

## Collecting Seeds and Managing Insects: My Career as a Forest Conservation Biologist by Robert Jetton '93

Imagine South Carolina with no trees. No southern Appalachian Mountain forests to provide the clean drinking water in the Table Rock Reservoir. No Piedmont forests to provide shade and help keep cooling costs down during the hot summers in Columbia. No coastal forests to protect our favorite Low Country beach towns from the full force of hurricane storm surges. No loblolly pine plantations, tree nurseries, or Fraser fir farms to provide the paper and wood products we use daily, the dogwoods that adorn our front yards, and the Christmas trees we bring into our homes to celebrate the holiday season.

Forests constitute the world's number one renewable resource and provide us with everything from toilet paper and 2x4s to textiles that clothe us and biofuels that power our homes and vehicles. The list of forest products we depend on in our daily lives is long and probably contains items that would surprise you. For example, did you know that some yogurts contain cellulose from trees as an added source of fiber? Our forests, both natural and planted, are critical to our human way of life. In a world with an ever-increasing population—just over 7 billion in 2013, with 30 percent being dependent on wood for heating and cooking—our forests also face significant threats from insects, disease, and climate change that could make them disappear.

The health and sustainability of the world's forests is an issue I ponder daily. I am a forest conservation biologist with a particular focus on the field of forest entomology, meaning I study trees, the insects that attack them, and ways to control or mitigate the damage. As a faculty member in the Department of Forestry and

Environmental Resources at North Carolina State University, I have a mandate to conduct research and develop strategies in applied tree conservation. I work closely with a group of six other scientists, and the undergraduate and graduate students we train, in a tree-breeding and conservation organization called Camcore.

### Banking Seeds and Preserving Forests Worldwide

Camcore partners with organizations in the United States, Central and South America, southern Africa, Indonesia, Australia, and China—my job also includes some awesome travel opportunities—to conserve native forests and the ecosystems services they provide, such as clean drinking water. We also work with timber companies in these countries to promote the sustainable development of industrial plantation forestry for wood and paper products, packaging materials, and biofuels.

Within Camcore, my particular focus is

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**Robert Jetton** in a forest plantation in Uruguay where one of his projects involves working with Weyerhaeuser to develop strategies for managing insect pests in Eucalyptus plantations grown for plywood production.

on native forests and tree species that are endangered in their native environments. Together with my students and other collaborators, I utilize a strategy called genetic resource conservation to maintain the diversity and adaptability of tree species threatened by exotic insects that have arrived in the United States from other countries. What this means is that I design strategies to collect and save seeds from tree species that are at risk of being eliminated from their natural habitats—seeds that can later be used to reintroduce a species to its habitat once the particular threat is under control or eliminated altogether.

Sounds simple, right? While comparisons to Johnny Appleseed are tempting, it is actually a more complicated process than simply collecting seeds and later spreading them around the forest. Our goal is to collect a seed sample that is truly representative of a tree species everywhere it is threatened. This requires fairly intensive up-front research on genetic diversity using DNA technologies, analysis of soil and terrain characteristics, variations in tree physical and chemical characteristics, climate factors, and how these all differ among populations. We then use the data to design seed collection strategies that will capture a broadly

representative and adaptable seed sample that can be used to successfully reintroduce a tree species across a broad portion of its native habitat where it has been eliminated by an insect.

#### Two Million Hemlock Seeds

One such project I have worked on that readers of *Highlights* might find of interest is right in our own backyard. Eastern hemlock (sometimes called Canada hemlock) is a conifer species native to the Appalachian Mountains from eastern Canada west into the Upper Midwest and south to Georgia and Alabama. It is also a popular ornamental tree for yard plantings....my brothers (**Will '86**, **Andrew '88**, and **Peter '89**) and I grew up with a bunch of them in our yard in Gower Estates. If you have visited the foothills of northern Greenville County or anywhere in western North Carolina during the past several years, you likely have noticed a large number of dead and dying hemlocks. This is occurring throughout most areas where the tree grows naturally in the eastern United States and is caused by an exotic insect from Japan called the Hemlock Woolly Adelgid.

My colleagues and I at Camcore have studied this problem for the past ten years, using the strategy outlined earlier to place more than two million hemlock seeds into conservation. Much of this resides in cold-storage in seed banks at various locations around the country, but we have also used some of the seed to establish protected hemlock plantings. Eventually, once we have a better understanding of how to manage the adelgid, these seed resources will be used to reintroduce the hemlock to the locations where it has been killed.

#### The Path From CCES to a Career I Love

My job is fascinating, and I am lucky to have a career I love. I spend my days doing research, teaching students, and developing seed conservation plans and insect management strategies for forests in the United States and in such faraway places as Brazil, Chile, Uruguay, and South Africa.

So, how did this kid from the 1980 Primer class, who thought 3<sup>rd</sup> grade was so nice he did it twice, end up as a university academic and forest conservation biologist? After graduating CCES in '93, I attended Furman University where I majored in biology and was first introduced to the fields of forestry and entomology. From there I went on to earn an M.S. and Ph.D. in both fields at NC State University where I also discovered the Camcore program and my career path.

However, I can truly trace my love of the forest to childhood summers spent at Camp High Rocks and to the Wonders of Wilderness (WOW) program that existed at CCES during my years in Lower School (at the old downtown campus). My years in the Middle and Upper Schools as a member of the Outdoors Club also contributed significantly to my appreciation of nature through camping and rafting trips and Saturdays doing trash pick-up along Mauldin Rd. for Adopt a Highway.

My interest in insects? I blame 10<sup>th</sup> grade biology and the dreaded insect collection assigned by Mr. **Reggie Titmas**. ■

*Dr. Robert Jetton is an assistant professor and researcher at North Carolina State University in Raleigh. He and his wife, Dr. Jennifer Emerson, a molecular biologist, live in Cary, North Carolina.*