

# EVALUATION OF COMMON BEAN GENOTYPES FOR ORGANIC CULTIVATION IN RIO GRANDE DO SUL, BRAZIL

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## INTRODUCTION

Ecologically and organically based systems represent an evolution to conventional agriculture in view of the need to use renewable inputs that do not negatively impact agroecosystems. The readjustment of bean production systems involves the use of management practices that are friendly to the environment and the replacement of inputs. However, there is a need to define and adopt a set of management practices to obtain adequate productivity (Bevilaqua, et al., 2021). The identification of genotypes adapted to the organic system is of great importance in the scenario of conventional agriculture, whose varieties were developed to respond to high solubility fertilizers and the wide use of pesticides. Common bean (*Phaseolus vulgaris*) cultivars from Embrapa Clima Temperado were developed with several characteristics that make them adapted to these types of production systems (Antunes et al., 2017). On the other hand, farmers have used a wide range of ecologically-based inputs whose characteristics and use in organic agriculture have been sought in research, such as biofertilizers (Goncalves et al., 2008). The objective of this work is to verify the adaptability of common bean genotypes to ecologically based systems used in Rio Grande do Sul.

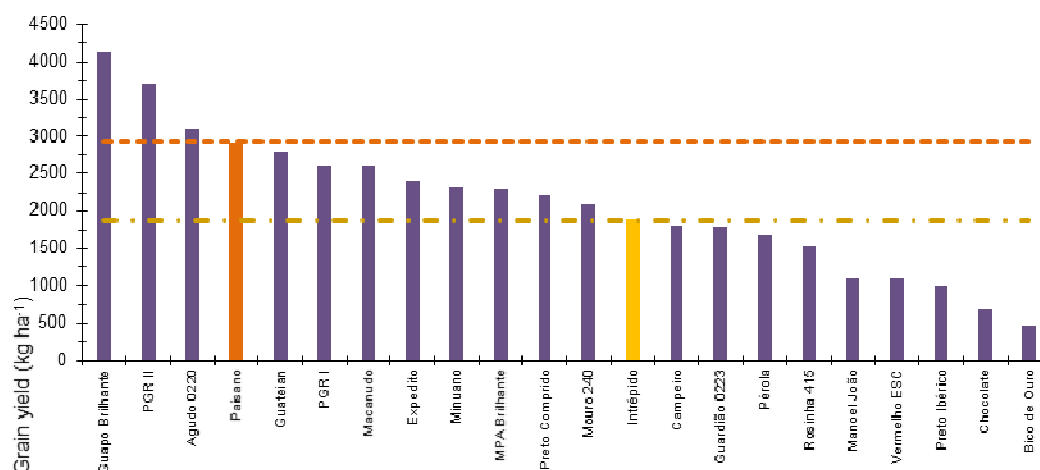
## MATERIAL AND METHODS

An evaluation trial was carried out with 26 genotypes, at the Cascata Experimental Station, of Embrapa Clima Temperado, using a Federer augmented block design. The Cascata area is traditionally dedicated to the organic cultivation of various crops of interest to family farming. The controls used were the cultivars BRS Intrépido and BRS Paisano. In the management of the area, black oat and vetch cover crops were used, conducted in winter, with semi-mechanized cultivation. For base fertilization, 500 kg.ha<sup>-1</sup> of turkey manure was used. Previously, the area had been corrected with limestone, natural phosphate and basalt powder, within a rotation program with other annual crops, mainly maize and cassava. The row spacing was 0.5m and the sowing density was 250,000 plants ha<sup>-1</sup> (Araujo et al., 1996).

## RESULTS AND DISCUSSION

In Figure 1 the grain yields of the evaluated genotypes are presented and it is verified that Guapo Brilhante, PGR II and Agudo 0220 genotypes presented results above the controls and the other evaluated genotypes. The cultivar Guapo Brilhante, recommended for conventional cultivation in the 1990s, stood out, reaching a grain yield of 4,200 kg ha<sup>-1</sup>, while the best control, cultivar BRS Paisano, yielded approximately 3,000 kg ha<sup>-1</sup>. The genotype PGR II also stood out in terms of grain yield, demonstrating the effectiveness of using populations with a broad genetic base to obtain high yields in organic systems, and such populations may also have better tolerance to pests and diseases (Antunes et al., 2017). The Agudo 0220 genotype, selected from landrace germplasm, showed higher yield than the controls too. The genotypes Bico de Ouro, Chocolate, Preto Ibérico, Vermelho Escuro, Manoel João, Rosinha 415, Pérola, Guardiã TB 0223 and BRS Campeiro showed lower grain yield than the controls. Those genotypes with color grain or high thousand-seed weight such as Vermelho Escuro, Manoel João, Rosinha 415 and Bico de Ouro, must be compared and should be also evaluated as varieties with qualifications in terms of consumption

preference and nutritional quality. Under organic cultivation, a fundamental point is the choice of the area that presents a low occurrence of weeds that are difficult to control, avoiding humid areas or with strong wind, preferably with east-north exposure and one of the main necessary practices is the use of cover crops preceding cultivation, such as black oat (*Avena strigosa*), vetch (*Vicia sativa*), rye (*Secale cereale*) and fodder radish (*Raphanus sativus*) (Bevilaqua et al., 2021). No visible symptoms of anthracnose and occurrence of pests were observed in the experimental plots, not requiring corrective measures.



**Figure 1.** Adjusted means of grain yield of common bean genotypes under organic cultivation. Cascata Experimental Station. Embrapa Clima Temperado, Pelotas, RS, 2023.

## CONCLUSIONS

The common bean genotypes Guapo Brilhante, PGR II and Agudo 0220 showed higher grain yield than the controls and other evaluated genotypes and can be indicated for cultivation in organic systems, with the cultivar Guapo Brilhante reaching approximately 4,200 kg ha<sup>-1</sup>. The cultural practices adopted are essential to achieve an adequate grain yield, with a low incidence of diseases and pests, which allow the organic certification of production.

## REFERENCES

- Antunes, I.F., Bevilaqua, G.A.P., Noronha, A.D.H., Eicholz, E.D. 2017. Cultivo do feijão: Cultivares BRS Paisano e BRS Intrépido. In: Medeiros, C.A.M. Alternativas para Diversificação da Agricultura Familiar. Pelotas, Embrapa Clima Temperado. 130p. (Embrapa Clima Temperado, Documentos, 443)
- Araujo, R. S., Rava, C.A., Stone, L.F., Zimmermann, M.J.O. 1996. Cultivo do feijoeiro comum no Brasil. Piracicaba: Potafos, 786 p.
- Bevilaqua, G.A.P., Noronha, A., Schiedeck, G., Antunes, I.F., Eicholz, E.D., Guarino, E.D. 2021. Diagnóstico das práticas de manejo relacionadas a alta produção de grãos de feijão na agricultura familiar da região Norte do Rio Grande do Sul. Pelotas: Embrapa Clima Temperado, 21 p. (Documentos / Embrapa Clima Temperado, ISSN 1516-8840; 511).
- Goncalves, M.M., Schiedeck, G., Schwengber, J.E. 2008. Produção e uso de biofertilizantes em sistemas de produção de base ecológica ecológica. Pelotas: Embrapa Clima Temperado. 20p. (Embrapa Clima Temperado, Circular Técnica, 78)