



Biochar in the Orchard

Posted by [Bodi Wallace](#)

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[Bodi Wallace](#)

[Biochar in the Orchard](#)

January 25, 2017 07:20AM

Registered: 8 years ago

Posts: 3

I have slowly been making headway on my knowledge of biochar and came upon a PDF presentation by some folks in Oregon. If I can get it to upload maybe you can find some benefit. Curious stuff...

[www.wilsonbiochar.com] If the link doesn't take you to the white paper, scroll down the page to about halfway and look for "Biochar Return on Investment in Fruit and Nut Orchard Production". My overview of it revealed that biochar could be helpful and deserves some testing on my site. Full disclosure: I am not connected in any way to the originators of this paper, the biochar "industry" or any other commercial venture. Just passing along some info that might be of benefit.

Cheers,

Bodi

Edited 1 time(s). Last edit at 01/26/2017 06:47AM by Bodi Wallace.

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[David Maxwell](#)

[Re: Biochar in the orchard paper](#)

January 25, 2017 04:31PM

Registered: 11 years ago

Posts: 197

This is an interesting subject. There is a fellow locally (south-west Nova Scotia) who is lobbying hard to build a "small" bio-char plant in the town of Bridgewater, NS which will burn local feedstocks (more below), to provide steam to drive an electric generator, while the residual heat is piped to local businesses for space heating, and the bio-char made available for agriculture, (although he was less clear about the benefits of this). The feedstock would be the bark from a local sawmill, plus the slash left from the logging operations, plus, (and here he got into some difficulty with a rather sceptical audience), whatever else combustible he could round up, including scrub bush, and even cultivated poplar or other fast-growing small trees or fibrous plants. The problem is that the soils in SW Nova are the poorest in the Maritimes. The forests have been logged over in clear-cut logging for generations, and the regrowth is becoming progressively weaker as the soil nutrients are removed with the harvested timber. (The pitch that his bio-char plant would make use of this otherwise "worthless" scrub vegetation rang a bit hollow when it was pointed out that the very existence of the weak vegetation was due to the depletion of the soil, which would only be exacerbated by his plan to extract the last remaining atom of nutrition from the soil and truck it off to be burned. (The same problem we are experiencing with our water supplies - we are removing vast quantities from one place and moving it often vast distances away, so that it is no longer recycled locally). He was asked whether his bio-char could be returned to the land which he had just stripped, and he opined that this would not be economically feasible. (The problem being how one values resources - strictly in dollars and cents, or in all the other attributes like soil health, climate mitigation, esthetic values, etc.) Short conclusion, (mine!): interesting concept, but has to be viewed in the larger wholistic context.

[Broomholm Orchard](#)

Zone 5b in Nova Scotia

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[Todd Parlo](#)

[Re: Biochar in the orchard paper](#)

January 25, 2017 08:55PM

Registered: 10 years ago

Posts: 301

This is a good topic to get into, particularly since it is so very "in" these days.

Let me chime in with two opposing views:

Firstly: This, as far as I have read, makes perfect scientific sense for the remediation of poor soils. The germ of this idea apparently was berthed in the tropics, areas of very poor organic matter accumulation. Logically there, as well as in locations like those mentioned by David, it makes sense to have a plan for increasing nutrient banking, water holding capacity, and ion exchange. Biochar could be part of such a plan. In some cases, coarse waste might have no other destination than to be transformed into a useful product like this for agriculture. So, at present it may be that biochar has a possible place in an agricultural system. The article(s) on the Wilson site (thanks Bodi) is good reading, and nicely stacked with citations. We know a local couple that started a biochar company, and they are good human

beings, but I am sure they would agree that we need to be accurate in how each new approach can be helpful.

Secondly: the rebuttal: It is poor practice (no disrespect intended, I am as guilty here) to have too much faith in information touted by those selling the idea or product. While most people may be trustworthy, impartial assessment is always nice. Here are two articles to give a little balance to some of the ideas of the biochar industry (yes, now an industry).

[\[permaculturenews.org\]](http://permaculturenews.org)

[\[e360.yale.edu\]](http://e360.yale.edu)

There is ample evidence that biochar indeed does as advertised in terms of amending soil for the benefit of crops...that is, in a soil that needs it. It is also true that it is one solution. Organic matter, and other sources of nutrients also meet these needs. This might be a tilled cover crop, a natural mulch, debris or what have you. Granted, biochar may prove easier to deal with on a physical level, but does not mean it is a requirement. Also important to remember is the consideration of its usefulness in a particular soil/location. In areas like the tropics or near desert landscapes like Australia (both used in studies of biochar efficacy), the bc would have obvious benefits. These locations are often very low in organic matter due to high decay rates. In an area like the cool humid northeast the case is less attractive. It will have uses in the annual agricultural crops system, aka high tillage farming. This could be a godsend for that particular area, but it does bring up the idea that perhas we are doing damage control, not necessarily addressing the reason we have failed in the first place. I seriously doubt the answer will be in an industry that will inevitably require transporting bulk material, processing it, retransporting it to smaller and smaller redistribution systems, bagged or trucked and field distributed. And then call it an environmental savior.

Which leads us to the next concept, to which I see as a weak argument- carbon sequestration. I have not seen the math on this, but if we are using heat to produce (essentially), charcoal, I would assume we are producing co2, no? Even if this is negligible, carbon produced in this form is not permanently sequestered. We all know this right? Even in the biochar industry literature, it states it may be hundreds of years before it winds up in the atmosphere. So, again we are concerned with our own lifetimes, a human attribute that caused all this environmental havoc in the first place. But, ok, lets say the carbon is gone forever (it isn't). You know what also sequesters carbon (and for a much longer duration)? Legos! This is the argument brought up by my son on a regular basis. The plastics that we rant against are among the greatest carbon sequestration tool we have, and to boot it also keeps us from burning that petroleum- a win win. But it avoids the problems associated with it. And so, we need an honest assessment of each new fix and determine if the positive result justifies any damage it may inflict. Now, to the point, life is a carbon cyler. A plant becomes of carbon, it dies, it rots, the carbon returns to the ether. A process that slows it down, does just that. A tree does not really permanently sequester carbon, it borrows it, and later returns it to the atmosphere. Carbon, like energy in the first law of thermodynamics, is conserved. Biochar could be a useful tool for us all, but making dubious claims will likely undermine its credibility.

[Walden Heights Nursery & Orchard](#)

Zone 3 in Vermont

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[Bodi Wallace](#)

[Re: Biochar in the Orchard](#)

January 26, 2017 07:22AM

Registered: 8 years ago

Posts: 3

I figured this would generate some discussion. Great! First, if you have any knowledge of biochar you know about the International Biochar Initiative. From a little research it seems like they're driving the "industry", which makes me suspicious. Second, like most stuff in my orchard I try it first myself and see how it works. If I like it and it makes sense and isn't going to do damage to someone or something downstream, its worth a try.

I liked Michael's answer to a question asked of him about potentially diseased ramial wood chips. I think the questioner asked if he was worried that the diseased wood chips would pose a disease problem in the orchard where they ended up. Michael's answer (if I got this right) was basically, not to worry. Any disease would be gobbled up eventually by good guy fungus. I sort of liken that to this, perhaps wrongly, but that's my take on using this for small scale gardening and orcharding

Another perception some folks have about biochar is exactly how much is needed. Not much apparently. Finally, on the same website there is a good pdf presentation that she has on how to make biochar in small batches, with examples in different locales.

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[Michael Phillips](#)

[Re: Biochar in the Orchard](#)

January 26, 2017 12:58PM

Moderator

Registered: 11 years ago

Posts: 621

Biochar acts as a rechargeable battery in conjunction with mycorrhizal fungi and fruit tree roots. And thus seems a very reasonable earth remedy to place in the planting hole. I say this whether dealing with sandy or clay soils, wherever agricultural disturbance has changed soil life balance. It takes some time to get a fungal network humming. Biochar in the immediate sense serves as a *gated community* where mycorrhizal hyphae find refuge from fungal predators. Soil aggregate formation will do the same but that's down the road, and all the more so in abused soils. What's especially cool is how these fine hyphae can access the carbonized structure of biochar particles whereas feeder roots cannot. Biochar continually recharges nutrient exchange sites, right there in the vicinity of establishing roots, making this a biological win-win. I source "homegrown biochar" for tree planting purposes mostly from wood stove ashes by sifting out the blackened ember chunks remaining.

Beyond that, I ponder further carbon investment in the expanding tree radius, if incorporating biochar with native soil further out from the

fruit tree has merit. A great way to do this is with a broadfork (especially in conjunction with lime if soil adjustment is being phased in as you can afford it). The return will be there if dealing with poor soil structure. Anyone inspired to research this may find the most dramatic results in a high density planting . . . where stunted root systems need all the help they can get!

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

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[Michael Phillips](#)

[Re: Biochar in the Orchard](#)

January 30, 2017 06:50PM

Moderator

Registered: 11 years ago

Posts: 621

Passing along some information from an insightful IPM fruit grower (with a PhD in Chemical Engineering, no less) whom I met at a small farm conference in Michigan this past weekend. The gist of these two papers is that we absolutely need to pay attention to the sources of biochar and how that biomass material is pyrolyzed. Dioxin contamination is a real possibility since biochar has a high sorption affinity for hydrophobic organic pollutants.

Here is a reference or two for you that outlines some of the issues around biochar & some nasty trace chemical possibilities . . .

http://www.biochar-international.org/sites/default/files/IBI_White_Paper-Implications_of_Potential_%20Dioxin_in_Biochar.pdf

Some of the work in Europe:

http://people.clas.ufl.edu/azimmer/files/Publication-pdf/Hale12_Bioavail-PAH-in-biochar.pdf

Hope this helps put a little perspective on what to look for in sourcing biochars. I would insist on a supplier that consciously was aware and addressed the issue versus the many folks that are unaware or ignore it. Combustion (partial or full) is not a precise art - it can lead to good things as well as bad - in many many ways. Just keep your eyes open.

[Lost Nation Orchard](#)

Zone 4b in New Hampshire

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