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## ANTIOXIDANT ACTIVITY IN RELATION TO THE SIZE OF POD IN DIFFERENT SNAP BEAN GENOTYPES

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## ANTIOXIDANT ACTIVITY IN RELATION TO THE SIZE OF POD IN DIFFERENT SNAP BEAN GENOTYPES

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**INTRODUCTION:** The snap bean (*Phaseolus vulgaris* L.) is a legume that is widely consumed on the world scenario due to its biochemical composition and nutritional quality (Furlan et al., 2016). Besides the nutritional compounds, the snap bean presents antioxidants properties, inhibiting or retarding the oxidative damage, which avoids the propagation of oxidative reactions and can prevent diseases caused by free radicals. (Silva et al., 2009).

The aim of this study was to evaluate the interaction between the antioxidant activity and pod size of several snap bean genotypes cultivated in the sowing season spring/summer and autumn/winter.

**MATERIAL AND METHODS:** The experiment was conducted in an organic system with protected cultivation in the municipality of Londrina, Paraná, Brazil. The study was conducted in a completely randomized design, in a factorial scheme (8 vs. 2), with four replications, being eight snap bean genotypes with indeterminate growth pattern (Teresópolis Ag 481, HAV 69, HAV 41, Preferido Ag 482, Macarrão Brasília, Trepador Top Seed, HT 30 e Favorito Ag 480) and two sowing seasons: spring/summer of 2014 and autumn/winter of 2015. Each experimental plot was composed by 10 plants spaced at 0.20 m in the line and 1.00 m between lines.

Samples of pods were collected from each treatment, being measured: the average pod mass, length and diameter of pods - measured in 10 pods per plant; And antioxidant activity (RUFINO et al., 2007). The data were submitted to analysis of variance by the F test ( $p < 0.05$ ) and compared by the principal component analysis (PCA), using software R (R, 2012).

**RESULT:** According to the analysis of variance (Table 1), it was found significant differences for the interaction genotypes vs. sowing seasons for all variables. In both seasons, the principal components analysis (PCA) (Figure 1) showed positive correlations for the phytometric characteristics of the pods and the absence of correlation of these variables with the antioxidant activity, suggesting that characteristics related to the size and mass of pods do not govern the antioxidants accumulation.

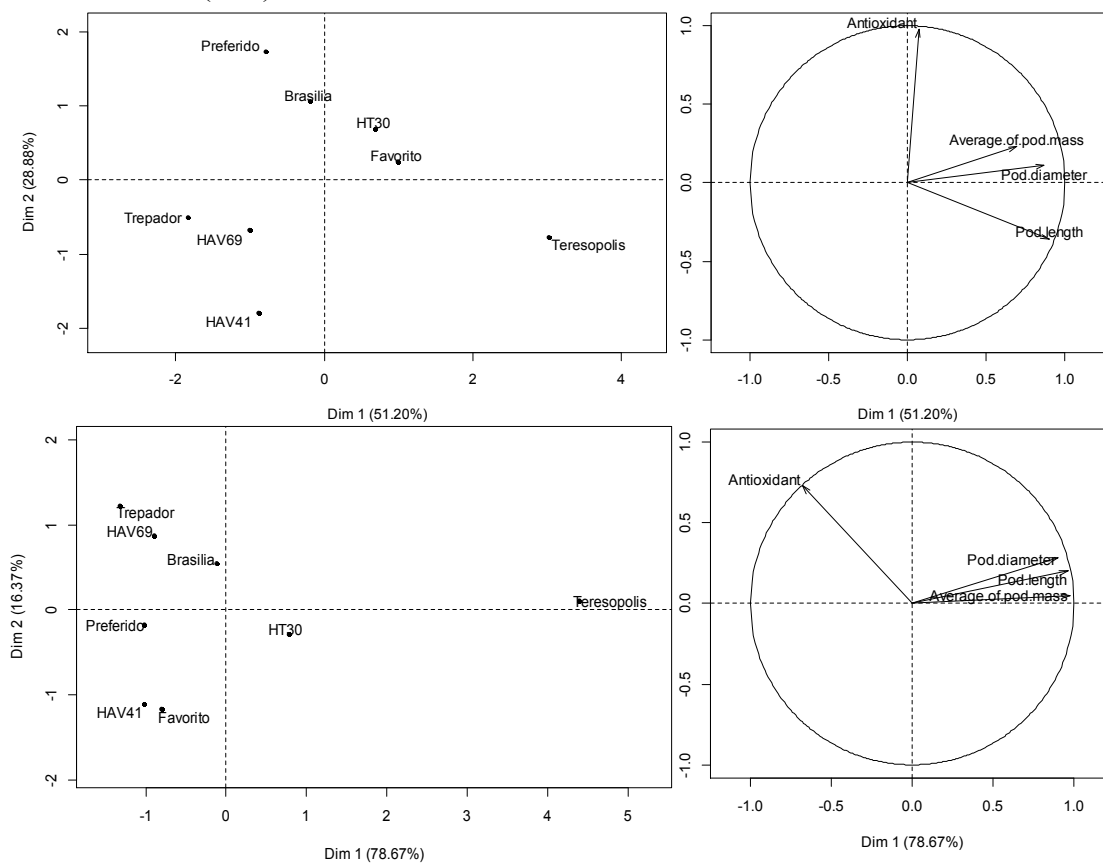
In the spring/summer season it was possible to separate the genotypes into three groups (Group I : Preferido, Brasília, HT 30 and Favorito; Group II: Trepador, HAV 41 and HAV 69; Group III: Teresópolis). In the second season four groups was separated (Group I: Trepador, HAV 69 and Brasília; Group II: Preferido, HAV 41 and Favorito; Group III: HT 30; Group IV: Teresópolis). The differences found in the grouping of genotypes are explained by the high environmental participation in the expression of these characteristics. However, the cultivars Brasília and Teresópolis showed high capacity *per se* (in the antioxidant accumulation and pod size).

**Table 1.** Mean squares values for phytometric characteristics of pods and antioxidant activity of eight snap bean genotypes grown at two sowing seasons. Londrina, Brazil, 2015.

Sources of variation	Average of pod mass (g)	Pod length (cm)	Pod diameter (cm)	Antioxidant (mg DPPH g <sup>-1</sup> )
Season (S)	73.859**	46.342**	0.001 <sup>NS</sup>	0.353 <sup>NS</sup>
Genotypes (G)	20.871**	32.945**	0.075**	1.219**
S vs. G	5.644**	6.730**	0.018**	1.112**
Residue	0.496	0.456	0.005	0.263
CV (%)	8.29	4.44	7.47	22.68
Mean	8.49	15.2	1.00	5.11

\*\* Significant at 1% and <sup>NS</sup> Non significant by F test ( $p < 0.05$ ).

**Figure 1.** Principal component analysis (PCA) obtained by the phytometric characteristics and antioxidant activity of pods of eight snap bean genotypes sowing in spring/summer (SS1) and autumn/winter (SS2).



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