

Annual Report 2012



About HRI

The Horticultural Research Institute (HRI) was established on Sept. 19, 1962, to support and promote horticultural research that benefits the nursery and landscape industry. HRI is the research affiliate of the American Nursery & Landscape Association (ANLA). Along with its research efforts, HRI provides the opportunity for individuals, businesses, associations and foundations to make important tax-deductible contributions for the support of educational and scientific research.

OUR MISSION

To direct, fund, promote and communicate horticultural research, which increases the quality and value of plants, improves the productivity and profitability of the nursery and landscape industry, and protects and enhances the environment.

CORE PURPOSE

- 1) To focus on industry survival issues such as pest management, environmental stewardship and sustainability, marketing, and mechanization/automation to reduce industry vulnerability to labor challenges and improve production efficiency.
- 2) To educate and enhance the industry by effectively communicating the results and facilitating the technology transfer of horticultural research.
- 3) To act as a clearinghouse for industry research and statistics.
- 4) To continue to develop HRI's Endowment Fund.

VISION

To be the premier horticultural research and development institution for the nursery and landscape industry.

President's Message 2012

I had a daunting task ahead of me this year, one that I could not escape; I was the lucky guy to be president when HRI celebrated its 50th anniversary with a goal to raise \$500,000. Through the dedicated staff and board we crafted an anniversary fundraising campaign, the Trek de Hort II, that celebrated our diverse industry. Trekkers, as we called them, were asked to support HRI with their own fundraisers that raised awareness about us and the necessary funds that we need to meet our operational and research needs.

Our trekkers were creative in their fundraising endeavors: a haircut, a challenge for the Gulf States, and losing weight kicked off our campaign. I obviously had to do something... and I did.

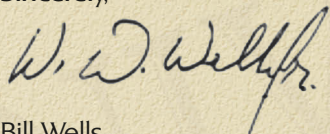
I went to Africa on a safari. I challenged myself to promote HRI to my friends and peers while requesting that they pledge to HRI by participating in my fundraiser, the Big Five African Safari Camera Hunt. I set a goal to take photos of the five most elusive animals and asked my friends to make donations based on the success rate of my photography.

Here's my findings. The scenery was outstanding, although a bit different from the United States. The elephants and rhinos are incredibly large up close and personal, while the lions make a lot of noise and their size is impressive also. The hardest animal to locate and get reasonably close to was the leopard, but oh did we ever do it! Cape buffalo are just plain mean and are to be avoided. We saw birds of all species by the hundreds and all kinds of other wildlife to be discovered and enjoyed.

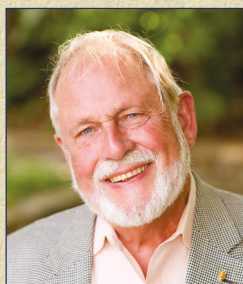
I had a remarkable year as president of HRI. I am fortunate to be a part of an industry with the best folks in business. I ask you, as we embark and transition to the changes in the industry, to keep up with us. Keep supporting our research, keep volunteering and sharing ideas. We need research. It takes time and research isn't always the fastest producer of results. But at the end of the day, HRI provides crucial outcomes that provide you with a better, safer and more sustainable industry, so that we may share in another 50 years.

Guess what? I took a photo of each of my goal species and raised \$5,000 that will be used to fund future horticultural projects. We are in this together, one plant and one idea at a time. Step-by-step we grow together, and the spirit of the green industry shines. Throughout this publication we highlight our generous gifts and the resulting research made possible by our donors. Thank you for allowing me to share in the success of 2012 and the HRI 50th anniversary.

Sincerely,



Bill Wells
W.D. Wells & Associates
HRI President 2012



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2012 Research Grants and Student Scholarships

HRI is committed to support annual research efforts focused on the highest priority needs of the green industry. HRI strongly encourages collaborative research efforts and challenges scientists to focus research on attainable outcomes that show a return on investment for the Green Industry. HRI awarded \$281,000 in research grants and student scholarships along with additional funding of \$15,000 in support of boxwood blight research for 2012.

The principal investigator is listed for each project. Many projects are collaborations between multiple research institutions and researchers.

\$10,000 Ref. #421: How Green Are Trees? A Life Cycle Inventory and Analysis of Nursery Production Methods, Distribution Processes, and Tree Care Practices

J. Ryan Stewart-University of Illinois at Champaign-Urbana Andrew Koeser-University of Illinois at Champaign-Urbana

\$16,000, Ref. #384: Production of Aromatic, Ornamental Plants for Screening of Essential Oils as Potential Biopesticides

Eugene K. Blythe-Mississippi State University, South Mississippi Branch Experiment Station, Poplarville, MS

\$20,000, Ref. #413: Analyzing the Environmental Impact (Carbon Footprint) and Economic Costs of Field-Grown Flowering Tree Production System Components

Dewayne Ingram-University of Kentucky Charles Hall-Texas A&M University

\$22,000, Ref. #394: Algal Mulch and Composted Algae to Improve Water and Nutrient Holding Capacity and as a Container Nursery Substrate Component

Joseph Albano-USDA-ARS-U.S. Horticultural Research Laboratory, Fort Pierce, FL
James Altland-USDA-ARS-Application Technology Research Unit, Wooster, OH

\$28,000, Ref. #356: Asian Longhorned Beetle Monitoring System for Arboreta and the Green Industry

Kelli Hoover-The Pennsylvania State University

\$30,000, Ref. #358: The Color of Marketing

Bridget Behe-Michigan State University R. Thomas Fernandez-Michigan State University
Charles Hall-Texas A&M University Marco Palma-Texas A&M University

\$30,000, Ref. #414: Reducing the Economic Impact of Ambrosia Beetles in Nursery Production

Steven D. Frank-North Carolina State University

\$35,000, Ref. #331: Carbon Sequestration and Greenhouse Gas Emission Reduction in Nursery and Landscape Production Practices

Glenn Fain-Auburn University, AL Charles Gilliam-Auburn University, AL
Stephen Prior-USDA-ARS, Auburn, AL Brett Runion-USDA-ARS, Auburn, AL
Allen Torbert-USDA-ARS, Auburn, AL Jeff Sibley-Auburn University, AL

\$78,500, Ref. #001: Keratin-Based Bioresins Continuing Work Addressing Biodegradability, Applicability, and Production of Green Industry Products

Masud Huda-Horticultural Research Institute Walter Schmidt, USDA-ARS, Beltsville, MD

HRI Student Scholarships

\$3,000 — Timothy Bigelow and Palmer W. Bigelow, Jr. Scholarship

\$4,000 — Carville M. Akehurst Memorial Scholarship

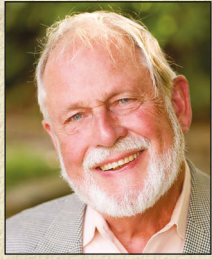
\$2,000 — Spring Meadow Nursery Scholarship

\$2,500 — The Muggets Scholarship

Industry Specialty Research Focus: Boxwood Blight

HRI raised \$15,000 from in 2012 in support of boxwood blight research. These funds were distributed to Kelly L. Ivors at North Carolina State University and James LaMondia at The Connecticut Agricultural Experiment Station Research Foundation, Inc. Dr. LaMondia will also receive FY2013 funding through the HRI competitive grants program.

HRI Officers & Executive Committee 2012



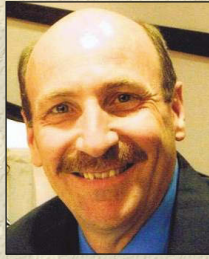
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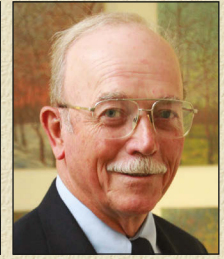
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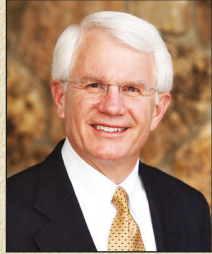


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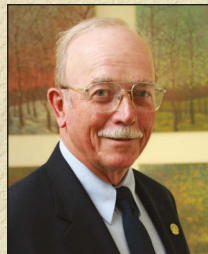
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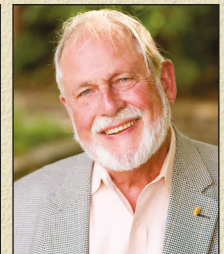
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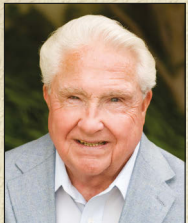
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At HRI we believe in investing in plants, people and the future. Your tax-deductible gift to HRI helps support research efforts that bring together research and business communities across the United States. HRI donors support a better environment, quality plants, and production practices, while supporting those that get to the root of biological and practical business issues -- the research community. Annual giving is vital to HRI's continued growth and success. Donations can be directed to existing named funds or to several designated general purpose funds within the HRI Endowment.

The following individuals and firms made an annual contribution or pledge to HRI in 2012. HRI is most appreciative of the continued support of our green industry members and friends.

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The following donations were made in honor and recognition of industry members in 2012

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Ornamental Plants Being Evaluated For Their Biopesticide Properties

Ornamental plants are being studied for their potential to produce essential oils that can be used to kill or deter insect pests, disease pathogens and weeds.

By David Kuack

While many trees, shrubs and flowers are grown primarily for their ornamental value, some of these plants have the potential to produce biopesticides. As pressure continues to be put on agricultural and horticultural producers by the public and government officials to implement more sustainable production practices, there is going to be an increasing need to identify safer, environmental-friendly pest control products.

Gene Blythe, assistant research professor at Mississippi State University's South Mississippi Branch Experiment Station in Poplarville, Miss., said pesticides from biological sources can provide unique modes of action, tend to have low mammalian toxicity levels and generally don't persist in the environment. With funding from the Horticultural Research Institute, Blythe, along with USDA and university researchers, is studying the potential of growing ornamental plants for their essential oils that could be processed into biopesticides.

"This is a very different use for ornamentals," Blythe said. "There are already a number of ornamental plants that are grown commercially for extraction of essential oils for use in perfumes or for food flavorings and many other products. We are simply taking the plants



and using them for something different other than what they have been traditionally used for. We are also growing and screening different species."

Selecting Plants

Prior to becoming a researcher, Blythe was employed as a grower at Monrovia, a commercial nursery headquartered in Azusa, Calif.

"My background is in nursery production," he said. "I spent 20 years at Monrovia so I had the opportunity to grow many different types of plants. Many of them have aromatic qualities. We are looking at different species — plants that are different or unique and haven't been worked on from this angle before. The chemical

composition of the essential oils may be different from species to species, such as eucalyptus. We are currently working with a couple hundred species of plants."

Blythe said he uses different criteria to choose which plants he is going to grow. He uses his experience as a grower looking for plants that are aromatic, particularly the vegetative parts. He is looking at a variety of ornamental plants, including annuals, perennials, herbs, woody ornamentals and some native species. These include plants in the Lamiaceae (mint) and Asteraceae (sunflower) families.

"We are also looking for plants that can be grown in this region," he said. "Being located in south Mississippi, there are some plants that will do well here and others that won't."

Blythe said in some cases the climate in Mississippi can limit what crops can be grown.

"I grow a few crops in a greenhouse, crops that would be too tender to leave outside during the winter," he said. "We have grown common annual marigolds, but we have also been growing some perennial marigolds, including *Tagetes lemmonii*, *T. nelsonii* and *T. elliptica*. We can't grow everything that we would like to test. But we certainly haven't run out of plants to work on."

Dr. Nurhayat Tabanca, a chemist at the National Center for Natural Products Research in Oxford, Miss., has been doing the essential oil extractions. She has experience with essential oils from working with plants in her homeland of Turkey and other countries.

Delivering The Goods

One of the benefits of having Blythe involved with this project is the ability to deliver plant material in the quantities and quality that chemists need to extract enough oils for screening.

"Essential oils of commercial crops currently on the market originate from producers in many different countries," Blythe said. "One of the reasons that I have been involved is to produce a reliable and consistent supply of the plants. The chemists I work with know that the essential oils haven't been modified or adulterated. They know where the essential oils come from and that they are pure."

Blythe said the crops he is growing are propagated by seed from reliable commercial sources and by clonal cuttings from nurseries and botanical gardens.

"Here we can maintain the plant material and ensure that it is properly identified," he said.



"Also, there is less plant-to-plant variability than what might occur if the plant material had been collected in the wild. The chemists I am working with know the plant material has been properly grown, harvested, dried and packed. I do the drying of the plants and package them so I have control over the process."

Blythe said the chemists need a sample size of about a kilogram of dried plant material to start to screen an essential oil for potential use. He said some aromatic plants don't produce enough oil to warrant further study.

"It is easier to extract the oil from dried material," he said. "As long as the plant material is stored out of extreme heat and doesn't get ground up or pulverized, the essential oils will stay good for a long period of time."

Blythe said another reason for rejecting a plant is if the chemistry of the essential oil isn't different or novel.

"That's why we are not working with rosemary oil at this time," he said. "It's well known and there has been much published in the scientific literature about it. There are also commercial products available with rosemary oil in them."

Screening Oils For Effectiveness

Blythe said the initial testing of the essential oils is done by collaborating scientists using microassays. This method enables the oils to be

tested more efficiently and cost effectively.

"If the oils show good results in the lab then the screening can move on to field testing," he said. "Plant pathologists start with *Colletotrichum*, which is one of the most sensitive disease pathogens. If they get positive results with that organism then they will test it against some other pathogens. Entomologists first test the oils against azalea lace bug, which like *Colletotrichum* tends to be more sensitive. In the future we want to look at other insect pests as well. The essential oils could also be tested on food crop pests."

Blythe said a considerable amount of the oil screening has been done on mosquitoes. Some of the screenings using essential oils for this purpose have been done by scientists at USDA's Mosquito and Fly Research Unit in Gainesville, Fla.

"The essential oils will be tested against mosquito larvae and adults and they will also be tested as repellents," he said. "They are looking for insect repellents that American troops can use overseas as a potential replacement for DEET. The entomologists might also determine that certain chemicals are effective on crops as pest repellents, not necessarily to kill the pests, but to repel them."

Blythe said the identification of effective oils could also lead to the development of synthetic biopesticides.

"The chemists could identify a compound or compounds that are unique and effective and determine that it is less expensive to produce a compound synthetically than by extraction," he said. "The herbicide Scythe contains some pelargonic acid, which is produced synthetically rather than by extraction from the oil of pelargonium plants."

Blythe said essential oils from species of *Agastache* (hummingbird mint), *Artemisia* (wormwood) and *Monarda* (bee balm) have shown promising results in initial screenings.

"One of the crops being looked at is *Agastache rugosa* 'Golden Jubilee', which was an All-America Selections winner in 2003 (<http://www.all-america-selections.org/winners/details.cfm?WinID=405>). It was an award winning ornamental and now we are looking at using it for something completely different than growing it for its ornamental qualities. Eventually we hope to have other scientists involved in this research along with commercial companies that can take our findings and develop these essential oils into useful products that can benefit agriculture, horticulture and the general public."

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David Kuack is a freelance technical writer in Fort Worth, Texas; dkuack@gmail.com.



PHOTO CAPTIONS

Photos by Gene Blythe, Mississippi State University

1. A field planting of *Ocimum* (basil) cultivars produced for eventual harvest and extraction of essential oils.

2. *Agastache rugosa* 'Golden Jubilee', a 2003 All-America Selections winner, may be a source of potentially useful essential oil.

3. *Tagetes nelsonii* (Mayan marigold) is a fall-blooming perennial with highly aromatic foliage owing to its content of essential oil.

4. *Monarda fistulosa* (wild bergamot), an American native perennial, produces leaves containing an essential oil that shows potential as a mosquito repellent.

Donor Spotlight: William Flemer III Fund

We are proud to announce that HRI is the recipient of a generous \$50,000 donation from the estate of William Flemer III. This donation will create the William Flemer III Fund within the HRI Endowment.

William Flemer IV announced the fund during the HRI reception at the Mid-Atlantic Trade Show on Jan. 12, 2012. Mr. Flemer stated, "His bequest to HRI exemplifies his lifelong devotion to the advancement of ornamental horticulture, and his abiding affection for the nursery industry and its people, his friends and their families, who have given their lives to the work he loved. His family shares that affection and appreciation, and is happy to know that, through HRI, valuable research, which will further improve this rewarding profession, will be his lasting legacy."

William Flemer III was a third-generation nurseryman, born and raised on Princeton Nurseries in Kingston, New Jersey, where he lived for his entire life. He was president of that company from the mid-1960s through the 1980s. His life work was the selection,

introduction, and promotion of a large number of superior shade tree cultivars. Mr. Flemer's tree selection work was initially in response to the widespread loss of the American elm to Dutch elm disease in the 1950s. His first introduction was

the 'Shademaster' honeylocust, which replicated the beloved vase shape of the elm without its disease susceptibility, and without the profuse seed pods and vicious thorns of seedling honeylocusts.



Providing Garden Center Employees With Consistent, Timely Training

A web-based education program allows garden center employees to learn at their own pace and when time is available.

center operators try to bring in seasonal workers at the last minute in order to reduce costs,” Lacey said. “Since they don’t have a dedicated human resource or training person, when seasonal hiring begins each company is left to pull together whatever training materials they have available. Every garden center across the country spends time developing similar training material that is foundational to any new hire. This includes basic policies related to safety procedures, sexual harassment, dress code, being on time and product information.”

When new employees are hired, Lacey said, they are usually provided a combination of reading materials, handouts and classroom training. This method of training can be costly, time consuming and inefficient because it takes a management employee away from their regular duties, each time a new hire or group of hires, comes on board.

Lacey said an increasing number of companies in many industries are moving away from only classroom instructor-led training. Companies are using a “blend” of training materials which includes eLearning.

Today’s eLearning courses can actually be more effective than traditional lecture-based approaches. According to the American Society for Training and Development, the average percentage of formal learning available via technology-based methods is 33.3 percent, and it is expected to continue to increase.

Benefits Of Online Learning

Companies have recognized that using eLearning courses as part of their training approach can be beneficial. The major benefits from eLearning are:

- Improved training costs. Producing learning content is time consuming whether it’s online or not. With eLearning, each time the course is accessed the return on investment improves because fixed production costs are divided by the number of uses.
- Increased productivity. Because eLearning is not bound by geography or time, a company can control the training’s impact on production by training people during down times.
- Standardization. A company may have an effective instructor, but there is no guarantee that the training material will be presented the same way across all sessions. eLearning allows for the creation of a standardized process and consistency in the delivery of content.
- Real-time access. Live lecture-based learning requires that those who participate align their schedules to the training calendar. eLearning eliminates scheduling conflicts because the course can be accessed anytime, anywhere.

- Improved retention. The combination of information and some good practice activities with feedback creates a learning environment that helps employees retain the course content, which produces results.
- Ongoing access to resources. eLearning makes the information available 24/7 whether it be for employees seeking a refresher or for new employees being trained for the first time.

A New Training Approach

With funding from the Horticultural Research Institute and input from garden center operators across the country, Lacey developed a five course web-based eLearning pilot program for training new employees. The five courses are:

1. New Hire Orientation, which covers basic policies and procedures.
2. Introduction to Safety, which is an overview of basic safety policies, hazards and safe work methods.
3. Introduction to Customer Service, which discusses the value of customers in relation to the business, how to provide good customer service and basic selling.
4. Product Knowledge, which covers both green and hard goods. This course addresses basic skills including watering, stocking and merchandising.
5. Identification of Plant Material, which covers the five most common annuals, perennials, shrubs and trees providing information and photos. This course could be adapted to include plants in different regions of the country where the garden centers are located.

Real World Application

During spring 2012 three garden centers trialed the training program from March 12 to April 30. The courses were centrally hosted and participants were able to log on to the program website from their company’s computers. There was a graded quiz at the end of each one-hour course.

For the pilot program all five courses were reviewed and feedback provided to validate and improve the content. The New Hire Orientation course had the largest audience and was used to obtain detailed learner feedback. Participants were surveyed about the information presented in the courses, the experience of using a computer for training and their thoughts about eLearning being a regular part of their companies training program.

Of the people who participated in the program, 34 percent were 20 years old or younger; 22 percent were ages 21 to 49 and 44 percent were



By David Kuack

Independent garden centers find themselves in an increasingly competitive environment, partly driven by the mass merchandisers’ expanding use of technology. Garden centers’ historical competitive edge has been in plant quality, knowledgeable employees and customer service. But those advantages are being eroded as mass merchandisers improve the quality of their plant offerings and work to improve customer service. Having trained and knowledgeable employees is one area in which garden centers can continue to differentiate themselves.

Many companies and organizations are investing in technology-based training delivery methods. Adoption of online or eLearning frequently produces efficiency gains and decreases the overall cost of training employees. However, creating an effective eLearning program requires a commitment and investment in development costs.

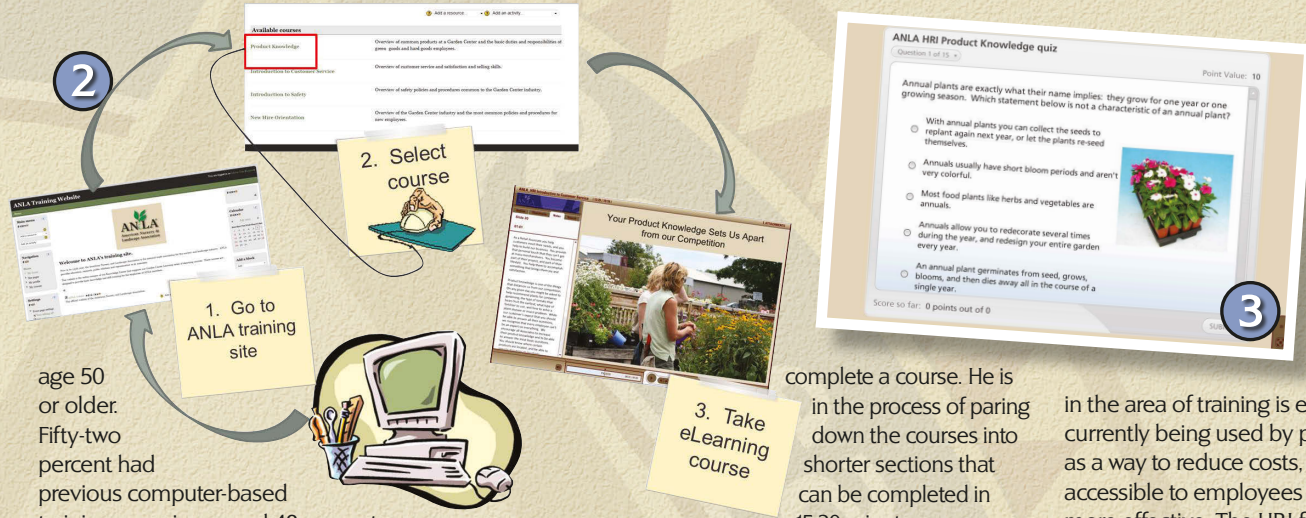
Limited Training Resources

Most garden centers don’t have a dedicated staff person to design and develop training materials and to train new employees. Sean Lacey, a partner at South Mountain Learning, in Boiling Springs, Pa., said many of these companies employ an office manager who handles a multitude of management tasks, including payroll, timekeeping, scheduling, hiring and employee training. He said most garden centers aren’t able to afford a full time person dedicated to training.

Garden centers operate with a mix of core full-time staff, part-time workers who come back each year, and seasonal employees hired for the peak season.

Hiring of seasonal employees by garden centers typically begins in March. These seasonal employees are usually hired in a staggered manner bringing in one or two at a time.

“From a financial perspective, many garden



“Every company has a need to develop people who will become supervisors and managers,” he said. “The garden center industry can also explore the use of eLearning in its traditional conference based programs.”

age 50 or older. Fifty-two percent had previous computer-based training experience and 48 percent did not.

“Going into the pilot we thought that some garden center operators would be skeptical about an eLearning program because they have older workers who aren’t familiar with computers,” Lacey said.

Feedback from the participants was very positive in comparing their experience with the eLearning courses to classroom courses. The majority of participants indicated that they would be able to apply the knowledge learned from the eLearning courses on the job and that the eLearning courses were a convenient and a good way to learn the material.

“With the positive feedback we received from the participants, we proved that computer-based learning is effective and well-received among garden center employees, Lacey said. “The companies that were involved in the pilot liked the program’s consistency, ease of delivery and availability on demand when time allowed.”

The average time to complete a course was one hour. One of the comments Lacey received from the participants was to reduce the time it takes to

complete a course. He is in the process of paring down the courses into shorter sections that can be completed in 15-20 minutes.

The use of technology in the area of training is expanding and is currently being used by progressive companies as a way to reduce costs, make learning more accessible to employees and to make learning more effective. The HRI-funded eLearning pilot program has demonstrated that the knowledge available in independent garden centers can be leveraged to create standardized training programs. These programs are cost effective and accessible to all, which can maintain the competitive edge of having the most knowledgeable employees in an increasingly competitive environment.

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PHOTOS CAPTIONS:

1. Employees are able to log on to the garden center training materials from a local computer.
2. Taking the eLearning courses is as simple as logging on to the training website, selecting a course and then launching the course from the site.
3. Each eLearning course has a knowledge quiz to confirm that the material has been understood by the participant.

“We can break the courses down into smaller versions on more specific topics,” he said. “This would enable employees to do a course in less time and to choose the topic they want to learn about.”

Potential For Industry Standardization

Lacey said a major advantage to the eLearning program is it eliminates garden center operators from having to be training design and development experts.

“The operators are the subject matter experts, but the pilot program has shown how the knowledge of the industry can be tapped to create standardized training,” he said. “It avoids having each company redundantly develop its own separate program, which is delivered in a less cost effective and less learning effective manner. It also frees up local resources to develop any site specific training information to complement an industry standard training program.”

Lacey said the program has the potential to be expanded to include other content areas like supervisory and managerial topics.

Donor Spotlight: Dayton Bag & Burlap Establishes \$100,000 Fund in Support of Green Industry Research

HRI is proud to announce that it is the recipient of a generous \$100,000 donation from Dayton Bag & Burlap located in Dayton, Ohio.

Mr. Bob Couch, the nursery sales manager at Dayton Bag and Burlap and member of the HRI Executive Committee and Board of Trustees, announced the creation of the Dayton Bag & Burlap Employees Fund at the Mid-Atlantic Trade Show on Jan. 12, 2012.

Mr. Couch said, “Dayton Bag & Burlap celebrated our 100 year anniversary in 2010. We arrived there by the hard work and loyalty of our employees. Illustrating that loyalty is that, for instance, our president and owner has been there for fifty years, six of us, including myself,

have been there over thirty years, and several more have been with us for 10-15 years. We wish to honor those folks with our donation. We believe in HRI and the great work they do. The health of the nursery business is vital to the health of Dayton Bag.”

Dayton Bag & Burlap was established in 1910. Dayton Bag & Burlap has been a leader in the nursery, industrial, and die cutting industries for more than 100 years. Headquartered in Dayton, Ohio, there are seven locations nationwide.

One of the nation’s largest converters of jute and burlap products, Dayton Bag & Burlap is proud to feature

its own state of the art wire basket production facility at its headquarter location. Contact Dayton Bag & Burlap at 800-543-3400 or online at www.daybag.com.



From Coop To Container To Consumer

The Horticultural Research Institute has partnered with USDA to develop a process for converting poultry feathers into biodegradable resins for use in commercial and consumer products including growing containers.

By David Kuack

The poultry and egg industry contributes about \$265.7 billion to the U.S. economy, which is just over 1.7 percent of the gross domestic product. Fats and feathers resulting from the processing of poultry are rendered into other useful products. These products include feather meal, which is used as a protein source in pet food, aquaculture and cattle feed. These feathers also have the potential to be used in other products containing keratin, which is a biodegradable plastic resin made from feathers.

Keratin-derived Resins

The Horticultural Research Institute signed a Cooperative Research and Development Agreement with USDA's Agricultural Research Service in 2006 to study alternatives for plastics used in the horticulture industry. The purpose of the agreement was to develop biodegradable plastic resins made from avian feather keratin. One of the goals of the project was to develop formulations for biodegradable growing containers made without any petroleum-based components. Another goal was to determine if keratin could be used as an additive with existing plastic pot resins to reduce petroleum-based materials.

In 2009, a joint patent application (Biodegradable Products from Poultry Feathers and Methods of Preparation Thereof) was filed by USDA-ARS and HRI with the U.S. Patent Office. The patent-pending application included the use of keratin and a variety of other plant-based agricultural waste products.

The development of the keratin resins led to the manufacture of injection-molded growing containers comprised of 30 percent keratin and 70 percent regrid high density polyethylene (HDPE) in 2010. HRI worked with container manufacturer Nursery Supplies Inc. to create a standard 1-gallon container containing keratin resin. The containers were manufactured on the company's production line in its Pennsylvania plant. The containers matched the standard requirements for polypropylene production and had a rejection rate of 12 percent.

The keratin containers were distributed for trialing to ARS research sites in Beltsville, Md., and McMinnville, Tenn., and to several land grant universities. Formulation biodegradation studies are also underway at the Beltsville location to determine at what rate the formulations will breakdown.

Impact Of The Economy

Marc Teffeau, HRI's director of research, said today's recessionary economy has had a major impact on all businesses, including container manufacturers.

"The margins are so small in regards to pot manufacturing," Teffeau said. "The emphasis is on getting the feedstock materials to make the pots at the lowest possible price. Keratin, which is considered a bioresin, is a substitute or drop-in replacement for petroleum resins in pots.

"We have found that the price point and profit margin for keratin just aren't where they need to be in order to be competitive with petroleum-based resins. The abundant supplies of natural gas that can now be used to manufacture base resins have kept the resin material price stable. This is not the case for the large majority of non-petroleum-based bioresins, whether they are made from keratin, corn, soybeans or sugar cane."

Teffeau said that bioresins, including keratin, are more expensive because of the cost of development.

"Comparing the costs for petroleum-based resins and bioresins, the margins aren't there," he said. "For example, it's difficult to compete with 50 cents a pound regrid HDPE."

From a commercialization standpoint, Teffeau said, he knows that keratin will work as a replacement for petroleum-based resins. HRI and USDA have developed several keratin formulations that have been combined with a variety of petroleum-based polyolefins, including polyethylene, polypropylene and HDPE.

Further Commercialization

Teffeau said based on HRI's experience the market applications for keratin will probably go initially into other higher profit margin products outside the horticulture industry. HRI has identified possible applications in military-related and specialized high tech products.

"Technically a container manufacturer could buy the keratin resin and put it in its pots," he said. "The reality is I don't see the market



opportunity currently available for this type of product. This transitional product is a pot in which part of the petroleum-based resins are replaced with keratin. In talking with pot manufacturers and big box retailers to get an idea of market demand, it doesn't exist right now. In our current economy, consumers are not demanding this type of product on a scale large enough to ensure profitability.

"No matter what surveys say, generally consumers want to be green, but they don't seem to want to spend "the green" to be green. Long term and with a better economy, I am sure the market situation will change. But right now I see these materials being pushed into the market as value-added rather than pulled by consumer demand."

As a result, Teffeau said HRI is looking at other high end, higher profit margin products for which the keratin formulations can be used to manufacture.

"We are looking for commercial partners to take this technology and the formulations to the next level of product development and commercialization," he said. "Money would come back to HRI through sublicensing or some other type of agreements. This would probably be based on a royalty percentage of net sales."

HRI has set up a wholly-owned, for-profit Maryland-based limited liability company called Green Industry Innovations to handle the commercialization of the keratin technology.

"This company would handle all of the commercialization agreements," Teffeau



said. "Whatever fees come back to Green Industry Innovations, minus expenses, would automatically be transferred tax-free to the HRI Endowment to support additional industry research."

Teffeau said incorporating keratin into a traditional plastic nursery container would simply involve replacing it with a petroleum-based resin. The replacement would not result in a biodegradable pot.

"Based on our research and our experience, I'm not saying that we couldn't develop a larger 100-percent biodegradable pot that was 3- or 5-gallons. But this is going to be very difficult to achieve because of the longer nursery crop production cycle," he said. "There is a longer period of exposure to outside elements. It's almost counterproductive to try to get something that is going to last longer under inclement weather conditions and then put it into the ground and expect it to decompose."

Container Research Continues

Even though a 100-percent biodegradable container might not be practical for woody ornamentals with long production cycles, it does have potential for short term crops. HRI in its commitment to the industry to bring a biodegradable pot to the marketplace is currently developing a 100-percent biodegradable pot. HRI is working with an independent injection molder in Maryland to manufacture the biodegradable pots which were HRI's design.

"This summer we talked with a big box green goods buyer about biodegradable pots," Teffeau said. "He told us, based on what products he had seen on the market, our product will have a shelf life where many of the other bio-containers have a tendency to start to decay on the shelf if they are not turned over quickly for sale. Our container doesn't biodegrade until it's in the soil. Another advantage is the resins that we have developed can easily be printed on so this would allow for the application of brand logos on the containers."

Other Horticultural Products

Teffeau said the next step for HRI is to find a company or organization interested in working on product development.

"It has been very difficult to bring new technologies to the marketplace because companies are being risk averse in today's economic climate," he said. "Unless you can bring something to a company that has proven benefits and its performance is equal to or better than what they are using, doesn't cost anymore and preferably costs less, and the technology is tied up in a nice turnkey package, we have found reluctance on their part to make the investment. In the plastics industry a number of companies have actually shut down their research and development departments. They have just hunkered down and are producing what they can

produce until the economy gets better. This is the same feeling across many industries."

HRI, working with a Maryland-based equipment manufacturer, an international mesh manufacturer and a Maryland Department of Agriculture Specialty Crop Grant, has developed formulations that incorporate a small percentage of keratin into sod mesh. Teffeau said this type of product doesn't need to be 100 percent biodegradable, but only needs to break down into smaller pieces.

"The problem now is if plastic sod mesh is laid down and the grass dies, the mesh is left lying on the ground," he said. "This can lead to lawnmowers getting tangled up with the mesh. People could also trip over the exposed mesh."

Another product under consideration is a sod wrap that is used to hold together large rolls of sod. The plastic mesh wrap keeps the sod intact during delivery to installation sites. Once the mesh is removed it has to be discarded or hauled off to a landfill.

Teffeau said a keratin-based product area that looks promising based on HRI-ARS research and formulations is the production of 100-percent organic slow-release fertilizers. The initial extrusion process for the fertilizers would be the same as the one used to produce the resin materials for the growing containers. The difference would be what is added during the extrusion process to provide the nutrient content and release rate during the biodegradation of the fertilizer pellets. The fertilizers would have application to both growers and consumers.

"We could engineer fertilizers that when they are put into growing substrates would provide a slow release form of nitrogen and other nutrients," he said. "Or we could formulate slow-release consumer fertilizers for application to landscapes where there are concerns with fertilizer runoff."

What's Next?

Even though the economy has impacted the development of products manufactured with keratin, Teffeau remains optimistic about the use of this bioresin.

"We have learned a lot about keratin," he said. "We have over 350 different formulations that we have developed and we have some promising proprietary processing techniques for which we are preparing to file joint patents with USDA-ARS. We have collected some basic economic data on keratin processing and production. We have some ideas for potential product applications outside the horticulture industry. Now we are looking for companies to collaborate with us to take what has been developed onto the next stage of commercialization."

For more: Horticultural Research Institute, (202) 434-8695; mteffeau@anla.org; www.hriresearch.org.

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PHOTO CAPTIONS:

1. The Horticultural Research Institute has worked with USDA's Agricultural Research Service to develop processing techniques for turning poultry feathers into the bioresin keratin that can be used to manufacture biodegradable containers.

2. At the USDA's Agricultural Research Service laboratory in Beltsville, Md., polymer chemist Masud Huda (back left), chemist Walter Schmidt (center) and HRI director of research Marc Teffeau use an injection molder to produce biodegradable pots from poultry feathers.

3. The biodegradable pots being developed by HRI don't biodegrade until they are placed in the soil. They can easily be printed on allowing for the application of brand logos.

What Motivates Consumers To Buy Plants?

The Color of Marketing research project will help determine what consumers focus on and how long they focus on it when looking at retail plant displays.

By David Kuack

If consumers were willing to pay a 20-30 percent premium for plants based on how they were produced, would you be willing to change your growing practices? The Color of Marketing research project, which is being funded by the Horticultural Research Institute, is trying to determine how much more consumers would pay for plants based on production practices. The study is being done by researchers at Michigan State University and Texas A&M University.

"A couple of areas in the country have gone through major droughts," said Bridget Behe, horticulture professor at Michigan State University. "We know that droughts have, in some cases, had a profound effect on plant sales and, we believe, people's attitudes towards planting and buying plants, including plant material for the landscape."

Behe said there hasn't been a lot of research done on segmenting and profiling the market. She said the HRI-funded study will look primarily at customer segmentation and how much of the market is concerned with environmental issues.

Gathering Marketing Data

Behe said the Color of Marketing project builds off data that was collected from a previous survey that included 2,500 consumers in five different locations in the United States and Canada.

"We were looking at consumers' impressions of not just plant material, but the plant material in displays," she said.

The displays included petunias, herbs, vegetables, perennials and flowering shrubs. In each of the displays there were three signs. One sign had the name of the plant, such as mixed herbs, petunias or flowering shrubs. Another sign used one of four different terms about how the plants were produced: 1.) sustainably-grown, 2.) grown with water-conserving practices, 3.) grown with energy-conserving practices and 4.) conventionally grown. The terms were not defined because the researchers were using eye-tracking equipment to determine what the study participants were looking at when viewing the displays. The third sign was the price of the plant.

"We designed this study to identify what they are actually looking at in terms of making a choice from a selection of plants in a display and also what they are thinking about in terms of sustainability. We never defined the word "sustainability" for the study participants."

Information was also collected about the type

of plants the participants purchased, where they purchased them along with other demographic data. Additional questions focused on which consumers were more concerned with in their daily lives: current or future consequences.

"We have a manuscript currently under review that is based on an online study done in 2011 that shows people who are more oriented toward future consequences are more environmentally conscious," Behe said. "And people who are more directed toward current consequences are less environmentally focused."

"What we want to do with the eye-tracking data is use the future and current consequences scale to see what people are actually looking at. For example, if you are a future consequence focused person, we want to see if there is a difference in what you are looking at. Are you looking at how the plant material is grown? Conversely, if you are current consequence focused, you might be looking primarily at the price. This is one of the hypotheses that we want to test."

What Are People Willing To Pay?

A second part of the Color of Marketing project will determine what people are willing to pay for plants that were used in the eye-tracking study. The plants will be set up in auction displays where participants will have the opportunity to bid on the plants.

"The study participants are going to bid on plants that are described the same way as they were described in the eye-tracking study," Behe said. "We want to bring people in to determine what they are really willing to pay for. For example, some may pay more for plants that are grown sustainably, or with water-conserving measures, or with energy-conserving measures or are conventionally grown. As in the eye-tracking study, these terms are not going to be described or defined for the auction participants."

Comparing POS Displays

The last part of the Color of Marketing project will be done in the spring to determine what



impact production methods have on sales.

"We are going to set up displays of plant material in several retail garden centers and monitor how much is sold from a display that promotes water-conserving measures," Behe said. "We will use some of the same plants that were used in both the eye-tracking and plant auction studies. A set of plants would be merchandized and advertised as grown using water-conserving measures. There would also be a parallel display that would not be merchandized in this way. We will then track the sales to see what kind of pull through occurs to see if there are any differences between the two displays."

Benefits to the industry

Behe said the market segmentation information collected from the Color of Marketing project will be of benefit to growers, retailers and companies that create merchandising and marketing products and programs.

"We are trying to help growers and retailers understand what consumers are looking at and

what are they evaluating," she said. "This will also affect acceptability of some of these plants. Some consumers are addicted to impatiens and the current downy mildew issue will affect what people are going to try to substitute because their impatiens aren't growing well. A drought can do something similar. It can eliminate certain plants from the palette that consumers and growers are used to producing. We have to look at what are some of the appealing plants that may be used as substitutes and how do we convince people to try those substitutes and not just give up on plant material because of bad experiences."

Behe said the goal of this project is to give the

industry some of the market information it needs so that it is available when drought, disease and other unforeseen issues occur.

"It's something we can do to help reduce the number of consumers giving up planting and deciding to do something else than gardening," she said.

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PHOTO CAPTIONS

1. A heat map produced by data from eye-tracking glasses shows areas of this plant display where visual activity is high (red), low (pale green) and none at all (blank).

2. The part of this Christmas tree that received the highest visual activity, as seen through eye-tracking glasses, is shown in red, followed by the yellow and pale green areas.

Donor Spotlight: Orum-Midwest Research Fund Established with \$250,000 Gift to HRI

WASHINGTON, DC – The Horticultural Research Institute (HRI) is proud to announce that it is the recipient of a generous \$250,000 donation from the Peter Orum family, Midwest Groundcovers, LLC, St. Charles, Ill., and Midwest Trading Horticultural Supplies, Inc., near Virgil, Ill. This donation will create the Orum—Midwest Research Fund within the HRI Endowment.

When discussing the establishment of the Orum—Midwest Research Fund Mr. Orum noted, "Many years ago we established an HRI fund in honor of my mentor in plant propagation, John Wilde and some years later we established a fund in honor of my parents, Lydia and Palle H. Orum; and on the birthdays of these honorees we keep building the funds.

"In the 90's, I served on the HRI Board and was Vice President and President for several years. Because of HRI, the nursery industry has clout both within government and academics. HRI itself has real resources to put down when asked to do necessary things. So now it is HRI's 50-year anniversary and what better time could it be for the Orum family and the Midwest Companies to join together and establish a substantial HRI fund."

Midwest Groundcovers is deeply rooted in traditions of growth and innovation. When Peter Orum immigrated to the United States in 1965, he brought with him a deep knowledge and tradition of horticulture. This he gained from his experiences and training on the 2-acre nursery of his father, Palle Orum, in Jutland, Denmark, his nursery apprenticeships at Spejlborg and

Vilvorde Nurseries and his education at the Vilvorde Horticulture School in Copenhagen. Peter had enlisted in the Danish Army, Corp of Engineers, worked through the ranks and became an engineer officer. Much of the organizational systems and construction at the Midwest companies stems from what was learned in the Corp of Engineers. Most importantly, Peter had an entrepreneurial spirit and a vision of the course his life would follow – a journey that would be defined by hard work, passion and a fearless drive to succeed.

Midwest Groundcovers LLC is an industry leader in the propagation, growing, and wholesale distribution of quality container nursery stock. The company operates over 600 acres of state-of-the-art nursery production facilities at five locations in St. Charles, Ill., Virgil, Ill., and Glenn, Mich. Each year, these facilities produce millions of container grown plants including more than 100 different ground cover varieties; over 250 species of local ecotype native plants identified as Natural Garden Natives™, 140 regional Midwest native species of which some are naturally occurring selections; more than 500 varieties of perennials and ornamental grasses; and over 170 varieties of deciduous shrubs, native shrubs, broadleaf evergreens, hardy shrub roses, conifers and vines.



Midwest Trading Horticultural Supplies, Inc. is a horticultural hard goods supplier and fabricator, headquartered in Virgil, Ill., approximately 55 miles west of Chicago. The company specializes in the production of potting soils, engineered soils, rooftop mixes, bark mulches and composts in addition to re-wholesaling other nursery and landscape products. The company operates two material pick-up yards, one located at the headquarters in Virgil, and another 15 miles east in nearby St. Charles. It has a 40-acre barge terminal production facility in Ottawa along the Illinois River. Midwest Trading has served the green industry in Chicagoland and the Midwest states for more than 30 years, and takes great pride in the high quality products and services that it provides to its customers.

The HRI Endowment Fund

Many HRI donors wish to honor friends, loved ones, and industry associations by establishing a named endowment fund. The investment returns on endowed funds are awarded annually in the form of research grants. Each fund awards a grant or multiple grants. A fund can be established and paid over a five-year period. Annual donors may contribute to HRI by donating to any fund listed or our annual fund.

Endowment Circles

Eight Circles were established to recognize the giving levels for individuals who establish a named endowment fund or put HRI in their will.

- Emerald Circle . . . \$500,000 and above
- Diamond Circle . . \$250,000 to \$499,999
- Founder's Circle . . \$100,000 to \$249,999
- Funds recognized at this level were started before 1990*
- Platinum Circle . . . \$100,000 to \$249,999
- Gold Circle \$50,000 to \$99,999
- Silver Circle \$25,000 to \$49,999
- Bronze Circle \$20,000 to \$24,999
- Heritage Circle . . . Individual Bequests

INDIVIDUAL, FAMILY AND CORPORATE FUNDS

Donations of \$20,000 or more (paid over a five-year period) can take the form of a named fund in the HRI Endowment. The donor or group donating the money can name the fund. Funds begun at more than \$100,000 afford donors the opportunity to provide some guidance about the research that will be funded by the proceeds from the named fund.

EMERALD CIRCLE

Sylvan Nursery-Sylvia and Neil Van Sloun Fund

DIAMOND CIRCLE

Bailey Nurseries, Inc. Fund
Gordon Bailey, Jr. "Tour de Hort"
Orum-Midwest Research Fund
Spring Meadow New Plants Fund
Spring Meadow Nursery Scholarship Fund

FOUNDER'S CIRCLE

These funds were established before 1990

Albert and Olga Bachman Fund
The Robert W. Baker Companies Fund
Imperial Nurseries for Ernest Bietenholz Fund
Timothy S. & Palmer W. Bigelow, Jr. Scholarship Fund
Fairview Evergreen Nurseries/F.C. Hetz Fund
Dwight Hughes Family Fund
Karl Junginger Fund
Ramona and Bob Lederer Memorial Fund
Edmund V. Mezitt Fund
Myra K. and Thomas S. Pinney, Jr. Fund
J. Frank Schmidt Family Trust Fund
Emanuel Shemin Fund
Ernest Tosovsky Fund
Martin W. Usrey Fund

PLATINUM CIRCLE

Carville M. Akehurst Memorial Scholarship Fund
14 Dayton Bag & Burlap Employees Fund

Theodore & Emily Guarriello/Nursery Supplies, Inc. Fund
Prides Corner Farms Fund
Sherman Nursery Company Fund

GOLD CIRCLE

Lewis Bookwalter/Berryhill Nursery Co. Fund
Bruce and Doris Briggs Fund
Campbell & Ferrara Fund
Alice Crocker Horticultural Research Fund
Susan and Bob Dolibois Key Award Fund
John W. Flemer Memorial Fund
William Flemer, III Fund
Flower Carpet Research Endowment Fund
Home Nursery, Inc. — Chuck & Jean Tosovsky Family Fund
Harold and Rebecca Nickel Fund
Ed and Betty Rosenthal Florikan Endowment Fund
Siebenthaler Family Fund
Hugh A. Steavenson/Forrest Keeling Nursery Fund
Melvin, Dona, Richard and Debra Surface Fund
Syngenta Professional Products Fund
Tennessee Valley Nursery for Hoskins, Minnie Lee & Bonnie Shadow Fund
The Usrey Family Scholarship Fund
Richard P. and Marian T. White Fund
John B. and Elizabeth Wight Fund
John E. Wilde Propagation Fund
Willoway Nurseries Endowment Fund

SILVER CIRCLE

Bill and Gusta Adams Fund
American Plantsman/Environmental Improvement Fund
Ed Brown Fund
Bruce Family Fund
Ray Brush Fund
Carolina Nurseries, Inc. Research Endowment Fund
Bryan A. Champion Memorial Scholarship Fund
Elma E. and John R. Collier Memorial Trust Fund
The Conard-Pyle Co. Fund
Otto Damgaard Research Endowment Fund
Dundee Nursery & Landscaping Company Fund
William Flemer, Jr. Fund
Florists' Mutual Insurance Fund
Flowerwood Nursery-Plant Development Services, Inc. Fund
GreenForest Nursery-Gulf States Fund
Harold Harned Memorial Fund
Jack Harrell, Sr. Fund
The Hicks Family Fund
Betsy Boggs Hillenmeyer Fund
Louis and Martha Hillenmeyer Fund
Robert and Eileen Hillenmeyer Fund
Hines Nurseries, Inc. Fund
Frank G. Kearney Fund
Frank S. and Hilda P. LaBar Fund
Landscape Plant Development Center Fund
The Lerio Corporation Fund
Dick and Lou Marshall Fund
McKay Nursery Fund

Muggets Scholarship Fund
Merten E. Natorp Fund
Hans Nelson Family Trust Fund
NSI/ Lerio Customer Marketing Fund
The Lydia & Palle H. Orum Research Fund
Otten Bros. Nursery & Landscaping, Inc. Fund
Richard E. Posey — Buckeye Resources, Inc. Fund
John and Gladys Powell Fund
The Scotts Company Fund
Shady Grove Plantation and Nursery Inc./Johnny and Ninkie Brailsford Memorial Fund
Sheridan Nurseries Research Fund
Avery H. Steinmetz Fund
Sunleaf Nursery, LLP — Robert & Carol Lyons Fund
Alma and Robert Taylor Fund
Bob Terry/Fisher Farms Fund
Valent Nurture Fund
O.L. and Verona Weeks Fund
Wight Nurseries Centennial Fund

BRONZE CIRCLE

Clayton A. Bunting Fund
Mr. & Mrs. Peter F. Costich for Edwin H. Costich Fund
Harold Crawford Fund
Richard E. Cross Memorial Fund
Arie F. den Boer Memorial Fund
Erickson Family Research Endowment Fund
Gold Star Wholesale Nursery, Inc. Fund
William and Kathryn Heard Fund
Allen M. Helmich Fund
The John Henry Co. Fund
The Hess Family Fund
Oliver A. and Fred R. Hobbs Fund
Hoffman & McNamara Endowment Fund
Hoogendoorn Nurseries, Inc. Fund
Horticultural Printers Fund
Keiding, Inc. Fund
The Kraft Family Fund
Esther M. Lawyer Memorial Research Endowment Fund
Lincoln Nurseries for Aart and Margaretha deWit Fund
Al and Gladys Lindstrom Owners of Wandell's Nursery, Inc. & Minnesota Valley Companies Fund
Maschmeyer Family Fund
Minnesota Bork Family Fund
Raymond and Jane Oglesby Fund
John J. Pinney Fund
Joyce O. and Thomas S. Pinney, Sr. Fund
William N. and Jane N. Scarff Fund
Richard Schlick Fund
Siebenthaler Patent Fund
Teufel Nursery Fund
Robert W. Turnbull Memorial Fund
Susie & Bruce Usrey Education Fund
Van Hof Nurseries Fund
Wellington Kennedy Memorial Research Fund
Weyerhaeuser Company Foundation Fund
Wiegand's Nursery Endowment Fund

THE LEGACY CLUB FUND

HRI has established a fund that allows industry members to recognize legacies. Honor children, grandchildren or that special someone through a donation of \$1,000/legacy to the Legacy Club Fund.

Legacy Club Members as of December 2012

Dale and Ruth Bachman for **Amy Bachman, Joel Bachman, Anna Itman and Tatum Itman**

Gordon and Jo Bailey for **Dan Bailey, John Bailey, Joseph Bailey, Mark Bailey, Michael Bailey, Patrick Bailey and Theresa McEnaney**

Dan and Kathy Batson for **Brad Batson**

Jim and Martha Berry for **Garner Kingston Berry**

Janet and John Brailsford, Jr. for **Elizabeth Allen Brailsford, Sarah Francis Lillian Coggins and Moultrie Thomas Brailsford Coggins**

Randy and Mary Davis for **Caleb Zane Davis, Colby Wayne Davis, Rande Elizabeth O'Donnell, Taylor Anne O'Donnell and Lily Raye Garcia**

Randy Davis and Greenleaf Nursery Co. in memory of **Gil Nickel**

Tom and Barb Demaline for **Karen and Eric Demaline**

Bob Dolibois for Susie Dolibois in honor of the **Hawaiian sunset**

Bob and Susie Dolibois for **Lucas, Jonah and Sophia Dolibois**

John and Winnie Dolibois and Betsy Lallathin for **Lucas John Dolibois**

Arthur (Bud) Eskola for **Ava Boyles**

James and Joanne Harden in memory of **Barney Grimm**

Marilyn Hicks for **Owen Bosley Folk**

Debra and Dwight Hughes, Jr. for **Hannah Joy Hughes and Sarah Faith Hughes**

Carol Lyons in honor of **Bob Lyons**

W. Scott McAdam for **Amanda, Veronika, and W. Scott McAdam, Jr.**

Wayne Mezitt in honor of **Cullen Mezitt, and Braden and Graham Lindeman**

Peter and Irma Orum for **Christian R. Keller and Lydia Chen-Ching Orum-Keller**

Dan and Linda Nelson for **Jack D. Nelson**

Thomas S. and Myra Pinney, Jr. for **Nikki Stark**

Don and Christine Richards for **Alexandra and Jack Richards**

Wayne Sawyer for **Matt Sawyer**

Greg and Ellen Schaan for **Calista Schaan, Cassandra and Chris Varricchione, and Ezra Schaan Varricchione**

Evelyn and J. Frank Schmidt, Jr. for **Mitzie**

Evelyn Schmidt for **Laelie Rasmussen, Tirien Rasmussen, Bryn Webster and Avery Lael**

Frank and Barbara Schmidt for **Laelie Anna Rasmussen and Tirien Mercy Rasmussen**

Joseph and Virginia Schulte for **Audrey Baird and Catherine Baird**

Dale Siems for **Addison N. Ivie, Braidyn T. Siems, Brandon Lee Ivie, Breanne E. Ivie, Ellivia Lou Johnson, Amber R.O. Siems, Austin J. Siems, Danielle A. Siems, Mackenzie M. Siems, Matthew J. Siems and Zoey A. Siems**

Bob and Jeanne Terry for **Cameron Evans, Kyra Evans, Karlie Evans, Haley Terry, Jenna Terry, Katlin Terry, Robert Terry, IV and Rory Richardson**

Bob Terry and Fisher Farms in honor of **Robert Dolibois**

Bruce and Susie Usrey for **Jack Brown, Ruby Brown, Maxfield Brown, Chase Usrey, and Colin Usrey**

INDIVIDUAL BEQUESTS THE HERITAGE CIRCLE

Gary E. Briggs
Raymond and Elizabeth Brush
John H. den Boer
Robert Eastman
Dwight Hughes
Joanne Kostecy
Gary Mangum
Peter Orum
Ashby Pamplin
Myra K. and Thomas S. Pinney, Jr.
Ernie Tosovsky

NATIONAL, REGIONAL & STATE ASSOCIATION NAMED FUNDS

Many green industry associations and organizations find that HRI affords greater research opportunities by maximizing a larger endowment like HRI's to fund industry research. By creating a fund within the HRI Endowment, an organization does not have the administrative, operational, and overhead expenses typical of managing an investment portfolio. The earnings from a named fund support the named fund's grant award each year.

HRI funds horticultural research that meets industry-approved standards for value, impact and accountability. From the moment an investment is made by a donor, HRI handles the entire competitive grants process. Industry leaders evaluate the significance and economic usefulness of projects. HRI's scientific advisory panel assesses their feasibility, and methodology. HRI's leadership, financial advisors and investment committee take on the fiduciary responsibilities of the endowment.

EMERALD CIRCLE

Ohio Research Endowment Fund

DIAMOND CIRCLE

Oregon Nursery Industry Endowment Fund

FOUNDERS CIRCLE

These funds were created before 1990

Eastern Region IPPS Fund Recognizing: L.C. Chadwick, James Cross, William Flemer, III, Alfred J. Fordham, David F. Hamilton, Peter Orum, Ralph Shugert, Jr., William Synder, and James S. Wells
Illinois Nurserymen's Association Fund
Michigan HRI Endowment Fund
Southern Nursery Association SNA/HRI Golf Classic Fund
Tennessee Nurserymen's Association Fund

PLATINUM CIRCLE

Associated Landscape Contractors of America Fund
HRI Golf Classic Fund
New England Nursery Association Fund

GOLD CIRCLE

California Association of Nurserymen Endowment for Research & Scholarship Fund
Florida Nurserymen & Growers Association Fund
Garden Centers of America Consumer & Retail Research Endowment Fund
Garden Council Marketing Fund
Massachusetts Nursery & Landscape Association Fund
Minnesota Nursery & Landscape Association Fund
NCTA Bob Stohr Memorial Christmas Tree Research Fund
New York State Research Endowment Fund
North Carolina Association of Nurserymen Fund
Pennsylvania Landscape & Nursery Association Fund
Rhode Island Nursery & Landscape Association Fund
Southern Region IPPS Fund
Texas Nursery & Landscape Association Fund
West Virginia Nursery & Landscape Association Fund

SILVER CIRCLE

ANLA Past President's Fund
Iowa Nursery & Landscape Association Research Corp. Fund
Mechanization Fund
Memorial Fund
South Carolina Nursery & Landscape Association Very Important Partner Fund
Western Nursery & Landscape Association Fund
Wholesale Nursery Growers of America Fund

BRONZE CIRCLE

ANLA Centennial Fund
ANLA Industry Honor Roll Fund
Georgia Green Industry Association Fund
Hudson T. Hartmann/Western Region IPPS Fund
Illinois Landscape Contractors Association Fund
Indiana Nursery & Landscape Association Fund
National Association of Plant Patent Owners Fund
National Landscape Association Fund
Nursery Growers of Lake County Ohio, Inc. Fund
Wisconsin Nursery Association Inc. Fund

Trek De Hort II: A Celebration of Horticulture



Trek De Hort II

A Celebration of Horticulture

Through HRI we can coordinate researcher efforts to address problems such as boxwood blight that rear their ugly heads on an all-too-often frequency. If we don't raise money to fight these issues ourselves, who will address our needs? HRI was created and has been around for 50 years because we know we must rely on ourselves to tackle green industry business issues through quality research efforts. HRI brings together researchers and government agencies focused on research solutions and best management practices that enable businesses to thrive.

We kicked off our 50th anniversary celebration at the Mid-Atlantic Nursery Trade Show in January. Our anniversary fundraising campaign, **Trek de Hort II: A Celebration of Horticulture** achieved our primary goals that were to: raise awareness about HRI and research, and receive participation from industry members who would create unique fundraising opportunities in support of our anniversary.

Our "trekkers" came out in full force and through their creative works raised more than \$500,000 in donations and pledges. Here are our trekkers dedicated fundraising challenges. We extend extreme appreciation and gratitude for their efforts.

GreenForest Nursery Gulf States Trek Challenge

Dan Batson created a unique fundraising challenge to increase green industry member participation from the Gulf States region. He asked individuals to donate in support of the miles he has traveled while completing his HRI volunteer duties. **The GreenForest Nursery Gulf States Trek Challenge raised more than \$21,000, which GreenForest Nursery matched and now stands at \$42,000.** This challenge continues into 2013 and beyond, as Dan Batson and his gulf state friends continue to attempt to raise \$50,000 from the industry. In return, GreenForest Nursery will match donations up to \$50,000, which will create a \$100,000 fund within HRI.



and there to donate to Pantene Beautiful Lengths, a charity that makes wigs for those undergoing chemotherapy treatments. Within 10 minutes they raised around \$800 dollars and a pair of scissors was found.

Stephanie trekked home with a head of hair 12 inches shorter and the knowledge that she had raised more than \$3,000 with proceeds donated to HRI in support of future research.

Todd Davis is the Biggest Loser Trek de Hort

Todd Davis is very passionate about the nursery industry. He understands that it is a challenging time for our industry. Unfortunately, there has never been a greater time of need for nursery research. He knows that if we don't raise money to support these issues ourselves, then nothing less than the interstate commerce of nursery products is at stake. This is why he decided to participate as a trekker. One of his major goals for the year was to get into better shape. And while doing so, he created a way to benefit himself and HRI. Through the **Todd Davis is a Big Loser Trek**, he sought out pledges for every pound he lost for the year. While he sweated on a treadmill, he received more than \$10,000 in pledges to HRI that will help the green industry thrive for generations to come. We are happy to report that by the end of December, Todd had lost 36 pounds!

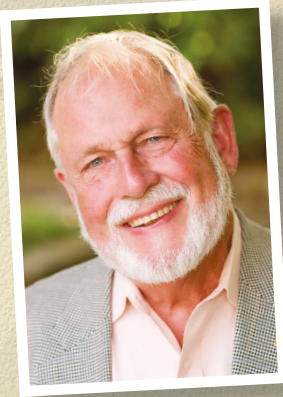


Haircut for Horticulture

As most of you know, when our industry gathers creative ideas happen. During the ANLA Clinic in Louisville this year, ANLA hosted



a Party With a Purpose, which was sponsored by Spring Meadow Nursery and Nexus Corp. Three charities benefited from the proceeds of the event: The Horticultural Research Institute, the Barbara Hauf Cancer Foundation and the Breast Cancer Research Foundation. During the event, Stephanie Stockton agreed that if \$1,000 were raised, she would cut 12 inches of her hair right then

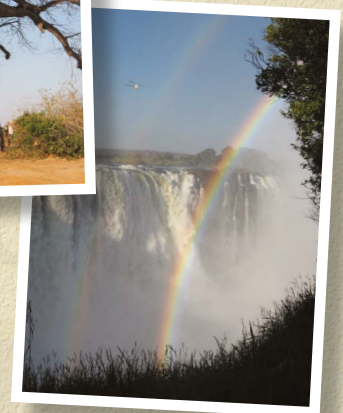
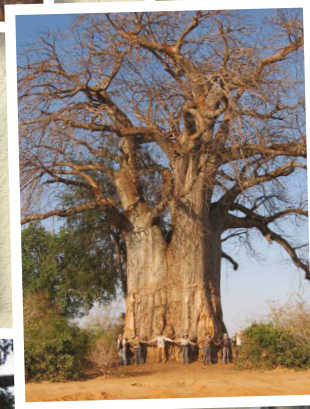
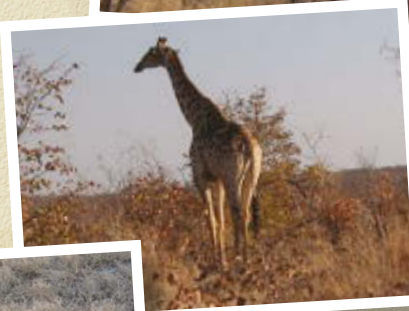
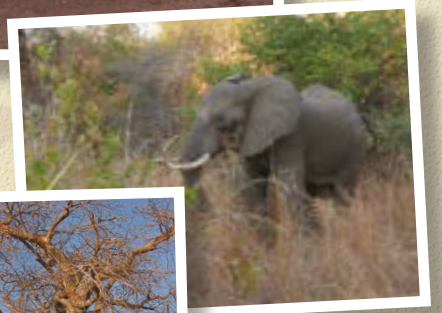
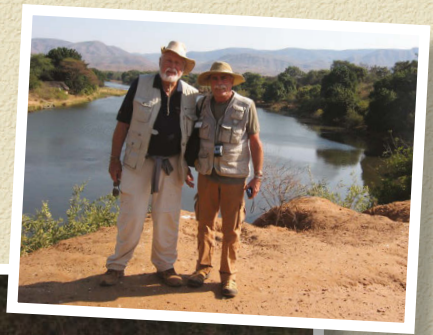
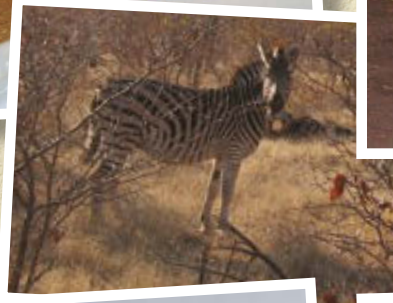


Big Five Safari Camera Hunt Trek

Bill Wells returned from his African safari camera hunt in support of HRI. His goal was to take a photograph of the five most difficult animals

to see on safari while raising pledges in support of his effort.

Bill Wells had this to share about his adventure, "The scenery was outstanding, although a bit different from the United States. The elephants and rhinos are incredibly large up close and personal while the lions make a lot of noise and their size is impressive also. The hardest animal to locate and get reasonably close to was the leopard. Cape buffalo are just plain mean and are to be avoided. We saw birds of all species by the hundreds and all kinds of other wildlife to be discovered and enjoyed. Originally, I asked HRI members to make a tax-deductible donation of up to \$100/per animal species that I was able to photograph, and I



achieved my five species goal. HRI will use the donations for scholarships and research grants in support of the green industry." Our 2012 president raised \$5,000 through his trek.

Together, we showcase the value and importance of horticulture. We extend extreme appreciation and gratitude for the efforts of our trekkers that committed to raising awareness and support as we celebrated 50 years of green industry progress through quality research. We hope you'll continue to trek with us by supporting HRI with an annual donation.

HRI Scholarship Recipients For 2012

Carville M. Akehurst Memorial Scholarship



Leah Comerci

The Carville M. Akehurst Memorial Scholarship was established in 2002 by HRI and the Mid-Atlantic Nursery Trade Show, Inc. (MANTS). This scholarship serves to memorialize Carville M. Akehurst who served the horticultural industry as one of the founders of MANTS. MANTS, an association formed by the state nursery and landscape associations of Maryland, Virginia, and West Virginia, together with HRI, have established this scholarship with the belief that the strength and future success of the horticulture industry lies in the solid education of today's students.

The 2012 Carville M. Akehurst Memorial Scholarships in the sum of \$2,000 each was awarded to Leah Comerci and Stephanie Marino.

Leah Comerci from Beckley, W. Va., is a senior at West Virginia University. She is majoring in landscape architecture. When asked about her selection of her major Comerci noted, "I initially selected my major as I wanted to meld my artistic interests with my environmental concerns and love of nature.

My interests in the discipline have since evolved to encompass a deep concern for plant ecology principals and the proper stewardship of the land through sustainable practices.

After graduation I plan on seeking employment in the professional field, obtaining the status of a licensed landscape architect, and eventually continuing my education with a master's degree. I am very grateful to Ms. Vannesa Finney and the Akehurst family and the Maryland Nursery & Landscape Association for selecting me as the recipient of the scholarship."

Stephanie Marino from Severn, Md., is a junior at the University of Maryland. She is majoring in landscape architecture with minors in landscape management and sustainable studies. Marino commented on the reason she selected her majors, "I have a great appreciation for nature and chose to major in landscape architecture because it allows me to interact with nature creatively. I am looking forward to working for a landscape architecture company, designing to enhance the environment and quality of life." Marino's additional interests include traveling to Washington, D.C., Baltimore, and Annapolis, Md., to see the historic sites, museums, and monuments. She enjoys urban settings as well as historical sites and hopes to incorporate both into her future designs.



Stephanie Marino

Spring Meadow Nursery Scholarship

The 2012 Spring Meadow Nursery Scholarship of \$2,000 was awarded to Allison Jones, a graduate student at Michigan State University. Jones graduated with a Bachelor of Science degree in horticulture from Michigan State University. Currently, she is studying to receive her Master of Science in horticulture with a focus on horticulture marketing.

Jones was overjoyed to learn that she was the 2012 recipient and noted, "This scholarship is important to me because it comes directly from an industry business. This shows me how much the industry, specifically Spring Meadow, cares about supporting younger horticulture industry members and education. This scholarship also helps to give me a great connection to people directly working in the industry. I am very honored to receive this scholarship. I greatly appreciate the support from Spring Meadow. I am excited to be nearing the end of my college studies so I can enter into the working industry and contribute to the great things horticulture has to offer."

Dale and Liz Deppe founders of Spring Meadow Nursery, Inc. in Grand Haven, Mich., created the Spring Meadow Scholarship Fund within the HRI Endowment in 1999. Bright, well-trained and qualified people are essential to the nursery industry. This fund is dedicated to helping aspiring students from across the country obtain a degree in horticulture. It is also Spring Meadow's way of giving back, and sharing with others their passion for plants and the nursery industry.



Allison Jones

Timothy S. & Palmer W. Bigelow, Jr. Scholarship

The 2012 Timothy S. and Palmer W. Bigelow, Jr. Scholarship of \$3,000 was awarded to Renee LaGue. LaGue is a graduate student at the Conway School of Landscape Design and a resident of Montague, Mass.

LaGue is pursuing her Master of Science degree in Sustainable Landscape Design and Planning. LaGue on why she selected her major, "I would like to be able to create productive, beautiful landscapes that will have a positive impact on the communities – both human and ecological-- that surround them. Plants and landscapes are absolutely essential to life and I hope to solve human problems while at the same time creating innovative ecological solutions. After graduating, I hope to join a small, collaborative practice focusing on home gardens with a high percentage of native plants, edible landscapes, and ecological restoration. In so doing, I hope to make the landscape more beautiful, more useful, and more resilient to change."

The Bigelow Scholarship was created in 1988 by the Palmer W. Bigelow family of Bigelow Nurseries in Northboro, Mass., to aid students from New England who seek a career in horticulture. The scholarship is dedicated to one of the family's children, the late Timothy Bigelow, and to Palmer W. 'Bill' Bigelow, who died in 1997. The Bigelow family considers student scholarships the most important commitment that the horticultural industry can make to ensure the growth and development of the nursery and landscape industry.



Renee LaGue

Muggets Scholarship

The 2012 Muggets Scholarship of \$2,500 was awarded to senior, Justin Menke at the University of Kentucky. Menke is majoring in landscape architecture.

"I have always enjoyed design and I have always had an appreciation for plants and nature. So landscape architecture seemed like a perfect fit for my interests. Through my education, I am continually amazed at how complex and multi-faceted landscape architecture is. It is truly a challenging and fascinating field," stated Menke.

Menke explained why the scholarship is important to him, "Landscape architecture is a five year program, and so the extra year is an additional strain. Also given the difficult economic situation, the less student debt I have upon graduation, the better."

An informal group called the Muppet Growers of America (MGA) began in 1981 as a social, educational and fundraising group. Each year, MGA participants would meet to discuss important plant issues while contributing to the Muggets Scholarship Fund. MGA members understood the importance of having qualified and quality professionals within the green industry. MGA supporters hope to help aspiring students from across the country obtain a degree in horticulture with this scholarship.



Justin Menke

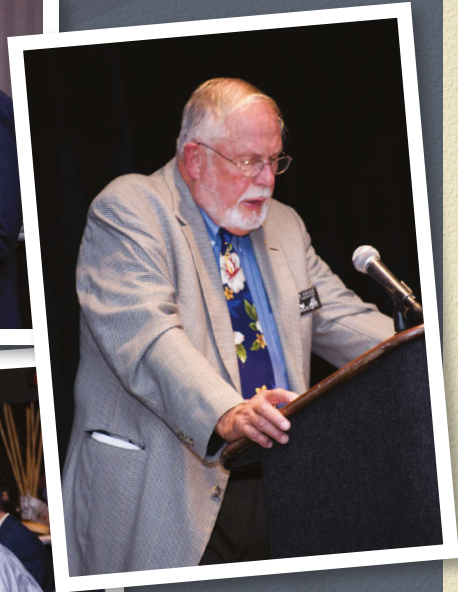
The HRI Endowment Fund is composed of several scholarship funds that aid students who are seeking a lifelong career in horticulture. HRI and its member firms consider graduating students in horticulture to be the lifeblood of the green industry. The individuals and firms who support these endowment funds are to be commended for their industry leadership.

To apply for an HRI scholarship applications must be submitted by May 31 of each year. Annual awards are distributed in September.

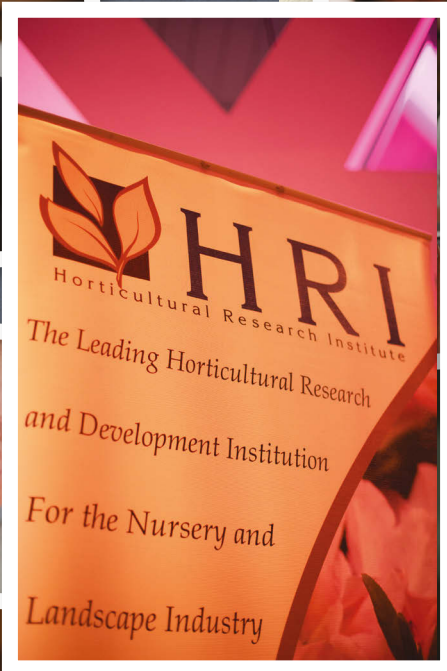
Individuals wishing to learn more about creating a scholarship endowment fund may contact Teresa Jodon at 202-695-2474 or tjodon@hriresearch.org.

Event Photos

July 2012 HRI Reception



HRI 2012 Winter Reception



Horticultural Research Institute Statement Of Financial Position

DECEMBER 31, 2012 AND 2011

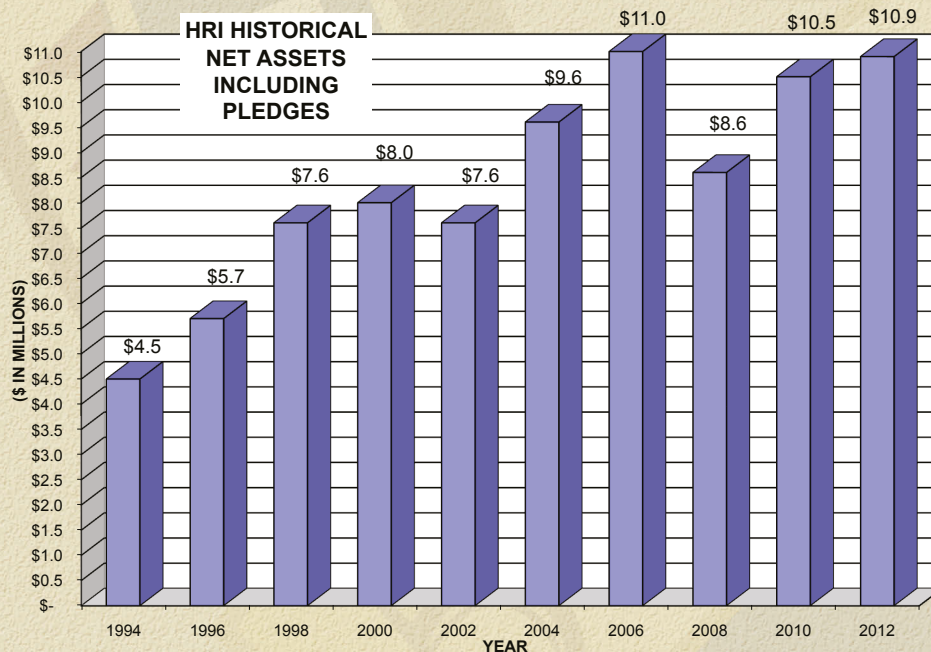
Fiscal year 2012 was a year in which we celebrated HRI's 50th anniversary with tremendous support from you. We reflect with gratitude to our donors and HRI members that entrusted us with their contributions for the betterment of HRI and the green industry. The stock market continues to experience extreme volatility, but through sound financial advising from SunTrust Bank, our investment income continues to lead all revenue categories for HRI with investment balances stable and growing.

Our 50th year showed increased contribution and support within the industry. This has renewed our sense of purpose and vision for another 50 years. HRI continued to maintain its research focus by targeting its research grants to specific projects that promote a tangible return on investment while being committed to adapting and being stewards to the donor legacy we highly value. We raised funds for specific priority research items like boxwood blight and funded nearly \$300,000 to research projects for the year.

Donations and new pledges to HRI totaled more than \$670,000 with a continued increase of annual donations and membership contributions. It is not only the endowed funds but also the annual donors that enhance HRI's commitment to green industry progress through innovative research. It takes a collective green industry to engage and support its research needs. We hope more within the community will take action to annually support HRI.

ASSETS	2012	2011
CASH IN BANKS	\$313,943	\$132,066
INVESTMENTS	9,907,549	9,552,134
PLEDGES RECEIVABLE & OTHER ASSETS	<u>679,416</u>	<u>481,569</u>
TOTAL ASSETS	<u>\$10,900,908</u>	<u>\$10,165,769</u>
 LIABILITIES AND NET ASSETS		
LIABILITIES		
ACCOUNTS PAYABLE & DEFERRED REVENUE	<u>\$186,936</u>	<u>\$219,983</u>
 NET ASSETS		
UNRESTRICTED	29,817	(59,183)
TEMPORARILY RESTRICTED	384,671	118,254
PERMANENTLY RESTRICTED	<u>10,299,484</u>	<u>9,886,715</u>
TOTAL NET ASSETS	<u>10,713,972</u>	<u>9,945,786</u>
TOTAL LIABILITIES & NET ASSETS	<u><u>\$10,900,908</u></u>	<u><u>\$10,165,769</u></u>

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