



Home
Agenda/Agenda
Conference Committees/Comitês da Conferência
Conference Sponsors/Patrocinadores
For the Media/Para a Mídia
Venue and Travel information/Local e informações sobre viagens
Field trip to the Amazon/Excursão técnica para a Amazônia
Biochar Resources/Biochar Recursos

FIELD TRIP TO THE AMAZON/EXCURSÃO TÉCNICA PARA A AMAZÔNIA

Post-Conference Field Trip to Terra Preta Sites on the Amazon

By Kelpie Wilson

After the conference, about 50 participants flew to Manaus and boarded the well-appointed riverboat, Helios Gabriel on Thursday evening September 16th, 2010. Dinner and drinks provided opportunities to carry on discussions begun at the conference. The boat got underway just after midnight, motoring about 60 km upstream on the Rio Solimoes to arrive at the first site on Friday morning.

The objective of the first day was to visit small farmers growing crops on Terra Preta sites at the Costa Naranjal, the “Orange Coast”. This Terra Preta site is high up on a river bluff – a Tertiary formation that never floods. These high bluffs are where most Terra Preta sites are found. They are the areas of permanent habitation – the village sites where charcoal accumulated in the soils for hundreds of generations, making Terra Preta. With the river at its dry-season lowest, it was a steep climb up the bluff to the small village on top.

The farms at this small settlement are typically 50-100 meters wide fronting the river. They extend back along the bluff for 1 km or less to a backwater that floods in high water. Our first stop was the farm of the Marinho family where agricultural extension agents are helping to optimize production in the orange and papaya orchards integrated with crops of tomato, pepper and cucumber. In all, 8 species of vegetables and fruits are produced commercially here. Most of this produce is grown on both Terra Preta and the lighter Terra Mulata soils found on the farm.

Professor Newton Falcao of INPA (Instituto Nacional de Pesquisas da Amazonia) and his team sampled the soils in the different zones of the farm and made recommendations to optimize production. The farmer had been adding fertilizers and amendments that were not needed on the richer soils. Taking advantage of both modern knowledge and ancient techniques, the fruit trees are now healthier and more productive, and the farmer is building new soil in the less productive areas. Dr. Falcao explained that the objective is not so much to recreate the ancient Terra Preta, but to stabilize the small farmer and stop the cycle of slash and burn agriculture.

Walking through the papaya orchard nearest the shore, we could see the dark soil under foot. I scraped a bit of soil away with my foot and immediately unearthed a pottery shard.

The farmer cut a banana leaf and laid it on the ground. Newton Falcao began drilling soil cores at 20 cm intervals and laying them on the leaf so we could see the soil profile. The dark soil extended to almost 80 cm. Further away from the river edge is the lighter Terra Mulata soil. This soil does not contain pottery shards.



Thank you to our field trip sponsors: Embrapa Amazon and INPA/CPCA
All photos courtesy of Kelpie Wilson



Village at the Costa Naranjal



Terra Preta soil at the surface.



A pottery shard found just under the

As we walked further away from the river, the appearance of the soil changed dramatically. The native oxisol is red and the surface is littered with iron nodules. Less than 1 km from the edge of the bluff, the land slopes down to the flooded forest, where the farm has several fish ponds. Farmer Manoel Marinho said that he makes more money from selling his fish than from the oranges and produce. The fish also help with the farming – he is able to use the fish waste as a fertilizer for the poorer soils. Since working with the extension agents, Marinho says his prosperity continues to increase. The 18 hectare farm supports about 20 members of his extended family and he now owns several vehicles. Electricity is key to this prosperity, operating pumps to aerate the fish ponds and irrigate the fields – a necessity in the dry season.

The group now faced a decision: a nice lunch awaited us back at the boat, but it would take time to ferry everyone back and forth, and some people proposed that we skip lunch and walk in a nearby forest instead. But we needed some kind of sustenance. Manoel Marinho and his family were wonderful hosts. Not only did they interrupt their busy work day to show us around, they whipped up an impromptu lunch of fruit and grilled fish for those who decided to skip lunch on the boat.

After lunch we walked down the road to the farm of 80 year old Francisco Costa. Newton Falcao is studying the response of papaya to several different treatments of biochar and fertilizer on native oxisol soils at the farm. Behind the papaya plots was the forest we would walk in. This was not primary forest, but still interesting to see. There were monkeys!

Our next stop was back at the river's edge where we visited an old forest on a Terra Preta site with diverse species of gigantic trees, including cocoa, cupuacu, orange, banana and rubber trees. The owner intends to preserve this food forest and hopes to build a small cafe overlooking the river to encourage tourists to visit his Terra Preta site.

After a long and rewarding day, we were glad to return to the boat for a meal and continued discussion of all that we had seen.

Day two of the field trip took us part way back downriver to an Embrapa research station where scientists are sampling and characterizing the anthrosols there. Embrapa had very recently dug four large pits in two different Terra Preta sites, a Terra Mulata site and in a native latisol. We were informed that the pit in the compacted native soil took twice as many men and twice as long to dig. Anyone interested could go into any of the pits for a closer examination. It seemed everyone wanted to descend for an immersion in the dark earth and a fun photo opportunity.

Researcher Gilvan Coimbra Martins told us that this characterization work is just beginning. It has been challenging for Embrapa to find the funding since it is an agricultural agency and Terra Preta characterization is considered basic research, somewhat outside of Embrapa's main focus. So far the research team has discovered a large variation of soil characteristics both within sites and between different sites. Part of the characterization work involves a survey of soil fauna like earthworms. Martins answered many questions that the group had. Regarding the economic value of Terra Preta soil, he said that farmland with Terra Preta typically sells at a price that is 5 to 6 times higher than adjacent land. He also dispelled the myth that Terra Preta can somehow re-create itself when it is removed from a site for sale as fertilizer. This is just a convenient story for the operators who engage in this illegal trade.

The excursion concluded with a leisurely trip back to Manaus, stopping for a quick swim in the river and to view the miles-long mixing zone where the Rio Negro and the Rio Solimoes converge to form the Amazon River. Some of us saw pink river dolphins. Others got to see the caiman, a type of

surface. They are everywhere in the Terra Preta.



Soil profile at the richest Terra Preta site on the farm. This soil contains 8-10% carbon.



Soil profile of the Terra Mulata. This soil contains 1-2% carbon.



Native oxisol with iron nodules on the surface. This soil contains less than 0.5% carbon.



Manoel Marinho and his wife. Tom Miles (at right) did a superb job of translating Portuguese into English for the group.

crocodile. Arriving in Manaus we could see that this city of 2 million people is a major shipping port. We saw the massive bridge under construction that will open up new development opportunities in the Amazon and wondered how this will impact forests and indigenous people.

Our hosts at Embrapa did a marvelous job of organizing this very fun and educational trip. For most of us, this was our first visit to the Amazon, an unforgettable experience. Many thanks to Embrapa and the crew of Helios Gabriel for taking such good care of us.

If you would like to see more pictures, see my photo essay on Flickr:

Field Trip Day One

<http://www.flickr.com/photos/81339495@N00/sets/72157625032572768/>

Field Trip Day Two

<http://www.flickr.com/photos/81339495@N00/sets/72157625048755544/>



Newton Falcao and his papaya plots on the farm of Francisco Costa.



View into the canopy of the old Terra Preta food forest.



Tasting cupuacu. Cupuacu is a relative of cocoa (*Theobroma grandiflorum*) and it makes a delicious juice and a tasty custard dessert.



The well-appointed Helios Gabriel awaits us at the end of a long day. Moored closer to shore is the more traditional Amazon riverboat that transported Johannes Lehmann and his Cornell students.



David Laird makes a close examination.



How many Cornell students can fit in a Terra Preta pit?



The confluence of the Rio Negro and the Rio Solimoes.