



Soil carbon contents in integrated crop-livestock and crop-livestock-forest systems in the Brazilian Cerrado

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Introduction

Pasture and soil degradation in recent years has been main constraints at conventional systems to animal and grain production in Brazil. Soil carbon and organic matter preservation in these soils are very important for sustainable productivity. In this presentation, we report the results of 6 years of integrated crop-livestock and crop-livestock-forest systems on soil carbon contents in a clayed Oxisol of the Brazilian Cerrado.

Material and Methods

The field experiment was carried out in an area of degraded pasture (20° 26' S, 54° 43' W, 530 m asl) at Embrapa Beef Cattle Research Center, Campo Grande, MS, Brazil since 2008/09. Details in Oliveira et al. (2012), and Pereira et al. (2014). Treatments included ICL (integrated crop-livestock, no trees), ICLF14 (integrated crop-livestock-forest with single line of trees, 14 m apart) and ICLF22 (lines of trees 22m apart). Soybeans were cultivated conventionally in 2008/09 and no-till in 2012/13. Grazed pastures of *Brachiaria brizantha* cv. BRS Piatã were cultivated between eucalyptus trees, after soybeans. Two transects lines, composed by 10 single soil samples/transect, were taken yearly in May-June, to 20 cm depth, and analyzed for total C in an autoanalyser (Sumika/Shimadzu).

Results and Conclusions

Table 1. Soil C contents to 20 cm depth under different integrated systems 6 years after establishment. Data are means of 8 replicates/treatment/year.

System	Years							Means
	2008	2009	2010	2011	2012	2013	2014	
	g C/cm ³							
ICL	2,19a	2,34a	2,39a	2,46a	2,68a	2,57a	2,69a	2,47a
ICLF14	1,56b	2,07b	1,88b	1,98b	2,03b	2,08b	2,01b	1,95b
ICLF22	1,83c	2,35a	2,21a	2,18b	2,51a	2,30c	2,33c	2,24c
Means	1,86	2,26	2,16	2,21	2,41	2,31	2,35	2,22

Over a 6 years period, soil under ICL, showed highest values of total C content as compared with ICLF14 or ICLF22 (Table 1). ICL system (no trees) had less competition for light, water and nutrients, and provided greater source of organic matter for soil carbon, than grass/pasture combined with trees. Grass biomass and animal production were greater in ILC as reported in cited papers.

References cited

Oliveira et al. (2012). Anais do XXII Congresso Brasileiro de Zootecnia, Cuiabá, MT, Brazil.3p.
Pereira et al. (2014). Proceedings of Tropentag 2104, Prague, Czeck Republic,4p.

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