

BRAZILIAN LAND RACE GERMPLASM YIELD POTENTIAL

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INTRODUCTION

In order to accomplish with urban population demand for common bean (*Phaseolus vulgaris* L.), a staple food in Brazil, the Embrapa Temperate Climate Research Center – CPACT - common bean breeding program has selected as main goals the improvement of both agronomic performance and nutritional profile. Such accomplishment would suffice not only producer needs, but also consumer ones. Among the available germplasm for breeding purposes, land races represent a very important source. This importance is due to the high genetic variability present as result of the different environments in which common bean is grown, that exert distinct evolutionary forces, understanding that the plant population simultaneously exert environmental changes, ending up in a co-evolution of plants and environments. In order to find answers on the potential of land race germplasm as source of genes for yield improvement as well as new cultivars for direct use, and as such summing up elements to adjust improvement for agronomic performance, a comparison on yield of land races and CPACT-derived breeding lines, was conducted.

MATERIAL AND METHODS

Common bean land races obtained both through donation by farmers and field collections, and CPACT-derived breeding lines, were compared. Land races have their origin from all production regions of Rio Grande do Sul State, in Southern Brazil, and some of them have been cultivated for more than 50 years. Mostly of the breeding lines were at F₅ generation and resulted from selection performed at the common bean breeding program of CPACT. The land races were sown in individual test rows 4m long, 0.5m apart, with a seed density of 12 seeds m⁻¹. At each ten line-group, an individual line of both cultivars BRS Expedito and BRS Campeiro were sown and used as a parameter for performance comparison. BRS Expedito is a black seeded cultivar released by the CPACT common bean breeding program that presents a high yielding potential, a good field resistance to anthracnose, and a high protein content, being suitable to direct harvest. BRS Campeiro, is also a black seeded cultivar, released by Embrapa Rice and Common Bean Research Center, with broad adaptation and high yielding potential. The trials were carried out in 2005/06 and 2006/07 at Embrapa Temperate Climate, located in Pelotas, Rio Grande do Sul State, Brazil. Fifty land races and 56 CPACT-derived breeding lines were tested in 2005/06 cropping year, whereas 57 land races and 60 CPACT breeding lines were tested in 2006/07. Sowing dates were, October 27 and November 13, in 2005 and 2006, respectively. The comparison of line behavior was based on the yield mean of the check cultivars for each group of ten lines.

RESULTS AND DISCUSSION

Results have shown that in 2005/06, 28,0% of the land races tested outyielded the mean of the check cultivars as compared to 69.0% for the breeding lines. The check cultivars mean was 1,940.1 kg ha⁻¹. The same way, 28% of the land races presented yields above check cultivars yield mean, in 2006/07, compared to 31% of the breeding lines. The check cultivars mean in 2006/07 was 1,421.2 kg ha⁻¹. Another important observation refers to the fact that in the 2005/06 cropping year, 14% of the land races have shown a yield performance superior to the general mean for the best check cultivar for each ten-lines group. For the same comparison, 30.3% of the breeding lines have shown a better performance in relationship to the best check cultivar mean yield. In 2006/07, the values for the comparison with the best check cultivar mean, were 12.3 % for the land races and 29.0% for the breeding lines. It was also observed that the mean yield of the land races, decreased 41.9% from 2005/06 to 2006/07, as compared to the breeding lines, which did not suffer any decrease in mean yield. This result suggest that the breeding lines, that were selected at the site where the trials were carried out, have a greater yield stability for this site, while land races, in opposition to the breeding lines, are originated from diverse environments possessing specific adaptation to these sites. It is recognized that the land race germplasm under study show a very promising picture as new cultivars as well as new sources of genes for the common bean yield improvement program.