

# BIOMASS-C TRANSPORT INTO SOIL CARBON POOLS IN BRAZILIAN OXISOLS: A LONG TERM INCUBATION STUDY

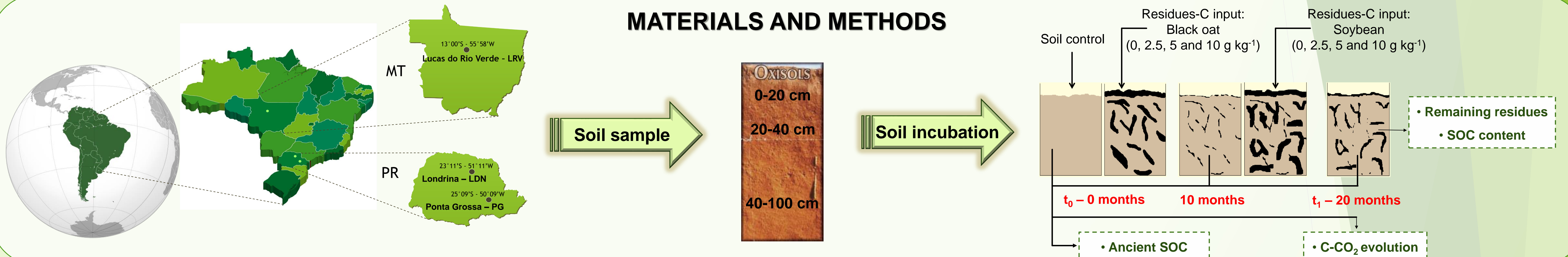
Cleber Briedis<sup>1</sup>, Joao Carlos Moraes Sa<sup>1</sup>, Rattan LaP<sup>2</sup>, Rafael Schimiguel<sup>1</sup>, Pamela Thaísa Bressan<sup>1</sup>, Daiani da Cruz Hartman<sup>1</sup> and Ademir Ferreira<sup>1</sup>,

(<sup>1</sup>) Av. Carlos Cavalcanti, 4748, Universidade Estadual de Ponta Grossa, Ponta Grossa, Brazil; (<sup>2</sup>) 2021 Coffey Road 210 Kottman Hall, The Ohio State University, Columbus, OH

## INTRODUCTION

- Soil organic carbon (SOC) is an important pool affecting the terrestrial C cycle. It may be a significant source or sink for CO<sub>2</sub> depending on the management.
- No-till is important to SOC accumulation from temperate to tropical environment.
- However, some studies indicate a low SOC stabilization after a long time of C inputs.
- Thus, how SOC accumulation is affected by SOC content on long term NT lands and how is the capacity to soil store SOC is still unclear, especially in Oxisols.
- Therefore, using Oxisols can strengthen the knowledge about SOC saturation which is important to increase SOC sequestration efficiency, to mitigate the anthropogenic effect on climate changes and advance food security.

## MATERIALS AND METHODS



**Table 1.** Cumulative CO<sub>2</sub>-C emission after 20-months of incubation in response to biomass-C rates in Oxisols of subtropical and tropical ecosystem.

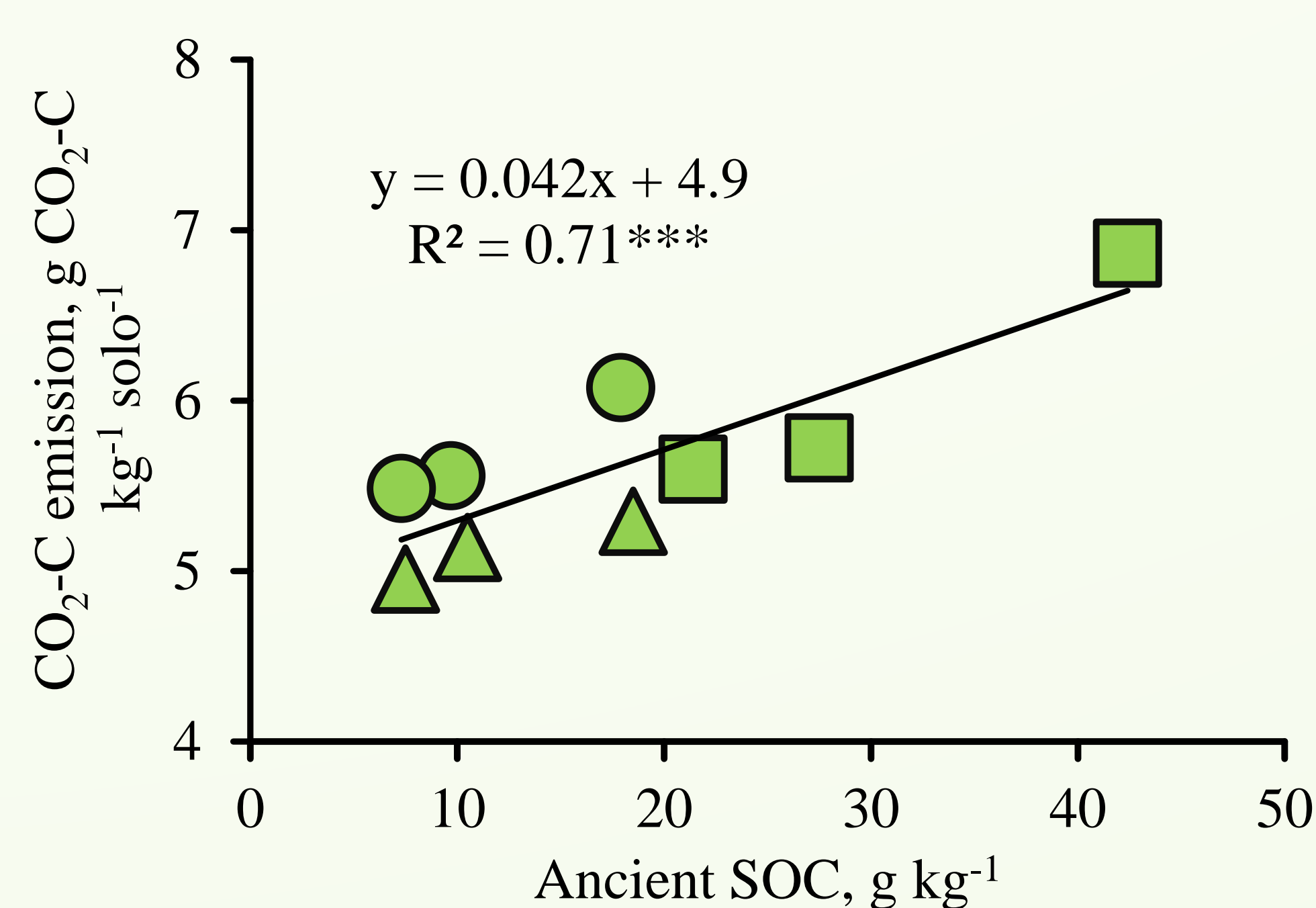
Site	Layer, cm	Biomass-C input, g kg <sup>-1</sup>				Linear Regression <sup>2</sup>
		0	5	10	20	
Ponta Grossa	0-20	2.70 a <sup>1</sup>	5.53 a	7.70 a	11.52 a	0.99 <sup>3</sup>
	20-40	1.18 b	4.37 b	6.63 b	10.72 b	0.99
	40-100	0.97 b	4.15 b	6.67 b	10.60 b	0.99
Londrina	0-20	1.38 a	4.58 a	7.18 a	11.17 a	0.99
	20-40	1.07 ab	4.20 ab	6.40 a	10.58 b	0.99
	40-100	0.83 b	4.02 b	6.91 b	10.18 b	0.97
Lucas do Rio verde	0-20	1.13 a	3.83 a	6.21 ns	10.00 ab	0.99
	20-40	0.95 ab	3.90 a	5.93	9.78 b	0.99
	40-100	0.64 b	3.11 b	5.88	10.18 a	0.99

## RESULTS

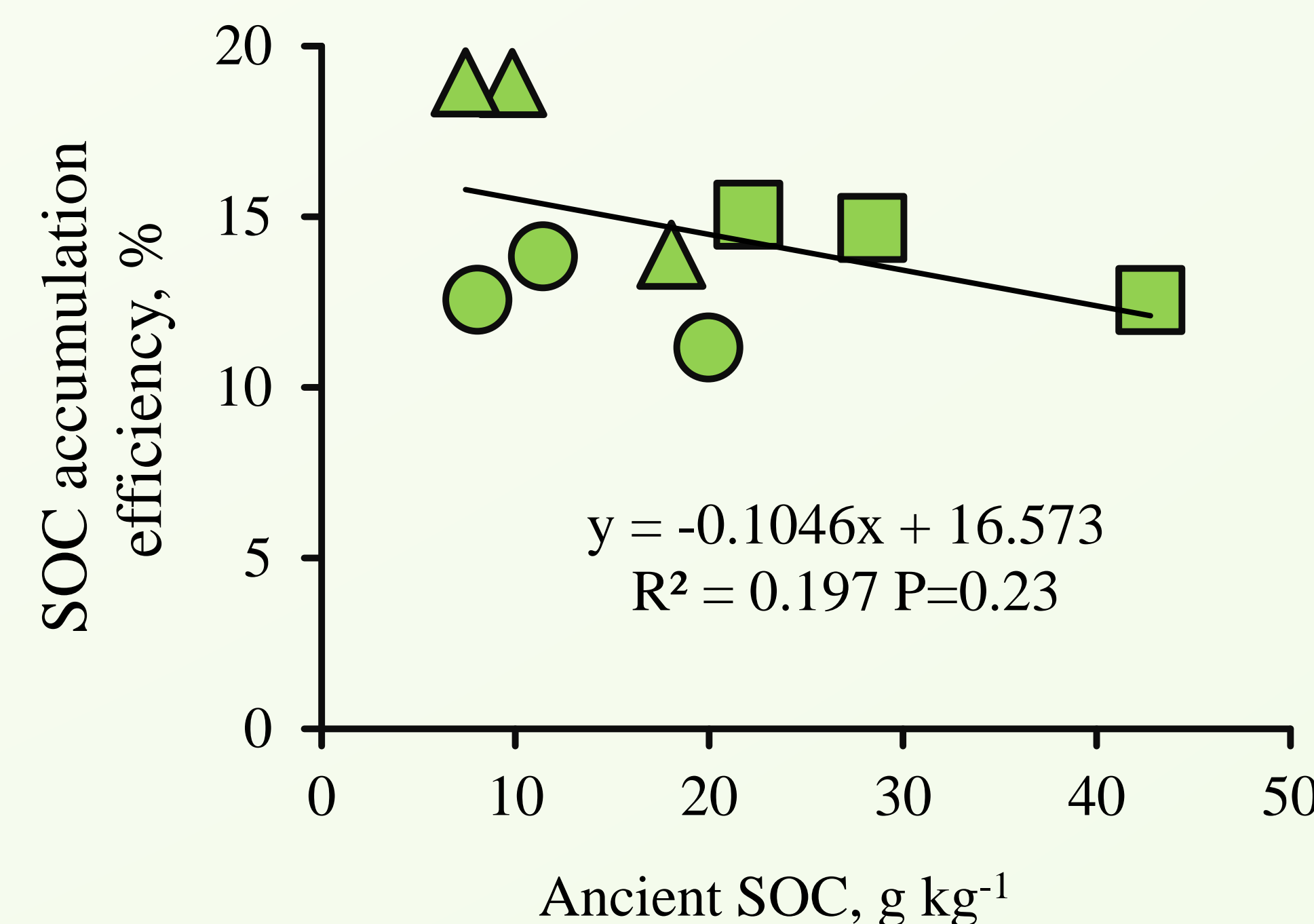
**Table 2.** SOC-biomass accumulation in Oxisols from tropical and subtropical ecosystem in Brazil due different layers.

Layer	Ponta Grossa	Londrina	Lucas do Rio Verde
cm	g kg <sup>-1</sup>		
0-20	1.71 <sup>ns</sup>	1.63 b <sup>1</sup>	1.46 <sup>ns</sup>
20-40	1.69	2.21 a	1.52
40-100	1.68	2.15 a	1.30

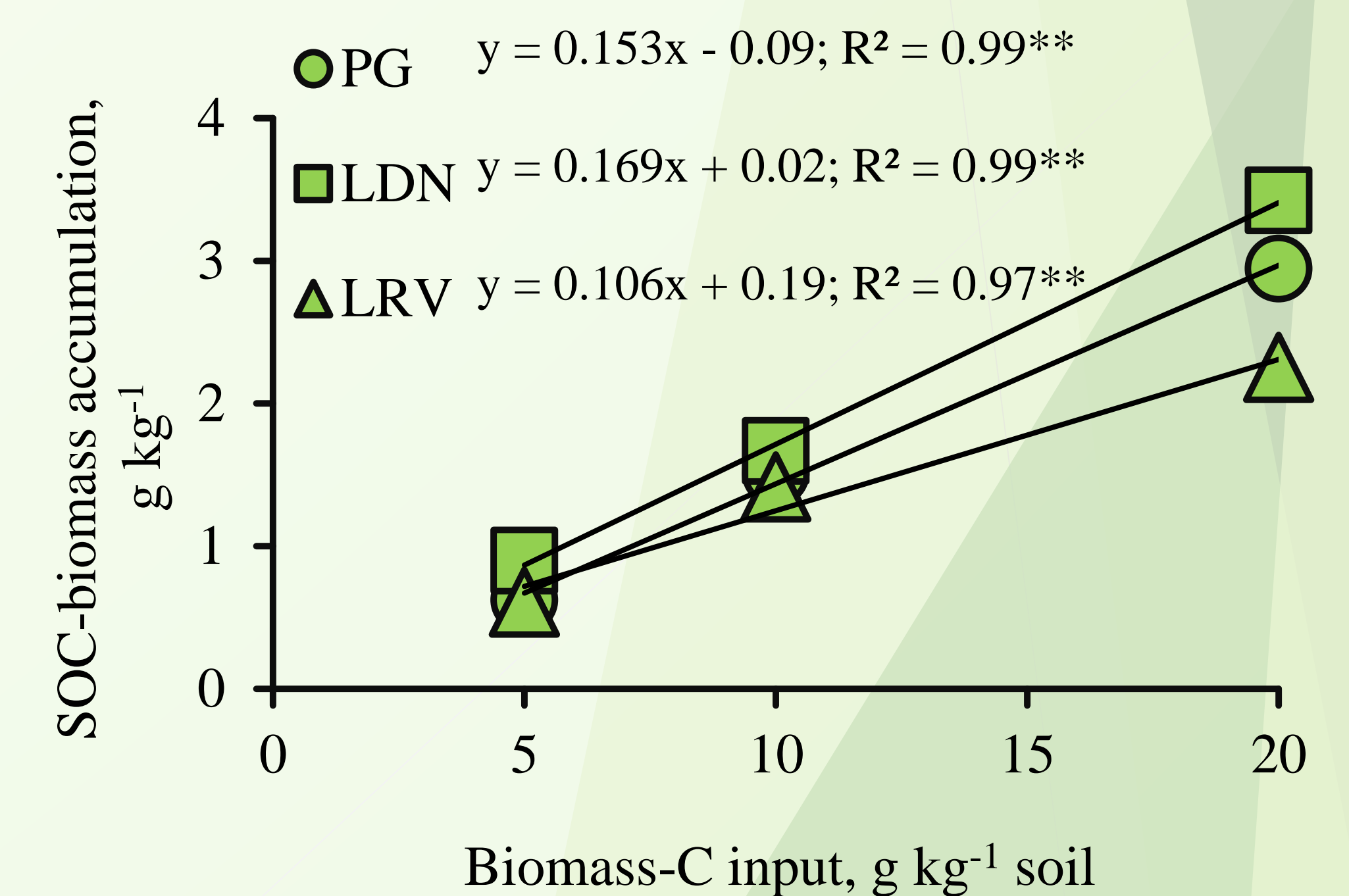
<sup>1</sup> Same lowercase letters comparing layers does not differ by the Tukey's test (p<0.05).  
<sup>ns</sup> no significant by the Tukey's test (p<0.05).



**Fig. 1.** Relationship between cumulative CO<sub>2</sub>-C emission and ancient SOC: ■ Ponta Grossa, ● Londrina and, ▲ Lucas do Rio Verde. \*\*\* p-value significant <0.001%.



**Fig. 2.** Relationship between SOC accumulation efficiency and ancient SOC: ■ Ponta Grossa, ● Londrina and, ▲ Lucas do Rio Verde.



**Fig. 3.** SOC-biomass accumulation due biomass-C inputs. Each point represents an average of three layers. \*\* p-value significant at 0.01%.

## CONCLUSION

- The study period was not enough to identify the C saturation in any soil depth incubated.
- The long-term incubation indicate a large potential of the Oxisols accumulate C, specially at deep layers, developing alternatives to enhance C by root system in subsoil.



Support:

