental conditions found in this new region, Demonstration Units of beans that have been sown within this region have been analyzed in order to provide information to farmers on the most adapted cultivars. As checks, traditional cultivars under use by farmers have been used. This paper, which reviews the results from experiments conducted under 'Caxias do Sul' extension service supervision, aims to contribute to the selection by farmers of the best adapted cultivars among much of those presently available.

MATERIAL AND METHODS

The municipality of Caxias do Sul, located in the central hilly region of Rio Grande do Sul, with geographical coordinates 29.1634°S, 51.1797°W, is the headquarters of Emater's administrative region and comprises 49 municipal offices. Methodology follows the description by Villela et al. (2016), where the Demonstration Unities (UD) were composed of seventeen cultivars already recommended by research institutions located in southern Brazil, having as check the cultivars in use by farmers. From the 49 municipalities, 16 carried out 23 UDs. The testing period ranged from 1994/95 to 2006/07. UD's, for the most part, were installed in properties of farmers selected by Emater / RS employees. Statistical analysis involved the analysis of variance for the variable grain

yield and the Dunnett's test mean comparison, having the farmer's cultivar as a term of comparison. Twelve of the seventeen cultivars presented the required amount of data for statistical analysis.

RESULTS AND DISCUSSION

As shown in Table 1 of the twelve cultivars tested, two of them, Macotaço and Minuano, displayed significant yield differences in relationship to the farmers' cultivar, with 44.0 and 38.1 % yield advantage over the check, respectively. Both cultivars are black seeded, which is the color seed type preferred in Rio Grande do Sul State. An important characteristic associated with the cultivar Macotaço is its favorable performance when subjected to water stress. This testing concept has been developed from accumulated experience by farmers. As a solid conclusion, the SUDF has shown, as it was detected for the Soledade region (Villela et al., 2016), to be a valuable methodology for cultivar selection in different production areas, at a low cost.

Table 1. Mean seed yield ($kg.ha^{-1}$) and releasing year of SUDF cultivars in comparison to farmer's cultivar. Emater /RS' Caxias do Sul region, RS, Brazil.

Cultivar	Seed yield ($kg.ha^{-1}$)	Release year
Farmer's cultivar (check)	**2,037.7**	**-**
Rio Tibagi	1,899.3	1976
Carioca+	2,528.7	1976
Guateian 6662	2,625.3	1979
Iraí+	1,847.0	1981
Macanudo	2,659.2	1989
FT 120	2,734.4	1989
Minuano	2,815.1*	1991
Iapar 31+	2,695.2	1994
Macotaço	2,938.9**	1994
Iapar 44	2,706.7	1994
Guapo Brilhante	2,438.2	1995
Pérola+	2,734.5	1999

*: Cultivar differs from the check by Dunnett's test at α=0.05; **: Cultivar differs from the check by Dunnett's test at α=0.01; +: Cultivar with no black seed coat.

REFERENCES

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