

# MACCY BIOCHAR MEMBER BULLETIN

No. 26 - November 2021

Maccy Biochar is a Task Group of the Macclesfield Community Association Inc.

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40,103 litres biochar made; 21 tonnes of CO<sub>2</sub> removed.

## HELLO ALL.

### Welcome to our 26th Member Bulletin.

In this Bulletin we report on our biochar production, and new opportunities and challenges coming up for us in 2022.

### End of Season - November 2021 PRODUCTION

*From this just a couple of months ago:*



*To this at the end of the season:*



*All cleaned up and ready for summer shutdown.*

*Well done Team!*

We made 2568 litres of biochar in November which brings our total for 2021 to 16,442 litres. However when we add in the contributions from members that have been reported so far that brings our total for the year to 19,932 litres.

So it seems we managed to slightly exceed last year's production despite the wet winter and the annoying weekly cycle that often saw a wet Wednesday (our designated 'burn' day!).

## PRODUCTION SCOREBOARD SUMMARY

The latest summary of our production and carbon capture as at 30/11/21 is shown below. This year's values are based on:

Dry bulk density of our biochar = 189 kg/m<sup>3</sup>.

Carbon content of our biochar = 84.3%.

SA emissions factor = 0.43 kgCO<sub>2</sub>/kWhr.

MACCYBIOCHAR SCOREBOARD at 30/11/21					
YEAR	2019	2020	2021	TOTAL	Units
BIOCHAR PRODUCED	1720	18451	19932	40103	Litres <sup>2</sup>
CARBON CAPTURED	222 <sup>1</sup>	2939 <sup>2</sup>	3062	6223	Kg
NET CO2 REMOVED	0.775	10.048	10.690	21.513	Tonnes
ELECTRICITY OFFSET	1.520	23.369 <sup>4</sup>	24.862	49.751	MWhr

1. Re-calculated based on 3rd party biochar analysis dated 19/4/20

2. Includes 6670L from members.

3. Re-calculated based on 3rd party biochar analysis dated 28/1/21

4. Calculated based on Australian National Greenhouse Accounts Factors Oct. '20 (SA: 0.43 kgCO<sub>2</sub>/KWh)

## OPPORTUNITIES & CHALLENGES IN 2022

### 1. PROSPECT HILL:

We have been offered the opportunity to use a massive pile of cypress pine branches recently felled on a property at Prospect Hill. This generous offer includes access to water for quenching etc and is close to the road. Assuming it is dry enough to use by next May the challenge will be to decide how to best use our limited resources to take up this offer while not neglecting the local opportunities we already have.



*This shows part of the existing pile stretching down the slope to the left. The trees behind will also be added. Enough for at least one year's operation at our present production rate!*



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## 2. BIOCHAR TRIALS?

One of our members has offered us the use of his property to conduct trials of biochar in pasture applications.

We are aware that there have been many biochar trials conducted over the years, and even some local trials by Fleurieu Farming Systems and the SA dairy industry trials involving dung beetles. So we do not want to repeat what others have done. We would much prefer to build on what others have done.

So the question arises:

What sort of trial would be the most useful?

Once we establish our objective then we will look to engage an expert to design and supervise a set of trials. Then seek funding to implement the process.

What do YOU think?

## 3. FEED SUPPLEMENT FOR DAIRY COWS

The fore mentioned trials of biochar in conjunction with dung beetles demonstrated the benefits of using biochar as a supplement to a cow's daily food intake. Biochar helps the cow to retain the nutrients it eats, thereby helping to keep the cow healthy and improve milk quality. When dung beetles are added to the scenario the biochar is taken underground fairly quickly where it can do the most good in helping to sustain soil life and health. It seems to me that this application of biochar is about as good as it can get! However in keeping with our policy to keep our operation as simple as possible and to promote value adding as something for private enterprise to take up we have not pursued this application directly. But we do encourage local feed suppliers to take our raw biochar and process it to be suitable for the dairy feed application.

## NEWS FROM AUSTRALIA

**Stephen Joseph** says: Read our paper with the meta data on crop response. **How biochar works, and when it doesn't: A review of mechanisms controlling soil and plant responses to biochar.**

<https://onlinelibrary.wiley.com/doi/pdf/10.1111/gcbb.12885>

## BIOCHAR SALES



*One of our members recently purchased 10 bags of our raw biochar which nearly cleaned us out! Here is the loading in progress.*

So we have 3000 litres remaining and if needed we will allocate one of those bags as a member's bag so that purchases of less than 1000 litres can be made at 40c/litre.

## GRINDING BIOCHAR – Points of view:

This open letter from Norm Baker is interesting: Erica and everyone:

I know I'm going to be in the minority here on the issue of grinding biochar. That said, I'm going to disagree with everyone.

**First**, the only reason to grind biochar is to be able to process it through machinery. Otherwise it can be simply laid on the crop soil and tilled in - just like Mother Nature does it and the Amer-Indians did it in South America.

**Second**, there is a huge push to functionalize biochar sooner than the five years required for the maturation of the soil microbiology that is responsible for the soil fertility. I have yet to see a single scientific publication documenting full crop response sooner than five years. Of course, adding biochar and appropriate fertilizers in year 1, 2, 3 and 4 will produce an improved crop response as long as the full 10% of biochar by soil volume is added during that period.

**Third**, I would bet that through the years I have read of a dozen different methods for grinding biochar. All of them have either the dust problem or the "too

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wet" problem. Many of the methods I have seen are a bit physically dangerous.

**Fourth**, the only time I have ever engaged in grinding biochar was to see if there was a benefit in controlled experiments side-by-side. I have yet to find a benefit except for running biochar through some sort of agricultural machinery.

**Fifth**, when you spread biochar onto a crop soil, worms eat it, freezing and thawing breaks it apart, and simply working the soil tilling or weeding, etc., breaks it down. I have conducted an experiment here to see how long natural processes take to break down the biochar. The answer is really quite simple at least here in my soils - which by the way are the worst gardening soils I've ever seen in my entire life. If the biochar is in chunk form and it is buried below 3 to 4 inches deep in the soil, it stays in chunk form. Digging those spots up seven years later showed chunk forms of biochar but also showed blacker richer earth immediately around those chunks. Just a few feet over from those spots, the biochar had been spread on the soil surface and worked in with a Rototiller when I was ready to plant. Within one year you cannot find any chunk biochar.

**Sixth**, rationalizations about improving this simple process of laying the biochar on the soil and working it in are incredible. But, do an experiment to see if it really improves crop response. Do not do an anecdotal experiment - "try this and see what happens". Do a controlled experiment - side-by-side in the same kind of soil with only one variable. Most controlled experiments yield clearly visible and positive results, or they yield no results at all which is almost more valuable than positive results.

As gardeners we all seem to have a universal mindset that says we can take a natural soil and if we do enough amendments, apply enough biochar, apply enough fertilizers, improve our composting operations, perhaps engage in Bokashi fermentation, or lasagna gardening or the application of worm tea or what other amendment or magic solution or other specialized technique comes down the road, our crops will be better bigger and more nutritious. In a lifetime of growing crops as a gardener, and orchid judge,

farmer, specialty nursery owner and now biochar researcher, corporate America has taken advantage of the mindset to "try this and see what happens". Since it takes at least one growing season to see any positive results, the anecdotal experiment is simply forgotten. But not the time and money wasted.

I recognize my opinion on this is different than most gardeners and, every time I give a biochar presentation to a bunch of growers, their questions always reflect this mindset. They're not wrong because their lifetime of experience helps them achieve positive results. But, for personal gardeners like all of the people engaged in this discussion (as far as I can tell), why would we waste the energy to grind biochar when it is not necessary?

Please bring on objections. I would really enjoy hearing them.

Norm

**Frank Strie in Tasmania** tells how he uses a **6.0HP Chipper Shredder**. The chipper and flail blade system quickly breaks down fresh coarse, wet or moist Biochar into a fine material.



Masport Chipper Shredders are built strong with a heavy steel frame and large safe chute. The drive system is run by a V-Belt rather than a direct drive

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Making Biochar for carbon capture and soil improvement*

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system. This design is more tolerant to impact and unnecessary overload on the drive system and engine.

...9 flail hammer blades

...Bar grate, designed to avoid clogging with damp Biochar

When the Shredder is new use the Bar-grate as it works fast without blockages and good fine results.

Over time as the edge of 9 Flail hammer blades round off the char will get coarser; that is the time to swap the Bar grate with the standard Grate with the round holes.

Fresh, water quenched or liquid manure slurry quenched Biochar will come out of the Shredder like the consistency of fresh wet brick mortar.

Store in 1m<sup>3</sup> cage tanks for a few (~6) weeks to mature and cure. By then the Biochar is perfectly crumbly, still moist but not wet anymore, perfect for bagging or direct soil application.

<https://masport.com.au/outdoor-garden-products/outdoor-power-equipment/chipper-shredders/6-0hp-chipper-shredder-2>

Hope this assists  
Frank

## And this from Rick Wilson:

Norm. Three years ago I was asked to consult to improve the quality of sports fields and to reduce water use. When I measured the infiltration rate (speed at which water moved into the soil), using a field infiltrometer the rates were extremely low (below 1/2 inch per hour). Sprinklers went on, and the water just sat on the surface would often run into the street. I aerated three of the fields. On one of the fields I top dressed compost at 40 cubic yards per acre, another field I used 40 cubic yards of biochar. And then dug the material into the soil. (Nothing in the 3<sup>rd</sup> field – the control).

Three years later, the measured infiltration rates, and the water use were reported by the grounds keeper. Immediate improvements in infiltration were observed for the biochar - and the field is now lush, unlike the other fields.

So why do I believe there is an immediate improvement in water infiltration rate with biochar? Seems it's because it is irregularly shaped, with lots of

tortuosity. Which forces irregular packing of the soil opening up the pores and allows water (and air) in.

The biochar is enabling the fundamental role of soil, which is to exchange water and air (and hold nutrients). I've concluded from my years of working with this material (since 2012) for soil applications, you see a positive impact from biochar on plant growth when you treat acidic soil - neutralized by biochar's high pH; and because you open up the soil porosity enhancing water and air exchange.

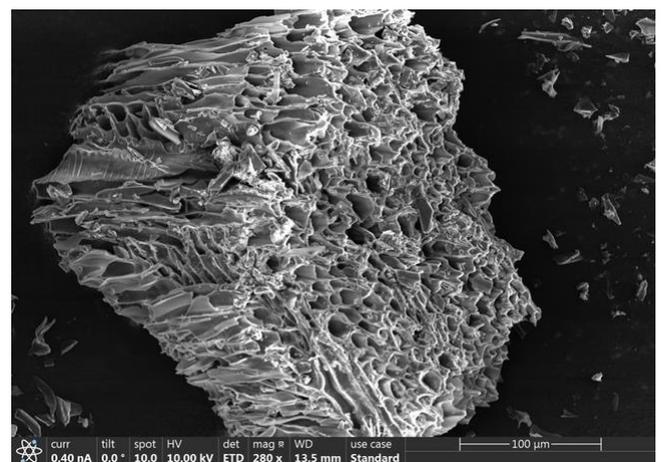
Which suggests that if you want to see strong returns for your biochar effort, focus on acid soils, or those with low infiltration; and that you want irregularly sized biochar particles to get maximum impact.

What you are doing when you grind is to reduce the ability of biochar to improve water infiltration into the soil. Grind carefully. The most unique property of biochar is its porosity.

Rick Wilson

## And this from Nando Breiter:

I was sent this electron microscope image of a crushed biochar particle today.



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## ANNOUNCEMENTS:

### 1. End of season celebration:

Please reserve **Sunday 12 December from 12 noon** at Davenport Square, Macclesfield to meet up and celebrate our achievements this year. Hopefully the BBQ will be accessible and we can do a fry-up of whatever you bring eg gourmet sausages!

Main thing is to meet up, enjoy the company and swap a few yarns.

Hope to see you there.

RSVP.

### 2. Free biochar:

We carried out a trial "burn" a couple of weeks ago using a different method (Top lit updraft) with brush and leaf litter from the site clean-up

The result was sub-standard in that there were a lot of small uncharred pieces left over. Too many to sort out thoroughly. But OK to use in the garden or compost.

So we have bagged it separately (450 litres) and invite you to come and take it. Let me know how much you will take and I will make a list. First come first reserved. It's going fast.

### 3. World Soil Day – Dec. 5<sup>th</sup>.

### 4. Soil Week Australia – starts Dec. 5<sup>th</sup>

Check out Bev Middleton's new website at

<https://soilweekaustralia.com.au>.

### 5. Summer activities

There will be no production during the fire ban season so there is an opportunity to arrange other activities such as visits and seminars. The following have recently been flagged as suggestions:

- Visit to Aldinga eco-village;
- Seminar on biochar carbon credits.
- Another course on Biochar for Beginners.

Do either of these activities interest YOU?

## HOW DOES BIOCHAR DIFFER FROM CHARCOAL?

The chart shown below summarises the answer to this question from many aspects.

	Charcoal	Biochar	Activated Carbon
<b>Feedstock</b>	Hardwood, sawdust + Binding Agents	Ag, forestry & other organic materials/waste	Coconut shells, peat, coal, petroleum pitch
<b>Common Uses</b>	Fuel (Cooking)	Soil Amendment Remediation Filtration Binding Agent (livestock)	Filtration Odor Control Remediation Binding Agent (humans)
<b>Relevant Qualities</b>	Burnability Low smoke	Adsorption/Porosity CEC Sequestration	Adsorption
<b>Cost</b>	\$ - \$\$	\$\$	\$\$\$
<b>Production</b>	Slow Pyrolysis; Kiln	Slow Pyrolysis; Kiln; Gasification	Pyrolyzed at 600 – 900C + activated at 250C OR Chemically impregnated & cooked @ 450 – 900C
<b>Carbon Footprint</b>	Carbon Neutral: May lead to Deforestation	Carbon Negative (in many situations) 	Carbon Positive

## MEETINGS

Committee meetings are normally held on the 3<sup>rd</sup> Monday of the month (public holidays excepted) from 7:30 pm. In the Macclesfield Institute Supper Room. Financial members are welcome to attend.

**Enquiries: Brian Lewis Mob: 041 148 0935**

**Please note: There will be no meeting in December. So next meeting will be 17 January 2022.**

## COMMITTEE MEMBERS at present are:

**Brian Lewis** – Chairman, Treasurer & Newsletter.

**Kelvin Williams** – Deputy Chair.

**Fiona Williams** – Membership Secretary.

**Geoff Brockhouse** – Wood collection Team Leader.

**John Agnew** – Schools Liaison.

**Stephen Heading** – Technology.

**Dean Hewlett** – Water Quality.

**Ivars Eglitis**.

**EX-OFFICIO ADVISORS are:**

**Greg Marlu** – Operations;

**Meegan Semple** – Horticulture; and

**Tony Huppatz** – Carbon credits.