

To: WormEzine list
Subject: WormEzine Vol. I, No. 3, August 2002

WormEzine
News and information from Mary Appelhof
... about vermicomposting, worms, and other critters that live in the soil.
August 2002
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They laughed when I said worms eat my garbage,
but I showed them how, and now thousands say the same thing ...

A WORD FROM MARY APPELHOF (a.k.a. WormWoman)

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Dear Worm Workers,

We're suffering from the heat again here in Michigan, but luckily I'm heading for the northwoods where I hope it will be cooler. I've been digging out all sorts of information about the relationships between fungi and the other four kingdoms ... Bacteria, Protoctista (algae, protozoa), Plants, and Animals for my contribution to the Fungi groups' paper for our ZERI (Zero Emissions Research Initiative) training. You know what? I didn't mention earthworms once! You've got to believe I'm stretching my brain!

I enjoyed my time with home-schoolers here in Kalamazoo, Michigan. About 30 educators showed up with a whole bunch of little ones. We tossed t-shirts with worm

composting images on them to substitute for slides, watched a bit of Wormania!, and set up a worm bin. This particular group is one of Jane Goodall's Roots and Shoots chapters, and they will be going into their communities to teach others about worm composting. The Roots and Shoots program has three goals: to care about the environment, to care about animals, and to go into the community sharing information. Worm composting certainly fits all three!

My feature this month takes you briefly through why I believe we have a problem with excess nitrogen, and how worm bins can help alleviate a part of the problem. I'll continue developing more on these concepts here and on my website, which will incorporate more information all the time, so keep checking it out!

Once I get back from vacation, I'll be pressing to get my posters and presentations ready for ISEE7 (International Symposium on Earthworm Ecology) in Cardiff, Wales! I will report back on this event in the fall issues of the WormEzine.

As always, give me a call or drop me a note and tell me what's going on in your neck of the woods.

To read the archives on the web, visit the following URL:
<http://www.wormwoman.com/>

2-----FEATURE-----

WORM BINS and COMPOST TEAS

Excess Nitrogen

Nitrogen is critical to life. It makes up 78% of the earth's atmosphere, yet is relatively inert in its gaseous form. Splitting of the strong triple bond, which holds two N atoms together, must occur before N can be incorporated into life forms. Splitting is done in nature by nitrogen-fixing bacteria and through lightning strikes. Human beings have learned how to split these bonds at great energy cost in order to produce nitrogen compounds, which include fertilizer.

More N has been "fixed" industrially than by nature--with great consequences. Nitrogen in nitrate, nitrite, and ammoniacal forms is soluble in water and can be used by plants, but if it isn't taken up immediately, rain and irrigation cause it to move through the soil into the groundwater where its toxicity becomes a problem. (RESOURCE A BELOW) This Nitrogen problem affects every microorganism in the soil, a relationship defined as the Soil Foodweb.

Soil Foodweb

Healthy soils contain millions of microorganisms even in a teaspoon. Most of these organisms have never been given a name. But we are learning something about what they do, how they relate to each other, and how important they are for sustaining other kinds of life. These include bacteria, fungi, protozoa, nematodes, microarthropods, earthworms, and other soil organisms (directly correlated to my ZERI training ... more info to come).

The relationships among these organisms are fascinating and complex, but it all boils down to "who eats who?" Once nitrogen has been fixed, it passes from one organism to another, becoming part of an enzyme in one, a DNA molecule in another, an amino acid in another. And when it is given off as waste, the nitrogen can be a nutrient for plants. As long as nitrogen is part of living soil organisms, it won't wash through the soil and become toxic nitrate. (RESOURCE B BELOW) In short, healthy soil --full of microorganisms in balance-- can combat the excess nitrogen problem. How can we contribute to the microorganism balance in our soil? Compost tea.

Compost Tea

Compost tea is an extract of good compost that contains millions of microorganisms allowed to reproduce in an oxygenated, nutrient-rich environment. Good compost is produced aerobically, has gone through a heating stage to kill weed seeds and kill human pathogens. Quality compost contains high, balanced populations of diverse organisms, including bacteria, fungi, protozoa, and nematodes.

Aeration is critical for allowing the great explosion of organisms to occur in a tea-making machine. Specific nutrients such as molasses (encourages bacteria) and humic acids (support fungal growth) can be added to encourage one set of organisms over another. Teas are sprayed as a foliar spray or soil drench within hours after brewing. Foliar sprays reduce plant diseases by covering leaf surfaces with beneficial organisms, leaving neither food nor space for pathogens. When used as a soil drench, compost tea inoculates the soil with this great abundance and diversity of organisms. With sufficient food present (organic material), these organisms will thrive and their cycling of nutrients will feed your plants ... healthy soil sustained through nurturing the soil foodweb. In order to brew compost tea—you need to cultivate good compost ... (RESOURCE C BELOW)

Worm Bins

A worm bin, or vermicomposting system, can provide an excellent source of organisms with which to make compost tea. Homeowners without large gardens or landscapes don't have sufficient volume of vegetative wastes for high-temperature composting. It's hard to get a compost pile big enough to heat up sufficiently to kill weed seeds and pathogens. With a worm bin, however, you can get the bacteria, fungi, and protozoa needed to make good compost tea without large volumes.

A worm bin consists of a container with provisions for aeration, moistened bedding such as shredded paper, and the right kind of worm--preferably redworms, *Eisenia fetida*. Organic food waste buried in the bin becomes food for the bacteria, fungi, protozoa and

nematodes that, in turn, become food for the worms. This process yields excellent compost for compost tea. As briefly described above, compost tea can be utilized to combat the nitrogen problem by enriching the soil ecosystem-the soil foodweb.

Further evaluation of the Nitrogen problem and solutions (including compost tea) can be reviewed via the noted resources or by visiting my web site.

3=====RESOURCES=====

- A. Wolfe, David. *Tales from the Underground*. 2001. Cambridge Center, MA: Perseus Books.
- B. Ingham, Elaine R. Andrew R. Moldenke, Clive A. Edwards. *Soil Biology Primer*. 2000. Ankeny, IA: Soil and Water Conservation Society.
<http://www.soilfoodweb.com>
- C. Ingham, Elaine. *The Compost Tea Brewing Manual*. 2nd ed. 2001. Corvallis, OR: Soil Foodweb Inc.
<http://www.soilfoodweb.com/>
<http://lists.ibiblio.org/mailman/listinfo/compostteas> (listserve)
- D. Appelhof, Mary. *Worms Eat My Garbage*. 2nd ed. 1997. Kalamazoo, MI: Flower Press.
<http://www.wormwoman.com/>

4=====COMING EVENTS=====

A. RHONDA SHERMAN is putting together a workshop titled "Start a Worm Farm--An Introduction to Growing and Selling Earthworms for Profit" which will be held in Raleigh, NC on August 13. Scott Subler, Kelly Slocum, and Al Eggen will be speaking at the all-day workshop.

Rhonda Sherman

Biological & Agricultural Engineering

N.C. State University

3110 Faucette Drive

Raleigh, NC 27695-7625

For more information about the workshop, go to

<http://www.soil.ncsu.edu/training> and click on Composting Workshops and click again for the brochure.

B. INTERNATIONAL SYMPOSIUM ON EARTHWORM ECOLOGY 7 Sept. 1-6 in Cardiff, Wales. This will be the first major international earthworm conference since the Vermillennium that was held in Kalamazoo, Michigan, USA in 2000. For info:

<http://www.cf.ac.uk/biosi/worm2002/registration/Worm2002RegForm.pdf>

C. MINI-SYMPOSIUM ON EARTHWORMS Sept. 7 at The National Museum of Wales, Cardiff. This event for youth takes place the Saturday following ISEE7 and takes advantage of local and international experts in town for the symposium. The schedule includes Mary Appelhof (*Worms Eat My Garbage*), Rhys Jones (*Snakes are NOT Worms - Feel Them!*), Geoff Baker (*Worms Down Under*), Trevor Pearce (*Worms are Nice - to Eat!?*), Jill Clapperton (*Junior Science Experiences in Canada*), and Liz McCurdy (*Worms in the American Classroom*).

D. VERMICO BEST MANAGEMENT PRACTICES IN VERMICOMPOSTING Oct. 10-11 in Portland, OR For info: <http://www.vermico.com/>

Thanks for subscribing!

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ABOUT THE AUTHOR Mary Appelhof is founder and president of Flowerfield Enterprises, which develops and markets educational materials on vermicomposting. Its publishing imprint is Flower Press, publisher of the how-to book *Worms Eat My Garbage, the classroom activity book and curriculum guide, Worms Eat Our Garbage: Classroom Activities for a Better Environment, The Worm Cafe: Mid-scale vermicomposting of lunchroom wastes, and Diabetes at 14: Choosing tighter control for an active life.*

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