

# The *Temperate Agroforester*

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## Silvopasture Systems Demonstrated by AgroForest Wisconsin

By Miles Merwin

Farmers in Wisconsin have the opportunity to see first hand a project that will demonstrate the feasibility and profitability of combining trees, forage crops and livestock. AgroForest Wisconsin at Sunnyhill Acres in Sheboygan County is managed by fifth generation farmer Geoff King. Additional funding over three years will be provided by the Sustainable Agriculture Program of the Wisconsin Department of Agriculture, Trade and Consumer Protection.

"The addition of a forestry enterprise to the annual ag crop will diversify and stabilize per acre income, and benefit whole farm profitability," according to Geoff King. Prior to starting the agroforestry demonstration project, Geoff was already supplementing his income from sheep grazing and forage by producing firewood and maple syrup from the mixed hardwood woodlots on his 200 acre farm.

Through new plantings and thinning of existing woodlands, AgroForest Wisconsin will show three stages in the development of a silvopastoral system. Starting last year, trees were planted on three acres of an existing mature pasture. Hybrid poplar cuttings and red oak seedlings were planted in rows 40 ft. apart at about 100 trees per acre; three poplars were

planted for each oak. Tube shelters protect the trees from animal damage and improve growing conditions.

In this silvopastoral system, pasture crops will provide short term income while tree crops of different rotation lengths will yield medium and long term returns. Forage is either grazed or mechanically harvested each year.

Geoff plans to harvest the poplars for firewood in 7-10 years as a cash crop to help cover the initial investment of tree planting. Removing the poplars will leave about 30 red oaks per acre to grow on a longer rotation for a timber crop.

"We expect to see benefits of introducing tree crops on ag land in that they will tend to increase retained snow cover, thereby adding moisture to the soil," Geoff King said, "and also reduced moisture stress on forage

crops during the mid-season heat by providing partial shading."

By wide spacing and then thinning, he aims to create a uniform canopy of oaks to improve growing conditions for the forage crops and thereby to increase yields in the second and third cuttings. Trees and perennial pastures will also reduce the potential for soil



Farmer and Project Manager Geoff King herds his sheep among trees planted in spring 1995 inside tube shelters as part of the AgroForest Wisconsin demonstration project near Cascade, WI. (Photo courtesy of The Country Today)

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## ***The Temperate Agroforester***

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### **Mission Statement**

The mission of AFTA is to advance the knowledge and application of agroforestry as an integrated land use approach to simultaneously meet economic, social and environmental needs. AFTA focuses on agroforestry in temperate zones, with an emphasis on North America. AFTA pursues its mission through networking, information exchange, public education, and policy development.

### **AFTA Membership Dues**

Regular \$15; Student \$10; Sustaining \$50;  
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### ***The Temperate Agroforester***

**Editor:** Miles Merwin

Contributions related to agroforestry are welcome. Please submit items either on PC-formatted diskette, as a text file attached to an e-mail message, or typewritten. Deadlines for submissions are the 15th of March, June, September and December. Address all items to: Miles Merwin, The Temperate Agroforester, P.O. Box 266, Lake Oswego, OR 97034, Tel. (503) 697-3370, fax (503) 697-1767, e-mail [mmerwin@teleport.com](mailto:mmerwin@teleport.com)

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## **President's Corner**

*Gene Garrett, AFTA President*

Spring greetings are extended to all as we anxiously await the arrival of warm weather. I know many of you are in the process of planning new agroforestry projects. Please be reminded that agroforestry is a new land-use concept in the temperate zone and, even as you read this, new practices are evolving. If you have a "better idea" for an agroforestry design, please share it with us through this media.

I have just returned from Washington, D.C. where Dr. Bill Rietveld, Director of the National Agroforestry Center in Lincoln, Nebraska, Dr. Bruce Wight, National Agroforester for the USDA Natural Resources Conservation Service, and I put on an "Agroforestry Stakeholders Workshop". We were pleased that many of the USDA agencies were represented along with five non-governmental organizations.

The half-day session served many purposes, but in particular it was designed to enhance the understanding of agroforestry, improve linkages between stakeholder organizations, and provide a forum for participants to have input on the future direction of our national agroforestry initiative.

Dr. Rietveld and Dr. Wight are providing excellent co-leadership on agroforestry within USDA. AFTA recognizes and appreciates their efforts and we will continue to work with them as, together, we build the future of temperate zone agroforestry. □

## **Proposals Requested for 1997 North American Agroforestry Conference**

**The Association for Temperate Agroforestry is seeking proposals from organizations interested to host, and co-sponsor with AFTA and other groups, the Fifth North American Agroforestry Conference (NAAC) to be held in 1997. For information on the submission of proposals to host the NAAC, please contact as soon as possible Dr. H.E. Gene Garrett, AFTA President, School of Natural Resources, University of Missouri, Columbia, MO 65211, Tel. (573) 882-3647, Fax 882-1977.**

# Agroforestry Symposia at 1996 Agronomy Society Meetings

By Bill Rietveld, National Agroforestry Center

In cooperation with the American Society of Agronomy (ASA), National Agroforestry Center, AFTA, and other private organizations, an agroforestry symposium will be held at the ASA meetings in 1996. Papers presented during a portion of the program related to temperate agroforestry will form the basis for a new book.

Two 4-hour sessions on agroforestry will be held at the ASA annual meetings, scheduled for November 3-8 in Indianapolis. One symposium will focus on advances in tropical agroforestry, and the other will focus on temperate agroforestry systems in North America.

## New Agroforestry Textbook

The proceedings of the temperate symposium will be published as an ASA special publication, tentatively titled "Agroforestry: an Integrated Science and Practice, Volume 1: Temperate Agroforestry Systems in North America." It is intended to be the first scientific textbook and reference on temperate agroforestry directly relevant to the US, and will be used by university students, scientists and land use professionals.

In addition to chapters authored by the symposium speakers (see below), the book will include additional chapters on the ecological foundation for agroforestry, nomenclature and classification of US agroforestry systems, and the future of agroforestry in the US. The book should be available in early 1997.

Papers presented during the tropical symposium will be published separately. Abstracts of the posters presented at the agroforestry symposia will be included in the ASA proceedings.

## Symposia Goals

The goals of the symposium are to: (1) synthesize the current level of knowledge and discuss the directions of future research, (2) enhance awareness of how integrated production and conservation systems contribute to the economic, environmental and social sustainability of ecosystems, and (3) stimulate interest in interdisciplinary research between the agriculture and forestry/natural resource communities.

The temperate agroforestry symposium is sponsored by ASA Division A-8 Integrated Agricultural Systems, and is co-chaired by Drs. Bill Rietveld and Gene

Garrett. Invited speakers and their topics for the temperate agroforestry symposia are as follows:

- *Role of agroforestry in sustainable agricultural land-use systems*: James Lassoie (Cornell University)
- *Windbreak Systems: a Versatile Technology*: James Brandle (University of Nebraska)
- *Silvopastoral Systems in Temperate Zones*: Terry Clason (Louisiana Agric. Experiment Station)
- *Alley Cropping Systems*: Gene Garrett (University of Missouri)
- *Integrated Riparian Management Systems to Protect Water Quality*: Richard Shultz (Iowa State University)
- *Forest Farming Systems*: Louise Buck (Cornell University)
- *Economics of Agroforestry*: William Kurtz (University of Missouri)
- *Social Dimensions of Agroforestry and Challenges to Obtain Adoption of Conservation Practices* (speaker TBA)

## Tropical Symposium Topics

The tropical agroforestry symposium is sponsored by ASA Division A-6 Tropical Agronomy and will be chaired by Dr. P.K.R. Nair. Speakers have been invited to make presentations on the following topics:

- *Litter Quality, Decomposition and Nutrient Release from Tree-Leaf Litter*: P. Mafongoya (Dept. of Research & Specialist Services, Zimbabwe), C. Palm (Tropical Soil and Fertility Program, Kenya), and K. Giller (University of London, UK).
- *Biophysical Interactions in Tropical Agroforestry Systems*: M.R. Rao (ICRAF, Kenya) and P.K.R. Nair (University of Florida, USA).
- *Tree-Soil Interactions in Traditional and Evolving Agroforestry Systems on Acid Soils in the Amazon Basin*: E.C.M. Fernandes (Cornell University, USA) and J.C. Matos et al. (EMBRAPA, Brazil).
- *Soil Improvement by Trees in Subhumid and Semiarid Africa*: R.J. Buresh (ICRAF, Kenya).
- *Nutrient Cycling under Mixed Tree Systems in Southeast Asia*: P.K. Khanna (CSIRO, Australia).

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# Update on Agroforestry Development Projects in Minnesota

By Jan Joannides and Scott Josiah, CINRAM

*The following information was prepared by Jan Joannides and Scott Josiah of the University of Minnesota Center for Integrated Natural Resource and Agricultural Management, and circulated to members of the Minnesota Agroforestry Coalition.*

## Riparian Restoration

Several projects are working on restoring riparian areas using agroforestry systems.

**Minnesota River Forest Restoration Initiative.** The Minnesota River Forest Restoration Initiative, initiated by MN Rural Partners with the leadership of Marcia McLaughlin, is now gaining momentum to launch a concerted effort to promote riparian agroforestry in selected areas of the Minnesota River watershed. This project hopes to provide rural economic opportunities while protecting the environment by encouraging the replacement of environmentally sensitive riparian cropland with stands of native species and hybrid poplars. This initiative plans to install a number of agroforestry demonstrations that will also be used (should funds be located) for research purposes.

### Long Prairie River Stewardship Project.

The Long Prairie River Stewardship Project is a local attempt to interact with and educate the community on issues pertaining to the river. The Long Prairie River meanders approximately 100 miles from its source at Lake Carlos near Alexandria, Minnesota to the confluence with the Crow Wing River near Motley, Minnesota. The watershed drains about 1000 square miles from 5 counties.

A current focus of this project is to promote streamside plantings which are an easy way for local people to potentially enhance water quality and improve the river environment. Greg Nolan is coordinating this project and plans to install a number of plantings on cooperator lands along the Long Prairie River this spring. Plantings will incorporate a range of species planted in a variety of arrangements according to landowner goals and desires.

Greg feels that landowner participation is essential to the long-term success of the plantings. CINRAM, in collaboration with the Minnesota Rural Partner's Minnesota River Forest Restoration Initiative and agency personnel, is working with Greg to develop a series of options for riparian plantings that landowners can

choose from to meet their own objectives and that fit specific site conditions.

## Hybrid Poplar

Interest in hybrid poplar continues to gain momentum across Minnesota as a short rotation woody crop. The primary market appears to be the pulp and paper industry, composite board companies, and energy companies. Several timber companies are purchasing large land holdings solely for the production of hybrid poplar.

The bulk of our information on hybrid poplar activities comes from WesMin RC&D which continues to blaze ahead with promoting and developing the hybrid poplar industry in Minnesota. The following information comes directly from the WesMin RC&D Council's January 1996 Highlights.

**MN Wood Energy Scale-Up Project - Phases 1 & 2.** WesMin is cosponsoring the nation's first biomass-to-electrical energy project utilizing hybrid poplar trees. The purpose of the project is to test whether large-scale plantings of hybrid poplar are possible and can produce biomass to help meet future energy needs. A total of 2,500 acres of hybrid poplar now exists in a 50-mile radius of Alexandria. Each plantation is being evaluated and cultural treatment prescriptions are being planned. The WesMin Council is serving as local coordinator and administrator of the \$750,000 project. Project partners include DNR-Forestry, Northern States Power Company, the Electric Power Research Institute, U.S. Department of Energy - Oak Ridge National Lab, and the US Forest Service.

The WesMin Council also has been selected to receive a \$250,000 grant from the McKnight Foundation of Minneapolis, MN. The grant will advance work on the MN Wood Energy Scale-Up Project to additional areas of Minnesota. The grant will also enable WesMin to develop marketing, management, and training programs for the poplar plantations and document the social, economic, and environmental benefits. This will include benefits from supplying fuel for biomass power plants and fiber for wood processors in Minnesota, as well as providing farmers with new income sources.

**Minnesota Agro-Forestry Cooperative.** In December and January, the WesMin Council held

three meetings with potential growers. Over 180 people attended to hear about hybrid poplar and the new cooperative. The cooperative has filed articles of incorporation and completed membership agreements and disclosure statements for use at an upcoming meeting. The WesMin staff have also completed an application to the University of Wisconsin - River Falls for a Cooperative Development Initiative Grant which would help with technical support for the cooperative.

**Whole Tree Energy™ Update.** Energy Performance Systems, Inc. (EPS) remains on a "short list" of proposals being considered by Northern States Power Company (NSP) for funding. The EPS proposal and two other proposals are seeking to produce electricity from biomass in an effort to meet energy production mandates placed on NSP. The WesMin Council has been working with EPS to establish a Whole Tree Energy™ to electrical energy demonstration power plant near Alexandria, MN. A 100 Megawatt plant would require 80,000 acres of hybrid poplar trees as feedstock and would generate approximately 600 jobs.

**Hybrid Poplar Related Research:** The WesMin RC & D Council is involved in several research related projects necessary to support the MN Wood Energy Scale-Up project and eventual commercialization of hybrid poplar as an alternative long-term crop. The following research began in 1995:

*Hybrid Poplar Herbicide Trial:* A replicated experiment testing the effects of 11 herbicides on hybrid poplar.

*Plastic Film Mulch Research Plots:* Evaluate the effect of porous black plastic mulch on the survival and growth of hybrid poplar in a plantation setting on three different soil types. Each plot is about 1 acre in size, with 600 trees per plot. WesMin staff are responsible for site selection, layout, planting, and weekly monitoring for soil temperatures and moisture content, and physical responses.

*Regional Hybrid Cottonwood Planting:* Four sites in the upper Midwest (MN, IA, MI, WI) were selected for the planting of about 80 different hybrid cottonwood selections to determine climatic suitability, growth characteristics, and disease resistance. The Minnesota site is located at the Rosholt Farm (Westport, MN). The University of MN and the USFS are the principle research institutions. Pope SWCD is responsible for maintenance of the plot (weed control, etc.). WesMin serves as a liaison between the USFS and the SWCD and also assisted with plot layout and planting.

*Hybrid Poplar Stool Bed:* Since 1993, the Pope SWCD and WesMin have cooperated to operate a hybrid poplar stool bed (nursery) at Rosholt Farm. The primary purpose behind establishment of the stool bed was to increase the amount of newly released hybrid poplar clonal stock and focus distribution to private nurseries. To date the stool bed has supplied nearly 200,000 hybrid poplar "sticks" to six private nurseries, three fiber companies, and about 80,000 sticks to the local hybrid poplar planting efforts. The stool bed also provides a modest annual return to each partner. Several comments have been received about the outstanding quality of the stock. Production from this year's harvest is expected to approach 200,000 cuttings. Harvest will be completed in November and December.

### Windbreaks

Prairie County RC & D has been successfully promoting the use of windbreaks to protect small rural communities from strong winds. The program began with several successful demonstration windbreaks strategically located in high visibility areas. The windbreaks clearly help residents conserve energy, reduce snow removal costs, and provide education, recreation, and aesthetic benefits. The positive results have inspired other towns to request assistance, with 4 windbreaks planted and 5 more planned. Some 30 additional communities in Prairie County alone are also interested! The problem is finding adequate funds to purchase the prime agricultural land necessary for the windbreaks, and to pay for planting and maintenance costs. But the message is clear, carefully promoted agroforestry technologies that address real needs in a cost effective way will be popular and will spread rapidly.

### CINRAM

The Center for Integrated Natural Resource and Agricultural Management (CINRAM) was granted \$10,000 by the Minnesota Institute for Sustainable Agriculture to establish a research and educational agenda for integrated natural resource and agricultural management in Minnesota. It is expected that agroforestry, because of its integrated nature, will be a major component of any final research agenda.

For more information, contact CINRAM, 115 Green Hall, University of Minnesota, 1530 N. Cleveland Avenue, St. Paul, MN 55108, Phone: 612/624-7418; Fax: 612/625-5212; e-mail: joann001@maroon.tc.umn.edu. □

# National Agroforestry Center Programs and Regional Contacts

The National Agroforestry Center (NAC) is a pioneering program to accelerate the development of agroforestry, a science and practice that integrates agriculture and forestry land uses. An interagency joint-venture, it combines resources of the USDA Forest Service and Natural Resources Conservation Service to develop and apply agroforestry technologies in appropriate conservation and/or production systems for farms, ranches, and communities.

The Center serves as a catalyst to form partnerships, promote cooperation, and leverage resources. NAC cooperates with a national network of agencies, universities, and organizations to encourage agroforestry research and technology transfer. The Center strives to develop and deliver agroforestry technologies based on the needs of resource professionals assisting landowners.

**Research & Development:** Forest Service scientists and co-located NRCS scientists from the Watershed Sciences Institute and the Wetlands Science Institute work with university cooperators to develop and integrate agroforestry technologies to attain more economically, environmentally, and socially sustainable ecosystems. Areas of emphasis include:

- Genetically improved multipurpose trees for agroforestry plantings
- Riparian buffer systems and bioengineering technologies for farms and communities
- Integrated production/conservation systems at farm and small watershed scales
- Understanding ecological interactions within agroforestry systems
- Quantification and valuation of benefits from agroforestry practices
- Decision-support models for evaluating alternative conservation systems
- Application guidelines and tools for agroforestry technologies

**Technology Transfer & Applications:** Forest Service and NRCS Agroforesters work with a national network of cooperators to develop and distribute agroforestry technical information. Products and services include:

- Current information through *Inside Agroforestry*, the Centers newsletter
- Technical information through *Agroforestry Notes*, leaflets, videos, and displays
- Technical support to facilitate the development of agroforestry projects in the field

- Demonstrations to encourage local adoption of new/needed technologies
- Applications projects to adapt technologies to local conditions
- Assessments and case studies to assemble needed technical information
- Special projects to adapt agroforestry technologies to new situations
- Conferences and workshops to facilitate information exchange
- Training courses delivered at the regional and local levels

**International Exchange:** An International Coordinator facilitates the development of agroforestry projects with international cooperators and selectively involves agency and university professionals for mutual benefit.

- Stateside interface for the International Center for Research in Agroforestry (ICRAF).
- Technical assistance to USAID missions and Peace Corps
- Application of agroforestry technologies in cities and communities.

## Information Contacts

For more information, call 402-437-5178 (extensions listed below):

**Administration:** Dr. Bill Rietveld, Director, ext. 27

**Research & Development:** Dr. Michele Schoeneberger, Research Program Leader and Soil Scientist, ext. 21

### **Technology Transfer & Applications:**

*Northern Plains:* Jerry Bratton, FS Lead Agroforester, ext. 24

*Northeast and Midwest:* Bruce Wight, NRCS Lead Agroforester, ext. 36. Voice Mail: 1-800-384-8732, Box 945-5956

*West:* Gary Kuhn, NRCS Agroforester, NRCS Watershed Sciences Institute, Seattle, WA. Phone: 206-616-7166 (temporary). Voice Mail: 1-800-384-8732, Box 851-1570

*Southeast:* Jim Robinson, NRCS Agroforester, NRCS Grazing Lands Technology Institute, Ft. Worth, TX. Phone: 817-334-5232, ext. 3624. Voice Mail: 1-800-384-8732, Box 965-2290

**International Technology Exchange:** Dr. Sarah Workman, International Coordinator, ext. 40 ☐

# Putting the "Agro" in Agroforestry: 1995 ASA Meeting Posters

By Bruce Wight, National Agroforestry Center

"Agroforestry: Working Trees for Agroecosystems" was the theme for a poster session held at the annual meeting of the American Society of Agronomy in St. Louis in early October, 1995. The purpose of the poster session was to place more emphasis on the "agro" in agroforestry. Eleven posters were presented covering several key subject areas, including alley cropping, windbreaks, riparian buffers and silvopastoral systems. The poster abstracts are summarized below. The posters generated a lot of interest among the meeting participants and raised the general awareness of agroforestry among agronomic specialists.

**An Alleycropping Bioremediation-Biofuels System.** *J. Colletti, R. Schultz, and C. Mize, M. Thompson, I. Anderson and D. Buxton, Iowa State University.* A study was initiated to utilize treated biosolids as a "fertilizer" to increase productivity of fast-growing trees and agronomic crops in an environmentally sound manner. In a six-replicate design, tree and crops are produced in side-by-side 15 m wide alleys. The system is an alleycropping system with alternating 15 m wide strips planted to grain (corn/soybean) or forage crops (switchgrass/reed canarygrass) and trees. Tree alleys consist of 6 rows of a cottonwood hybrid planted in three sets of closely spaced rows. Treatments include a control and two levels of biosolids. Biosolids application started in 1991 with surface application in the perennial tree and forage crops, otherwise biosolids are injected. Heavy metal and nitrogen concentrations in groundwater, soil, and in plant tissue are monitored. Production costs, product yields and value, and pest problems are evaluated. Results indicate enhanced biomass production with biosolids application and minimal environmental effects on soil, groundwater, and plants. (Contact *J. Colletti, 515-294-4912*).

**A Multispecies Riparian Buffer Strip System for Reducing NPS Pollution.** *R. Schultz, J. Colletti, T. Isenhardt, C. Mize, P. Wray, W. Simpkins, M. Thompson, and J. Pease, Iowa State University.* A streamside management model is being developed on several privately owned farms in central Iowa. The model consists of a multispecies buffer strip composed of rows of trees closest to the stream, several rows of shrubs and a strip of native prairie grasses established next to the crop fields. This plant community can trap sediment, remove or immobilize up to eighty percent of certain agricultural chemicals moving through the buffer strip, provides diverse wildlife habitat and alternative products for the landowners. A second component of the model includes streambank bioengineering techniques that help to reduce streambank erosion. Various combinations of willow posts and cuttings are used with rock or red cedar to stabilize the toe and slopes of the bank. This component can virtually stop bank erosion. The third component of the system model includes small constructed wet-

lands which intercept field drainage tiles before they enter the stream. Microbial and immobilization processes are able to reduce chemical inputs by 50-80 percent depending on the time of year. (Contact *R.C. Schultz, 515-294-1458*).

**Biological Control and Beyond: Capitalizing on the Ecological Interactions of Agroforestry Systems.** *M.E. Dix, J.R. Brandle, R.J. Johnson, M.O. Harrell, R.J. Wright, R.M. Case, L. Hodges, and K.G. Hubbard, USDA-FS and Univ. of Nebraska.* Traditional farming practices tend to encourage monocultures and extensive use of pesticides limiting ecological diversity of agricultural ecosystems. As a result, populations of predators, parasites and pathogens of insect pests are reduced due to the loss of habitat and reduction of food resources. In contrast, ecosystems which have a wide variety of plant and animal species tend to dampen pest population extremes. Integration of agroforestry components into production systems increases plant and animal diversity, enhances community interactions and reduces the pressure to control pest outbreaks with pesticides. Improving ecosystem diversity allows producers to maintain economically viable operations while enhancing the overall health of the agroecosystem. (Contact *M.E. Dix, 402-437-5178, ext. 25*).

**Windbreak Technology: The Use of Windbreaks in Sustainable Agricultural Systems.** *J.R. Brandle, L. Hodges, and B.C. Wight, Univ. of Nebraska and USDA-NRCS.* Windbreaks have an important role to play in integrated agricultural systems. Trees and shrubs planted as windbreaks provide wind erosion control, improve crop yield, and enhance the quality of many wind-sensitive crops. Farmstead windbreaks protect the home and reduce energy consumption. Windbreaks reduce stress on livestock, improve weight gain, and reduce mortality of young animals. Overall windbreaks can increase the profitability of the agricultural operation. Properly designed windbreaks can provide additional income from wood products, tree crops and fuelwood while enhancing wildlife populations and adding species diversity to an otherwise limited array of crop species common in agroecosystems. Finally, windbreaks add beauty to the landscape and increase the value of the land. (Contact *J.R. Brandle, 402-472-6626*).

**Effects of Shade on Potential Forage Crops for Agroforestry Systems.** *C.H. Lin, R.L. McGraw, M.F. George, H.E. Garrett, B.J. Piottter, and J.L. Alley, Univ. of Missouri-Columbia.* In agroforestry alley-cropping systems, shade may have a significant effect on the quantity and quality of forage crops grown in the alleys. Twenty seven forages were grown in full sun and under 50% and 80% shade. Above-ground dry weight, leaf area, leaf-stem ratio, internode length and specific leaf dry weight were measured in each shade environment. Two *Desmodium* species (*D. paniculatum* and *D. canescens*) displayed tolerance of shade and had greater dry weights at 50% and 80% shade than in full sun. Similarly, two cultivars of tall fescue ('Ky31' and 'Martin') exhib-

ited higher dry weights at 50% shade than in full sun. Five cool season grasses (Kentucky bluegrass, orchard grass, ryegrass, smooth brome and timothy), two legumes (white clover and alfalfa 'Cody'), and one warm season grass (Indian grass) did not show significant reductions in dry weight under 50% shade. Moreover, ryegrass, smooth brome grass, and timothy displayed no significant reduction in dry weight under 80% shade. Most plants displayed changes in morphological development. In general, internode length and leaf area increased while specific leaf dry weight decreased as shade level increased. (Contact C.H Lin, 573-882-6416).

**Agroforestry on Western Oregon Hill Lands.** S. H. Sharrow, Oregon State Univ., Corvallis. There are approximately one million hectares of hill lands in the Pacific Northwest. Much of this land historically supported oak woodland. Livestock grazing and farm woodlots are their primary agricultural uses. Hill lands will support conifer forests. Agroforestry may present some opportunities to increase productivity by intensifying management on these lands. Douglas-fir/pasture systems are more productive than forest or pastures alone. Five-year average (1990-1994) forage production was 4400, 4900, and 3000 kg/ha for agroforests, pastures, and forests, respectively. Approximately 50% of the forage produced each year was consumed by sheep grazing pastures or agroforests. Agroforest trees were approximately 14 cm taller than were forest trees in November 1994. A average annual tree diameter growth was 14% greater in agroforests than in forests during 1990-1994. High productivity of agroforests results from efficient site resource sharing of trees and pasture plants in time and space. (Contact S.H. Sharrow, 541-737-1627).

**Alley-Cropping: An Agroforestry System.** H.E. Garrett, Univ. of Missouri-Columbia. Agroforestry, the intentional integration of agricultural and forestry based land use systems, provides multiple benefits that collectively contribute to agroecosystem sustainability and profitability. Agroforestry addresses the nation's land-stewardship needs by converting degraded lands, protecting sensitive lands and diversifying farm production systems. Alley cropping, a form of agroforestry where tree rows are widely spaced and the alleyways planted with agronomic crops (row crops and cover crops) and specialty crops, is rapidly emerging as a viable land use alternative. The benefits derived include increasing and diversifying farm incomes, abating soil erosion and nutrient loading, and protecting watersheds. In the five Midwestern states of Missouri, Illinois, Indiana, Iowa and Ohio more than 19 million acres of cropland have been identified that have an erodibility index greater than 10. Approximately 9 million of these acres are recommended for forestry planting and would benefit from the application of alley cropping technology. (Contact H.E. Garrett, 573-882-3647).

**Soil Bioengineering: Trees, Shrubs, and Grasses for Stable Slopes.** B.C. Wight, G. Wells and J. Dickerson, USDA-NRCS. The value of vegetation to reduce soil erosion has long been recognized. However, the value of woody vegetation to reinforce slopes and to provide barriers to earth movement have been over-

looked. Soil bioengineering combines mechanical, biological and ecological concepts for slope protection and bank stabilization. Soil bioengineering is an applied science that utilizes woody species that can root from cuttings to create a living structure for slope stabilization. When properly designed, soil bioengineering techniques not only help to stabilize slopes, they also improve infiltration, filter runoff, transpire excess moisture, moderate ground temperatures, improve habitat and enhance aesthetics. This paper will discuss the design and installation of various soil bioengineering techniques used to stabilize slopes, which include live staking, brush mattress, brushlayer, live fascine, branchpacking, and post planting. (Contact B.C. Wight, 402-437-5178, ext. 36).

**Avian Use of Woody Vegetation in Agricultural Landscapes.** N. Sunderman, F.L. Fitzmaurice, R.J. Johnson, J.R. Brandle, M.E. Dix, L. Hodges, L. Young, R.M. Case and R.J. Wright. Univ. of Nebraska-Lincoln and USDA-FS. Agroforestry systems offer options for maintaining agricultural competitiveness while enhancing stewardship of soil, water and living wild resources. Agricultural landscapes tend to be intense monocultures with various biological system functions replaced with external inputs. Diversity of plant and animal life in agricultural systems is primarily associated with crop field edges such as windbreaks, riparian zones, and other habitats adjacent to the crop system. Many birds, small mammals and other predatory organisms associated with these edges consume pest insects in the edges and in the adjacent fields. These natural enemies offer a potential key to buffering pest outbreaks and reducing the need for pesticide use. (Contact R.J. Johnson, 402-472-6823).

**Riparian Buffer Systems: An Integrated Approach.** M. Schoeneberger, M. Dosskey, G. Bratton, G. Wells, B. Wight, K. Hoagland and J. Brandle, USDA-FS, USDA-NRCS and Univ. of Nebraska-Lincoln. Multistrata riparian buffer systems that include trees have the potential to provide effective nonpoint source pollution control while providing additional benefits like wildlife and fish habitat, recreational opportunities, and tree products to the landowner. Buffer system design, and thus ultimate performance, is dependent on prediction of the nonpoint source load, the hydrologic connection between the load and the riparian location, and the additional by-products the landowner wants. An inter-agency partnership is utilizing an integrated approach of research, demonstration and application, and information and education to adapt and promote multistrata riparian buffer technologies as an integral BMP in agricultural and urban environments of the Great Plains and Midwest. (Contact M. Schoeneberger, 402-437-5178, ext. 21).

**Forest Farming: High Value Understory Edible Crops for Integrated Production Systems.** L.E. Buck, J.P. Lassoie, and R. Beyfus, Cornell University. Forest farming refers to cultivation under woodland shade, and to the planting and culture of edible tree crops combined with belts or blocks of edible forage or herbage. Both hold increasing promise for combining conservation and economic vitality objectives in the Northeastern United States. (Contact L.E. Buck, 607-257-0951). □



## ► **AgroForest Wisconsin**

erosion on his hillsides.

The second phase of the AgroForest Wisconsin project will try to show landowners who have acreage currently in the Conservation Reserve Program (CRP) that agroforestry can be a financially and environmentally attractive alternative to the resumption of tillage. Maple saplings will be transplanted from nearby woodlands into another mature pasture at wide spacing, thereby creating an intermediate term silvopasture. Permanent pasture will support annual grazing beneath the trees. As the maples mature, they will be tapped for the production of syrup, and could eventually be harvested for a wood crop.

"We hope to demonstrate an option to landowners who have acreage coming out of CRP, rather than returning to tillage," Geoff said. "Although some CRP acres have been planted with trees, waiting for those trees to become marketable may not be financially feasible without that land generating annual income. Silvopasturing or alley cropping may be solutions."

The third component of the AgroForest Wisconsin demonstration involves thinning of an existing woodland and the introduction of rotational grazing. King plans to thin one of the farm woodlots to about 30 trees per acre. Pasture acreage will be increased by the establishment of grass clover beneath the trees for sheep grazing. A working example of a mature silvopasture with 60-90 year old trees will thus be created.

"By establishing a forage crop in existing wooded acres," Geoff said, "additional grazing paddocks will

add flexibility to our rotational grazing and provide benefit to livestock in reducing weather-related stress from heat and wind." He expects that both crop and livestock production will increase through the use of widely-spaced trees and rotational grazing.

With uniform canopy cover, livestock will be less likely to congregate under individual trees. Rotating sheep from one paddock to the next reduces the potential for tree damage and also lessens their impact on the pasture. Animal health will also benefit from the shade and shelter provided by the trees.

## **Monitoring and Outreach**

Throughout the duration of the AgroForest Wisconsin project, Geoff King and others will monitor tree growth, crop and animal yields, fuel use and soil fertility. The practical results of the project will be shared with other farmers, both through on-site field days and educational displays at other meetings.

The first field day will be held at Sunnyhill Acres on June 1, 1996. Information on AgroForest Wisconsin will be displayed at conferences of the Wisconsin Woodland Owners, Wisconsin Graziers, Wisconsin Shepherds and Wisconsin Farm Progress Days.

A brochure which briefly describes the project and contains a map for visitors to the site is available. For more information, contact Geoff King, AgroForest Wisconsin Project Manager, Sunnyhill Acres, N2889 County Hwy. W, Cascade, WI 53011, tel. (414) 528-8773. □

*Thanks to Geoff King, Mary Hoff and The Country Today newspaper for their assistance with this story.*

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## ► **Agroforestry Symposia**

- *Agroforestry and Management of Sloping Lands*: E. Craswell (IBSRAM, Thailand).
- *Shade Management in Coffee and Cacao Plantations*: J. Beer et al. (CATIE, Costa Rica).
- *Domestication and Commercialization of Indigenous Trees in Agroforestry for the Alleviation of Poverty*: R.R.B. Leakey and A.J. Simons (ICRAF, Nairobi).
- *Genetic Improvement of Agroforestry Trees*: T. Simons (ICRAF, Nairobi) and J. Weber (ICRAF/CIAT, Colombia).
- *On-Farm Research and Technology Testing in Agroforestry*: P. Rosseau (Auburn University, USA), M. Bannister (PADEF, Haiti) and J. Henao (International Fertilizer Development Center, USA).
- *Socioeconomic Research in Agroforestry: Progress,*

*Prospects and Priorities*: E. Mercer (US Forest Service, USA).

For further information about the temperate agroforestry symposium at the ASA 1996 meetings, contact either Bill Rietveld, USDA National Agroforestry Center, East Campus-UNL, Lincoln, NE 68583, tel. 402-437-5178, ext. 27, or Gene Garrett, School of Natural Resources, University of Missouri, Columbia, MO 65211, tel. 573-882-3647.

Questions regarding the tropical symposium should be addressed to P.K.R. Nair, School of Forest Resources and Conservation, University of Florida, Gainesville, FL 32611, tel. 352-846-0880.

For information about registration at the ASA meeting, contact David Kral, Associate Executive VP, American Society of Agronomy, 677 S. Segoe Rd., Madison, WI 53711, tel. (608) 273-8080, fax 273-2021. □



### New Release of WBECON Program

Jim Brandle of the University of Nebraska has released a new version (2.2) of the WBECON program. The computer software helps landowners and public agency advisors evaluate the economic costs and benefits of field windbreaks. The new update corrects an error in the routine that calculates windbreak costs.

To obtain a copy of Version 2.2, send a 3.5 inch diskette with a self-addressed, stamped envelope to Jim Brandle, Dept. of Forestry, Fisheries and Wildlife, University of Nebraska, Lincoln, NE 68583-0814.

### New Book on Tagasaste Fodder Tree

Lawrence C. Snook, 1996, *Tagasaste*, Second Edition, Agrovision, 132 p.

Tagasaste (*Chamaecytisus palmensis*) is a hardy leguminous shrub which provides high-protein green fodder for livestock. This updated edition details the experience of farmers in Australia and other dryland regions who are using tagasaste not only for fodder, but also livestock shelter, aquaculture, erosion control, wildlife habitat and firebreaks.

Postpaid price is US\$25 (A\$19.95 in Australia and NZ). Order from Agrovision, P.O. Box 2223, Mansfield, QLD 4122, Australia.

### Incentives for Private Forest Conservation

Kirk Johnson, 1995, *Building Forest Wealth*, University of Washington, 44 p.

This report offers proposals for economic incentives to encourage private forest landowners to adopt forest stewardship practices and to promote long-term productivity of private forest land. Recommendations cover a variety of topics, including tax incentives, regulatory stability, ecosystem management, landowner education, cost-share programs, conservation easements and value-added forest products.

To order, send \$12.50 (includes postage) to: Northwest Policy Center, University of Washington, 327 Parrington Hall, DC-14, Seattle, WA 98195.

### Short Rotation Woody Crops Newsletter

At the Oak Ridge National Laboratory, the Short Rotation Woody Crops Operations Working Group has published its first newsletter. It is intended as a venue for sharing of technical and scientific informa-

tion among managers, researchers and manufacturers involved in plantations of fast-growing trees for fiber and fuel. Membership in the group is free and open to anyone interested in SRWC. To join the newsletter mailing list, send your name and contact details to: Bob Perlack, ORNL, Box 2008, Building 4500N, Oak Ridge, TN 37831-6205.

### Report on American Hardwoods

Harry Alden, *Hardwoods of North America*, USDA Forest Service General Technical Report.

The National Hardwood Lumber Association (NHLA) is now the exclusive distributor of this new report, billed as the most complete reference available on North American hardwoods. It contains detailed information on 107 species, including botanical description, native range, wood characteristics, mechanical properties, shrinkage, kiln drying schedules, and working properties.

Postpaid price \$13.00; order from NHLA, P.O. Box 34518, Memphis, TN 38184-0518.

### 1993 Agroforestry Conference Papers

A limited supply of the Proceedings of the Third North American Agroforestry Conference held August 15-18, 1993 in Ames, Iowa are still available. Copies can be obtained for \$20 which includes postage to US and Canadian addresses; add \$5 for shipments to other countries. Send a check payable to Iowa State University (indicate "For Proceedings-3rd NA AF Conference") to Joe Colletti, Forestry Dept., 243 Bessey Hall, Iowa State University, Ames, IA 50011-1021.

### Biological Diversity in California

A special issue of the University of California periodical, *California Agriculture*, examines biological diversity from a biological, economic and social perspective. Emphasis is placed on the role of farmers and private landowners in conserving biodiversity, and case studies describe actions to enhance wildlife habitat on farm and rangelands. The issues discussed have relevance throughout the nation. Order *California Agriculture*, Vol. 49, No. 6, Nov.-Dec. 1995, "Biological diversity: What is it and why do we care?" (\$3.00 postpaid) from DANR, University of California, 300 Lakeside Dr., 6th Floor, Oakland, CA 94612-3560. □



## Internet Resources

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### Corrected Address for AFTA Home Page

If you have had difficulties accessing the WWW home page for information on AFTA and temperate agroforestry, try the following URL:  
[http://gis.umn.edu/~hperry/agroforestry\\_home.html](http://gis.umn.edu/~hperry/agroforestry_home.html).

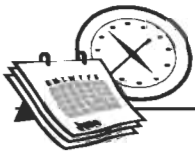
### World Forest Institute

The World Forest Institute, located in Portland, OR, has opened a Web home page. General information about WFI's products, services and internship program, articles from WFI publications, and brief descriptions of the forest resources of each of the

countries sponsoring a desk at the Institute is included. Visit the site at: <http://www.vpm.com/wfi>.

### UC Sustainable Agriculture Program

The Web page opened by the University of California Sustainable Agriculture Research and Education Program (SAREP) contains information on SAREP-funded projects and articles from seven years of quarterly newsletters. Also featured are an online Cover Crops Database, calendar of events, and links to Web and gopher sites related to sustainable agriculture. Look for it at: <http://www.sarep.ucdavis.edu>. □



## Mark Your Calendar

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**Hardwood Symposium**, May 8-11, 1996, Cashiers, NC. The 24th Hardwood Symposium, sponsored by the National Hardwood Lumber Association. For information, contact NHLA, P.O. Box 34518, Memphis, TN 38184, tel. (901) 377-1818, fax (901) 382-6419.

**Soil and Water Conservation Society**, July 7-10, 1996, Keystone, CO. The annual meeting of SWCS will focus "on individuals who manage or affect the management of natural resources, and their needs as people who are responsible for conservation of the earth's land and water resources." Contact SWCS Meeting Coordinator Nancy Herselius for conference information: SWCS, 7515 NE Ankeny Rd., Ankeny, IA 50021, tel. (800) 843-7645 ext. 18, fax (515) 289-1227, e-mail [swcs@netins.net](mailto:swcs@netins.net).

**Fifth Black Walnut Symposium**, July 28-31, 1996, Springfield, MO. As part of the Walnut Council annual meeting, there will be two full days of technical presentations on all aspects of managing walnut, especially the use of agroforestry. A field tour is planned to the Hammons Products Co. to see their agroforestry program. For details contact: James Jones, Hammons Products Co., 217 Hammons Dr., Stockton, MO, 65785, tel (417) 276-5181, fax 276-5187.

**Short Rotation Woody Crops**, Sept. 23-25, Paducah, KY. This first conference of the Short Rotation Woody Crops Operations Working Group will include an organizational meeting, technical workshop, and field tour. Registration prior to July 31 is \$100 (\$125 thereafter). Contact Ms. Wilma McNabb, Biofuels Feedstock Development Program, ORNL, P.O. Box 6422, Oak Ridge, TN 37831-6422, tel. (423) 574-8029, fax 576-8143, e-mail [wmx@ornl.gov](mailto:wmx@ornl.gov).

**SAF Agroforestry Working Group**, Nov. 11-12, Albuquerque, NM. During the Society of American Foresters annual meeting, the Agroforestry Working Group will sponsor a technical session dealing with the establishment, care and management of trees in agricultural land use systems. For information, contact Russell Hatz, USDA-NRCS, 101 SW Main, #1300, Portland, OR 97204-3221, tel. (503) 414-3235, fax 414-3277, e-mail [hatzr@scsor.attmail.com](mailto:hatzr@scsor.attmail.com). □

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## Networking Partners

### NFTA Merges with Winrock's FACT Net

Winrock International's Forestry and Natural Resource Management Division has assimilated the Nitrogen Fixing Tree Association (NFTA) into a new Forest, Farm and Community Tree Network (FACT Net).

Through applied research, extension and communication activities, NFTA for 15 years focused on the use of nitrogen fixing trees for sustainable agriculture and environmental protection. Winrock has also been a leader in multipurpose tree research and extension, and managed the Forestry/Fuelwood Research and Development Project (F/FRED) for 10 years.

The FACT Net will publish research and extension materials on both N-fixing and non-fixing multipurpose tree species. Starting this year, regular publications will include: FACT Sheets (6 per year), FACT Net News (3 per year) and Forest, Farm and Community Tree Research Reports (annual and special reports). Winrock forestry staff will continue the "global extension service" started by NFTA to answer tree-planting questions.

For more information about joining FACT Net, contact Winrock International, Rt. 3, Box 376, Morrilton, AR 72110, tel. (501) 727-5435, fax 727-5417, e-mail [forestry@msmail.winrock.org](mailto:forestry@msmail.winrock.org).

## Membership Application

**JOIN US!** Your membership in AFTA includes a subscription to our quarterly newsletter, a membership directory (updated annually), discounts on publications of special interest, information on upcoming meetings, and the opportunity to work with others to promote more productive and sustainable land management.

**Annual Membership Dues**  Regular \$15; Student \$10; Sustaining \$50; Institutions \$20; Lifetime \$300

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Main Agroforestry Interests \_\_\_\_\_

Membership dues can be paid by a check drawn on a U.S. bank in U.S. dollars payable to AFTA. Please send completed application and dues to: AFTA, c/o Dr. Deborah Hill, Treasurer, Department of Forestry, University of Kentucky, Lexington, KY 40546-0073, USA.