June 2005 SFI E-zine

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5. **Environmental and Economic Costs of the Application of Pesticides Primarily in the United States'**

Upcoming Events

Sustainable Studies Institute offers free classes!!

Class time is 7-9 pm for all classes.

July 21: Biological Lawn Care with Shepard Smith, Soilsmith, Reece Speas, W & W Lawn Care and Robert Shepard, Soil Foodweb Inc

Aug 18: Backyard Composting: with Joe Richard, NW Vermicompost, Andy Westlund, Harmony J.A.C.K. Farms and Merry Bradley, Grass Roots Gardens

Sept 15: Preparing Plants for Winter: with Dr. Elaine R. Ingham, President of Soil Foodweb Inc and Robert Shepard, Soil Foodweb Inc

Oct 13: Mulching/Leaf Compost: with Jon Rowley, Seattle P. Patch and Harry McCormack, Sunbow Farms

Nov 17: Biological Pest Control Methods: with Joe Whaley, Director of Sustainable Studies Institute

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Workshops

SFI Corvallis
Dr. Elaine Ingham teaches three in-depth workshops at the Soil Foodweb, Inc. Laboratory in Corvallis, Oregon. The workshops include classroom instruction, hands-on laboratory work and field demonstrations.

October15—17, 2005
Introduction to the Soil Food Web
PDF registration form

October 19—20, 2005
Compost Technology
PDF registration form

October 20—21, 2005
Compost Tea Technology
PDF registration form

In-depth Description of the three workshops are available as a PDF download.
For more information contact Twila or Matt at (541) 752-5066 or email info@soilfoodweb.com

Microscope class – July 18, 2005 Register now to secure your place!
Light Microscope Class - SFI Corvallis
PDF registration form

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.

Cost: $200 per person (limit 20) 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 $425.00 or Leica CME-$1400.00 (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 Nedra at (541) 752-5066 or email info@soilfoodweb.com

1. Greetings from Elaine

Just a quick note to let you all know that I am in Australia. I arrived early in June, and have taught a couple of courses already.

We had the compost tea party in Byron Bay, at ReGenesis Farm, in mid-June. It was a great success and everyone learned a great deal. As at the Texas Tea-Off last fall in Austin, Texas, the tea machines that people brought to test all turned out to be good at making tea. The biology was in the good to very good range in nearly all the machines. The flow-form made good tea as well!

The only machine that didn't perform well had too much food added to the brew, as two people had put foods in! Talk about going anaerobic!

The University course at Southern Cross University has started. Graham Lancaster, the Director of the Environmental Analysis Lab, and I teach this course, on the topic of Integrating Soil Biology and Soil Chemistry.

We have 12 students in the course this year, which is amazingly good considering the severe drought conditions and growers lack of money. We will of course teach the course again next year.

Graham and I use the money from the course to fund research, and this year we have analyzed quite a few composts using both the chemical and biological tests. The data from that comparison will be presented at the University course. We will be looking at SEM preparations of several of these composts this week in the course. Three field trips are scheduled - to two macadamia orchards, to a golf course and to a cattle-soya-barley-compost farming operation. Students get to take samples and then analyze the biological and chemical data from those samples during the course.

I return to the US the second week of July.

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2. New Consulting Program

Soil Foodweb is pleased to announce a new, more in-depth consulting service for our valued clients, aimed at developing detailed management strategies optimized to meet the needs of the individual grower.

Based on information derived from our standard biological soil tests, along with client-provided soil chemistry analysis and management history of the field, we will work up a written step-by-step plan, compatible with the client’s available equipment and resources, for improving the soil biology to remediate problems and increase yield and quality of the desired crop(s).

A typical plan will include—but not be limited to—identification and remediation of specific problems with soil chemistry (mineral deficiencies or surpluses) and structure (compaction, saturation), recommendation of nearby sources of quality compost, compost tea and other amendments, and a detailed schedule for application of amendments and follow-up testing. Particular emphasis will be placed on preparing the soil for planting in the Spring, maintaining its fertility through the growing season, and proper mulching or cover-cropping to protect it through the winter.

The yearly registration fee for this program will be $55.00. Please contact us for more details.

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3. **Time For Early Summer Sampling in Northern Hemisphere**

If you haven't had your soil, compost, or compost tea tested for awhile**,** now is a great time to do so. The crops are in the ground and hopefully thriving. Is the soil biology now in place sufficient to maintain healthy growth and disease resistance through the rest of the growing season, or does it need some help? Does your compost or tea have the right numbers of the right organisms in it to be of maximum benefit to your plants? Regular testing keeps you informed, allowing you to make the right management decisions.

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4. **Ocean "dead zones" from nitrogen runoff point to need for more sustainable farming practices**

Every summer a vast area (currently estimated at 8,500 square miles) on the northern coastal shelf of the Gulf of Mexico becomes void of life due to depletion of dissolved oxygen. This area has increased in size every year since the flood of 1993, and severely threatens one of the world's most productive fisheries. 146 similar "dead zones" near the mouths of major rivers have been identified in coastal waters around the world, with comparable effects on local fishing economies. As developing countries continue to modernize, this number is expected to increase.

The condition is caused by excessive levels of nitrogen and phosphorus compounds washed from the land and carried into the sea by the rivers. These nutrients stimulate huge blooms of algae and phytoplankton, which later die, sink to the bottom, and are consumed by bacteria. These bacteria also consume most of the dissolved oxygen, driving levels to below 2 ppm. Compounding the problem is a surface layer of lighter, warmer fresh water which prevents the cooler deep water from coming into contact with atmospheric oxygen. All the fish and faster-moving sea creatures which can, escape to more aerobic waters. Clams, oysters, mussels, and other seabed denizens perish.

Agricultural runoff from chemical fertilizers and raw manure is considered to be a major contributing factor, along with municipal sewage, industrial pollutants, and nitrogen oxides from fossil fuel exhausts.

Suggested remedies have included the planting of wooded or grassland buffer zones along the shores of streams bordering farmlands, the creation of more wetlands to absorb the runoff, and legal restrictions on the volumes of fertilizers that may be applied. The state of Tennessee, and several European countries, have recently adopted strict new water quality standards which may force some growers to modify their current practices.

Farmers are understandably reluctant to undertake steps which will reduce their productive acreage or cut their yields. But by moving toward more sustainable methods they may be able to maintain or exceed current crop yields while significantly reducing the runoff of water-soluble nutrients and, in the long run, reducing their operating costs.

The key to achieving this is improving the soil biology, which in turn will take care of soil chemistry and physical structure. Many agricultural soils are depleted of carbon, so an important first step is to replenish the organic matter in the soil through the ongoing incorporation of composts, mulches, and cover crops. Mineral deficiencies may be addressed with non-soluble rock products such as limestone and rock phosphates. Along with organic matter and minerals, appropriate biology **must** be inoculated via composts and compost teas. Bacteria and fungi are the foundation, because they are the primary decomposers of organic matter and metabolizers of mineral nutrients. Protozoa, nematodes, arthropods, earthworms and so on feed upon the bacteria, fungi, and one another, excreting plant-available nutrients steadily throughout the growing season.

N, P, K and other nutrients which are tied up in the biomass of soil microbes do not leach into groundwater and streams: they feed the crops, not the algae and plankton offshore. Because many species of bacteria and fungi are known to break down or sequester toxins, soils with good biological activity can mitigate ground water pollution. Another feature of biologically healthy soil, which may directly reduce runoff, is its improved water retention due to its greater porosity.

Hopefully, as more and more pioneering growers demonstrate success with biological farming methods, more and more conventional growers will recognize the benefits and begin to change over. This can only lead to positive outcomes for farmers and fishermen alike.

David Pimentel is a professor of entomology at Cornell University who publishes authoritative literature reviews on pest management, energy in agriculture, and related sustainable agriculture topics.

This 24-page article on environmental and economic

costs of pesticide application is freshly published
in the June 2005 issue of "Environment, Development
and Sustainability."

Regards,

Steve Diver

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5. 'Environmental and Economic Costs of the Application of Pesticides Primarily in the United States'

Environment, Development and Sustainability
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Abstract
An obvious need for an updated and comprehensive study prompted this investigation of the complex of environmental costs resulting from the nation's dependence on pesticides. Included in this assessment of an estimated $10 billion in environmental and societal damages are analyses of: pesticide impacts on public health; livestock and livestock product losses; increased control expenses resulting from pesticide- related destruction of natural enemies and from the development of pesticide resistance in pests; crop pollination problems and honeybee losses; crop and crop product losses; bird, fish, and other wildlife losses; and governmental expenditures to reduce the environmental and social costs of the recommended application of pesticides.

The major economic and environmental losses due to the application of pesticides in the USA were: public health, $1.1 billion (per) year; pesticide resistance in pests, $1.5 billion; crop losses caused by pesticides, $1.4 billion; bird losses due to pesticides, $2.2 billion; and groundwater contamination, $2.0 billion.

Keywords Agriculture - costs - crops - environment -livestock - natural resources - pesticide – pesticide resistance - public health

Conclusion:
An investment of about $10 billion in pesticide control each year saves approximately $40 billion in US crops, based on direct costs and benefits. However, the indirect costs of

pesticide use to the environment and public health need to be balanced against these benefits. Based on the available data, the environmental and public health costs of recommended pesticide use totaled more than $9 billion each year (Table VI). Users of pesticides pay directly only about $3 billion, which includes problems arising from pesticide resistance and destruction of natural enemies. Society eventually pays this $3 billion plus the remaining $9 billion in environmental and public health costs (Table VI).

Our assessment of the environmental and health problems associated with pesticides was made more difficult by the complexity of the issues and the scarcity of data. For example, what is an acceptable monetary value for a human life lost or a cancer illness due to pesticides?

Equally difficult is placing a monetary value on killed wild birds and other wildlife; on the dearth of invertebrates, or microbes lost; or on the price of contaminated food and groundwater.

In addition to the costs that cannot be accurately measured, there are many costs that were not included in the $12 billion figure. If the full environmental, public health and social costs could be measured as a whole, the total cost might be nearly double the $12 billion figure. Such a complete and long-term cost/benefit analysis of pesticide use would reduce the perceived profitability of pesticides.

The efforts of many scientists to devise ways to reduce pesticide use in crop production while still maintaining crop yields have helped but a great deal more needs to be done. Sweden, for example, has reduced pesticide use by 68% without reducing crop yields and/or the cosmetic standards (PCC, 2002). At the same time, public pesticide poisonings have been reduced by 77%. It would be helpful, if the United States adopted a similar goal to that of Sweden. Unfortunately with some groups in the USA, IPM is being used as a means of justifying pesticide use.