

## Correlation between soil chemical attributes and soybean and forage yields in a crop-livestock system

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**Introduction** High crop yield is closely related to the quality of soil, since it occurs when the chemical, physical and biological attributes are in balanced levels and showing good conditions for plant growth. Among the soil chemical properties, organic matter (OM) has been described as the best indicator of soil quality, as it is directly related to various processes occurring in the soil. Thus, this study aimed to evaluate the correlations of soil chemical attributes within three different management zones (MZ) in a crop-livestock system (CLS).

### Material and Methods

The study was conducted on a consolidated CLS area of 14,9 ha in Bage city-RS/Southern Brazil, during the agricultural year of 2012/2013. The experimental design was a randomized bloc, using a factorial 3x2, with 8 repetitions. The treatments were defined within 3 MZ (high, medium and low soybean yield) determined by the harvesting map of the previous crop i.e annual ryegrass pasture. In each MZ, eight soil samples were collected from two depths: 0 to 0.10 m and 0.10 to 0.20 m. Soil chemical properties data from different MZ were analyzed, using the analysis of variance and means were compared by Tukey test ( $p > 0.05\%$ ).

### Results and Conclusions

There were no differences between soil chemical properties within the different MZ. Soil OM at 0-0.10 m depth was different within the MZ, showing the lowest content (3.03%) within the low productivity management zone (LPMZ) and the highest content (3.75%) within high productivity management zone (HPMZ). This result followed the patterns of soybean yield of 850 kg/ha within LPMZ and 3,020 kg/ha within HPMZ. These results show that soil OM is a good indicator of soil quality, since this attribute is directly related to chemical, physical and biological factors. In addition, it was observed a positive correlation between the soybean and forage yields, only at the first forage dry matter sampling ( $r = 0.62$ ).

Table 1 - Correlation analysis between the soybean and forage yields. Bage - RS, 2014.

Crop/pasture	Forage sampling (cuts)			
	1st	2nd	3rd	Total
Soybeans	0,62*	0,06	-0,11	0,22
Forage 1st cut		0,24	-0,14	0,45
Forage 2nd cut			0,26	0,76
Forage 3rd cut				0,69

\*Pearson correlation 0.05% significance level.

The results show that the response of different crop yields is distinct within the same area. Thus, when the objective is to evaluate limiting attributes of crop yield, it is necessary to collect a large database and perform a multidisciplinary analysis, as suggested by SANTI et al. (2012), because the soil physical results in higher constraints of pasture production than the soil chemical properties.

### References cited

SANTI et al. (2012) Soil Till. Res.