

INSTITUTE OF FOREST
BIOTECHNOLOGY

Annual Report



July 1, 2002 – June 30, 2003

The Institute of Forest Biotechnology

Providing a Platform for Communication and Partnership

Balancing the demand for forest products with the responsibility for forest protection will be increasingly difficult over the next fifty years. The challenge is gaining more wood more efficiently on less land with less environmental impact. Biotechnology is a powerful tool that may help us meet this challenge. Research reveals practical possibilities, such as providing trees with new growth characteristics, altered processing capabilities, resistance to external threats, and economically valuable product traits. However, given the power of biotechnology to create both risks and benefits, risks must be minimized and a balance of societal, ecological and economic benefits must be ensured. Before us is a rare and important opportunity to place ethical and societal imperatives at the forefront of this developing technology.

Trees are of prime importance to humans, to our culture and to the environment. The use of biotechnology in forestry may have a profound impact on all of these areas, and that impact must be carefully shaped. Arising issues must be credibly and thoughtfully addressed to ensure appropriate technology application and maximal benefits. Science and research, industry and commercialization, issues and policy, ecology and environment: all must be merged and addressed. Thoughtful, innovative partnerships will be required to bring together the diverse stakeholders into a cohesive framework. To meet industry and societal needs, to accurately assess risk, and to ensure adequate policy development and appropriate funding, all require a strong, central voice and guiding organization.

Accordingly, the Institute of Forest Biotechnology, a non-profit 501 (c) (3) organization was formed to work for societal, ecological and economic benefits from appropriate uses of biotechnology in forestry worldwide. It is guided by a 14-person Board of Directors that will grow to a 20-person Board of Directors

I

“Accurate information on uses, advances, challenges, and issues in forest biotechnology is very scarce, while public acceptance of the technology is dependent upon such information. The purpose of IFB is to address this void.”

— *Dr. Dennis C. Le Master*
 PROFESSOR AND HEAD
 DEPARTMENT OF FORESTRY
 AND NATURAL RESOURCES
 PURDUE UNIVERSITY

consisting of six each from government/academia, non-governmental organizations and forest industry, plus the President of the Institute, and an at-large representative.

Administration of the Institute is by a small staff, initially consisting of the President and a Program Manager. As the organization develops the staff will expand in line with the needs of its programs.

2

The Institute's mandate is to advance responsible research and development in forest biotechnology for cultural, ecological and economic gain to society. Areas of focus of the Institute include: 1) facilitating the restoration of native trees that are endangered due to diseases and insects, 2) providing structure for stakeholder interactions on alleviating and neutralizing anthropogenic environmental impacts, 3) providing a forum to address concerns about the potential adverse effects of genetically altered forest trees, and 4) facilitating recommendations on how the world can meet its future wood needs. IFB will work to address each of these specifically so that forest biotechnology can have a positive impact on the future of the planet.

The Four Cornerstones of IFB are:

- *Heritage Trees*[®]. This program explores the potential for the use of biotechnology to help rescue and reintroduce threatened and endangered tree species, matching technology providers with university researchers. It will initially focus on American chestnut, elm, and Fraser fir.
- *Ecological Ramifications*. The concern that exists about ecological disturbances from use of genetically modified organisms (GMOs) will be addressed through symposia and projects, and partnering with biotechnologists and ecologists to fill the knowledge gaps.
- *Societal Issues*. Because trees hold cherished places in our culture and heritage, efforts will be made to identify the social, cultural and ethical issues at stake in the application of biotechnology to trees, and to address those concerns through forums and research reports to help guide the public debate.
- *Outreach*. This program will focus on communicating the fundamental science and the risks and benefits to society, the environment and the economy.

Institute of Forest Biotechnology Program Activities 2001–2003

HERITAGE TREES®

- *A Heritage Trees Workshop: Developing Partnerships, Strategies and a Practical Program*, a workshop focused on American chestnut, held November 1-2, 2001.
- Conducted a workshop on Fraser fir, an economically valuable and threatened species important to N.C., held December 11, 2002.

3

ECOLOGICAL RAMIFICATIONS

- *Modifying Reproduction in Urban Trees*, a meeting to explore the uses of tree biotechnology, particularly genetic engineering, to produce social and environmental benefits by modifying the flowering or fruit production in trees planted in urban and suburban environments, February 12-13, 2003.

SOCIETAL ISSUES

- *New Trees on the Horizon: Charting the Societal, Cultural and Ethical Issues of Forest Biotechnology*, a joint proposal with The Hastings Center and the North Carolina Biotechnology Center submitted to IUCN, addressing the issues of forest biotechnology.
- Teamed with Scottish Enterprise to sponsor a forum on *Forest Biotechnology in Europe: Impending Barriers, Policy, and Implications* in Edinburgh, Scotland, September 12-13, 2002. Produced a pre-meeting “Challenge Document” and meeting proceedings.

“The reduction of timberland in the U.S. South is placing additional pressures on the remaining woodlands to grow more on each acre to keep up with the needs of society.

As a lumber manufacturer and landowner interested in perpetually improving the quality and diversity of our forests, I find the IFB an exciting vehicle to prepare, help us focus and develop new products, and assist us for the future.”

— *The Honorable Robert B. Jordan, III*
PRESIDENT
JORDAN LUMBER

O U T R E A C H

- Development of communicational materials on forest biotechnology, the Institute and its cornerstones.
- Development of a publication on the history of forest biotechnology in conjunction with the Forest History Society.
- A forest genomics proposal for the NC BioGrid, which is shared computational tools and space for easy data mining from genomics, proteomics and bioinformatics databases.
- Collaboration with the USFS on forest health policy through a sabbatical of Dr. Floyd Bridgwater with the Institute.

F U T U R E P R O J E C T S

- Organizing a forum, in collaboration with UNIDO, on *Growing Biotechnology in Latin American*, to be held in Concepción, Chile, March 2-5, 2004. The IFB is a sponsor for and participant in the forestry sessions at this forum that include talks on the state of the art in forest biotechnology, propagation, genomics, biosafety, and species conservation.
- Organizing a forum on forest biotechnology in North America, scheduled for Fall 2004, that is directed to the ecological and economic opportunities for forest biotechnology in North America; identifying target areas for research and coalescing efforts for a multi-stakeholder approach.
- Members of the IUFRO Task Force on Forest Biotechnology. The Task Force will produce a state of knowledge report on forest biotechnology, its applications, and possible risks to humans, other plants and the environment. A holistic approach will be used to ensure that all possible facts, evidence, risks and perceptions within a broader scenario are included. The report will be constructed in such a way as to be of benefit to specialists in the field, policy makers and the general public. This report will be presented at the IUFRO World Congress in Australia, 2005.

The Trees of Tradition, the Trees of Technology

HOW DO WE THINK about the future of trees? How do we anticipate the trees of our future? How will we develop and use forest biotechnology for the best possible benefit of the human and natural world?

The questions are consequential because trees and technology are both enormously consequential, for our life, for our economic productivity, and for our planet. For trees, we feel love; we relish their presence just as we are dependent upon their use. For technology, we also acknowledge dependency. We feel respect and also occasional uncertainty; we are accustomed to the technologies that have shaped the last 500 years of our history, but mindful that they increasingly yield ethical and societal issues as well as economic and personal advantage.

We have just begun to combine trees and biotechnology. We will continue to do so for decades and no doubt well beyond. Over those decades, forest biotechnology will yield the most complicated imaginable synthesis of scientific, societal, economic, environmental, and industrial outcomes: issues, questions, benefits, and perhaps unexpected consequences as well.

We are moving not just to new trees, but to a new juncture and to new recognitions about them, the most important planted crop: to preserve the trees of tradition, the world must deliberately and carefully accommodate the trees of technology. Protected places of beauty, often ancient and always wonderful, the forests worldwide that compel our traditional allegiance can better be protected if the trees of technology are carefully developed, effectively used, and fully discussed worldwide. Trees with new traits will yield new benefits and new plantations worldwide, but also new questions.

How can we best prepare for, and thoughtfully address, those outcomes and the trees of technology?

The Institute of Forest Biotechnology began in 2000 as a premise: that the world very much needed an entity attentive solely to such inevitable outcomes,



BURKE

6

to the application of biotechnology to trees. Exploration of the premise by varied persons from diverse vantage points yielded further refinement: that full attention to the issues attendant to forest biotechnology worldwide would be requisite for its appropriate and thoughtful development; that an organization varied in board members and innovative in approach was demanded; that diverse parties would welcome opportunity to work together around common issues viewed from different values, agenda, and expectations. The expectation was somewhat bold, as were approach and expected activities.

As this *Annual Report* nicely reveals, the Institute has moved in remarkably short time from premise to reality, from possibilities to programs, from interested parties to committed participants. In just two years, solid activities have been shaped around demanding questions and persons wide ranging in their responses to forest biotechnology. Much has already been addressed or initiated, from Heritage Trees to a European community addressing early issues of forest biotechnology, from application of the technology in South America to the desire of start-up forest biotechnology companies to be transparent and engage in dialogue with multiple stakeholders. Much more will unfold in coming years.

A smart board astutely aware of the issues at hand and a gifted initial staff — Susan McCord as Program Manager and Bob Kellison as President — take seriously the questions at hand and understand the juncture at hand.

The Institute of Forest Biotechnology is fully prepared to address with parties worldwide the questions with which we begin: How do we think about the future of trees? How do we anticipate the trees of our future?

W. Steven Burke
Chair, Board of Directors

Looking to the Future

This marks my first anniversary as President of the Institute of Forest Biotechnology. I believe that we have made significant progress during the year and the prospect of achieving financial stability is on the horizon. Our finances are more constrained than we would like, but we are optimistic that they will increase with an improvement in the economy. That said, the reasons for this optimism are contained in this, IFB's, first annual report.

7

The best way to describe the building process is to use the adage 'one brick at a time.' Some federal funding has recently been received and applications have been made to foundations where the chances of success are promising.

These funds are in addition to those contributed by the North Carolina Biotechnology Center and by several forest-based companies. Significant progress is being made on each of the four cornerstone programs of the IFB.



KELLISON



MCCORD

Despite the lull in the economy worldwide, we are encouraged by the interest shown in IFB. The initial North American interest now extends to Europe, Asia/Pacific and Latin America. We are particularly heartened by the addition of Arauco, a Chilean forestry company, as a contributor. The success of the international forum held in Scotland, September 2002, will be followed by planned events in Chile and North American in 2004. The forum *Forest Biotechnology in Europe: Impending Barriers, Policy, and Implications* focused on answering the question: What might be the consequences over time of not fully developing forest biotechnology in Europe? A commissioned Challenge Document designed to provide a policy framework and a foundation for discussion of the scientific opportunities and the societal issues associated with this technology preceded the meeting. The proceedings from this meeting are available as a booklet or on the web at www.forestbiotech.org.

A workshop directed to coalescing efforts to protect Fraser fir from pests was held in December 2002. Invited representatives from academia, forest industry, state and federal forest agencies, and individuals working with the Christmas Tree Growers Association were brought together to discuss the insect and dis-

“As forest biotechnology unfolds around the globe, the promising science, evaluation of environmental impacts and maximizing the benefits to society must all be merged and addressed. The Institute of Forest Biotechnology provides the impetus for these critical interactions.”

— Dr. Risto Seppälä

PROFESSOR

FINNISH FOREST RESEARCH INSTITUTE
PRESIDENT, INTERNATIONAL UNION OF
FOREST RESEARCH ORGANIZATIONS

ease problems threatening native Fraser fir stands and the plantation-dependent Christmas tree industry.

Modifying Reproduction in Urban Trees was the subject of a second workshop sponsored by IFB, USDA CSREES, USDA Forest Service, and Oregon State University. That event, in February 2003, focused on ways to modify flowering to reduce the spread of invasive and weedy species, reduce release of potentially allergenic and invasive pollen, and prevent unwanted fruit in street trees.

Three initiatives are identified for the coming year:

- Planning of a North American conference on forest biotechnology directed toward targeted research to ensure economic competitiveness, environmental safety, and positive societal impact.

- Full development of our Heritage Trees®

program to communicate the need for well-coordinated efforts to sustain and restore Heritage Trees outlining the potential value of incorporating biotechnology techniques, development of compelling science plans, and facilitating collaboration and information exchange on Heritage Trees research.

- Secure full funding for and hold the planning meeting for *New Trees on the Horizon: Charting the Societal, Cultural, and Ethical Issues of Forest Biotechnology*, a joint proposal with The Hastings Center, the North Carolina Biotechnology Center and IFB.

With the numerous accomplishments outlined next behind us, and the stated goals in front of us, we look forward to a banner year for IFB.

Robert Kellison, PhD

President, Institute of Forest Biotechnology

Accomplishments

The intent of the IFB has been to address all issues pertaining to forest biotechnology as described in the mission statement: *The Institute works for societal, ecological and economic benefits from appropriate uses of biotechnology in forestry worldwide.* In doing so, some activities will address production forestry and manufacturing while others will address societal issues. To effectively achieve this balance, the IFB must garner input from diverse perspectives. We feel that we are well on the way to accomplishing that objective judging by the comments received from all sectors and by the composition of the assembled Board of Directors.

A summary follows of the progress made in each of the four cornerstones: *Heritage Trees®*, *Ecological Ramifications*, *Societal Issues*, and *Communications*.

Heritage Trees®

Heritage Trees – the name coined by IFB’s Board Chairman Steven Burke – include several tree species endangered by exotic pests, as well as unique individual trees, of value because of their vast age, size or association with an historic event. Among the tree species that fit into this category are American chestnut, Fraser fir, Eastern hemlock, flowering dogwood, butternut, European elm, Dunkeld larch, and Burnham oak. The two species that have received our attention so far are American chestnut and Fraser fir.

American chestnut. The goal of The American Chestnut Foundation, The American Chestnut Cooperators’ Foundation and other entities is restoration of this American icon that occupied more than 25 percent of the forests of the Appalachian and Central States before being destroyed by a fungus introduced from the Orient in the early 1900s. Ongoing research since the 1940s has focused on finding natural resistance to the pest, but with limited success. Other efforts are to hybridize American chestnut with Chinese and/or Japanese chestnut and to work with the fungus to develop a hypovirulent strain that would be lethal to the ‘killer’ fungus. More recently, the idea has arisen to incorporate a fungus-lethal gene construct into a model chestnut specimen. *A Heritage*

“The Institute of Forest Biotechnology has successfully brought diverse and intelligent discussion around the potentials for application of biotechnology to trees.”

— Dr. Kenneth Munson
GENERAL MANAGER
FOREST OPERATIONS & TECHNOLOGY
FOREST RESOURCES
INTERNATIONAL PAPER COMPANY

Trees Workshop: Developing Partnerships, Strategies and a Practical Program was sponsored by IFB in November 2001 to bring the diverse parties together to encourage and accelerate collaborative research.

The IFB has formed a Heritage Trees Committee to develop a detailed plan to create disease resistant varieties of American chestnut and other Heritage Tree Species. An integral part of the plan will be to design creative and effective ways to disseminate relevant intellectual property donated by organizations for charitable research purposes, for example, model agreements between researchers and intellectual property owners. IFB Board member Al Lucier will chair the Committee.

ArborGen, Mendel, The American Chestnut Foundation NY Chapter and researchers at the University of Georgia and State University of New York at Syracuse are exploring expanded collaborative efforts on American chestnut. To date the IFB has received a \$50,000 donation from ArborGen that was designated to support important research on American chestnut at the University of Georgia.

Fraser fir. Occupying an area of about 75,000 acres in isolated stands in North Carolina, Tennessee and Virginia, the old-growth native stands have largely been destroyed by the introduced balsam wooly adelgid, a sap-sucking insect. Natural regeneration of Fraser fir follows some of the affected old-growth stands, but uncertainty exists whether these trees will themselves be subject to the pest as they attain a given age or size.

Fraser fir has also proven to be the Christmas tree of choice in the Eastern United States. At elevations about 1,000 feet lower than those of the native stands, plantations exist to supply the market. Those plantations are only slightly affected by the adelgid, but a root rot (*Phytophthora cinnamoni*) is impacting the crop.

Action is needed to address both of these issues: balsam wooly adelgid in old-growth stands and root rot in Christmas tree plantations. The IFB-sponsored *Fraser Fir Heritage Tree Workshop* was held December 11, 2002, to begin development of a science plan detailing the research needs, inclusive of biotechnology. The meeting report can be found on the Institute's website, www.forestbiotech.org.

Ecological Ramifications.

Significant economic and ecological value can be achieved from insertion of a gene or a gene construct into a tree that is affected by an introduced or endemic insect or disease pest. Those values can be compromised, however, if the modified plant hybridizes with a plant of like nature in the wild and confers a fitness advantage or produces a product noxious to other desired organisms. To date, research directed to these questions has shown that such modified plants create no more risk than a plant produced by outcrossing in a traditional tree breeding program. Evaluation needs to be continued, however, to ensure that undesired anomalies do not appear over time.

Flowering control or another physiological or ecological practice is essential to address the issue of environmental impact before there is deployment of genetically modified trees. The workshop, *Modifying Reproduction in Urban Trees* that was hosted by IFB in February 2003 explored the uses of tree biotechnology to produce social and environmental benefits via modifying the flowering or fruit production in trees planted in urban and suburban environments. The identified benefits were to reduce the spread of newly introduced, and long planted, invasive exotic tree species; improve tree vigor and stress tolerance by reduced fruit crops; curtail production of fruit that causes nuisances around homes or public places; and reduce the extent of local and regional pollen allergy. Representatives from landscape nurseries, forest industries, biotechnology researchers, environmental organizations and regulatory agencies were present. Key conclusions from the workshop were:

- Improved methods to regenerate and transform the many species and varieties of ornamental woody plants are required in order for meaningful commercial deployment to occur.
- Woody plants implanted with novel genes will have to be tested for performance to ensure quality control over relatively long time spans compared to annual crops, and methods to predict performance through genetic and phenotypic markers will be important.
- Public sector research. It is important that the public sector support research in biotechnology for woody ornamentals since the nursery industry may not invest in their own research programs due to the limited market for special crops and the high cost of regulatory compliance.

“The IFB is today’s insurance that tomorrow’s genetically engineered trees may safely serve human needs.”

— *Dr. Don Doering*
SENIOR ASSOCIATE
SUSTAINABLE ENTERPRISE PROGRAM
WORLD RESOURCES INSTITUTE

A paper covering the workshop is being readied for publication in a major journal. The meeting proceedings can be found on our website, www.forestbiotech.org.

Societal Issues.

The opportunity to place ethical and societal imperatives at the forefront of the development and use of life-based technologies is rare and important. Efforts to identify and better understand the issues raised by the application of forest biotechnology are being addressed by board members Lori Knowles (The Hastings Center) and Steven Burke (North Carolina Biotechnology Center). A proposal entitled “*New Trees on the Horizon: Charting the Societal, Cultural, and Ethical Issues of Forest Biotechnology*” has been developed and submitted to The World Conservation Union (IUCN) for funding. The funds will be used to assemble a working group with representatives from four broad stakeholder groups: policy; ethics, history and culture; industry and application; and science and the environment. The working group will conduct Societal Response Symposia in North American, South American and Europe to gain a wide range of responses and information. The resultant report will provide a constructive framework for public engagement and for policy formation.

I2

“IFB allows us to put into practice that old saying ‘measure twice, cut once’ for the promise of forest biotechnology. IFB offers industry, government, and NGOs the opportunity to consider this promising new technology before it is introduced into society.”

— Dr. Robert Friedman

VICE PRESIDENT
ENVIRONMENTAL AND ENERGY POLICY
THE CENTER FOR THE ADVANCEMENT
OF GENOMICS AND THE INSTITUTE FOR
BIOLOGICAL ENERGY ALTERNATIVES

Outreach.

This cornerstone spans the other three, in addition to having an initiative of its own. Efforts to build on this goal include the Biogrid, *Biosylvan News*, web site for pertinent forest biotechnology publications, proceedings of the forum on *Forest Biotechnology in Europe: Impending Barriers, Policy, and Implications*, and a joint effort with the Forest History Society to publish a booklet on the history of tree improvement inclusive of forest biotechnology.

1. **BIOGRID.** The data from sequencing plants and animals, especially with the onset of microarray analysis, are becoming so enormous that conventional methods of data storage and analyses are inadequate to handle the load. Added to that are the data from other biotechnology fields such as human genetics, pharmaceuticals, medicine, chemistry and plant and animal breeding. A complicating issue is that scientists with common research programs frequently store their data in different formats, utilizing various computer software packages. This limits the ability of one scientist to explore the data of the second. A potential solution is to work with genomic and informatics consortia that employ grid computing to enable scientists to easily search multiple data sets contributed by a community of scientists and publicly funded programs.

As part of this effort, the IFB is developing a forestry genomics module for the NC Bioinformatics Grid to test various applications and remote access to the grid. The large data sets of other disciplines stand to benefit from forestry where, by comparison, the data sets are small, accessible and in the public domain. Two species: loblolly pine (*Pinus taeda*) and Eastern cottonwood (*Populus deltoides*) have been offered to the Biogrid research group for development of the test grid. The IFB will work closely with the Forest Biotechnology Group at NC State University, who are developing the loblolly pine data sets, to bring this project online. This effort will serve as the template for the other branches of science where the databases are ten to 100 times larger and privacy and intellectual property issues must be taken into account.

2. **Biosylvan News.** The first issue of this IFB newsletter was distributed in March to colleagues and interested individuals. The goal of the publication, which is to be published twice a year (mid-March and mid-October), is to communicate in a down-home style about progress being made in forest biotechnology. Contributions are solicited from the



VOLUME 1, NUMBER 1

BIOSYLVAN News

Foreword

BIOSYLVAN NEWS is a new publication of the Institute of Forest Biotechnology (IFB). It will be issued two times a year: mid-March and mid-October. Its purpose is to provide current information to its collaborators and interested parties on the status of forest biotechnology in the world. In addition, it will carry guest editorials, news of pertinent personnel changes within the forest bioscience field and meeting announcements, all interspersed with a bit of human-interest *elements*. We solicit your submissions, the editors of which will exercise discretion in appropriateness and content. Deadlines for submissions will be mid-February and mid-September (one month before publication). Address correspondence to Editors:

Bob Kellison, Executive Director
bob_kellison@ncbiotech.org
 Phone (919) 549-8896

Susan McCord, Project Manager
susan_mccord@ncbiotech.org
 Phone (919) 549-8889

P.O. Box 13399
 Research Triangle Park,
 North Carolina, 27709-3399
 Fax: (919) 549-9710

Background

The Institute of Forest Biotechnology (IFB) is a 501 c 3 organization that was incorporated in Raleigh, North Carolina on October 9, 2000, following several years of deliberations. Its existence is deemed critical to public acceptance of forest biotechnology worldwide. Its mission:

The Institute works for societal, ecological and economic benefits from appropriate uses of biotechnology in forestry worldwide.

Location of the Institute in Research Triangle Park, North Carolina is for convenience, being juxtaposed to Duke University, North Carolina State University, University of North Carolina at Chapel Hill and North Carolina A&T State University, and to a myriad of public and private research facilities in Research Triangle Park, including the North Carolina Biotechnology Center, the progenitor of IFB.

A 20-member board of directors, consisting of six members each from academia/government, non-governmental organizations, and industry, plus the Executive Director and a representative from the North Carolina Biotechnology Center will govern the Institute. The Executive Director and the staff of IFB serve at the pleasure of the Board. Integral to the Board of Directors is the Project Manager of IFB, who is an *ex-officio* member.

Four cornerstones guide the Institute: **Heritage Trees, Ecological Ramifications, Bioethics, and Communications.** These pillars will be separately and jointly addressed in this and future issues of *Biosylvan News*.

INSTITUTE OF FOREST BIOTECHNOLOGY

readers in addition to input being supplied by the staff of IFB. Your input is encouraged.

3. **LITERATURE CITATIONS ON FOREST BIOTECHNOLOGY.** This service, provided on a monthly basis and found on our web site at www.forestbiotech.org, is a convenience to interested parties who might not have the time or the facility to do a literature search on the latest developments in forest biotechnology.
4. **PROCEEDINGS OF THE FORUM ON *Forest Biotechnology in Europe: Impending Barriers, Policy, and Implications*.** The proceedings are an edited compendium of talks presented at the forum sponsored by IFB, Scottish Enterprise, Scottish Forest Industries Cluster and the University of Abertay Dundee, held in Edinburgh, Scotland in September 2002. The proceedings, *Forest Biotechnology in Europe: The Challenge, The Promise, The Future*, and Challenge Document, *Forest Biotechnology and Europe's Forests of the Future*, can be found on our web site at www.forestbiotech.org. These are also available as a publication. The focal point of the forum was the possible consequences in Europe if the EU were to reject forest biotechnology research and development and its applications. Funding and in-kind support for the Forum totaling \$92,700 was provided by Scottish Enterprise and Scottish Forest Industries Cluster.



5. **COLLABORATION WITH THE US FOREST SERVICE.** Dr. Floyd Bridgwater was on sabbatical for one year working on a report on forest health policy within the purview of the US Forest Service. This report will be formally submitted fall of 2003.
6. **FOREST HISTORY SOCIETY PUBLICATION.** The Forest History Society and IFB will publish a document on the history of tree improvement and its connection to forest biotechnology. The booklet will be geared to the general public for distribution to civic organizations, natural resource classes, congressional staffs, and legislators. The author(s) will be chosen based on their knowledge of the science and on their ability to communicate to a lay audience. Publication of the booklet is expected in 2004.



PHOTO COURTESY: SUSAN MCCORD

A majestic landmark which dominates the capital city's skyline just as it dominated Scotland's history, Edinburgh Castle is the best known and most visited historic building. Perched on an extinct volcano and offering stunning views, this instantly recognisable fortress is a powerful national symbol, and part of Edinburgh's World Heritage Site. Forum participants took advantage of the location and toured Edinburgh Castle learning about Scotland's rich history after spending two days discussing its forests.

Growth Opportunities

THE MAJOR FOCUS OF IFB is planning for the future. That effort falls into three categories: administrative structure, economic solvency and project development.

Administrative Structure and Involvement. The goal is to fill the five vacancies on the Board of Directors, with three of those vacancies coming from non-governmental organizations, one from government/academia, and one from industry. A secondary goal is to involve each of the directors in a function that leads to quality growth of IFB.

The additional vision of IFB is to form a Board of Visitors, some of whom might be members of the Board of Directors. The separation of duties between the Board of Directors and the Board of Visitors is that the former group would primarily be involved in the operation of IFB, whereas the latter group would serve as conduits for committed partners and financial stability and growth. For the Board of Visitors to become a reality, a developmental officer schooled in public relations is needed. Efforts are in progress to secure funds for such a position for a three-year term. It is anticipated that sufficient funds will have been accumulated at the end of the three years for the developmental officer to be a permanent employee of IFB.

Economic Stability. A major effort of the President and Program Manager has been the garnering of funds from various sources to create a sound financial foundation for the prosperity of IFB. Financial backing and in-kind support have come from the following institutions:

ORGANIZATION AWARD ¹

North Carolina Biotechnology Center	<i>Platinum</i>
USDA Forest Service	<i>Platinum</i>
Scottish Enterprise	<i>Gold</i>
International Paper Company	<i>Gold</i>
ArborGen	<i>Silver</i>
Weyerhaeuser Company Foundation	<i>Silver</i>
CellFor	<i>Bronze</i>
Arauco	<i>Bronze</i>

¹Platinum-More than \$100,000, Gold-\$50,000 to \$100,000, Silver-\$25,000 to \$50,000, Bronze-Less than \$25,000.

A one-time grant of \$149,000 was obtained from the USDA Forest Service in 2003, a year in which funding was extremely restricted.

The Weyerhaeuser Company Foundation awarded IFB \$25,000 in 2002 with the possibility that a multi-year award could be forthcoming upon renewal in 2004. The application is being readied for submission to the Foundation, and the President has been asked to address the Foundation at their next Board meeting in January 2004.

Bioforest, the research and development organization of the Chilean forestry company Arauco, which is itself a subsidiary of CONAF, made a contribution of \$20,000 in 2002. A promise of continued annual funding at the same rate was given so long as IFB was making a positive impact on the use of biotechnology in forestry. Continued financial support is also expected from International Paper Company, ArborGen and CellFor.

Several proposals have been submitted to specific foundations for general support for the IFB. In addition, project-directed proposals will be submitted to identified foundations.

“I am excited that the Institute of Forest Biotechnology is tackling important issues around the interface of biotechnology and the welfare of the environment. As the field of forest biotechnology develops, it is essential that the policy dialogue includes information on the possible positive and negative environmental impacts of biotechnology.”

— *Dr. G. Thomas Bancroft*
VICE PRESIDENT
RESEARCH DEPARTMENT
THE WILDERNESS SOCIETY

Participatory Activities

18

BIO 2003 Annual Conference was held at the Washington Convention Center, Washington, DC, June 23-25, 2003. This conference coincided with BIO's 10TH Anniversary, thus was a gala affair attended by about 17,000 people. IFB sponsored a booth at the Conference. Information on the conference can be obtained at www.bio.org.

XII World Forestry Conference was held in Quebec City, Canada on September 21-28, 2003. IFB presented a poster in the Forest Management and Development Section. The web site for the conference is www.wfc2003.org.

Enhancing the Southern Appalachian Forest Resource, A Forestry Educational Outreach Program, Hendersonville, NC, October 2-3, 2003. The IFB helped to sponsor this meeting with a \$2,000 contribution and participated as a speaker. Additional information can be obtained at www.ces.ncsu.edu/nreos/forest/feop/symposium.

The Executive Committee of the International Union of Forest Research Organizations, chaired by President Risto Seppälä (an IFB board member) has formed a task force within IUFRO to address the coming events associated with forest biotechnology. Steven Burke and Bob Kellison have been named to the task force. The position paper to be written on the topic will be submitted to the Executive Committee and then delivered at the General Assembly of IUFRO at their World Congress in Australia, 2005.

The success of the European Forum has encouraged us to plan for similar events in other parts of the world. The next one will be held in Concepción, Chile on March 2-5, 2004 and hosted by the United Nations Industrial Development Organization (UNIDO). The IFB will help develop the forest biotechnology session and participate as an invited speaker.

North American Conference on Forest Biotechnology is being organized for Fall 2004. Collaborators for the conference, in addition to IFB, are the Forest History Society, Resources for the Future, and the Pinchot Insitute.

PHOTO COURTESY: SUSAN MCCORD



Forum participants visited several trees of historic value while in Scotland, one of which was the Mother Larch in Dunkeld. Planted 250 years ago by the second Duke of Athol, it has provided seedlings used across Europe. It became the seed source for foresting the area. By the time his heir, the fourth Duke of Athol, died, over 27 million larch trees were planted around Dunkeld.

Financial Summary

I N D E P E N D E N T A U D I T O R ' S R E P O R T

20

To the Board of Directors of The Institute of Forest Biotechnology
Research Triangle Park, North Carolina

We have audited the accompanying statement of financial position of The Institute of Forest Biotechnology as of June 30, 2003, and the related statements of activities, functional expenses and cash flows for the year then ended. These financial statements are the responsibility of the management of The Institute of Forest Biotechnology. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts of disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of The Institute of Forest Biotechnology as of June 30, 2003, and the changes in net assets and its cash flows for the year then ended in conformity with generally accepted accounting principles in the United States of America.

Perkins + Lund, PLLC

OCTOBER 6, 2003

Statement of Financial Position

JUNE 30, 2003

ASSETS

Current Assets

Cash	\$99,583
------	----------

Fixed Assets

Computer equipment	\$3,512	
Less: Accumulated depreciation	703	2,809
		<u>\$102,392</u>

21

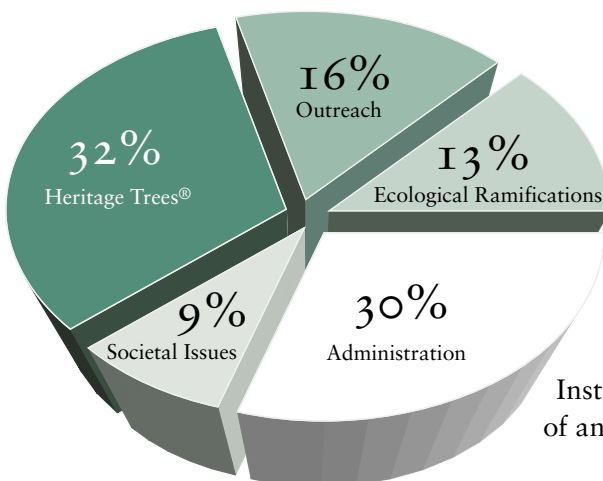
LIABILITIES AND NET ASSETS

Current Liabilities

Accounts payable	\$8,385	
Pension plan payable	148	\$8,533

Net Assets

Unrestricted, available for general activities	93,859	
		<u>\$102,392</u>



Institute programs equal 70% of annual expenditures

Statement of Activities

FOR THE YEAR ENDED JUNE 30, 2003

UNRESTRICTED NET ASSETS**Support and Revenue**

22

Contributions		\$145,000
Net assets released from restrictions		<u>52,000</u>
		197,000

Expenses

Program services — Heritage Trees	\$92,548	
Program services — Ecological Risk	45,572	
Program services — Outreach	42,650	
Program services — Societal Issues	28,100	
Administrative	25,079	
Management and general	50,310	
Fundraising	<u>8,781</u>	<u>293,041</u>
Net increase (decrease) in unrestricted net assets		(96,041)

TEMPORARILY RESTRICTED NET ASSETS

Contributions		52,000
Net assets released from restrictions		<u>(52,000)</u>
Net increase (decrease) in temporarily restricted net assets		<u>0</u>
Decrease in Net Assets		(96,041)
Net Assets at Beginning of Year		<u>189,900</u>
Net Assets at End of Year		<u>\$93,859</u>

Statement of Cash Flows

FOR THE YEAR ENDED JUNE 30, 2003

CASH FLOWS FROM OPERATING ACTIVITIES

Decrease in net assets	\$(96,041)
Adjustments to reconcile Change in Net Assets to Net	
Cash provided by (used in) operating activities:	
Depreciation	702
Decrease in operating assets	
Accounts Receivable	50,000
Increase (Decrease) in operating liabilities	
Accounts payable	(203)
Accounts payable	8,385
Pension plan payable	148
Net cash used in operating activities	<u>(37,009)</u>

CASH FLOWS FROM INVESTING ACTIVITIES

Purchase of fixed assets	<u>(827)</u>
Net cash used in investing activities	<u>(827)</u>
Net decrease in cash	(37,836)
Cash at beginning of year	<u>137,418</u>
Cash at end of year	<u><u>\$99,583</u></u>

Notes to Financial Statements

FOR THE YEAR ENDED JUNE 30, 2003

NOTE 1 *Nature of Organization and Summary of Significant Accounting Policies*

24

NATURE OF ORGANIZATION — In October of 2000, The Institute of Forest Biotechnology (“Institute”) was incorporated in Raleigh, North Carolina as a private nonprofit, nonpartisan organization for the purpose of working for societal, ecological and economic benefits from appropriate uses of biotechnology in forestry worldwide. This is done through programs and fora addressing issues, stimulating understanding, and convening diverse parties attentive to forest biotechnology.

PROGRAMS — The Institute has the following programs on which the Institute is built:

The Heritage Trees Program provides for the development and facilitation of public-private-non- governmental partnerships to regain or preserve threatened tree species of cultural, ecological or economic significance.

The Ecological Ramifications Program determines the ecological risk associated with successful incorporation of biotechnology in forestry.

The Societal Issues Program identifies the social, cultural and ethical issues at stake in the application of biotechnology to trees and forests.

The Outreach Program fosters education through communication of the science fundamentals of forest biotechnology, its benefits to society, the environment and the economy.

BASIS OF PRESENTATION — Financial statement presentation follows the recommendations of the Financial Accounting Standards Board in its Statement of Financial Accounting Standards (SFAS) No. 117, Financial Statements of Not-for-Profit Organizations. Under SFAS NO. 117, the organization is required to report information regarding its financial position and activities according to three classes of net assets: unrestricted net assets, temporarily restricted net assets, and permanently restricted net assets.

BASIS OF ACCOUNTING — The accompanying financial statements of the Institute have been prepared on the accrual basis of accounting in accordance with generally accepted accounting principles in the United States of America.

ESTIMATES — The preparation of financial statements in conformity with generally accepted accounting principles in the United States of America requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates.

CONTRIBUTIONS & GRANTS — All contributions and grants are considered to be available for unrestricted use unless specifically restricted by the donor. Amounts received that are designated for future periods or restricted by the donor for specified purposes are reported as temporarily restricted or permanently restricted support that increases those net asset classes. When temporary restrictions expire, temporarily restricted net assets become unrestricted net assets and are reported in the statement of activities as net assets released from restrictions.

CASH AND CASH EQUIVALENTS — Cash and Cash Equivalents include all monies in banks and highly liquid investments with maturity dates of less than three months. The carrying value of cash and cash equivalents approximates fair value because of the short maturities of those financial instruments.

PROPERTY AND EQUIPMENT — Property and equipment are recorded at cost when purchased and fair value when donated. Major additions or betterments are charged to the property accounts while replacements, maintenance and repairs are generally charged to expense as incurred. Depreciation is provided using the straight-line method.

INCOME TAXES — the Institute is exempt from Federal income taxes under Section 501(c)(3) of the Internal Revenue Code.

FUNCTIONAL EXPENSES — Expenses are charged directly to program or management in general categories based on specific identification. Indirect expenses have been allocated based on analysis of personnel time utilized for the related activity.

NOTE 2 *Commitments and Contingencies*

PENSION PLAN — The Institute has adopted a pension plan using TIAA-CREF as the carrier for the base plan. The plan provides that the Institute will match employee contributions dollar for dollar up to 5.0% of eligible wages. An accrual has been made for the unpaid portion of the expense.

MEMORANDUM OF UNDERSTANDING — The Institute conducts its operations from facilities that are a part of the North Carolina Biotechnology Center which was organized for the purpose of coordinating and stimulating research in biotechnology in North Carolina. In a noncancelable agreement for the year ended June 30, 2003 rent expense was \$12,000. This agreement allows for the use of capital equipment (e.g. computers and furniture) and facilities by the Institute. The agreement expires on June 30, 2004 and can be renewed at that time. Future minimum lease payments for the year ending June 30, 2004 is \$36,000.

NOTE 3 *Subsequent Event*

The Institute was awarded a federal assistance grant on August 18, 2003 by the United States Department of Agriculture Forest Service. The grant was for \$188,600 (\$149,000 federal funds and \$39,600 non-federal funds) and had a starting date of July 1, 2003 and ending date of June 30, 2004. The federal grant award and obligation of \$149,000 shall be administered in accordance with guidelines set forth in the Cooperative Forestry Assistance Act of 1978 (PL 95-313), as amended. The grant is to be used for the following programs: rural development, forestry and communities, heritage trees, ecological ramifications, and societal issues research.

NOTE 4 *Accounts Payable — Credit Card*

The Institute has one VISA credit card with BB&T. The credit limit for the card is \$15,000 with an annual interest rate of 10.15% for purchases and 19.90% for cash. The minimum monthly payments must be at least 2.0% of the outstanding balance or \$20, whichever is greater. The outstanding balance may be demanded due in full if the Institute defaults on any portion of the credit agreement. The outstanding balance at June 30, 2003 is \$ 2,011.

NOTE 5 *Restrictions on Net Assets*

Temporarily restricted net assets are available for the following purposes:

- Chestnut Transformation — Dr. Scott Merkel at the University of Georgia
- Expenses related to “Modifying Reproduction in Urban Trees” meeting

All temporarily restricted net assets were released from restrictions during the year ended June 30, 2003.

Board of Directors

Mr. W. Steven Burke
Senior Vice President
Corporate Affairs & External
Relations, North Carolina
Biotechnology Center,
Research Triangle Park, N.C.

Christine A. Dean, PhD
Director of Western Timberlands
Research, Weyerhaeuser Company,
Federal Way, Wa.

Don S. Doering, PhD
Senior Associate
Winrock International,
Arlington, Va.

Robert M. Friedman, PhD
Vice President for Environmental
and Energy Policy, The Center for
the Advancement of Genomics and
The Institute for Biological Energy
Alternatives, Rockville, Md.

Kevan Gartland, PhD
Professor of Biological Sciences,
University of Abertay Dundee,
Dundee, Scotland, UK

Maud Hinchee, PhD
Chief Technology Officer
ArborGen LLC, Summerville, S.C.

Robert C. Kellison, PhD
President, Institute of Forest
Biotechnology,
Research Triangle Park, N.C.

Ms. Lori Knowles
Associate for Law & Bioethics,
Director, Education and Outreach
The Hastings Center, Garrison, N.Y.

Dennis C. Le Master, PhD
Professor and Head, Department of
Forestry and Natural Resources
Purdue University, West Lafayette, In.

Alan A. Lucier, PhD
Senior Vice President,
National Council for Air & Stream
Improvement,
Research Triangle Park, N.C.

Kenneth R. Munson, PhD
General Manager, Forestry
Operations & Technology Forest
Resources, International Paper
Company, Savannah, Ga.

Mr. John Pait
Vice President, Business
Development, CellFor, Atlanta, Ga.

Ronald R. Sederoff, PhD
Distinguished University Professor
of Forestry and Co-Director,
Forest Biotechnology Group,
North Carolina State University,
Raleigh, N.C.

Risto Seppälä, PhD
Professor, METLA, Finnish Forest
Research Institute and President,
IUFRO, Helsinki, Finland

Project Partners & Sponsors

28

THE INSTITUTE would like to extend a special thanks to those individuals and organizations with the foresight and generosity to support the IFB in its initial programs, enabling growth, establishing credibility, and to move its mission forward.

ArborGen, LLC

Arauco

CellFor

Forest History Society

International Paper Company

International Union of Forest
Research Organizations

North Carolina Biotechnology
Center

North Carolina State University

Oregon State University

Purdue University

Scottish Enterprise

Scottish Forest Industries Cluster

State University of New York —
Syracuse

USDA Cooperative State Research,
Education, and Extension Service

USDA Forest Service

University of Abertay Dundee

University of Georgia

Weyerhaeuser Company Foundation



INSTITUTE OF FOREST BIOTECHNOLOGY

15 T.W. ALEXANDER DRIVE • RESEARCH TRIANGLE PARK, NC 27709-3399
919-549-8889 • FAX 919-549-9710 • WWW.FORESTBIOTECH.ORG