



# The **Temperate Agroforester**

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## **New Opportunities for Agroforestry in 1996 FAIR Act**

By Dan Cassidy, FAPRI, University of Missouri

On April 4, President Bill Clinton signed the Federal Agricultural Improvement and Reform Act of 1996 (FAIR). The new legislation provides authorization for some of the most sweeping reform of US agricultural policy in decades. This new era of agriculture, referred by some as "Freedom to Farm", presents new opportunities to enhance agroforestry applications within the US.

The FAIR Act was developed neither quickly nor easily. Congress and the Clinton Administration sought a new farm bill that would be more market-oriented, while providing greater planting flexibility. Further, they looked to maintain export competitiveness while reducing federal outlays. After months of negotiations, Congress approved the FAIR Act, guaranteeing producers a set of declining farm program payments over the next seven years that are not tied to production of a specific crop, nor are they tied to market prices. Total spending for these Market Transition Payments (MTP) over seven years is estimated at \$36.4 billion through 2002.

This significant change in US farm policy comes at

a time when US reserves of primary crops (feed grains, food grains and cotton) are low and prices are unusually high. Corn reserves are the lowest in years and prices have skyrocketed. While this is good for crop producers, it further reduces returns in an already bearish livestock market. These high crop prices and the change in the program are expected to result in higher planted acreage of several crops in 1996 and 1997.

The commodity provisions of the FAIR Act will have a direct effect on agroforestry practices. Major changes in commodity programs include: elimination of annual Acreage Reduction Programs (ARPs); ability to plant based on market conditions; calculation of farm program payments based on fixed rates that are decoupled from market prices; and eligibility to receive payments regardless of whether a crop is planted.

In other words, once a landowner has enrolled in the program, regardless of what is planted, they will

► **FAIR Act, p. 3**

## **The "Safe Harbor" Agricultural Wildlife Conservation Program**

*Planting trees on farms for agroforestry often creates new habitat for wildlife. However, when such plantings could potentially encourage threatened and endangered species, landowners are concerned about possible government interference if protected species are found on their land. A new program in California seeks to allay some of these fears — Ed.*

The California Department of Fish and Game (CDFG), in conjunction with the U.S. Fish and Wildlife Service, is proposing a "safe harbor" agricultural wildlife conservation program for the San Joaquin Valley. The "safe harbor" program was developed in response to agriculturists who wanted to integrate

wildlife habitat into their farming, but who had concerns that threatened or endangered species occurrence in the created habitat might create future liabilities. The CDFG is being assisted in this effort by the American Farmland Trust, a non-profit organization dedicated to protecting farmland and promoting farming practices that lead to a healthy environment.

Under the "safe harbor" program, landowners who voluntarily enter into Cooperative Agreements with the CDFG to create or enhance wildlife habitat on their property will receive "safe harbor" from future li-

► **Safe Harbor, p. 7**

## ***The Temperate Agroforester***

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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.

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*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 type-written. 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 [mimerwin@teleport.com](mailto:mimerwin@teleport.com)

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## **President's Corner**

*By Gene Garrett, AFTA President*

Greetings. Since my last message much has happened in agroforestry. I marvel at how rapidly this field of study is being recognized as an alternative to the way we have practiced agriculture and forestry in years past.

In the Spring issue of our newsletter, I identified a "stakeholders" workshop that had just taken place in Washington. I am pleased to report that Senators Bond and Kerry, respectively of Missouri and Nebraska, followed up on that workshop with a meeting with representatives of USDA agencies and the EPA. Basically, all agencies represented at this meeting were very positive about the future of agroforestry in the temperate zone. In particular, they felt agroforestry had an important role to play in the sustainable agriculture movement. I could not agree more with their assessment. Agroforestry is unique in what it offers. As part of an ecologically-based land management system, it can contribute substantially to generating the ecosystem diversity and processes important to long-term sustainability and profitability.

We are very pleased that the various USDA agencies and the EPA can see the potential benefits of agroforestry and have come out in support of it. This tells me that our organization (and, in particular, the membership) is doing a good job of getting the word out. Keep up the good work!

We are in need of agroforestry "success stories" for the newsletter. Those of you with stories to share are encouraged to contact Miles Merwin, our editor. □

### **Agroforestry Slides Wanted**

AFTA still needs additional slides of temperate agroforestry practices in order to develop a more extensive slide set on this topic. The slide set (or sets) depicting temperate agroforestry practices will be sold for use as teaching and promotional aids for classrooms, conferences, fairs, etc. Please send duplicates (return of originals cannot be guaranteed) with a brief description of the practice depicted, location, year and any other relevant information to Dr. Michael Gold, Forestry Department, Michigan State University, East Lansing, MI 48824-1222, USA. □

## ► FAIR Act

receive annual payments for the next seven years. A crop does not have to be planted to receive an MTP.

The FAIR Act modifies and reauthorizes several existing conservation provisions and creates new programs to address specific environment concerns.

### Conservation Reserve Program.

The Conservation Reserve Program (CRP) was created in 1985 to idle highly erodible cropland for a minimum of 10 years. More than 34 million acres have been planted to grass or trees in exchange for annual rental payments and cost-share assistance.

The FAIR Act provides authority for the Secretary of Agriculture (Secretary) to extend existing contracts or enter into new CRP contracts through 2002. The CRP is capped at 36.4 million acres. CRP participants will have the option to terminate contracts entered into before January 1, 1995 if the contract has been in effect for 5 years and if the land is not of high environmental value. Funding for the CRP was transferred to the US Department of Agriculture's Commodity Credit Corporation, eliminating the need for annual appropriations. This will solidify the funding base over the period of the farm bill.

The FAIR Act left many questions about the CRP unanswered. The Secretary has the discretion to determine specific eligibility criteria, rental rates and the provisions for extending existing contracts. This information will be released by USDA later in the year—expect something after September.

### Environmental Quality Incentive Program

The Environmental Quality Incentive Program (EQIP) was created to assist farmers and ranchers in addressing environmental concerns. Eligible landowners may obtain technical and financial assistance for conservation practices such as manure management systems, pest management and soil erosion prevention. EQIP was authorized at \$130 million in fiscal year 1996 and \$200 million per year thereafter. The funding will be divided equally between crop and livestock producers with payments to individuals capped at \$10,000 annually and \$50,000 over the life of the contract.

### Wetland Reserve Program

The Wetlands Reserve Program (WRP) provides financial and technical assistance for the maintenance and restoration of wetlands on agricultural land. Un-

der the FAIR Act the WRP is capped at 975,000 acres in 2002, to be divided between permanent easements, 30-year easements and cost-share agreements.

The FAIR Act also establishes the Wildlife Habitat Incentive Program, a Natural Resources Conservation Foundation and a new farmland protection program.

### Implications for Agroforestry

For the most part the FAIR Act, coupled with the current supply and demand situation in the US, provides a strong incentive to produce crops. In the short-term, high crop prices are expected to increase overall planted acreage. Producers will use the new flexibility to plant based on market conditions. Over the longer-term, crop production is projected to increase, rebuilding stock levels and reducing prices.

As crop prices moderate and market transition payments fall, producers will be seeking options to increase market returns. Agroforestry practices become a more viable alternative because MTPs are made regardless of whether a crop is actually planted. However, as farm payments fall, producers may implement management practices that provide short-term (annual) returns.

There may also be some cases where MTP's will be higher than the current cash rent landlords receive for specific parcels of land. In those cases, a landlord may well consider moving the acreage to trees, taking the MTP through 2002 (the end of the program) and then having a well established stand. Further, the CRP will likely continue to provide tree planting opportunities to landowners, however more detailed information will not be released until later in the year. EQIP could provide opportunities for agroforestry practices that provide specific environmental benefits.

The FAIR Act represents the beginning of a new era for US agriculture. Federal farm program payments will continue to decline resulting in a more market-oriented agricultural economy. It is difficult to assess the ramifications of the changes given that there is little historical data available. The implementation process will take time as regulations are drafted and subjected to appropriate comment and review. Ultimately, the FAIR Act may be remembered not for any new incentives but because it removed the disincentives that prevented landowners from implementing agroforestry practices under previous farm bills. □

Dan L. Cassidy is Program Director of the Food and Agricultural Policy Research Institute, University of Missouri, Columbia, MO 65201.

# The Pawpaw: Promising Future for an American Tree Crop

By Dr. Desmond R. Layne, Kentucky State University

The pawpaw [*Asimina triloba* (L.) Dunal] is the only temperate member of the tropical Annonaceae or Custard Apple family and it is the largest tree fruit native to the United States. Pawpaws grow wild in the rich, mesic hardwood forests of 25 states in the eastern United States ranging from northern Florida to southern Ontario (Canada) and as far west as eastern Nebraska. Pawpaws flourish in the deep, rich fertile soils of river-bottom lands where they grow as understory trees or thicket-shrubs. In addition to the tropical *Annona* relatives (cherimoya, atemoya, sweetsop, soursop, custard apple, etc.), there are eight members of the *Asimina* genus that are native to the extreme southeastern states of Florida and Georgia.

## Description of the Plant

Tree habit is quite different in the shaded forest understory, to which pawpaws are native, when compared with trees grown at a sunny location. In the understory, trees often exist in clumps or thickets resulting from root suckering or seedlings developing from fruits that dropped to the ground from an original seedling tree. These trees may grow up to 15 m tall and they demonstrate a 'shade' growth habit with wide crotch angles, open branching, horizontal orientation of large, long dark green leaves, and few lower limbs or fruit. By contrast, in full sun, trees typically assume a pyramidal habit with narrow crotch angles and compact appearance with straight trunk and drooping leaves. With adequate cross-pollination, trees grown in full sun may bear abundant fruit. Height and spread of a mature tree in full sun could attain 10 m and 6 m, respectively. Trees in full sun require no pruning or training.

For orchard production, we currently recommend 2 m in row x 5.5 m between row spacing. We have no experience with interplanting pawpaws with annual row crops or forages or utilizing them in an understory pasture for livestock grazing. If interplanting was to be done, it would be important to ensure that pawpaws received adequate water and fertilizer during the growing season or growth and tree health could be compromised. Although seedlings are strongly taprooted, profuse root suckering and the existence of thickets and groves in the wild suggests that the lateral root system is fairly close to the soil surface.

Livestock grazing may damage the root system near the soil surface and animal rubbing could damage the tree trunk and limbs. Browsing is not a typical problem with pawpaws -maybe due to the high level of defense compounds in the plant. In our experience, the only animal damage we have observed is limb breakage of small trees due to 'buck rub' which sometimes occurs during the deer rut. Pawpaws are somewhat tolerant to excess soil moisture for limited periods but they will not thrive in a heavy or waterlogged soil and they are mostly drought sensitive.

Flowers emerge before leaves in mid spring, usually just after the peak of dogwood (*Cornus florida*) flowering. The blossoms occur singly on previous year's wood and may reach up to 5 cm in diameter. Flowers are perfect but strongly protogynous, self-incompatible and therefore require cross-pollination although some trees may be self-compatible. Pollination may be by flies and beetles which is consistent with the presentation appearance of the flower: dark, meat-colored petals and a fetid aroma.

## Fruit Characteristics

Fruit set in the wild is usually low and may be pollinator or resource-limited, but under cultivation, tremendous fruit loads have been observed. Fruits are oblong-cylindric berries that are typically 3 to 15 cm long, 3 to 10 cm wide and weigh from 200 to 400 g. Some individual fruits may weigh up to 900 g depending on the particular variety or clone. Fruits may be borne singly or in clusters of up to nine fruits which resemble the "hands" of a banana plant (*Musa* spp.). Fruits are readily consumed in the wild by racoons, opossums, foxes and other wildlife. This highly aromatic, climacteric fruit has a ripe taste that resembles a creamy mixture of banana, mango, and pineapple. Shelf-life of a tree-ripened fruit stored at room temperature is 2-3 days. With refrigeration, fruit can be held up to 3 weeks while maintaining good eating quality. Within the fruit, there are two rows of large, brown, bean shaped, laterally compressed seeds that may be up to 3 cm long. Seeds contain alkaloids in the endosperm that are emetic. If chewed, seed poisons may impair mammalian digestion but if swallowed whole, seeds may pass through the digestive tract intact. The skin of the fruit should not be eaten.

## Crop Status

Pawpaws have tremendous potential to become a commercially important native plant based on the following reasons: (1) adaptation of trees to existing climatic and edaphic conditions; (2) valuable natural compounds in plant; (3) nutritional/cosmetic value of fruit; (4) nursery wholesale and retail tree production; and (5) as a component in residential 'edible' landscapes.

Pawpaw is well adapted to the 25 states to which it is native and where it already grows in the wild. It is hardy to USDA zone 5 (-25°C) and requires a minimum of 400 hrs annual chill units, 160 frost-free days, and 80 cm of annual precipitation with most falling during spring and summer. Pawpaw trees could be utilized for habitat restoration and biodiversity in parks, woodlots, and forests.

Pawpaws produce natural compounds (anonaceous acetogenins) in leaf, bark and twig tissues, that possess both highly anti-tumor and pesticidal properties. Dr. Jerry McLaughlin at Purdue University (personal communication) reports that asimicin (one of the most potent acetogenins from pawpaw) is 300X more potent than taxol (drug extracted from the pacific yew, *Taxus*) at treating specific cancers in animal studies. McLaughlin notes that unlike taxol, which can now be synthesized in the lab, asimicin and other acetogenin compounds like it exist in 200+ stereoisomeric forms, only one of which is the active conformation of the molecule. Thus the yield of the active molecule from laboratory synthesis is too low to be economically feasible, while the yield of the active molecule extracted from plant tissues is very high. He suggests that a potentially lucrative industry, based on the renewable production of pawpaw biomass (current seasons shoot growth) could develop once anti-cancer drugs and botanical pesticides are approved.

The high level of natural defense compounds in the tree make it highly resistant to insect/disease infestation (R.N. Peterson, The PawPaw Foundation, Washington, D.C., personal communication). With

proper management, organic commercial fruit production may be possible. Organic fruit production would reduce grower input costs (pesticides), environmental contamination, impact on beneficial insects and provide the consumer with a 'safer' food product.

Pawpaw is an excellent food source. It exceeds apple, peach and grape in most vitamins, minerals, amino acids and food energy value. Pawpaw fruits are best eaten fresh when fully ripe. The intensely sweet, tropical flavor and powerful aroma may also be useful for developing processed food products (blended fruit drinks, baby food, ice creams, sorbets, liquors, etc.). The flesh purees easily and freezes nicely. Pawpaws easily substitute in equal part for banana in most recipes and make excellent cookies,

bread, cakes, custards and pies to name a few. Aromatic volatiles may be used commercially in cosmetics and skin products.

Currently in the U.S., there are more than 40 commercial nurseries selling pawpaw trees. Seedling and grafted trees in the retail nursery trade are currently selling briskly for as much as \$18.50 and \$26.50 apiece, respectively, versus \$3 - 4 for a 2-year old, grafted apple tree.

Standing orders are currently in excess of 40,000 trees in the wholesale market (Jim Gilbert, Northwoods Nursery, Molalla, OR, personal communication). Although several nurseries sell bare-root seedlings, I encourage consumers to purchase container grown trees since bare root trees typically perform poorly and often die. If properly cared for (adequate light, water, fertilizer and weed control), a seedling tree should come into bearing in 5 - 7 years. A seedling tree to which a named variety has been grafted will come into bearing in as few as 3 years.

Pawpaws are ideally suited for the residential 'edible' landscape due to their lush, tropical appearance, attractive growth form, size, fall color (bright yellow), and delicious fruit. In addition, *Asimina* spp. are suitable for butterfly gardens as they attract the



A cluster of pawpaw fruit ripening at the Kentucky State University research orchard.

**Continued** ➤

zebra swallowtail (*Eurytides marcellus*) for whom they are the exclusive larval host plant.

### **Pawpaw Research at Kentucky State**

Kentucky State University has a comprehensive research program since 1990 directed toward developing pawpaw as a new commercial tree fruit crop for Kentucky and the United States. In Kentucky, alternative and potentially high-value cash crops such as pawpaw, are being investigated for their production feasibility in order to help supplement income for tobacco farmers and to enable diversification of their enterprises to ensure long-term viability. On-going research projects underway at KSU include: (1) determining factors affecting seed germination and seedling growth and development; (2) developing cultural recommendations for greenhouse and orchard production; (3) long-term evaluation of promising pawpaw clones and hybrids; (4) determining heritabilities for commercially important traits; and (5) characterizing the morphological and molecular variation in a diverse germplasm collection. Through funds received from a recent USDA competitive research grant, we are also developing techniques to: (1) clonally mass propagate desirable plants; (2) preserve diverse and promising germplasm; and (3) provide easy access to germplasm and information about germplasm, research findings, commercial recommendations, home gardener information, etc. to interested parties via an on-line database accessible over the Internet through the World Wide Web .

### **Germplasm Resources**

In 1994, Kentucky State University was approved by the USDA National Clonal Germplasm Repository system to serve as the national repository for *Asimina* spp. germplasm in the United States. The current collection of germplasm at KSU is in the form of trees planted in orchards, those growing in the greenhouse and seeds in refrigerated storage. There are currently approximately 1800 trees planted in three orchards at KSU. These trees include grafted pawpaw varieties (RVT, described below) and seedlings from over 70 distinct geographical regions of 17 states within the native range. Trees range in age from 1 to 5 years. None of the trees are fruiting yet although several flowered for the first time during Spring 1995. Also planted are *A. parviflora* (the dwarf pawpaw) seedlings and inter- and intraspecific hybrid seedlings. In the spring of 1996, 800 interspecific hybrids of advanced selections will also be field planted. This will

bring to a total of approximately 2800 trees at the KSU Research Farm. This is the largest collection of pawpaw germplasm in the world. Germplasm evaluation and selection will be an on-going, high priority area of the KSU pawpaw research program.

In 1993, the PawPaw Foundation (PPF) and KSU embarked on a joint venture, the Pawpaw Regional Variety Trial (RVT), to test within pawpaw's native range many of commercially available named pawpaw cultivars and PPF's advanced pawpaw selections. Identical orchards for RVT will be planted in 17 different university locations during fall 1995 or spring 1996, consisting of 300 trees each.

### **The Future**

Considerable efforts are currently underway at KSU and Purdue University (and others will soon be implemented at several academic institutions through RVT cooperation) to overcome the horticultural limitations to developing pawpaw as a new commercial fruit crop. In addition to the aforementioned research, there are several additional areas that will also require concerted attention: (1) development of postharvest techniques to maximize shelf-life and maintain quality of fresh fruits; (2) development of commercial/retail markets and promotion/consumer education strategies; (3) development of processed pawpaw products; and (4) development of a renewable pawpaw biomass production system for production of anti-cancer drugs and botanical pesticides. As these and other questions are answered, pawpaw will almost certainly become profitable to grow in the U.S.

Plans are currently underway for Kentucky State University to host a Fall Conference (tentatively scheduled for Oct. 10-11, 1996). The program will include presentations by scientists and others, workshops, orchard tours, etc. This meeting will be open to any interested persons (scientists, students, extension agents, foresters, growers, nurserymen, processors, marketers, naturalists, layperson/enthusiasts, press, etc.) who should contact me for details.

For more information (e.g. cultural recommendations, tree sources, etc.), consult my Pawpaw FactSheet on the WWW: <http://newcrop.hort.purdue.edu/hort/newcrops/Crops/CropFactSheets/pawpaw.html>. □

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## ► **Safe Harbor**

ability under both the Federal and California Endangered Species Acts beyond that which exists at the time a Cooperative Agreement is signed. By landowners implementing their habitat improvements, they may farm, develop, or make any other lawful use of the property, even if such use incidentally results in the loss of listed species. The "safe harbor" protection is extended to a landowner's successors and to neighboring landowners within one-half mile of the subject property.

### **Program Eligibility**

Landowners eligible for this program include private landowners, corporations, banks, special districts (such as water districts), cooperatives, and any non-Federal entity such as State or local agencies. A landowner interested in participating in the program would enter into a Cooperative Agreement with the CDFG which would detail the enhancement measures, how and when the landowner wants to provide monitoring access to the CDFG. In return, the landowner would be covered for incidental take of listed animals and adverse impacts to covered plant species on the habitat created under the program (should s/he choose to remove it), and any cultivated or fallow lands adjacent to the enhanced area. Preexisting habitat areas on the property which are occupied by listed species would not be included in the program, and take of listed species on those lands is *not* authorized under this program.

There are three additional qualifications on this process. First, listed species may not be shot, captured, or otherwise intentionally "taken". Second, only lands which are cultivated or fallow (defined as land in a regular farming rotation that has been tilled within the last four years), and not occupied by listed species, may be enrolled in the program (with the exception of lands specified below under Unique Enhancement Opportunities). Third, a participating landowner who plans to remove the habitat created under this program, must upon terminating the Cooperative Agreement, give the CDFG 60 days advance written notice and an opportunity to translocate any species in question if the CDFG chooses to do so.

The Cooperative Agreement does not relieve the participating landowner of responsibility for compliance with other applicable Federal, State, or local laws and ordinances. Changes in land use will still be subject to standard review under the California Envi-

ronmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) if applicable.

There may be a few cases where interested landowners wish to enhance existing habitats found on agricultural rangelands. The risk associated with enhancing existing habitat is the loss of listed species currently occupying the property, which will not be authorized by the permit. However, there may be areas of existing wildlife habitat that do not provide habitat for listed species due to their location or current condition. Habitats suitable for inclusion in the program would include valley and foothill grasslands, oak woodlands, and wetland/riparian habitats, but the project must avoid listed species habitat or lie outside the range of listed species.

The Cooperative Agreements for these unique projects would include all of the standard components listed earlier, plus the following: (1) a biological evaluation of the property must be conducted by a qualified biologist prior to entering the program to determine if any listed species occur on site; (2) although general wildlife habitat may occur on the site, all enhancement activities must avoid adverse impacts to identified *listed* species and their habitat; and (3) an exit from the program where the landowner wishes to remove the enhancement requires a return to no less than pre-project habitat conditions.

The CDFG anticipates that this program will be available to interested landowners in spring 1996. For more information, please contact: Ms. Gail Presley, California Department of Fish and Game, (209) 222-3761, ext. 143; Mr. Ron Rempel, California Department of Fish and Game, (916) 654-9980; Mr. Peter Cross, U.S. Fish and Wildlife Service, (916) 979-2728; or Mr. Erik Vink, American Farmland Trust, (916) 753-1073. □

### **Endangered Species Database**

Farmers and ranchers in California with computer access can search a new statewide database to determine whether any endangered species have been recorded in their area. Compiled by the state Department of Pesticide Regulation, the database is designed to allow pesticide users to quickly check for any restrictions due to endangered species near their property prior to spraying. After entering the county, township, range and section of a particular parcel, the database reports the species which have been found nearby, if any, along with guidelines for which pesticides can be safely used in their habitats. Lists of endangered species, sorted by species or by county, can also be downloaded. The database can be found at the following Web address: [http://www.cdpr.ca.gov/docs/es/db\\_desc.htm](http://www.cdpr.ca.gov/docs/es/db_desc.htm).

# Pruning Increases Wood Quality and Potential Profit

By Roger Fight, US Forest Service

Although this article (which originally appeared in Northwest Woodlands) focuses on one commercial timber species, it emphasizes the economic value of clear wood. Tree pruning is an important practice in silvopasture and alley cropping systems, both to increase wood quality and light penetration to understory crops and pastures — Ed.

Pruning on better Douglas-fir sites to 17 feet in a single lift might yield real rates of return before taxes in the range of 7 to 10 percent, according to a recent financial analysis. That analysis is based on a model developed from a mill recovery study where pruned logs were sawn and the volume of lumber by grade was recorded for each log. Conclusions about financial return rest on this model and a number of assumptions discussed below.

Clear wood is expensive now, but won't technology replace the need for clear wood? Technology has and will continue to find ways to use less expensive wood and non-wood substitutes for clear wood. Is it conceivable that this might occur to the point where clear wood is worth no more than knotty wood? It seems likely that there will always be uses where clear wood performs better, can be used with less cost, or is preferred because it is regarded as signifying quality. It is safe to assume that clear wood will be worth more than knotty wood; the imponderable is whether it will be worth more enough to justify the cost of pruning.

How does the timing of pruning affect financial return? The value of pruned logs depends very much on how large the unpruned core is and how thick the shell of clear wood is. For example, the 14.8-inch log shown in Figure 1 has one square foot of clear wood over a six-inch core while the 18.1-inch log has one square foot of clear wood over a 12-inch core. The 14.8-inch log produces over 50 percent more clear lumber from the same one square foot of clear wood. In New Zealand, it is common practice to measure the diameter over the pruned stubs at each pruning lift and have the measurement authenticated by an independent agent so credible information is available at the time of sale about the character of the pruned

Diameter: 14.8  
Defect Core: 6.0



Figure 1

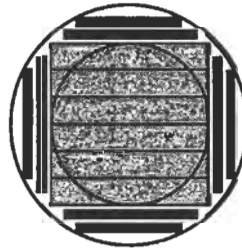
logs.

Will the landowner benefit from the increased value of clear wood when pruned logs are sold? In addition to recognizing their value, competition between mills that can effectively use pruned logs is needed. Pruning has now become common enough that mills will likely gear up to process pruned logs when they come to market. High-value logs can be transported farther, which effectively increases the competition for them.

Is pruning above 18 feet a good idea? It costs more in effort, if not dollars, to prune the upper part than the lower part of the tree. Would you be better off

pruning the lower part of another tree than pruning higher? Is it worth incurring some growth loss of knotty wood to achieve more clear wood faster? When pruning higher in the tree, a growth loss in valuable clear wood is incurred on the bottom log to get more clear wood faster on the upper log; therefore it's not such a good deal.

Diameter: 18.1  
Defect Core: 12.0



Is it better to prune in multiple short lifts or a single lift

to the desired height? There are no mill recovery studies to address this question, but studies based on simulated sawing of radiata pine in New Zealand show a substantial advantage to multiple-lift pruning. Studies in the United States that looked only at single-lift pruning appear to bear out that conclusion as well.

Pruning has occurred in fits and starts during the last century. Many of those pruned trees have now been harvested in what probably often turned out to be a windfall for the mill because the seller did not know they were pruned or could not convince the buyer of their full value. In the future, with pruned logs being essentially the only domestic source of clear wood, sellers with documented pruning should be able to get a price for their trees that reflects the value of clear wood. And with the recognition that there are no offer domestic sources of clear wood, pruning is likely here to stay. □

Roger Fight is a research forester, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.





### Literature of Forestry and Agroforestry

This volume traces the evolution of forestry from nature appreciation, to exploitation, to multiple use, to sustainable and scientific forestry through its research, education and literature. A chapter by P.K.R. Nair presents the growth and value of agroforestry. Other topics include the origins of forestry in northern Europe, sustainable forestry, and forestry education in the US. Over 1000 core monographs and 60 core journals most useful for forestry instruction and research are identified. The final book in the series *The Literature of the Agricultural Sciences*, this volume was edited by Peter McDonald and James Lassoie.

Copies of *The Literature of Forestry and Agroforestry* (\$79.95 plus \$3 postage) may be ordered directly from Cornell University Press, P.O. Box 6525, Ithaca, NY 14851-6525.

### Biomass Farmer and User

This newsletter from Europe is aimed at those who produce and process crops for energy, fiber and industrial feedstock. It will cover biomass production and related topics, e.g. short rotation coppice, bio-electricity generation and anaerobic digestion. The first issue also contains information on an alleycropping agroforestry trial with willow in England.

Annual subscriptions (6 issues) are US\$50 in USA and Canada, or £35 in U.K. Mail checks to Macpherson Associates, Maundrell House, The Green, Calne, Wiltshire, SN11 8DL, UK.

### Bamboo in the Pacific Northwest

On June 24-25, 1994 one hundred bamboo professionals and enthusiasts gathered in Gold Beach, Oregon to focus on the future of the fledgling bamboo industry in the Pacific Northwest. The proceedings of that meeting, published by the Pacific Northwest Chapter of the American Bamboo Society (PNC-ABS), discuss paper pulp development, bamboo history and ecology, bamboo in permaculture plantings, timber bamboo pole production, and other topics.

Copies of *Bamboo in the Pacific Northwest* are available for \$18. Mail checks (payable to PNC-ABS) to PNW Bamboo Workshop, 28446 Hunter Creek Loop, Gold Beach, OR 97444. Contact Dean Hines, 15211 - 91st Ave. SE, Snohomish, WA 98290 for information about joining the society. Dues are \$10 a year. The

PNC-ABS is the largest regional chapter of the American Bamboo Society.

### Agroforestry Research Trust Booklets

The following new publications are available from the Agroforestry Research Trust, 46 Hunters Moon, Dartington, Totnes, Devon, TQ9 6JT, UK. All are priced at £8 each; pay by international money order in pounds sterling, and include £1 for postage.

#### *Chestnuts: Production and Culture* (52 pp.)

A comprehensive guide to chestnut cultivation, including information on species, silviculture and coppice, nut production, rootstocks and cultivars, intercrops, pruning, fertilization, etc.

#### *Hazelnuts: Production and Culture* (27 pp.)

A complete guide to growing hazels for nuts and coppice pole production. Topics include pollination, siting, pruning, harvesting, processing, storage and cultivars.

#### *Walnuts: Production and Culture* (28 pp.)

A handbook for growing walnuts in temperate climates, both for nuts and timber. Includes silviculture, rootstocks, siting and planting, feeding and irrigation, pruning, pollination, harvesting, and cultivar selection.

### New Agroforestry Books from Australia

Two recent books published in Australia illustrate the increasing interest in farm trees and agroforestry among rural landowners there.

*Agroforestry: Productive Trees for Shelter and Land Protection in the Otways* by Rowan Reid and Andrew Stewart (US\$20 by air from Otway Agroforestry Network, Bambra Agroforestry Farm, RSD Boonah Road, Birregurra, Victoria, 3242, Australia). Focuses on the Otways, a temperate region in southern Victoria west of Melbourne where groups of farmers (farm tree and Landcare groups) have formed to address environmental problems such as soil erosion and salinity. Numerous case studies highlight the successes of individual landowners with planting trees for stock

**Continued** ➤

## ► **New in Print**

shelter, erosion and salinity control, managing and harvesting of farm-grown hardwood timber, and agroforestry integrated with whole farm planning.

*Farmtree\$ for the Mount Lofty Ranges: A regional agroforestry handbook* by Peter Bulman (US\$35 by air from Primary Industries S.A., P.O. Box 752, Murray Bridge, SA 5253, Australia). Although targeted at a

particular area of South Australia south of Adelaide, this book has relevance to other warm temperate regions. Well-illustrated throughout, it contains detailed information on planning, site assessment, species selection, establishment, management, harvesting and marketing. It also includes economic case studies of farm woodlots, timberbelts and wide-spaced agroforests which combine alley cropping and grazing with trees. □

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## **Black Walnut Agroforestry Focus of Missouri Meeting**

Alley cropping of eastern black walnut with row crops has proven commercially successful in the Midwest. Attendees at this year's annual meeting of the Walnut Council will have the opportunity to learn more about walnut agroforestry and culture.

The symposium "Black Walnut, Agroforestry and Nut Production" will be held July 28-31 at the Holiday Inn University Plaza in Springfield, Missouri. An extensive variety of speakers will address all aspects of eastern black walnut culture during four successive technical sessions.

In addition to several presentations on agroforestry, topics will include walnut genetics, fertilization, weed control, insects and diseases, nut production, timber processing and economics. Private plantation owners will also share their experiences during a landowner "show and tell" session.

A highlight of the meeting will be a full-day visit to the Sho-Neff Plantation near Stockton, MO. Managed by Hammons Products Co., the plantation is a working example of a commercial black walnut agroforestry system. The tour will make three stops, where speakers will discuss tree shelters, intercropping, nut production, progeny testing, wood quality and other topics.

Registration for the full program including meals and proceedings is \$128 for members of the Walnut Council, or \$148 for non-members. Daily registration and extra copies of the proceedings are also available. For more information, contact the Walnut Council (tel. 317-873-8780, fax 317-873-8788). Registrants should make their own lodging arrangements at the Holiday Inn in Springfield (tel. 417-864-7333); a special group rate is available. □

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## **SAF Meeting Will Feature Agroforestry Technical Session**

A special program on agroforestry will be presented during the Society of American Foresters National Convention, November 9-13, 1996, in Albuquerque, NM. Sponsored by the SAF Agroforestry Working Group, the technical session will be held on Monday, Nov. 11 and will be moderated by Russell Hatz, NRCS staff forester. Entitled "Evolving Realities of Agroforestry", the program will include the following speakers:

- Tamara Benjamin (Purdue University), *Growing Black Walnut and Corn*.
- Louise Buck (Cornell University), *The Social Organization of Agroforestry Innovation in Northeastern North America*.
- Andrew R. Gillespie (Purdue University), *Competition and Synergisms in 11 Years of Walnut/Red Oak/Corn Alley Cropping Trials in Indiana*.

- Mir Javed Hussain (Cornell University), *Bio-economic Efficiency of Poplar-based Agroforestry Systems*.
- William B. Kurtz (University of Missouri), *Results of a Nationwide Study of State-level Agroforestry Legislation and Policies*.
- Peter A. Williams (University of Guelph), TBA.

On Wednesday, Nov. 13, there will be an agroforestry tour, including stops to view local agroforestry practices, a native plants nursery, and field projects using native plants in agroforestry.

If anyone is interested in presenting a paper or a poster, please contact: Russell Hatz, State Staff Forester, USDA-NRCS Oregon State Office, 101 SW Main, Suite 1300, Portland, OR 97204-3221, tel 503-414-3235, fax 414-3277, e-mail [hatzr@scsor.attmail.com](mailto:hatzr@scsor.attmail.com). □



## Internet Resources

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### 1996 FAIR Act Web Sites

For more information on the 1996 FAIR Act, search for these sites:

USDA Home Page: [www.usda.gov](http://www.usda.gov)

NRCS Home Page: [www.ncg.nrcs.usda.gov](http://www.ncg.nrcs.usda.gov)

Cornell Legal Information Institute: [www.law.cornell.edu/uscode/16/ch58.html#s3812](http://www.law.cornell.edu/uscode/16/ch58.html#s3812)

### agAccess

<http://www.mother.com/agaccess>

agAccess is an agricultural and horticultural publishing company, based in Davis, CA, which specializes in information resources for sustainable agriculture. Their web site includes an on-line catalog of books and videos, an agriculture information clearinghouse and many links to other ag.-related sites.

### Agroforestry at Cornell University

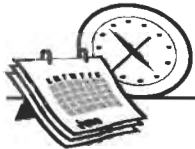
<http://www.cfe.cornell.edu/agroforestry/agroforestry.htm>

This site is a focus for temperate agroforestry communication in the Northeast, and contains extensive information on the Cornell Agroforestry Working Group, the Northeast Agroforestry Network and academic courses on agroforestry at Cornell.

### IUFRO Temperate Agroforestry Group

<http://iufro.boku.ac.at/iufronet/d1/hp11501.htm>

This site will contain information about the activities, publications and contact addresses for members of IUFRO Working Unit 1.15.01, Temperate Zone Agroforestry.



## Mark Your Calendar

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**AFTA Board of Directors**, July 29, 1996, Springfield, MO. A regular meeting of the AFTA Board of Directors will be held at the Holiday Inn-University Plaza in Springfield, Missouri. Members are welcome to attend. For more information, contact Gene Garrett, AFTA President, tel. (573) 882-3647.

**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).

**Third Annual Tree Farmer Convention**, Oct. 24-27, Portland, OR. Sponsored by the American Tree Farm System. Agroforestry will be included among the Saturday field trips. For more information, contact Betty Denison, Oregon Tree Farm System, 3415 Commercial Street S.E., Salem, OR 97302-5158, tel. (503) 362-0242, fax (800) 603-0865, E-mail: [bdenison@denilass.com](mailto:bdenison@denilass.com).

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

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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.



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