SELECTION STRATEGIES OF PROGENIES IN A COMMON BEAN RECURRENT SELECTION PROGRAM

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INTRODUCTION

Breeders biggest challenge is to identify the best progenies/lines or hybrids that will remain the best ones in future years and under different conditions from the experimental stations ones. The interaction progenies x environment is expressive for common beans in Brazil (MENDES; RAMALHO; ABREU, 2009; LIMA; RAMALHO; ABREU, 2012; LIMA et al., 2015), consequently the selection success can be hampered. Therefore, the aim with this work was to evaluate a progeny selection strategy that considers not only the progenies means, but also the mean from the population from which the progeny came. It uses several inbreeding generations information in order to mitigate the interaction effect.

MATERIAL AND METHODS

Progenies used in this work came from Universidade Federal de Lavras (UFLA) recurrent selection program for grain yield, XV cycle. 439 $S_{0:1}$ progenies, 322 $S_{0:2}$ and 79 $S_{0:4}$ progenies were evaluated in 2015/2016. All progenies were obtained by a recombination system that is similar to a "*top cross*". 20 $S_{0:3}$ progenies are selected in each cycle and used as female in crossing with the 19 other ones.

Grain yield was the trait under evaluation. The data were analyzed by mixed model approach. BLUP's effects were estimate considering the original population effect and also progenies of previous inbreeding generations effect. The genetic variance among progenies (V_P), the progenies x environments interaction variance (V_{PA}), and heritability (h^2) among progenies were estimated. Coincidence index was also estimated among the 10% best progenies considering one or more generation and the reference generation, $S_{0:4}$.

RESULTS AND DISCUSSION

The coincidence of the best progenies when considering the generation of selection and the reference generation $S_{0:4}$was low at most cases (Table 1).It was low even when considering all the evaluation generations ($S_{0:1}$, $S_{0:2}$ e $S_{0:3}$) in relation to $S_{0:4.}$ In this case, the coincidence of the best progenies was only 20%.

Tabela 1 - 10% best $S_{0:4}$progeniescoincidenceselectedbasedononeor more generations, genetic variance among progenies (V_P), progenies x environment interaction variance (V_{PA}) and heritability among progenies(h^2), for grain yield ($Kg.ha^{-1}$).

Generation	Coincidence	V_P	V_{PA}	h^2 (%)
$S_{0:1}$	0	60642.00	-	21
$S_{0:2}$	66.67	98994.00	-	41
$S_{0:3}$	0	25150.00	-	13
$S_{0:1}$, $S_{0:2}$ e $S_{0:3}$	20.00	23711.00	38677.00	23

The interaction progenies x environments is the most probable explanation to this low coincidence. This expressive progenies x environments interaction effect indicates that progenies grain yield was not coincident in all environments (generations/ seasons) evaluated. The interaction variance component (V_{PA}), was 1.6 times higher than the variance between progenies (V_P), for grain yield, considering the sequential analysis (Table 1). This emphasizes the high interaction effect.

Resende et al. (2016)proposed a new selection strategy by which the progeny merit is evaluated by an index that takes into account not only the progeny "per se" performance, but also the original population performance and the inbreeding generation's relationship coefficient. They showed that when adopting this index, the selection efficiency is higher. However, in this work, as commented previously, this index didn't improve the selection efficiency, probably due to the high progenies x environments interaction effect.

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REFERENCES

MENDES, F. F.; RAMALHO, M. A. P.; ABREU, A. F. B. Índice de seleção para escolha de populações segregantes de feijoeiro-comum. **Pesquisa Agropecuária Brasileira**, Brasília, v. 44, n. 10, p. 1312-1318, out. 2009.

LIMA, L. K.; ABREU, A. F. B.; RAMALHO, M. A. P. Implications of the progeny x environment interaction in selection index involving characteristics of the common bean. **Geneticand Molecular Research**, Ribeirão Preto, v. 11, p. 4093-4099, 2012.

LIMA, D. C.; ABREU, A. F. B.; FERREIRA, R. A. D. C.; RAMALHO, M. A. P. Breeding common bean populations for traits using selection index. **Scientia Agricola,** v. 72, p. 132-137, 2015.

RESENDE, M. D. V.; RAMALHO, M. A. P.; CARNEIRO, P. C. S.; CARNEIRO, J. E. S.; BATISTA, L. G.; GOIS, I. B. Selection index with parents, populations, progenies and generations effects in autogamous plant breeding. **Crop Science**, v. 56, p. 530-546, n. 2016.