October 2004 SFI E-zine

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I like facts. I expect people have noticed that.

Fact: People don't always make aerated compost tea perfectly. There are lots to know to get tea brewing right so that you know you are making great aerobic tea every time. It's like making bread. Experience is necessary.

If the tea doesn't "work", maybe the thing to say is, "What didn't go right in the brewing?" instead of "See, compost tea doesn't work."

Checking out what wasn't right, and figuring out how to make the tea brew better would be a good idea, instead of blaming the whole concept.

Making compost is similar – lots of things to understand when you are making compost. Most people can do a good job, if they just pay attention to keeping the process aerobic.

Again, rather like making bread. If bread comes out of the oven flat, you don't say, "See, this whole bread-making thing is worthless." Since you know bread isn't supposed to be flat, you know you didn't do something quite right. Same with compost tea, when you don't get a plant response, you know you didn't get something right.

One thing we've been doing is adding certain facultative anaerobes into the compost and tea. The specific ones are in the inoculum called EM, and are lactic acid-producing bacteria and proprionic acid-producing bacteria. Rather like a protection just in case the tea has too much food, or gets too warm, and oxygen becomes limiting – these facultative anaerobes out-compete human pathogens even in limited oxygen conditions.

We need studies done on these organisms added to compacted soil, to less-than-perfect compost, or compost tea, just like we need studies on the full aerobic foodweb being added to soil.

Upcoming Events

November 17, 2004

Light Microscope Class-SFI Corvallis (only 3 spaces left)

This class will give you the ability to assess your own compost teas. Discover the difference between fungal hyphae and organic matter; recognize bacteria, protozoa and nematodes**.**

8-Noon- classroom instruction

1-5 pm- Practical application

Cost: $200 per person (limit 10) all supplies will be provided in the class as part of the fee, as well as the new Microscope Manual, microscopes are an additional cost. Two scopes have been recommended by Dr. Ingham. Alexis J-model $400.00 or Leica CME-$1200.00 (includes case).

If you want to bring your own scope please contact us at the lab to discuss the specific requirements and be prepared to "upgrade" if necessary.

To register contact Twila or Matt at (541) 752-5066 or email info@soilfoodweb.com

November 6, 2004

The International Compost Tea Council (ICTC) presents
Compost Tea for the 21st Century
New Practices in Landscape Sustainability
Planting Fields Historic State Park and Arboretum
Planting Fields Rd., Oyster Bay, NY

PDF Registration form
PDF Program itinerary
Exhibitors PDF registration form

2004 Acres U.S.A. Conference Details Now Available

This year's conference, "Food as Medicine, Farm as Healer," takes place Dec. 9-11, 2004 in Minneapolis, Minnesota. Pre-conference intensive study sessions will be held the prior days. Learn how to manage your farm for production of maximum crop/livestock nutrition, how to tap into growing consumer demand for truly healthy food and market to quality-conscious consumers, and find that missing profitability — and fun — in farming!

Acres U.S.A. Conference — Dec. 9-11, 2004 — Minneapolis, Minnesota

ONLINE INFORMATION

Complete agenda

Conference registration information

Hotel reservations/flight discounts

In-depth pre-conference schools —

- Improving Soil & Foliar Foodwebs, Arden Andersen/Elaine Ingham
- Traditional Foods Workshop, Sally Fallon
- Managing Subtle Energies on the Farm, Benson, Karbowski, Shepard, Tanio, Wheeler

December 15, 2004

Neighborhood Network presents
Sixth Annual **Fall Organic Turf Trade Show**
Smithtown Sheraton
Smithtown, NY
Contact: Beth Fiteni, Organics Program Director
516-541-4321 to be sent registration materials

1. Two abstracts on compost teas for tomato disease control.

Info from Steve Diver

One trial showed a positive effect, while the second trial showed no effect. The Soil Soup brewed compost tea showed no effect, but neither did the Serenade biopesticide in the same trial, whereas a copper fungicide was comparable to a conventional fungicide control.

- Please note – work done at Iowa State had no assessment of the biology in the tea. They have no clue what was in the “compost” or the “compost tea” that was made, or if the biology even reached the leaf surfaces. How can this be called science? If they don’t measure what it is that compost tea is all about, how can a real scientist make a claim that something is what they say it is? It’s like claiming that a white liquid is milk, or that because you put flour, sugar and yeast together, the product made is bread. Lack of any data on what is important in compost or in compost tea is a clear indication that the Iowa State University folks were just trying to “prove” that compost tea doesn’t work. As I recall, the Kansas State scientists at least measured organisms in the compost and the tea. ERI

Organic Horticulture Posters at American Society for Horticultural Science
Austin, Texas | July 17–20, 2004 http://tinyurl.com/3tzt5

Control of the Foliar Disease, Septoria lycopersici, in Organic Tomato Production
http://tinyurl.com/5cqoh

Abstract: Disease management in organic tomato production poses one of the greatest challenges for organic producers in humid climates. Both organic and conventional tomato growers have relied on copper (Cu) fungicides to control many diseases, including Septoria lycopersici common in tomato production. Concerns have been raised regarding the use of Cu fungicides, because of their potential to cause plant damage and toxicity to beneficial organisms. The objectives of this research were to: 1) investigate the efficacy of compost tea made from either windrow composted cattle manure (WCCM) or vermicomposted cattle manure (VCM), and 2) compare the efficacy of organic fungicides with conventional fungicides to control S. lycopersici in organic tomatoes. Treatments included 1) a control, 2) a conventional treatment in which fungicide applications of Bravo plus Cu and Quadris plus Cu were alternated, 3) copper fungicide (Champion), 4) Serenade TM Fungicide (Bacillus subtilis), 5) WCCM compost tea, and 6) VCM compost tea. Disease pressure was mostly from the bacteria speck/spot complex. Disease severity was significantly ($P < 0.05$) reduced and marketable yield was 60% higher with the two Cu treatments (No. 2 and 3), compared to other treatments. A follow-up greenhouse experiment is in progress and will be presented with the field data.

Poster Board #290
Karen Joslin, Henry Taber, Sara Helland, Mark Gleason Iowa State University

Suppression of Septoria Leaf Spot Disease of Tomato Using Aerated Compost Tea
http://tinyurl.com/5gf3d

Abstract: Compost teas, made using an aerated brewing process, have been reported to have potential for controlling a range of plant diseases and improving crop health. Septoria leaf spot of tomato, caused by the fungus Septoria lycopersici, is a common and destructive disease of tomato in Kansas. A field trial was conducted at Wichita, Kansas during Summer 2003 to evaluate the potential of pre-plant compost, and compost tea applied as a foliar spray or through drip fertigation, to control Septoria leaf spot of tomato. The experimental design included three factors: Pre-plant application of 13N–13P–13K or vermicompost; fertigation with CaNO3 or compost tea; and foliar spray with compost tea, fungicide (Dithane) or water. A split plot design was used with fertigation treatments as main plots and the other two factors as sub-plots. There were 3 replications. Tomato cultivar Merced was used and individual plots consisted of 5 plants grown on beds covered with red plastic mulch and supported by stake and weave system. Aerated compost tea was brewed weekly using a vermicompost-based recipe including alfalfa pellets, molasses, humic acid, fish emulsion and yucca extract and applied to plots starting 2 weeks after transplanting. Disease incidence and severity were recorded weekly for 3 weeks following the appearance of disease. Plots were harvested twice weekly and counts of No. 1, No 2 and cull grade tomatoes were recorded. There were no effects of pre-plant or fertigation treatments on Septoria leaf spot disease, but there was a significant effect due to foliar sprays, with mean severity of compost-tea-sprayed plots (26.3%) and fungicide-sprayed plots (31.9%) significantly lower than water-sprayed plots (45.9%) at trial termination.

Poster Board #292

Chandrappa Gangaiah, Edward E. Carey, Ned A. Tisserat Kansas State University

View program and search on keywords for abstracts:
ASHS 2004 Annual Meeting Conference Program and Abstracts
http://www.ashs.org/annualmeeting/conference/index.lasso

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2. Soil Extraction: Which Extracting Agent Did You Use? How will you interpret that?

Working with soil chemists, we've gone over the list of potential soil extractants used in various places for extracting various materials. There are at least a minimum of 100 different ways to extract different nutrients from soil.

Part of the problem in comparing one lab's results with another is that they use different extractants. Different extractant procedures result in pulling different amounts of exchangeable nutrients out of soil.

It makes a difference if you add water first, and then add the acid, or put acid in first, and then add the water. You'll get different answers. So, what does your lab do?

We need to know how to interpret different soil chemical extracting procedures so we know how much of the total exchangeable pool is actually being pulled out of the soil with any particular soil extracting agent.

This of course is relative to the pH of soil to begin with. Different extractants remove exchangeable nutrients at different levels of efficiency as pH changes.

So why not put each soil into the same pH material to start out with? Because you just changed what is actually available in real-world conditions by doing that.

What we want to know from chemical testing is: How much nutrient is available for the plant to take up?

Do our current testing methods give us that information? Probably not.

I like Arden Anderson's explanation of different extracting methods. If you use really STRONG extracting agents, you get an idea of how much food you have in the house. That includes the freezer, refrigerator and on-the-table resources. In soil terms, that's total exchangeable nutrients.

The weaker extracting agents tell you how much is in the refrigerator and on the table. In soil terms, if you will, these are the easily exchangeable nutrients.

The Reams extracting agents, or the weakest extracting agents, assess what's on the table. In soil terms, these are the water soluble nutrients. The nutrients that have been pulled from exchangeable sites into the soil solution.

Do any of these predict what the plant WILL take up? No.

Just like a person, just because the food is in the freezer, the refrigerator, or even prepared and on the table, does not mean we will actually eat it. Just because nutrients are in water solution does not necessarily mean the plant can or will take it up.

So, it leaves us still with the need to understand how to measure, in a truly predictive manner, what the plant will take up.

Soil biology? Um, but which part of soil biology? How do know which set of organisms is most important in making any particular nutrient available to plants?

Well, we have some data that we're trying to put together, and lots more testing to figure this out.

But, we can rank the different extracting agents and methods so we get a relative idea of which methods should be getting more or less of the total exchangeable pool, under which pH conditions, with different clay compositions.

And then - hold on, this isn't all the chemistry you need to understand -

add in an understanding of the TOTAL EXTRACTABLE pool of nutrients.

What is the total amount of nutrient, that if you have a full foodweb present and performing their functions, will all be moved into the water soluble pool, and presumably, with the right biology present, become plant available?

In the assessments of soil chemistry underway with researchers in Australia, at Southern Cross University, there is no soil in Australia that lacks phosphorus. Or boron. Or silica. Or any nutrient, except perhaps nitrogen. If agricultural practices have really beaten on the soil, sulfur may be low as well. But no where near zero, and certainly, not limiting for plant growth for several crops at least.

The nutrients are in our soils. Only when soils have been hammered by poor ag practices, or by severe disturbances, should significant additions of nutrients be required. Otherwise, all you need is the biology to move the nutrients that are present, but sequestered and tied up in soil, into soluble pools for plant to take-up.

So, you can add the huge amounts of inorganic fertilizers recommended every year, forever, and destroy water quality at the same time, or add the biology needed, plus the foods to feed them, and exit the toxic chemicals from your farm shelves. You add back in the nutrients needed for plants in the foods for the microbes. You only have to replace what the plant took out. Which, based on testing the TOTAL NUTRIENT pool in compost, is only perhaps a half ton of well-made, aerobic compost, where N, S, or P have NOT been lost as a result of anaerobic conditions which develop when the organic matter is incorrectly "composted".

Your choice.

In the world of research, we need to figure out exactly which organisms are needed for each nutrient-solubilizing step, in all the conditions your soil is likely to need nutrient-solubilizing to occur, and make sure those organisms are present, and have food. Most of the time, plants will add the needed foods. As long as you keep plant cover on your soils, the organisms will keep working for you.

Not too much though. Balance is important. Well, lots more to go through to get the complete story, but I shouldn't try to cover everything in one fell swoop.

Elaine R. Ingham
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3. BT cotton results: Who do you believe?

Sunday, October 10, 2004
By Maya Babu and Mysore Grahakara Parishat

Worldwide, there is controversy surrounding the genetic modification of crops. In India, this controversy surrounds Bt cotton, genetically modified (GM) cotton manufactured by Mahyco-Monsanto company.

Bt cotton is so called because it is produced by splicing naturally growing cotton seeds with DNA from Bacillus thuringiensis, a soil bacterium known to produce a toxin which kills several cotton pests, including the boll weevil.

The splicing process is thought to transfer these pest fighting properties from the bacterium to the cotton. Supporters of Bt cotton claim that the crop will result in increased profits by decreasing pesticide costs. Critics of Bt cotton claim that cultivation will undermine the environment by inducing pests to become resistant to naturally occurring bacterial predators.

Multinational seed sellers
Critics also warn that Indian farmers will become perpetually dependent upon multinational seed sellers because of the Intellectual Property Rights regulation which mandates that farmers cannot keep the seeds from their crop for next year's sowing; if they want to sow Bt cotton next year, they have to purchase the seeds from the company again.

The Genetic Engineering Approval Committee of the Government of India released Bt cotton, the first GM crop in India, in March of 2002. Bt cotton was planted by more than a thousand farmers in Andhra Pradesh as part of a three-year trial. A coalition of more than 140 non-governmental organizations, the Andhra Pradesh Coalition in Defense of Diversity (APCDD), has commissioned a study which is monitoring the trial.

The study has found that Bt cotton was a failure in the first year trial. The seed costs were higher, costs for pesticide protection were (surprisingly) almost the same and the yield was lower and of inferior quality.

So Bt cotton not just failed to match the profitability of non-Bt hybrids, it did not even make a profit! Bt farmers lost an average of Rs. 1,295 per acre. In contrast, farmers growing non-Bt hybrids earned an average profit of Rs. 5,368 per acre.

Based on the experience of the first year's trial, Monsanto replaced the failed Bt cotton hybrid MECH-162 with Bt hybrid MECH-12 for the second year's trial. According to the recently published study of the second year's (2003-4) trial by APCDD, the new Bt hybrid was profitable, unlike MECH-162.

The rainfall was both timely and higher by about 30 per cent this year and this may have been the reason for the improved performance of MECH-12. Even though the new Bt hybrid performed well compared to last year, it was still 9 per cent less profitable than non-Bt hybrids. Increased profit, the very reason for promoting Bt cotton, was still not realized. So Bt cotton failed for the second year in a row to show more profit than non-Bt cotton.

Reduction in profit

According to the APCDD study, MECH-12 saved an average of Rs. 321 per acre on pesticides, the average yield per acre was higher by 0.17 quintals, but the average profit per acre was less by Rs. 751 when compared to non-Bt hybrids. The reduction in profit was due to the high cost of MECH-12 seeds. Despite a subsidy given by the Andhra Pradesh government, Bt cotton seeds cost 230 per cent more than other seeds.

Monsanto has published its own study of the second year trial. It gives a very different picture. According to the Monsanto study, MECH-12 saved an average of Rs. 1,856 per acre on pesticides, the average yield per acre was higher by 1.98 quintals and the average profit per acre is higher by Rs. 5,138 when compared to non-Bt hybrids.

APCIDD discounts this claim of Monsanto. It says that the Monsanto study (conducted by a marketing agency) contacted the farmers only once after the crop period and since the average Indian farmer does not keep accounts of what he has spent, the data collected are inaccurate. APCIDD claims that its study is more accurate as it contacted farmers every 15 days and hence "stayed close to the realities of the situation".

Final year trial

The spotlight is now on the third and final year trial for Bt cotton which is underway. Both the supporters and opponents of Bt cotton will be keeping a close watch on whether Bt cotton can be more profitable than conventional hybrid cotton in Indian conditions.

If Bt cotton fails to achieve this goal, the Indian farmer will keep away from Bt cotton and the controversy will die a natural death.

If on the other hand, Bt cotton turns out to be more profitable than regular hybrids, the debate is sure to be revived with renewed vigor on the issues of environmental damage from Bt cotton and the forced dependence of Indian farmers on MNC seed companies.

Related articles:
Monsanto's BT cotton seed sales soar (07 Sep 2004)
Suitability of Bt cotton (20 Aug 2004)
Bt cotton creates three times the earnings for Indian farmer (20 Jul 2004)
Bt cotton approved by Indian government (15 Jul 2004)

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4. Additives in TEA

I liked the list of questions to ask yourself whenever you were thinking about adding something to your compost tea brew. I asked Ted if I could re-print his list and thought process here.

Printed by permission of Ted

I came to see additives as just that: additives to the tea. I have tried them both and other things with mixed results. So before I used an additive like yucca or aloe vera I had to ask myself some basic questions:

1. What does the additive do to the bacterial/fungal life in my compost?

2. If it increases biomass in my tea, why can't I just make a dilution of the stuff and apply it directly to the biology in my soil?

3. Is the biology my additive feeding going to be something that actually works in the soil where I use it?

4. If the additive repels certain kinds of bugs or fungi or bacteria, is it actually making a friendly environment for the biology that is immune to the constituents of the additive on plants that would not normally be attacked by that biology?

5. Does the use of the additive offer a better result when I do soil analysis and plant assay?

6. Does the use of the additive change my product from CT which is a brew of the biology in my compost into something more like a brew of a plant extract?

7. Was the whole mess cost effective?

I have come to see CT as a very powerful tool in soil restoration. It is powerful and effective but it is slow. My turf experiments give a time line of about three years to restore soil to a point where it is significantly different and self-sustainable over a large area. Smaller areas may react faster but I think with proper care, a lawn can be completely free of any fertilizer input in just about three years. There are ways to shorten this but they are very expensive and may involve a lot of soil replacement.

It is a preventative in many cases but to date not proven as a curative as one would view a pesticide. It can increase agricultural quality but not necessarily quantity. (A caveat here: In test on one vineyard, the quantity of the harvest was larger but every vineyard had a larger harvest. I

never did a quantitative analysis to determine if the vines sprayed with CT were significantly more productive than those that received no tea. I did a brix analysis and the vines treated with tea showed significantly higher brix.)

My feeling is that the simpler one keeps the process the more success one will have. If recipes such as the ones given in the Compost Tea Manual or found on my web site http://www.earth-wise.com/ or from other reliable sources are used, beginners and experienced users can brew consistently good tea with high bacterial numbers. Fungal extraction and diversity are reflective of the compost they use. Beyond that, I don't think there is definitive data that shows that additives, however attractive they may look, significantly add to the end result of the tea. In other words, more may not be better in this case.

So, I would start simply and if I added anything test the plants where the stuff is used to make sure it is working or in the worst case scenario, doing nothing. Keep going back to the basic questions: "What am I brewing in my brewer? What do I want to get out of my tea? Get a good understanding of the soil food web and how biology interacts with plants. Always remember that we are victims of our education. We are taught and live in a culture that has a specific mindset and it is hard to overcome that thinking and work with something new. When thinking about tea, soil reports and plant assays, it is always important to remember that these reports are designed to show chemical levels consistent with a conventional knowledge of the manufacturer's recommendations.

Have fun.

Ted Peterson

5. Salt Index Calculations

I was asked the following –
It would be handy to have the method of calculation so that if we get any further salt indexes, we can work them out ourselves.

Method of calculating salt index - This is a measure of osmosity, or the ability to hold water against the application of pressure. Plants apply pressure to pull liquids into their roots. So if salts hold water more strongly than the roots can apply pressure to remove it, the plant will die. Same for microorganisms.

Sodium chloride is set as the standard, of 1.00, or in the scale of the data that was sent you, the relative unit for sodium chloride would be 100.

The easiest way to interpret that is that 100 pounds more or less of salt per acre has no discernable effect on the biology in the soil. When the salt index is 100, and you apply less than 100lb/ac, we do not measure an effect. Probably there is one, but we can't detect it with current methods. Let me point out that plate count methods won't show these negative effects, because

plate count methods assess spores and other dormant stages. So, ACTIVE organisms are being killed, and you'll miss it altogether if you rely on plate count methods.

If more than 100 pounds per ac of NaCl is applied, a detectable number of organisms will be killed. The higher the amount of salt applied, the more organisms will be killed.

The cause of the effect is holding water so organisms have no water available to use. Available water decreases below the threshold value needed by the biology to survive. The higher the salt index, the more water that salt will hold against the pull of pressure, and so the less usable water for the organisms, so more species die.

So how to use the below salt index. If salt has an index value of 100, meaning 100 lb/ac can be used without significant harm, then you can put together a ratio to calculate the others.

So, super phosphate has a value of 8, while sodium chloride has a value of 100. Thus you could put on 100 divided by 8 times more super P than salt before you would see a killing effect from the super P.

NaCl index/Material of interest salt index =
Multiply the 100 lb/ac amount by that ratio.

100/8 times 100 = amount of material of interest that can be put on before damage to the microbes occurs.

1250 lb/ac of super P before microbes will be harmed.

Now, let me point out that this does not jive with what I've seen in the field. I think they gave you a value for rock phosphate, not super P. Or the value for super P was determined using coarsely ground super P, where most of the mineral did not react in their test. If they grind it finer, the salt index would go way up.

I also have a hard time believing the surpentine super value, whatever that is. A value of 0 means the material does not dis-associate in water, so it will never dissolve. Why would you put something into your soil that is not capable of going into solution? Your plant will never be able to take it up.

Let's try another one

Potassium chloride (KCI)
100/114 times 100 = 87 lb/ac of potassium chloride could be used, not 100 lb/ac.
Or, if 100 lb/ac of KCI was used, organisms would be killed. The negative impact would be discernable.

SALT INDEXES

Surpentine super	0
Super phosphate	8

Pot. Chloride	114
Pot. Sulphate	46
CAN	82
Nitrophoska 12/10/10	56
Te Nitrophoska blue	60
Urea	75
Patent Kali	28

The table of salt index values was supplied by Graeme Reid, an SFI advisor in New Zealand, who obtained the data from Ravensdown, a government soil chemistry group in New Zealand.

Hope this was clear. Any questions, please ask.
Elaine Ingham

6. Grower Experiences

A. Fruit tree experiences.

I don't have any data because I'm a backyard gardener.

I've been using compost tea for 3 years on apple, pear, peach and plum trees. I've had no disease problems and stopped using Captan. The compost tea did nothing to reduce the dreaded plum curculio pest we here in Michigan. Also, the ACT appears to provide some organic food for the trees.

D A Kesian

The comments on the successes some North Olympic Fruit Club members have had over time have been sprinkled on this list. Several members now have their own brewers. We have not done any studies. Members grow apple, European pear, Asian pear, cherry, plum, kiwi, fig, chestnut, walnut, filbert, Shipova, apricot, blueberry, strawberry, raspberry, gooseberry, persimmon and more, in addition to ornamentals, flowers and vegetables.

In comparison to previous years where they had never used compost tea, members report having healthier trees. Leaves are larger, shiny, and more colorful; fruit is larger and they say sweeter. Scab has been greatly reduced or totally eliminated. Slug pressure has also been reduced.

In my own experience with young pear trees, I had pear blister mite which spread from one tree to the other and the trees on semi-dwarf rootstock bore no fruit through the fifth and sixth leaf. I was told to use lime-sulfur sprays and dormant oil before the leaves dropped. I didn't and only used mulch and compost tea as a soil drench and foliar spray throughout the growing season. Infected leaves were

removed and that alone was an all day exercise which left the trees practically naked.

This year the pears I now have are clean and are a good size. There remains some minor leaf damage, less than 2%. I expect a larger crop next year and I'm grateful I didn't lose a tree. I cannot definitively say that this is the result of using compost tea because I have used no controls. Hobby orchardists will not easily sacrifice their fruit trees. The only pest problem I do have at the moment is the pear or cherry slug or saw fly.

I'll be showing my fruit along with other members of the Club in two weeks on Saturday, October 23rd, at our fall fruit show. It's the largest fruit show in the Puget Sound region: http://www.wcfs.org/.

Judi