



Inside Agroforestry

Rocky Mountain Forest & Range Experiment Station
National Agroforestry Center

Spring, 1995

Welcome to *Inside Agroforestry*!

For those of you who are new to *Inside Agroforestry (IA)*, welcome to the latest source of agroforestry news and information available. *IA* is a quarterly newsletter designed for natural resource professionals like yourself, who are interested in the changing face of sustainable agriculture and agroforestry.

For those of you already familiar with *Inside Agroforestry*, we hope that you've enjoyed it so far and are as excited as we are about what's in store for agroforestry in the future!

Agroforestry is the integration of agriculture and forestry production and conservation practices to attain

more economically, environmentally, and diversified sustainable ecosystems. This technology can be applied in communities too!

Agroforestry is applicable nationwide. The demand for, and interest in, agroforestry continues to grow and, as a result, the Center continues to grow too! For more information on the Center, who we are, and where we're going, please see "Message From the Manager" on page 2.

One of our first efforts in response to this national need for agroforestry information is to make *Inside Agroforestry* available to organizations and professionals throughout the

United States. So, we're currently in the process of expanding our mailing list. If there is someone in your organization that should be receiving *Inside Agroforestry* in addition to, or instead of yourself; you would rather not receive this newsletter; or you're getting more than one copy, please send a note to Kim Isaacson at the Center and we'll be happy to correct our mailing list.

We do hope that you enjoy *Inside Agroforestry* and find it helpful and informative. If you need more information about agroforestry or have suggestions for future issues of *IA*, please contact us.

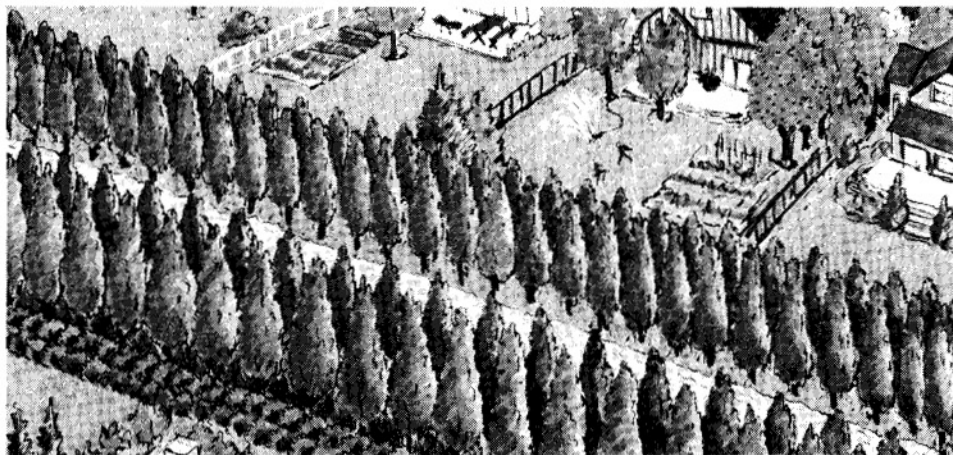
Working Trees...in Communities

We're all aware of the fact that windbreaks in rural areas help to minimize wind erosion and protect homes, livestock, and crop fields. But, did you know that they're just one of the numerous agroforestry practices that can also protect community recreation areas, parking lots, hospitals, schools, and homes?

Agroforestry is putting trees and shrubs to work for us. In other words, "Working trees." Working trees are planted in a specific place, in a specific design, for a practical purpose. They have a job to do. Agroforestry's goal is to use working trees to help make agricultural land...and communities, more sustainable.

Windbreaks are quite functional in the roles that they play, as are many other agroforestry practices. In addition to windbreaks, here are some examples of how community leaders and natural resource professionals can incorporate already-proven rural techniques into their communities.

(See *Working Trees* on page 7)



Riparian areas are just one of the rural agroforestry practices that can be applied in a community to work to protect and improve soil, water, air, and wildlife for human environments.

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Message From the Manager

A column of important events
as reported by Program Manager, Bill Rietveld

A New Name — An Expanding Future

Note that we have officially changed our name to the "National Agroforestry Center." Agroforestry has evolved and grown a great deal since the 1990 Farm Bill. As discussed before in my column, agroforestry is "coming of age" and is rapidly becoming recognized both within and outside the forestry community. Agroforestry is now clearly of *national* importance, with strong interest and support emerging in all parts of the country.

Our name change and expanded scope are in response to this national demand and support for agroforestry. The national agroforestry community of interest is now well organized under AFTA — the Association for Temperate Agroforestry. During the past year AFTA has published several key documents that have heightened awareness of the need and potential for agroforestry. Those documents list specific recommendations on what is needed to fully realize the potential of agroforestry. One recommendation is expansion of the scope of the Center, which we have done. We are also responding to recommendations to develop key partnerships that will further expand the Center's scope, responsibilities, and capabilities. We will keep you abreast of these developments in upcoming issues.

So what is the role of the National Agroforestry Center? How does the Center respond to agroforestry technology and information needs in 50 states and US territories? The answers are found in the words catalyst, partnerships, cooperation, networking, and leveraging.

The word *catalyst* best describes our role. A catalyst

is an ingredient, usually a small amount, that accelerates a chemical reaction that otherwise occurs slowly or not at all. That's our purpose, an ingredient that acts as a contact point, advocate, clearinghouse, reliable source of good information, and driving force to accelerate the development of the science and practice of agroforestry. We are a small group, so there is no way that we are going to do everything ourselves, and we don't want to.

The words *partnerships, cooperation, networking, and leveraging* describe how we attain our goals. We are committed to addressing the needs of agroforestry through networking with the existing national consortium of agencies, universities, and organizations that have agroforestry research and technology transfer expertise. Partnerships and cooperative projects between agencies, universities, and conservation organizations provide an avenue to leverage resources and expertise to attain common goals. The target audience is natural resource professionals who provide technical assistance to landowners, so our collective efforts are also leveraged through the multiplier effect. Agroforestry development is a national effort involving all stakeholders.

For the remainder of this fiscal year we are working with partners to be as nationally responsive as possible with limited resources. At the same time we are preparing to deliver expanded programs next year, assuming new partnerships and funding materialize. We look forward to working with your organization, and as always we welcome feedback.

Springtime On The Farm...Magic Is All Around Us

I believe in magic again, and life is more fun because of it. I don't know when I again started believing, but I think it was farming that reopened my eyes.

When I was young, magic was fun. "How did you do that?" It was magic. Then, like many kids, I sent off my hard-earned \$1.95 for a Book of Magic so that I too, could amaze my friends and family! And I soon learned that, after I had learned the secret, it was no longer magic — it was just a trick. Performing magic was another name for "trying to fool someone," and

believing in it was admitting to being a fool. Magic wasn't fun any more.

Then I became a scientist, and accepted the goal of learning nature's secrets. We call it "acquiring knowledge." No tricks, no magic — the world was full of knowledge waiting to be acquired. I had graduated from being foolish to being just plain ignorant. Learning is fine, but the goal of learning it all is a heavy burden.

But I want some fun now. And in the meantime spring happened again this year. Springtime is a time of wonder. Whether I plant a handful or a

truckload, dry, hard seeds burst open with new life. Naked branches suddenly become clothed with leaves and flowers. Baby animals appear in singles, pairs, litters — like rabbits out of hats. Wonderful things happening, and so much that I don't understand. But springtime is not knowledge waiting to be acquired. It is magic to be enjoyed. I am still ignorant, and I am still learning. But I'm a fool, too. A fool who believes in and depends upon magic in the fields and forests, and prairies. And magic is fun again.

Source: By Jim Lukens, ATTRA News, June, 1994. Volume 4, Number 2.

National Development of Agroforestry

by Michael A. Gold, President
Association for Temperate Agroforestry, and
Assistant Professor of Agroforestry
Michigan State University, Department of Forestry

As an alternative to conventional agriculture, agroforestry is unique because it simultaneously addresses critical economic, environmental, and social needs within agroecosystems. Up to the present time, a vision "gap" has existed in our government research and extension agencies, US

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University research and extension systems, in traditional commodity production organizations, and in the minds of those who make their living from the land. This manifests itself as a distinct *separation* of land-use practices and has led to our vision of the landscape as feedlots, woodlots, and crop monocultures. This gap in vision, with regard to potential production and conservation benefits of agroforestry, has constrained its development and implementation.

Discussions of the merits and potentials of agroforestry land-use practices invariably "turn on a light" in the minds of many stakeholders. A common question is: if agroforestry land-use practices have so much to contribute to land-use protection, production, and restoration, why are these practices not already widespread and in common use? The response is that agroforestry consists of a group of land-use management practices that have heretofore differed from the way most of us view land-

use and our perception of the landscape. Serious consideration of the integration of trees and shrubs into landscapes that traditionally have excluded woody plants requires a major change in perception. These are issues of vision, issues that must be addressed by those within the agroforestry community of interest.

In 1989, a ground-breaking conference, The First North American Agroforestry Conference (NAAC), held at Guelph, Ontario, Canada, brought the agroforestry community together to focus on temperate agroforestry in North America. The 1989 conference crystallized the awareness that no professional organization existed to represent the interests of those individuals or organizations interested in the interdisciplinary field of temperate zone agroforestry.

The Association for Temperate Agroforestry (AFTA) was established in 1991 to help fill this gap in vision and assist in promoting the broader use of integrated land-use practices in which trees play an integral role. AFTA exists to help organize, catalyze, develop, promote, and network agroforestry practices and stakeholders. AFTA has been involved in a number of national activities over the past 18 months to further the awareness and develop the support base to increase the use of agroforestry throughout the US. In March, 1995, AFTA completed and released a policy paper outlining national needs that can be addressed through agroforestry "Agroforestry: Blending Agriculture and Forestry Production and Conservation Practices." Needs include (in no special order of priority): 1) rural economic development; 2) field and landscape buffer zones; 3) land retirement programs; 4) integrated production systems; and 5) resolving rural/urban interface conflicts. Recommended policy actions are: 1) USDA leadership and coordination; 2)

research and development; 3) technology transfer and application; and 4) technical assistance and landowner incentives. This document reflects the combined effort of an alliance representing forestry, agronomy, range, agroforestry, conservation, and sustainable agriculture organizations.

Numerous efforts are currently underway to examine the potentials for increased use of agroforestry land use practices at state, regional, and national levels. At the state level, efforts range from very advanced like Missouri, California, and Ontario, Canada; to those well underway such as Iowa, Idaho, Oregon, New York, and Florida; to new initiatives like those in Minnesota and Georgia.

The Fourth NAAC will take place in Boise, Idaho, July 23-26, 1995, convened under the umbrella of AFTA and organized by the University of Idaho and the Idaho Agroforestry Coalition. The Idaho Agroforestry Coalition is a "collaborative public/private partnership that serves to help landowners enhance natural resource conservation while sustaining agricultural production through the establishment of *working trees*." This coalition exemplifies the partnerships currently being established to address the opportunities for blending agriculture, forestry and range production and conservation practices.

At the federal level, the USDA's National Agroforestry Center (NAC) has expanded its mandate to the entire US. The NAC is sponsoring eight regional agroforestry assessments. By year end, under the auspices of NAC, AFTA will develop a report on national agroforestry needs and priorities and propose an overall framework for regional agroforestry working groups.

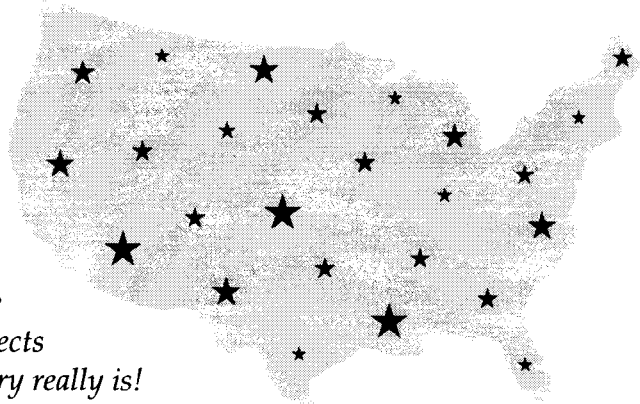
AFTA is cooperating with the forestry profession through its Society of American Foresters Agroforestry

----- (See National Development on page 7)

Agroforestry

All Kinds of Options...All Kinds of Places

Agroforestry practices can be applied most anywhere. Trees planted in the right place and in the right design, to serve a purpose is what agroforestry is all about! Practices include riparian buffers, streambank bioengineering, alley cropping, windbreaks, tree/pasture systems, tree/specialty crop systems, and living snowfences. There are a lot of landowners and public facilities in the United States who could use one or more of these practices to conserve, protect, and further utilize their land. Here's an array of successful, innovative projects that show you just how diverse and adaptable agroforestry really is!



Trees to Improve Air Quality?

Wind erosion is a persistent problem that affects farmers, and rural and urban dwellers alike. The Clean Air Act of 1990 brings attention to wind erosion, which has long been a concern for growers in low precipitation areas like that of the Pacific Northwest.

Landowners continually strive to control cropland wind erosion, while attempting to stay within the economic constraints of their farming operation. Today, however, they are faced with increasing public pressure to reduce erosion in order to protect air quality. To help them meet this challenge, a new research and educational program is underway in the Northwest to improve our understanding of the wind erosion/air quality problem and develop practical management solutions.

The Columbia Plateau PM-10 Project involves a comprehensive group of scientists, engineers, and conservationists who will study all aspects of defining and managing the wind erosion/PM-10 problem. Part of the project involves the installation of windbreaks in several counties in eastern Washington.

PM-10 (particulate matter less than 10 microns in size) are airborne particulates small enough to be taken into the body's respiratory system. The Clean Air Act made state governments responsible for monitoring and controlling the amount of PM-10 released into the air. Wind-blown dust from cropland is one source, while other sources include road dust, wood stoves, and industry. These are being addressed by local governments as well.

Urban and rural areas that exceed the PM-10 health standards must develop and implement plans to reduce emissions from major PM-10 sources. It is here that we may realize another one of the benefits of incorporating windbreaks and other agroforestry practices into farming systems. Mike Klungland, PM-10 Project Coordinator with the Natural Resources Conservation Service, feels that windbreaks, in combination with other control measures like crop residue management and conservation tillage (to increase the amount of surface residue and roughness), will play a big part in controlling wind erosion and reducing the amount of PM-10 emissions in the future.

By spring, 1997, research results and recommendations will be made to the EPA.

Hands-On Experience for Grade School Students

A windbreak *and* an outdoor laboratory! That's what Conrad, Montana grade school students have. In the spring of 1993, the children worked closely with the Montana Division of Forestry to help design and install a five-row windbreak around their school. The students continue to maintain the windbreak which is also used as an outdoor student learning center.

The windbreak not only protects school grounds and fosters environmental education but it helps lower fuel costs and provides habitat for a

variety of wildlife. It also demonstrates the proper placement and maintenance of windbreak plantings to others in the area.

One of the things that Ruth Carlstrom, Former Gifted and Talented Coordinator for the Conrad School District, really likes about the program is that the professional foresters who helped with the project were completely involved with, and dedicated to helping the students. The students developed and planned the budget, chose tree species, assisted with landscape design, and planted

the windbreak. Media coverage was also initiated by the children.

Carlstrom says that "the kids are so proud to be a part of improving their school grounds and the environment as a whole." Besides the fact that the school is located near a farming community and the windbreak is a necessity because of fierce Montana winds, she is excited about the hands-on experience that the outdoor lab provides the children now, and well into the future.

Two Crops...From The Same Land

Any time grasses, annual crops, or trees are intentionally mixed on a parcel of land, it creates a complex system that requires special management, but produces multiple benefits — both financial and environmental. And, alley cropping using eastern black walnut trees as a long-term investment, is a good example.

Alley cropping is growing an agricultural or horticultural crop, simultaneously with a long-term tree crop, to provide income from the land while it's being converted to woodland. Once trees grow large enough and begin to shade crops, a grass mixture can be planted between the tree rows to graze livestock or produce hay.

Jim Jones, Vice President of Hammons Products Company in Stockton, Missouri (the only nut processing company in the United States) feels that his primary responsibility is to ensure a nut crop for the future. And, it's because of this that his company turned to promoting the agroforestry technique of alley cropping.

The economics of a system play an important role in the success of alley cropping too, and Bill Kurtz, Professor of Economics at the University of Missouri, cites definite advantages for landowners.

Incorporating black walnut trees

into an alley cropping system optimizes use of the land. A study done by the University of Missouri shows that returns from the land, and the value of the land itself, continue to increase, especially as the trees age.

Many financial benefits, aside from regular income from nut production (once the trees reach 15 to 20 years), exist and continue throughout the rotation of the tree crop. For example, establishing an alley cropping system allows a landowner to diversify their farming operation. Also, most tree maintenance work is done during the late fall and winter months — the off-season of farming. Alley cropping can additionally provide a money-making hobby for retired individuals.

Another factor worth considering is that trees, planted in rows will serve as a windbreak and control soil erosion as well as yield a return, often times more

than a field planted with crops only. Finally, thinning activities, which provide commercially marketable saw logs produces mid-rotation income for the landowner. And, ultimately the harvesting of high-quality veneer wood yields about \$1.00 per board foot!

It's important to remember that proper management skills are a must. If a landowner has done their homework, and is willing to work closely with a knowledgeable professional, black walnut alley cropping is a long-term investment that can't be beat!



An example of an alley cropping system using eastern black walnut trees and soybeans.

More Than Just A Windbreak

Windbreaks can be utilized to do a lot more than break the wind and reduce soil erosion! In parts of the United States like the southwest, where overall precipitation is low, but snowfall is heavy, and winds are high, they're often referred to as "living snowfences."

The first, and most traditional purpose of a living snowfence is to strategically "trap" snow to keep it away from roads, livestock, working areas, or other structures... just as traditional slatted snowfences do.

The second, and more unique, purpose of a living snowfence is to disperse snow across a large area. This becomes quite an art, as the density

and composition of the planting play a major role in the success of snow distribution. The planting needs to be approximately 35 to 50 percent dense, depending on the site, and is usually made up of a mixture of evergreen and deciduous trees.

Strategically distributing moisture can do several things. For one, it can manipulate the native vegetation that will grow in a given area. By simply "storing" snow and providing additional moisture, a typical warm season pasture can have the potential to produce a warm/cool season mix that is better for livestock, hay production, and wildlife.

Another way to benefit from

manipulating snow distribution is to store it in an area where snow melt can drain into a water collection site, like a pond. This allows a landowner to use the water at a later date for stock watering or irrigation purposes.

According to Hal Brockman, forester for the New Mexico Natural Resources Conservation Service, there are over 100 sites in the New Mexico, Colorado, Oklahoma, and Texas area that use variations of this method. The goal is to protect areas and strategically distribute snow for maximum water usage. The benefits and success of living snowfences is so high that 65-75 percent of Stewardship Incentive Program funds in New Mexico are used for this purpose.

Money Really Can Grow ~~ON~~ UNDER Trees

American ginseng, a shade-loving herbaceous plant native to the hardwood forests of the northeast, is an herb with medicinal values that have long been recognized in the Orient. Furthermore, it has significant economic value and can be "wild" cultivated under a forest cover.

For its 5,000-year known history, ginseng has been taken as a general health tonic or to bring about a level of "balance" in the body. It is recommended as a safe, effective, natural stimulant; a health tonic; a herb that provides various psychological benefits; and acts as an anti-stress supplement, natural regulator of blood pressure, and an anti-diabetic. Additionally, it may increase sexual function; reduce the side effects of menopause; and actually slow down the ageing process.

The slow-maturing crop has strict, but reasonable, demands. It thrives in fertile, wooded, well-drained soil, needs critical amounts of shade and moisture, and must be protected from animal and human predators.

A grower can invest large amounts of money on equipment, tillage, sprays, and artificial shading in a high-

ly managed system. But, a better, less costly option, is to sow seed in a natural wooded setting. The naturally grown ginseng is in higher demand and also commands the highest prices. Wild-simulated ginseng usually brings from \$100 to \$200 per pound but has sold for as high as \$400 per pound!

In New York alone, ginseng is a million-dollar-per-year commodity. About 90 percent of the estimated annual 1,000-ton North American crop is exported to the Far East.

It's the root that is so valued and used for medicinal purposes. But, be careful, it takes 60 to 90 mature, dried roots to make a pound of marketable ginseng. The shrinkage from fresh to dry roots is significant, about 70 percent, so be cautious in estimating success.

Bob Beyfuss, Cornell Cooperative Extension County Agent, feels that there is great potential for forest cultivation of ginseng. It's a great opportunity for small scale woodlot owners because typically only small plots (the average size is less than one acre) are planted. It also takes a lot of work and the crop needs to be hand cultivated.

More and more people in the United States, and in other western countries, are beginning to listen more attentively to the folk wisdom of people who have been reaping the benefits of medicinal plants for centuries. If the proper environment exists and a landowner has the willingness to invest some time and effort into a alternative crop, ginseng could be the way to go.

Fourth North American Agroforestry Conference

July 23-26

Boise, Idaho

For More Information Contact:

Dr. John Ehrenreich

208-885-7600

Properly spaced working trees placed around homes, businesses, and other public facilities reduce energy costs and evapotranspiration from lawns and gardens. They also provide aesthetic value. Homes protected by shade trees or windbreaks can expect energy savings of 15-30 percent in the winter and 10-20 percent in the summer.

Rows of trees planted between residential areas and unsightly or loud areas can screen and buffer residents from unwelcome sights, sound, or dust associated with roads, industry, organized sports, businesses, or landfills. Reduction of sound levels in the range of 8-12 decibels (approximately half as loud) are common for tree, shrub, and grass combinations.

Natural or re-established streamside forests made up of trees, shrubs, and grass plantings help filter pollution from lawn runoff before it enters streams and rivers. These filter strips also reduce bank erosion, protect aquatic environments, enhance wildlife, provide recreational sites, and increase biodiversity.

Rows of trees near access roads and emergency routes reduce dangerous crosswinds, limit snow drift, lower snow removal costs, and increase driving safety. These "living snowfences" can also be designed to enhance recreational activities. For example, hiking and biking trails can be incorporated between rows of trees and berry producing shrubs mixed into the planting improve songbird and wildlife habitat.

Strategically placed plantings of trees, shrubs, grasses, and food sources provide havens for wildlife. This vegetation provides necessary food, shelter, breeding, and nesting sites. Wildlife plantings can be incorporated into backyards, recreation areas, or any open space that allows for the proper combination of plants and an available water supply.

As you can see, narrow rows of trees improve community environments for both work and play. Since agroforestry technologies such as windbreaks, living snowfences, erosion control plantations, and riparian

buffer strips provide conservation, economic, wildlife, and aesthetic value in rural America, it seems logical they have an important role to play in urban or community natural resource management, as well. And, working tree practices effectively conserve energy and natural resources, diversify the environment, and improve the environment for people.

A private nonprofit foundation has been created to administer the working trees in communities concept. The Plant-A-Tree/Help-A-Kid (PAT/HAK) Foundation has taken one more step toward a more sustainable future and added a youth component to the working trees concept. PAT/HAK functions to solicit and administer working trees projects by locating worthy projects, soliciting outside funding, and involving local youth groups to assist with the planning, planting, and maintenance of the project. These activities create a better environment for the community and at the same time foster environmental education for the children.

For more information about PAT/HAK, or if you know of a potential project, contact: Carol Green, GreenTree, 4125 Mill, Kansas City, Missouri 64111. Phone: 816-753-1147. FAX: 816-756-1135.

Working Group, and with the agronomy profession through active discussion to convene an Agroforestry Symposium at the 1996 American Society of Agronomy national meeting. That symposium will yield a state-of-the-art textbook on agroforestry in the US. AFTA has also initiated a dialogue with the sustainable agriculture community. As an example, with the assistance of Dr. Garth Youngberg, Director of the Wallace Institute for Alternative Agriculture, the Wallace Institute recently sponsored a "primer" on agroforestry to introduce agroforestry to a diverse assemblage of key individuals in Washington, DC.

US agroforestry has come a long way in a very short time and is in a very dynamic period of growth and development. The NAC, federal inter-agency partnerships, regional organizations, state and provincial coalitions, presence of AFTA and its developing linkages with traditional disciplines, conservation and sustainable agriculture organizations, plus increasing educational opportunities being developed in Universities and Colleges throughout the US and Canada, all bode well for the future of agroforestry in the US. All of these efforts, working in synch, will help change and broaden our national vision of land use to include agroforestry as a viable land-use practice.

Worms Fly and Swim to Rescue Trees

Flying worms? Worms that swim into dark tunnels to rescue trees from certain death? No, this is not science fiction. It is an ingenious use of a biological alternative to chemical pesticides that is proving effective against boring insects that destroy dogwoods, lilacs, and peach trees. Scientists at Biosys, Inc. of Palo Alto, California, have isolated a species of tiny, worm-like nematode that likes nothing better than to find a boring insect inside a tree, enter its body, and live there until it kills the host. Unlike their cousins that can damage plant roots, nematodes that attack insects have no appetite for plants and are not known to be harmful to humans or the environment. Tree experts can spray a mixture of nematodes and water on a tree after the boring insect has started to tunnel into the wood. The tunnel provides just the kind of dark, moist place nematodes enjoy. Using water from the spray application, the nematodes swim their way through the tunnel until they encounter the insect larvae, and the rest is history!

Source: *Arbor Day*, January/February, 1994.