

BIOCHAR

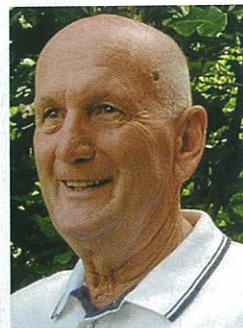
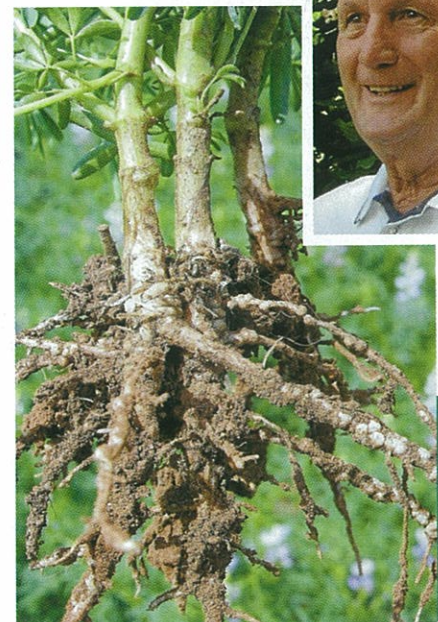
of that action 20-30 years afterwards on the various cereal crops," O'Grady says. "That's predominantly where our agricultural purchases have come from," says Batchelor. "It's people going, 'Okay, I want to try it but I'm just going to do a trial'. And that's been from a vineyard, a pawpaw plantation, even people doing landcare projects trying it. Forestry has looked at it as well." He says use of biochar can improve soils where there are deficiencies or water-holding issues and he has been selling biochar for this purpose.

"The other area we've sold our product into is the home garden market where people have been planting fruit trees in not the most ideal soils; therefore, they prepare a planting hole and a planting mix and add a lot of biochar into that mix and that helps them establish trees in a much more successful way," O'Grady says. "That's the biggest area, I suppose."

Indonesia bamboo biochar

Another approach is that of Barry Hayes, who invented and manufactures in Indonesia patented bamboo-based products which embody a philosophy similar to, but different from, that espoused by Batchelor and O'Grady. Batchelor and O'Grady recommend mixing compost with biochar to enhance the transfer of nutrients from the soil to the roots of plants but Hayes calls the mechanism the "smorgasbord effect".

"The smorgasbord effect has been proven by Toby Kiers, a researcher in Holland," he says. "That's been verified sometime in the past few months in a paper. Apart from the fact the plants are able to choose



proven life – from *terra preta* deposits in South America – is almost 1000 years.

Hayes is using the products experimentally in Australia but there are also dedicated

Ray O'Grady (inset) is developing a niche application for his imported bamboo biochar by banding it with seeds. He says it is likely to be particularly useful this way for legumes which depend on rhizobium inoculation.

their own nutrients, they also extract their own antibiotics."

These products stimulate the signal relationship plants have with the microbiology in the soil. "If a plant wants nitrogen it sends out appropriate chemical components – there are about 110,000 that have been identified in a single plant so it's a very complex machine – that activate the nitrogen-fixing bacteria, which then fix nitrogen from the air that's already in the soil," Hayes says.

Hayes markets two pelletised granular products. Geomite contains 10% biochar and sells in Australia for \$588/t. SuperChar contains almost 50% biochar and sells for \$825/t. This prices his biochar carbon at about \$1650/t. Hayes is currently looking for a distributor in Australia and says these price would probably come down once a distributor was engaged.

The products are similar in size to super-phosphate pellets, he says.

"For SuperChar we'd advise 80kg/ha for the first year of operation and, after that, 80kg/ha Geomite.

"We're just marketing them as a staged progression, basically. Buyers can choose which they want. Some people would prefer to use SuperChar as a first-up option to get some carbon into their soil, after which Geomite can be applied each year as a standard fertiliser."

In a test performed by the Barley Improvement Program at the University of Adelaide's Waite Campus, wheat grown using Geomite contained almost 21% more protein than wheat grown with diammonium phosphate. Grain size was about 8.5% higher in the Geomite sample compared with the DAP-fed sample.

SuperChar contains 50% biochar and 50% volcanic ash. Being crystalline, unlike the carbon which is the normal component of the soil carbon cycle, biochar is not decayed by micro-organisms nor is it easily weathered by soil processes, so

users in viticulture in South Australia. The products also contain a bio-activator.

"We produce the activation concentrate here and export it to the manufacturer in Indonesia. They can dilute it and use it to make the product."

In mid-December 2011 Hayes signed a contract with an agency of the Chinese government to manufacture Geomite and SuperChar in China through a company called N-tec in Hangzhou, Zhejiang province.

Sequestration unviable

As for carbon sequestration, Batchelor says biochar is on the "positive list" being promoted as part of the CFI but adds that the cost of unadulterated biochar must come down to encourage such use by farmers.

"From my point of view, in the form of making and selling biochar and being in a boutique industry with low volumes – producing (carbon) at \$1650/t – a \$25/t return per Australian Carbon Credit Unit is still a very small amount in the big picture," he says. "Anything is better than nothing, but it's still quite a long way off."

O'Grady does not market biochar as a method of carbon sequestration, either.

"We don't have that capacity – or that luxury – to do that. Trials that have been done at, let's say 10t/ha, with something that's going to cost \$2000/t, that's \$20,000/ha. Any carbon credits you're going to get are nothing compared with that cost."

He says it is a chicken-and-egg situation because investors won't invest in something until they know there's a market for the product.

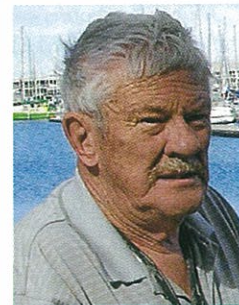
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Barry Hayes is making two soil ameliorants containing 10% and 50% imported bamboo biochar.

ADVERTISEMENT

Back to Basics #1: What is Organic Farming?

Organics is about health management and disease prevention – without synthetic inputs

Organic farming uses the best of both traditional agriculture and modern techniques, using nature and natural processes as its bedrock. Organic farming has a total focus on **soil health**. It is all about health management (rather than *disease control*) and preventative techniques for a productive farming environment.

How are pests and disease managed?

Plants living in a well balanced and healthy soil are less likely to be attacked by pests and diseases. Secondly, having a focus on "functional" biodiversity, often pests have a number of "enemies" or predators in the diverse flora and fauna of an organic farming system. This makes it harder for pests to get a foot hold and become such a significant problem. There are however a range of natural products and tools available to organic farmers as a last resort.

Agriculture and human health

It is increasingly being recognised that at a fundamental level the health of the soil is inextricably linked with the health of humans. Soils deficient in nutrients, unbalanced and with little life, are unlikely to produce the kinds of healthy plants and food that humans and animals need for optimum nutrition. Organic farming is about profoundly changing the way we look at and manage our health.

How productive are organic farms?

Many organic farms are just as productive, and often more so, than their conventional counterparts. Recently released results of an Iowa State University 13-year comparison trial show that, on average, organic systems produce greater yields and have lower production costs. The Rodale Institute's 30-year Farming Systems Trial (FST)@ demonstrates that: organic farming is more productive than conventional systems particularly in drier periods; uses 45% less energy; builds soil organic matter; is more sustainable, and; more profitable. How can this be? Conserving soil organic matter helps retain moisture and improves the resilience of soil and plants, particularly during climate extremes, making farms more productive.

Is organic farming progressive?

Sophisticated science and technology is needed to understand pests and their predator interactions and to rely on good timing of organic applications to build plant and soil health. Sometimes simple traditional methods can be relied upon, but increasingly it is being recognised that organics is about an involved understanding of nature and to this end, very good science is needed. There are now a number of centres worldwide dedicated to organic or biological farming systems research and the capacity of organic farming has progressed significantly over the past two decades.

What is the future for organic?

The latest research shows that global organic sales continue to grow. In Australia retail sales of certified organic products grew by 50% over two years between 2008 and 2010. In developed countries producers are increasingly pressured by markets to employ sustainable practices such as those incorporated in organic standards.



What resources are available to producers looking to incorporate organic methods?
The Biological Farmers of Australia (BFA) provides a number of services – see www.bfa.com.au for further information:

- **"Ask a farmer" forum** – ask questions of organic producers, agronomists, consultants
- **BFA registered farm inputs list** – (follow the links to Primary Producers – Organic Farming Inputs)
- **R&D and case studies** are published quarterly in the Australian Organic Producer magazine, available via subscription or BFA membership, and on the BFA website.
- **Award winning TAFE training** is available via BFA for little cost, including the option for on-farm remote training and mentoring
- **Workshops, market reports, Organic Producer mag, free advertising, and other benefits** are available to BFA members for \$99/ year
- **Organic certification programs** are available through BFA's subsidiaries Australian Certified Organic (export accredited program) and Organic Growers of Australia small producers program



Visit www.bfa.com.au for further information or phone 1300 331 309

The full Back to Basics series can be accessed via the BFA's website. Follow links to 'Why Organic?' - 'BFA guide to: what is organic?'