# Table of contents

## Plenary Talks

Plenary Talks PT.01-PT.07 ................................................................................................................... 3

## Session 1: Global Perspectives

Global perspectives
Oral Presentation: O-1.01-O-1.04 ........................................................................................................... 11

## Session 2: Modelling SOM: From soil pore to climate change

Soil self-organisation
Oral Presentation: O-2a.01-O-2a.03 ........................................................................................................... 14

Next generation SOM models
Oral Presentation: O-2b.01-O-2b.12 ............................................................................................................. 17
Poster Presentation: P-2b.01-P-2b.10 .............................................................................................................. 31

C sequestration and climate change
Oral Presentation: O-2c.01-O-2c.20 ............................................................................................................. 42
Poster Presentation: P-2c.01-P-2c.40 ............................................................................................................. 69
Quick Fire: QF-2.01-QF-2.02 ................................................................................................................... 112

## Session 3: Methods 1: Visualising SOM

Visualising SOM at the soil pore scale
Oral Presentation: O-3a.01-O-3a.05 ........................................................................................................... 115
Poster Presentation: P-3a.01-P-3a.09 ........................................................................................................... 122

Spatial variability of SOM concentration, composition, and persistence
Oral Presentation: O-3b.01-O-3b.15 ........................................................................................................... 132
Poster Presentation: P-3b.01-P-3b.20 ........................................................................................................... 146

Mapping and monitoring of soil organic matter
Oral Presentation: O-3c.01-O-3c.05 ........................................................................................................... 171
Poster Presentation: P-3c.01-P-3c.07 ........................................................................................................... 177
Quick Fire: QF-3.01-QF-3.02 ................................................................................................................... 184

## Session 4: Methods 2: Quantifying pools and fluxes of SOM

Mass spectrometry – The key to the soil organic matter ‘Black Box’
Oral Presentation: O-4a.01-O-4a.09 ........................................................................................................... 187
Poster Presentation: P-4a.01-P-4a.09 ........................................................................................................... 197

What is humified organic matter?
Oral Presentation: O-4b.01-O-4b.05 ........................................................................................................... 206
Poster Presentation: P-4b.01-P-4b.04 ........................................................................................................... 212
Organic nutrients
Oral Presentation: O-4c.01-O-4c.09 ........................................................................................................ 216
Poster Presentation: P-4c.01-P-4c.09 .................................................................................................. 217
Quick Fire: QF-4.01-QF-4.02 ............................................................................................................ 226

Session 5: Soil Health 1: Biological interactions
Ecosystem engineers
Oral Presentation: O-5a.01-O-5a.10 ...................................................................................................... 229
Poster Presentation: P-5a.01-P-5a.03 .................................................................................................. 239

Hot moments, hotspots and hotospheres
Oral Presentation: O-5b.01-O-5b.15 .................................................................................................... 242
Poster Presentation: P-5b.02-P5b.07 .............................................................................................. 259

Biology of deep soils: The final frontier?
Oral Presentation: O-5c.01-O-5c.05 .................................................................................................. 265
Poster Presentation: P-5c.01-P-5c.10 ............................................................................................... 270
Quick Fire: QF-5.01 .......................................................................................................................... 280

Session 6: Soil Health 2: The role of decomposition
SOM decomposition: links between carbon and nutrient cycling
Oral Presentation: O-6a.01-O-6a.15 .................................................................................................... 282
Poster Presentation: P-6a.01-P-6a.28 ................................................................................................ 296

Managing soil organic matter decomposition and stabilization for carbon sequestration and improved soil health
Oral Presentation: O-6b.01-O-6b.27 .................................................................................................... 323
Poster Presentation: P-6b.01-P-6b48. ............................................................................................ 354

SOM in rice paddy systems
Oral Presentation: O-6c.01-O-6c.05 .................................................................................................. 408
Poster Presentation: P-6c.01-P-6c.05 ................................................................................................ 415
Quick Fire: QF-6.01-QF-6.02 ............................................................................................................ 419

Session 7: SOM as natural capital
National and international SOM policy
Oral Presentation: O-7a.01 ............................................................................................................. 422
Poster Presentation: P-7a.01-P-7a.04 .................................................................................................. 423

Management effects on SOM and ecosystem services
Oral Presentation: O-7b.01-O-7b.20 ................................................................................................... 425
Poster Presentation: P-7b.01-P.7b.29 ............................................................................................. 446

Incorporating SOM into farming system evaluation
Oral Presentation: O-7c.02-O-7c.03 ................................................................................................... 481
Poster Presentation: P-7c.01-P-7c.06 ................................................................................................ 483
Quick Fire: QF-7.01-QF-7.02 ............................................................................................................ 491
P-2c.23

Conversion of amazon rainforest to pasture: Effects on carbon stocks and soil physical properties

Eduardo Matos¹, *Renato Rodrigues², Leticia Souza³, Fernanda Gregolin³
¹Embrapa, Embrapa Agrosilvopastoral, Sinop, Brazil
²Embrapa, Embrapa Soils, Rio de Janeiro, Brazil
³Universidade Federal de Mato Grosso, Cuiabá, Brazil

Introduction

The conversion of native forest to pasture is associated to changes in soil C dynamics. The maintenance, reduction or increase in soil carbon content in pastures compared to the natural ecosystems are dependent on several factors, including climate, soil type, tillage methods and residue and nutrient management.

Objectives

The objective of this experiment was to evaluate the effect of conversion of Amazon rainforest to pasture including well-managed pasture on carbon stocks and physical properties in a Haplic Ferralsol in the southern of Brazilian Amazon.

Materials & Methods

The study sites were located on three farms in the Amazon humid tropical forest, Alta Floresta-MT municipality – Brazil. Treatments corresponded to poorly managed pasture (PM1, PM2, PM3) and well-managed pasture (WM1, WM2, WM3) with 3 replications. A natural forest closed to the studied areas with the same soil characteristics was used as reference. WMP sites were all established in 2012, on previously poorly managed pasture areas, which was cultivated over the past 20 years after forest deforestation. WMP treatments comprehend the use of nutrient management strategies as well as adequate animal stock rate. On PMP treatments, there were no fertilizers or lime applications and animal grazing was continuous without stocking rate control. Soil samples were obtained in 2014 for five layers 0-5, 5-10, 10-30, 30-60 and 60-100 cm at each site.

Results

WMP2 obtained C stock similar to the native Forest in the 0-30 cm layer. However, C stocks on well-managed pasture (WM2 and WM3) were, on average, 27% higher than native forest. In the other treatments, even poorly managed pasture (PMP1 and PMP3) presented C stocks slight higher than native forest. The density of the soil in all assessed areas, were higher than those presented in the native forest, especially in the surface layers of 0-5, 5-10 and 10-30 cm, with values close to were close to the critical limit for root growth.

Conclusion

Conversion of Amazon rainforest to pasture can contribute to maintain soil C stocks; however C stocks may increase when well-managed pasture is used as a strategy for pasture management.