



## Adaptability of soybean cultivars in different crop years

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Genet. Mol. Res. 14 (3): 8995-9003 (2015)  
Received January 28, 2015  
Accepted May 29, 2015  
Published August 7, 2015  
DOI <http://dx.doi.org/10.4238/2015.August.7.8>

**ABSTRACT.** Soybean is one of the main sources of foreign exchange credits for Brazil in the agricultural sector. There is increasing interest in growing this leguminous crop, especially in the southern region of Minas Gerais, due to its importance as an alternative for crop rotation with maize. In this respect, the study of the adaptability of new cultivars to the region is indispensable so as to obtain high yields. Thus, the aim of this study was to evaluate the performance of 38 soybean cultivars for growing in the summer season in the municipality of Lavras, MG, Brazil, in the 2010/2011 and 2011/2012 crop years. The experiments were conducted in a randomized block design with 3 replications and the treatments consisted of 38 cultivars. At the time of harvest, the following assessments were made: grain yield (kg/ha), height of the lowest pod (cm), plant height (cm), and lodging. The data were subjected to individual and combined analysis of variance. The phenotypic mean values were clustered, adopting the Scott and Knott test. For simultaneous selection of multiple traits, the sum of rank index of Mulamba and Mock was adopted. The cultivar TMG 801 RR had the best yield performance; the cultivars Monsoy 8001, MGBR-46

(Conquista), and BRSMG 68 (Vencedora) also stood out. Considering simultaneous selection for grain yield, plant height, height of the lowest pod, and lodging, the cultivar TMG 801 RR is recommended for growing in the summer season in the southern region of Minas Gerais.

**Key words:** Cultivar selection; Genotype x crop year interaction; *Glycine max*; Selection index

## INTRODUCTION

Soybean is the main source of foreign exchange credits for Brazil in the agricultural sector. It is estimated that in the 2013/2014 crop year, Brazil will produce approximately 90 million tons of the oilcrop, production 10.8% greater than the 2012/2013 crop year. The expectation is that Brazil will export 41.5 million tons, maintaining its position as the largest worldwide exporter of soybean (CONAB, 2014).

Due to its economic importance, this crop has been the focus of developing research, especially in the area of breeding, with the attainment of improved cultivars, carriers of alleles able to express broad adaptation and good tolerance to biotic and abiotic factors, representing significant contributions to the productive sector.

The growth and development of soybean and, consequently, grain yield are the result of the interaction between cultivars and factors arising from the growing environment, such as sensitivity to photoperiod and to air temperature, which lead to flowering. The sensitivity of the cultivars in relation to photoperiod and to air temperature, directly related to the beginning of the reproductive period, is the main characteristic for zoning of cultivars (Munstock and Thomas, 2005).

As a result of environmental factors in phenotypic expression, a genotype x environment interaction is expected; i.e., the behavior of the different lines and/or cultivars does not coincide in the environments assessed (Ramalho et al., 2012).

Some studies seeking to confirm better adaptability of available cultivars have been undertaken in various regions of Brazil. Guimarães et al. (2008), in a study carried out in an experimental area of the Universidade Federal de Lavras (Lavras, MG, Brazil), evaluated 40 soybean cultivars and observed that the cultivars with the best results were Vencedora, Conquista, and Monarca.

Conducting an experiment in areas located in two different municipalities (Lavras and Itutinga, MG), Carvalho et al. (2010) evaluated 24 cultivars, finding that the best results were obtained in the following cultivars: Monsoy 8001, Conquista, Vencedora, DM Nobre, Emgopa 315, DM Vitória, Monsoy 6101, Preta, UFV 16, Emgopa 316, Santa Rosa, Aventis 7002, and CAC 1, with grain yields ranging from 2958 to 3575 kg/ha.

With the aim of evaluating the performance of 17 soybean cultivars in the municipality of Botucatu, SP, in the 2002/2003, 2003/2004, and 2004/2005 crop years, Lemos et al. (2011) observed that most of the materials evaluated attained results greater than 3000 kg/ha; however, the cultivars IAC 22, BRS 133, and BRS 156 were those that most stood out in the three crop years.

Peluzio et al. (2010) evaluated 17 cultivars in two trials conducted in the municipalities of Palmas, TO and Gurupi, TO. The authors observed a significant effect of the location

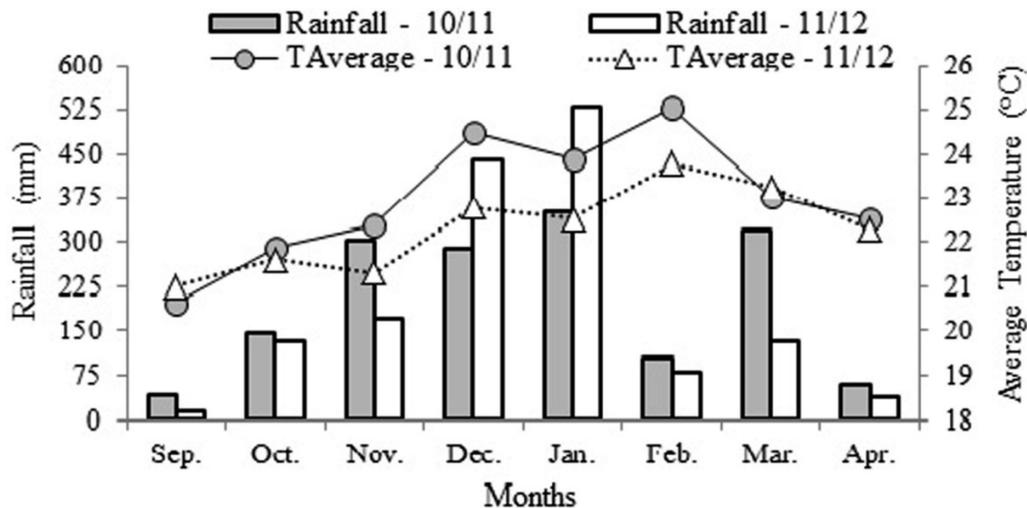
x cultivar interaction for all the characteristics evaluated, except for the number of days to flowering. The cultivars BRSMG Valiosa, M-SOY 8585 RR, and TMG 106 RR achieved the greatest mean yields.

However, it should be noted that these evaluations considered the cultivar performance in different locations. The crop season effect was not considered. Reports indicate that the genotype-season interactions are quite relevant and should be studied for the selection of cultivars with greater adaptability. In breeding programs, several traits can be analysed simultaneously to identify the desirable cultivar. In this context, a selection index can be applied as a useful tool. There are no reports about the uses of such index aiming to select soybean cultivars with higher performance in the southern region of Minas Gerais State.

In light of the above, the aim of this study was to select soybean cultivars, evaluating them in regard to adaptability to the southern region of Minas Gerais for summer growth over two crop years, considering yield performance and adopting a selection index.

## MATERIAL AND METHODS

The experiments were set up at the Universidade Federal de Lavras (UFLA), located at latitude 21°14'S, longitude 45°00'W, and altitude of 918 m, in the 2010/2011 and 2011/2012 crop years in a soil classified as Latossolo Vermelho Distroférico (LVdf; Oxisol). According to the Köppen classification, the climate in the municipality of Lavras is Cwa (Antunes, 1986), rainy temperate, with a dry winter and rainy summer. Average annual rainfall is 1529.7 mm (INMET, 1992). The rainfall and temperature data over the period of the experiments are shown in Figure 1.



**Figure 1.** Monthly averages of rainfall and air temperature in Lavras, MG, Brazil, in the 2010/11 and 2011/12 crop years over the time of the trials. Source: Instituto Nacional de Meteorologia (INMET).

A conventional soil tillage system was used, with plowing followed by disking and mechanized opening of planting furrows spaced at 0.50 m. Fertilization followed the recom-

recommendations of the Soil Fertility Commission of the State of Minas Gerais (Ribeiro et al., 1999). Table 1 shows the data in regard to chemical analyses of the soils of the experimental area.

**Table 1.** Chemical composition of the Latossolo Vermelho Distroférico típico (Oxisol) soil (0-0.20 m) before setting up the experiments in the 2010/2011 and 2011/2012 crop years (Lavras, MG, Brazil).

Crop Years	pH	Ca <sup>2+</sup>	Mg <sup>2+</sup>	Al <sup>3+</sup>	H <sup>+</sup> +Al <sup>3+</sup>	SB	CEC	P	K
		cmol <sub>c</sub> /dm <sup>3</sup>						mg/dm <sup>3</sup>	
2010/2011	5.20	2.10	0.30	0.20	7.90	2.70	10.30	6.00	117
2011/2012	5.90	4.70	1.30	0.00	2.90	6.30	9.20	7.21	118
		Zn <sup>2+</sup>	Mn <sup>2+</sup>	Cu <sup>2+</sup>	B	Fe <sup>2+</sup>	S	OM	V
		mg/dm <sup>3</sup>					(dag/kg)	(%)	
2010/2011	2.60	13.90	3.00	0.10	-	-	3.40	55.9	
2011/2012	5.31	13.33	0.60	0.33	-	-	2.61	68.51	

H + Al = potential acidity; SB = sum of bases; CEC = cation exchange capacity at pH 7.0; OM = organic matter; V = base saturation.

Before sowing, the seeds were inoculated with *Bradyrhizobium japonicum* using the peat-based inoculant Nital at the proportion of 1,200,000 bacteria per seed.

Seeds were sown manually, and thinning was carried out 25 days after germination, maintaining 15 plants per linear meter. The other crop treatments were performed in a uniform manner in the experimental area according to the procedure presented by Carvalho et al. (2010).

The experimental plots consisted of four 5.0-m length rows, spaced at 0.50 m, using the two center rows as a useful area, with elimination of 0.50 m at their extremities. A completely randomized block experimental design was adopted, with 3 replications and 38 treatments (Table 2).

At the time of harvest, the following were assessed: height of the lowest pod (distance from the root collar of the plant up to the node of the first pod, in centimeters, of 5 random plants); plant height (distance from the root collar up to the extremity of the main stem, in centimeters, measured in 5 random plants); lodging rate, evaluated according to Bernard et al. (1965) with the following scores: 1 for all upright plants, 2 for some plants leaning or slightly lodged, 3 for all plants moderately leaning or 25-50% lodged, 4 for all the plants severely leaning or 50-80% lodged, and 5 for more than 80% lodged plants; as well as grain yield in kg/ha after conversion to 13% moisture.

Individual analyses, per crop year, for all the traits were made using the statistical model  $Y_{ij} = \mu + t_i + r_j + e_{ij}$ , where  $Y_{ij}$  is observation in reference to treatment  $i$  in replication  $j$ ;  $\mu$  is overall mean;  $t_i$  is effect of treatment  $i$ ;  $r_j$  is effect of replication  $j$ ;  $e_{ij}$  is experimental error  $\cap N(0, \sigma^2)$ .

Having obtained the mean values per crop year, combined analysis was carried out, considering each experiment as a replication. The experimental error of this analysis corresponds to the cultivar x crop year interaction. Mean error is obtained by the mean of the mean square error in the individual analyses (Ramalho et al., 2012).

The collected data were subjected to statistical analyses with the assistance of the Sisvar<sup>®</sup> software (Ferreira, 2000), using the Scott-Knott test at 5% for comparison of mean values.

For selection considering all the traits assessed, the selection index proposed by Mulamba and Mock (1978) was adopted, in which selection is carried out based on classification or ordering of the lines for multiple traits. The principle of the Mulamba and Mock index is transformation of the adjusted phenotypic means of the genotypes for each trait into rankings, according to the interest of the breeder, i.e., in the sense of increasing or decreasing the phenotypic expression. In the present study, the following rankings for yield were adopted: “1” for values above 3000 kg/ha; “2” for intervals from 2500 to 3000 kg/ha; and “3” for yields less than 2500 kg/ha. For plant height, plants of 60 to 120 cm were considered as ranking “1”, and plants less than 60 cm or greater than 120 cm received ranking “2”. For height of the lowest pod, ranking “1” for cultivars with values from 10 to 15 cm, and ranking “2” for values less than 10 cm or greater than 15 cm was adopted. For cultivars with lodging scores from 1 to 1.9, ranking “1” was adopted; ranking “2” for scores from 2 to 2.9, and ranking “3” for scores as of 3. Based on the rankings of the lines for each characteristic, the sum is established, obtaining the values of the index for each treatment. The cultivars that obtained the lowest total values are selected as those of best overall performance.

**Table 2.** Cultivars used in the experiments in the 2010/2011 and 2011/2012 crop years (Lavras, MG, Brazil).

Cultivar	Origin
Aventis 7002	Aventis
BRS 136	Embrapa
BRS 137	Embrapa
BRS 255 RR	Embrapa
BRS 750 SRR	Embrapa
BRS 850 GRR	Embrapa
BRS Carla	Embrapa
BRS Favorita RR	Embrapa
BRS Milena	Embrapa
BRSGO 204 (Goiânia)	Embrapa
BRSGO Luziânia	Embrapa
BRSMG 250 (Nobreza)	Embrapa
BRSMG 251 (Robusta)	Embrapa
BRSMG 68 (Vencedora)	Embrapa
BRSMG 760 SRR	Embrapa
BRSMG Garantia	Embrapa
CAC 1	Cooperativa Agrícola de Cotia
DM Nobre	Agropecuária Dois Marcos
Elite	Embrapa
Emgopa 315	Emater-GO
Emgopa 316	Emater-GO
MGBR-46 (Conquista)	Embrapa
Monarca	Embrapa
Monsoy 6101	Monsanto
Monsoy 7211 RR	Monsanto
Monsoy 8000 RR	Monsanto
Monsoy 8001	Monsanto
Monsoy 8229	Monsanto
NA 7255 RR	Nidera
P98Y11	Pioneer
P98Y30	Pioneer
Preta	UFLA
Suprema	Embrapa
TMG 1179 RR	Tropical Melhoramento e Genética
TMG 127 RR	Tropical Melhoramento e Genética
TMG 801 RR	Tropical Melhoramento e Genética
UFV 16 (Capinópolis)	UFV
UFV TN 105	UFV

Experimental precision was evaluated by the accuracy estimate (Resende and Duarte, 2007; Ramalho et al., 2012) using the estimator (Equation 1) shown below:

$$r = \sqrt{1 - \frac{1}{F_c}} \times 100 \quad (\text{Equation 1})$$

in which,  $r$  is the accuracy expressed in percentage;  $F_c$  is the F value calculated.

## RESULTS AND DISCUSSION

The summary of combined analysis of variance is shown in Table 3. A significant difference ( $P < 0.001$ ) was seen for the grain yield and plant height traits. This result shows that there is variability among the cultivars tested for these characteristics.

**Table 3.** Summary of combined analysis of variance of the grain yield traits (Yield, kg/ha), height of the lowest pod (HLP, cm), plant height (PH, cm), and lodging (LOD) (Lavras, MG, Brazil, 2010/2011 and 2011/2012 crop years).

	d.f.	Sum of squares			
		Yield	PH	HLP	LOD
Cultivar (C)	37	187833.02**	203.15**	17.41	0.62
Year (Y)	1	494271.59**	5.21	1.90	2.58
C x Y	37	208780.54**	52.75	13.14	0.44
Error	85	63894.12	77.11	14.51	0.68
F calculated (cultivars)	2.94	2.63	1.20	0.91	
Accuracy (%)	81.23	78.72	40.82	-	

\*\*Significant at 1% probability by the F-test.

In the average of the crop years, a significant difference was not detected for lodging and height of the lowest pod. This was expected - since the treatments assessed are commercial cultivars that are already recommended, it is expected that these traits remain within the required commercial standard.

The cultivar x crop year interaction was significant for the grain yield trait, showing that the behavior of the cultivars did not coincide in the different years (Table 3). The genotype x environment interaction is frequently reported in the literature for different crops (Ramalho et al., 2012). In the soybean crop, this is also an important fact.

The magnitude of the interaction may be observed by the ratio between the sum of squares of the interaction and the total sum of squares. Notice that in the present study, interaction explained 37.5% of the total variation. This fact shows the importance of testing cultivars in different crop years (Table 3).

According to Allard and Bradshaw (1964), there are foreseeable and unforeseeable environmental factors. In this context, it may be inferred that there is a great variation from one crop year to another in regard to unforeseeable factors because normally the water regime and the occurrence of pests and diseases are different and have a direct effect on expression of the production potential of the cultivar.

Accuracy estimates reflect the precision in which experiments were conducted and also the existence of variability. According to Ramalho et al. (2012), accuracy estimates above 70% are considered to be of high magnitude. In this study, that level was observed for the grain yield and plant height traits (Table 3).

The plant height characteristic is directly related to yield, the degree of lodging, and efficiency in mechanized harvest, and it is thus of fundamental importance that this trait be assessed in the selection of cultivars with good adaptability to a new region because it undergoes changes from environmental factors. In the present study, a satisfactory height was observed for mechanized harvest in all the cultivars studied, ranging from 69 cm in BRS 255 RR to 110.5 cm in the Suprema cultivar. Values from 60 to 120 cm are considered ideal (Carvalho, 2009) (Table 4).

**Table 4.** Phenotypic mean values of the traits of grain yield (Yield, kg/ha), plant height (PH, cm), height of the lowest pod (HLP, cm), and lodging index obtained in the cultivar selection trials (UFVA, Lavras, MG, 2010/2011 and 2011/2012 crop years).

Cultivars	Yield (kg/ha)	HLP (cm)	PH (cm)	Lodging
TMG 801 RR	3772.00 <sup>a</sup>	22.50 <sup>b</sup>	93.00 <sup>b</sup>	2.00 <sup>c</sup>
Monsoy 8001	3446.00 <sup>b</sup>	20.00 <sup>b</sup>	87.00 <sup>b</sup>	2.00 <sup>c</sup>
MGBR-46 (Conquista)	3370.50 <sup>b</sup>	25.00 <sup>a</sup>	88.00 <sup>b</sup>	1.50 <sup>b</sup>
BRSMG 68 (Vencedora)	3293.00 <sup>b</sup>	23.00 <sup>a</sup>	94.00 <sup>b</sup>	2.50 <sup>c</sup>
UFV 16 (Capinópolis)	3125.00 <sup>c</sup>	21.00 <sup>b</sup>	100.00 <sup>b</sup>	2.00 <sup>c</sup>
P98Y11	3106.50 <sup>c</sup>	24.00 <sup>a</sup>	87.50 <sup>b</sup>	1.50 <sup>b</sup>
TMG 1179 RR	3106.00 <sup>c</sup>	18.50 <sup>b</sup>	77.00 <sup>c</sup>	1.50 <sup>b</sup>
Aventis 7002	3035.00 <sup>c</sup>	24.50 <sup>a</sup>	89.00 <sup>b</sup>	1.50 <sup>b</sup>
Elite	2977.50 <sup>c</sup>	22.50 <sup>b</sup>	105.50 <sup>a</sup>	3.00 <sup>d</sup>
DM Nobre	2945.50 <sup>c</sup>	25.00 <sup>a</sup>	105.50 <sup>a</sup>	3.00 <sup>d</sup>
CAC 1	2937.50 <sup>c</sup>	28.00 <sup>a</sup>	93.50 <sup>b</sup>	2.50 <sup>c</sup>
BRS 136	2931.50 <sup>c</sup>	23.50 <sup>a</sup>	96.50 <sup>b</sup>	2.00 <sup>c</sup>
BRSMG 760 SRR	2902.50 <sup>c</sup>	22.00 <sup>b</sup>	102.50 <sup>a</sup>	2.00 <sup>c</sup>
Emgopa 316	2861.00 <sup>c</sup>	26.00 <sup>a</sup>	106.50 <sup>a</sup>	2.50 <sup>c</sup>
BRS Milena	2860.00 <sup>c</sup>	22.00 <sup>b</sup>	85.50 <sup>c</sup>	2.00 <sup>c</sup>
BRSMG 251 (Robusta)	2855.50 <sup>c</sup>	21.00 <sup>b</sup>	93.00 <sup>b</sup>	1.50 <sup>b</sup>
Monsoy 8000 RR	2834.00 <sup>c</sup>	20.50 <sup>b</sup>	88.00 <sup>b</sup>	1.00 <sup>b</sup>
BRS Favorita RR	2789.00 <sup>c</sup>	25.00 <sup>a</sup>	83.00 <sup>c</sup>	1.50 <sup>b</sup>
BRS Carla	2757.50 <sup>d</sup>	22.50 <sup>b</sup>	101.50 <sup>a</sup>	3.00 <sup>d</sup>
BRS 750 SRR	2741.50 <sup>d</sup>	23.50 <sup>a</sup>	82.50 <sup>c</sup>	1.50 <sup>b</sup>
BRSGO 204 (Goiânia)	2712.50 <sup>d</sup>	24.50 <sup>a</sup>	95.50 <sup>b</sup>	1.50 <sup>b</sup>
Emgopa 315	2705.50 <sup>d</sup>	21.00 <sup>b</sup>	81.00 <sup>c</sup>	2.00 <sup>c</sup>
BRSMG Garantia	2680.50 <sup>d</sup>	31.00 <sup>a</sup>	105.00 <sup>a</sup>	2.00 <sup>c</sup>
Monsoy 6101	2680.00 <sup>d</sup>	24.00 <sup>a</sup>	94.00 <sup>b</sup>	2.50 <sup>c</sup>
BRS 850 GRR	2672.00 <sup>d</sup>	17.50 <sup>b</sup>	82.50 <sup>c</sup>	1.50 <sup>b</sup>
NA 7255 RR	2657.50 <sup>d</sup>	18.00 <sup>b</sup>	79.00 <sup>c</sup>	1.00 <sup>b</sup>
Suprema	2643.50 <sup>d</sup>	24.50 <sup>a</sup>	110.50 <sup>a</sup>	2.50 <sup>c</sup>
Monarca	2642.50 <sup>d</sup>	20.00 <sup>b</sup>	104.00 <sup>a</sup>	2.50 <sup>c</sup>
TMG 127 RR	2602.50 <sup>d</sup>	20.00 <sup>b</sup>	96.50 <sup>b</sup>	2.00 <sup>c</sup>
Preta	2583.50 <sup>d</sup>	23.50 <sup>a</sup>	88.50 <sup>b</sup>	1.50 <sup>b</sup>
BRSMG 250 (Nobreza)	2555.50 <sup>d</sup>	22.00 <sup>b</sup>	83.00 <sup>c</sup>	2.50 <sup>c</sup>
Monsoy 8229	2546.00 <sup>d</sup>	21.50 <sup>b</sup>	90.50 <sup>b</sup>	2.50 <sup>c</sup>
BRS 137	2540.00 <sup>d</sup>	20.00 <sup>b</sup>	70.00 <sup>d</sup>	1.50 <sup>b</sup>
BRS 255 RR	2533.00 <sup>d</sup>	19.00 <sup>b</sup>	69.00 <sup>d</sup>	1.50 <sup>b</sup>
BRSGO Luiziânia	2506.50 <sup>d</sup>	26.50 <sup>a</sup>	96.00 <sup>b</sup>	2.50 <sup>c</sup>
UFV TN 105	2451.50 <sup>d</sup>	16.50 <sup>b</sup>	85.50 <sup>c</sup>	1.00 <sup>b</sup>
Monsoy 7211 RR	2431.50 <sup>d</sup>	21.0 <sup>b</sup>	98.00 <sup>b</sup>	1.50 <sup>b</sup>
P98Y30	2282.50 <sup>d</sup>	20.50 <sup>b</sup>	81.50 <sup>c</sup>	2.00 <sup>c</sup>
Standard error	103.19	1.55	3.58	0.33

\*Mean values followed by the same letters belong to the same group by the Scott and Knott test at 5% probability.

Just as for plant height, height of the first pod has a direct effect on mechanized harvest. If the height of the first pod is below 10 cm, there may be losses in the operation because the combine has to operate very near the soil. According to Marcos Filho (1986), satisfactory height is around 15 cm. Among the cultivars assessed, height of the first pod ranged from 16.5 cm in the cultivar UFV TN 105 to 31 cm in the cultivar BRSMG Garantia (Table 4).

Highly affected by plant height, lodging plays an important role in cultivar selection since lodged plants make mechanized harvest unviable. In the present study, scores from 1.00 to 3.00 were observed; the lowest values were observed in the cultivars UFV TN 105, NA 7255 RR, and Monsoy 8000 RR. However, it should be emphasized that, in spite of the differences observed, significance for the trait was not detected (Table 4).

The cultivars, as was expected, showed wide variation in yield, ranging from 2282.5 to 3772 kg/ha, which shows the importance of this study since the goal is to identify those with greatest adaptability. It was observed that for the southern region of Minas Gerais, in the municipality of Lavras, the cultivar that showed the highest yield was TMG 801 (3772 kg/ha). Other cultivars that showed good performance were Monsoy 8001 (3446 kg/ha), MGBR-46 (Conquista) (3370.5 kg/ha), and BRSMG 68 (Vencedora) (3293 kg/ha), which do not differ among themselves by the Scott and Knott test (Table 4). However, it should be noted that the cultivars of greatest performance showed yield greater than the national average of 3106 kg/ha, obtained in the 2010/2011 crop year.

In plant breeding, the breeder normally assesses various traits and, in this context, simultaneous selection is necessary for these characteristics assessed. In this regard, the adoption of selection indices constitutes a good strategy. There are various alternatives available in the literature; however, the Mulamba and Mock (1978) index is a worthwhile and easily used alternative. By this method, classification of the treatments is obtained for the different traits and a ranking is attributed. After that, the sum is calculated. The cultivar with the lowest total value is selected as the best, i.e., it showed the best performance in most of the traits assessed. In the present study, this strategy was used and the results are shown in Table 5. Notice that, adopting this tool, the cultivar TMG 801 RR may be selected.

**Table 5.** Result of the rank sum test considering the traits of grain yield, plant height, height of the lowest pod, and lodging (Lavras, MG, Brazil, 2010/2011 and 2011/2012 crop year).

Cultivar	Rank sum	Cultivar	Rank sum
TMG 801 RR	6	BRSMG 760 SRR	8
MGBR-46 (Conquista)	7	BRS Milena	8
P98Y11	7	Emgopa 315	8
TMG 1179 RR	7	BRSMG Garantia	8
Aventis 7002	7	TMG 127 RR	8
Monsoy 8001	7	UFV TN 105	8
UFV 16 (Capinópolis)	7	CAC 1	9
Monsoy 8000 RR	7	Emgopa 316	9
NA 7255 RR	7	Monsoy 6101	9
BRSMG 68 (Vencedora)	8	Suprema	9
BRSMG 251 (Robusta)	8	Monarca	9
BRS Favorita RR	8	BRSMG 250 (Nobreza)	9
BRS 750 SRR	8	Monsoy 8229	9
BRSGO 204 (Goiânia)	8	BRSGO Luiziana	9
BRS 850 GR	8	Monsoy 7211 RR	9
Preta	8	Elite	9
BRS 137	8	DM Nobre	9
BRS 255 RR	8	BRS Carla	9
BRS 136	8	P98Y30	9

The cultivar TMG 801 RR shows degree of maturity of 8.2 and a determined growth habit. It is resistant to stem canker, soybean rust, and frogeye leaf spot; however, it is susceptible to target leaf spot.

The results of this study allow us to identify cultivars with improved agronomic performance for the region under study. Despite this region being known by coffee, maize and milk production, currently, it is considered to have an expressive potential for soybean production.

During the last 3 years, the soybean planted area have increased 50.78% in the region, totaling 40,498 hectares cultivated with this crop (IBGE, 2014). In this context, the present study indicates cultivars that can be used in the region.

## CONCLUSIONS

The cultivar TMG 801 RR showed the best yield performance; in addition, the cultivars Monsoy 8001, MGBR-46 (Conquista), and BRSMG 68 (Vencedora) stood out.

Considering simultaneous selection for grain yield, plant height, height of the first pod, and lodging, the cultivar TMG 801 RR is recommended for growing in the summer in the southern region of Minas Gerais.

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