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Performance of integrated systems (CLS and CLFS) in Ponta Porã, Brazil

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Introduction

Aiming at to monitor the agronomic performance of integrated production systems having soybean and corn with pasture and eucalyptus was implemented in a transition area between the Atlantic Forest and Cerrado biomes a technological reference unit (URT).

Material and Methods

The URT is located in an Oxisol, 350 g kg^{-1} clay, altitude of 680 m, Cfb climate (Koppen) in Ponta Porã, MS, Brazil (22°32'56"S 55°38'56"W). The systems were established in 2009 in crops cultivated area last 30 years. The following systems are implanted: L-PC: monoculture with soybean in the summer and corn in the fall/winter with soil preparation; b) L-PD: No-till, with soybean in the summer and corn intercropped with forage (*Brachiaria ruziziensis*) in the fall/winter; ILP: integrated crop-livestock system with the alternation between crops (soybean/corn+*B. ruziziensis*) and pasture (*B. brizantha* cv. Xaraés) conducted in No-till, with two-year cycles; ILPF: integrated crop-livestock-forest system with alternating crops with pasture, grown in single lines of trees (eucalyptus) spaced 25 m (200 trees/ha) and 12.5 m (400 trees/ha), the rotation of crops and pasture is a two-year cycle; F: Eucalyptus forest, 2x3 m (1666 trees/ha); PP: continuous pasture *B. brizantha* cv. Xaraés under pasture of beef cattle.

Results and Conclusions

Soybean and corn yield were consistently higher than the ILP system compared to other systems, being influenced in an expressive way by the presence of trees in the smaller spacing between rows and to the extent of the growth of trees. Integrated systems (ILPF) resulted in smaller trees in height but with greater diameter of the trunks and wood volume compared to the forest system (F). Systems with pastures had increases in carbon content in the soil (Table 1). The pasture has benefited from the presence of trees in years with occurrence of frosts.

Table 1. Relative soybean and maize grain yield, mean values for diameter at breast height (DBH), height and volume of eucalyptus trees to 57 months after planting and variation (Δ) of the total organic carbon (TOC) of soil layers between the years 2010 and 2013, in management systems.

systems	relative grain yield (L-PC=100)							variables trees			Δ TOC (g kg^{-1})		
	soybean				maize			DBH	high	volume	0 - 5	5 - 10	10 - 20
	2011	2012	2013	2014	2011	2012	2013	---- m ----		m^3	-------- cm --------		
L-PC	100	100	100	100	100	100	100				-0,94	-1,69	-2,24
L-PD	104	114	115	100	99	85	109				-0,04	0,07	-0,51
ILP	82	174	130	103		104	128				6,20	-0,14	-0,97
ILPF12	89	117	84	48	89	86	43	0,24	17,20	0,41			
ILPF25	92	134	114	96	133	100	87	0,24	18,52	0,41			
PP											3,68	2,87	3,97
F								0,21	20,33	0,37			

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