THE SHADE TREE

A BI-MONTHLY BULLETIN DEVOTED TO NEW JERSEY'S SHADE TREES

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BULLETIN OF THE NEW JERSEY SHADE TREE FEDERATION
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IN MEMORIAM: VINCENT DUJETS

It is with great sorrow to share the news on the passing of Vincent Dujets, who passed away suddenly on October 24, 2020.

Vince has been a long-time supporter and friend of the NJ Shade Tree Federation, as well as many arboricultural associations. Vince received the William J. Porter Award of Appreciation in 2014 and was pleasantly surprised and thankful for the award. Vincent Dujets was the president of Northeastern Arborist Supply and also a past president of the Arborists Association of New Jersey.

The members and officers of the NJ Shade Tree Federation express our deepest grief to his wife, Karen, children and family.

SEASON'S GREETINGS

The Executive Board and Directors of the New Jersey Shade Tree Federation wish to thank everyone for their support over the past year. Best Wishes are being extended for a Happy Holiday Season. May the New Year be healthy, happy and prosperous to each and every one of you!

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The Executive Board wishes to extend their appreciation to the following sponsors who have contributed to the financial success of the conference.

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TREES SET SIXTH-GRADERS UP FOR SUCCESS

University of Illinois College of Agricultural,
Consumer and Environmental Sciences

The transition to middle school is undeniably tough for many sixth-graders, even in the best of times. Mounting academic demands, along with changes in peer dynamics and the onset of puberty, result in a predictable and sometimes irreversible slump in academic performance.

A new University of Illinois study suggests an unexpected but potentially potent remedy: trees.

"Hundreds of studies show a positive link between contact with nature and learning outcomes, but the studies on nature near schools focus on young children or older learners. We wanted to make sure the same pattern was true in this vulnerable and overlooked population," says Ming Kuo, associate professor in the Department of Natural Resources and Environmental Sciences at Illinois.

It was. Even after taking a whopping 17 variables into account including student demographics, school resources, and neighborhood characteristics, Kuo and her co-authors found that the more tree cover around a school, the better its standardized test scores in both math and reading. The study included 450 middle schools and nearly 50,000 students in urban, suburban, and rural communities in Washington State.

But why would trees boost test scores? Kuo's previous work points to a cause-and-effect relationship between nature and learning, with more exposure to nature resulting in improved concentration, greater classroom engagement, and less disruptive behavior. No surprise, then, that greener schools perform better.

Samantha Klein, a master's student who worked with Kuo on the study, made a point to compare different kinds of vegetation at different distances from schools.

"We wanted to offer concrete guidance to landscape architects, principals, and school boards interested in putting the greenness-achievement link to work, giving them clues as to what should be planted, and where," Klein says.

Kuo, Klein, and their team were able to differentiate tree cover from grass and shrubs using satellite imagery. "From a practical standpoint, trees cost more to install than grass. So if school districts could get away with just putting grass everywhere, that would be really helpful to know," Klein explains.

Unfortunately, that wasn't the case. Trees were far and away more

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impactful for test scores than other types of vegetation. Still, Kuo emphasizes that compared with other school resource investments planting trees around a schoolyard is still an incredibly cheap and effective intervention. But it could take a sea change before school districts accept school greening when other demands seem so much more pressing.

"I think school boards have always been faced with distributing very limited funds, especially in the poorest areas. They might think that, with all the other pressing needs for funding, school landscaping is the least of their concerns. Little do they suspect that a treeless schoolyard may actually be contributing to poor school performance," Kuo says.

The satellite images also helped Kuo's team pinpoint where tree cover mattered most. They compared the importance of greenness in different buffer zones around schools, within 250 meters (around two blocks) and 1000 meters. It turned out trees closer to the schools made all the difference, even when controlling for greenness at farther distances. In other words, even if the larger neighborhood was leafy, students were no better off if the schoolyard wasn't.

These findings extend previous discoveries in Chicago public schools. Kuo's work there showed the importance of tree cover near schools in low-income urban districts. But since her current study includes 450 schools across a wide spectrum of populations, she's confident her results apply more broadly.

"One of the nice things about this study is not only the sheer number of schools and students we're looking at, but the huge range in Washington State. We've captured everything from extremely urban to totally rural areas; rich schools and poor schools; schools with predominately white, Hispanic, Black, or American Indian student bodies; and every level of greenness represented within each of those samples," Kuo says. "The fact that the greenness-achievement link is true here is encouraging to me. It gives us some confidence that our recommendations apply to a whole variety of schools."

How does all this apply against the backdrop of remote learning during the COVID-19 pandemic? School greenness won't make much of a difference if kids aren't leaving the house. But whether they are physically in school or not, Kuo thinks contact with nature could be critical right now.

"I think the need for trees is more acute at this time. One of the big benefits of greenery, and one of the reasons we think it affects academic achievement, is it's a really potent stress reliever. Kids are aware that things are weird and that a lot of adults are kind of freaked out. And so having access to nature might be even more important than usual."

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SCIENTISTS UNRAVEL HOW AND WHY AMAZON TREES DIE

Science Daily November 9, 2020 • Source: University of Birmingham

The capacity of the Amazon forest to store carbon in a changing climate will ultimately be determined by how fast trees die -- and what kills them. Now, a huge new study has unraveled what factors control tree mortality rates in Amazon forests and helps to explain why tree mortality is increasing across the Amazon basin.

This large analysis found that the mean growth rate of the tree species is the main risk factor behind Amazon tree death, with faster-growing trees dying off at a younger age. These findings have important consequences for our understanding of the future of these forests. Climate change tends to select fast-growing species. If the forests selected by climate change are more likely die younger, they will also store less carbon.

The study, co-led by the Universities of Birmingham and Leeds in collaboration with more than 100 scientists, is the first large scale analysis of the causes of tree death in the Amazon and uses long-term records gathered by the international RAINFOR network.

The results published in Nature Communications, show that species-level growth rates are a key risk factor for tree mortality.

"Understanding the main drivers of tree death allows us to better predict and plan for future trends -- but this is a huge undertaking as there are more than 15,000 different tree species in the Amazon," said lead author Dr Adriane Esquivel-Muelbert, of the Birmingham Institute of Forest Research.

Dr David Galbraith, from the University of Leeds added "We found a strong tendency for faster-growing species to die more, meaning they have shorter life spans. While climate change has provided favorable conditions for these species, because they also die more quickly the carbon sequestration service provided by Amazon trees is declining."

Tree mortality is a rare event so to truly understand it requires huge amounts of data. The RAINFOR network has assembled more than 30 years of contributions from more than 100 scientists. It includes records from 189 one-hectare plots, each visited and monitored on average every 3 years. Each visit, researchers measure all trees above 10cm in diameter as well as the condition of every tree.

In total more than 124,000 living trees were followed, and 18,000 tree deaths recorded and analyzed. When trees die, the researcher follows a fixed protocol to unravel the actual cause of death. "This involves detailed, forensic work and amounts to a massive 'CSI Amazon' effort conducted by skilled

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investigators from a dozen nations," noted Prof. Oliver Phillips, from the University of Leeds.

Dr Beatriz Marimon, from UNEMAT, who coordinates multiple plots in central Brazil added: "Now that we can see more clearly what is going on across the whole forest, there are clear opportunities for action. We find that drought is also driving tree death, but so far only in the South of the Amazon. What is happening here should serve as an early warning system as we need to prevent the same fate overtaking trees elsewhere."

TREE BASICS

From the Library of Tree City USA Bulletins • Arbor Day

July/August 2020 • New Program for Community Wellness

This new program will improve community wellness by building on the scientific studies that show the health benefits of trees. For example, findings by Dr. Roger Ulrich gained worldwide attention when he documented faster and more satisfactory recovery of post-operative hospital patients who had a window view of trees as opposed to those who had the same type of operation but viewed only a brick wall. Since that epic study in the 1970s, dozens of others have found similar results, ranging from safer pregnancies to the wellness of senior citizens – all linked to trees and most likely the stress reduction they provide for us.

To encourage the practical and more widespread application of these findings, the Arbor Day Foundation - with professional partner, The Davey Tree Expert Company and collaborators The Professional Grounds Management Society, Practice Greenhealth, and the U.S. Forest Service-has developed a recognition program that honors healthcare facilities that create therapeutic landscapes on their properties and communities and meet these five standards:

1. An advisory committee with representation from such stakeholders as healthcare providers, grounds personnel, patient advocates, and community forestry officials.

2. A tree care plan that nurtures and protects campus trees and identifies opportunities for strategically adding new trees. For facilities with little or no space for trees on the property, and option is to adopt street or other public trees adjacent to the facility.

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3. Collaboration with the community as evidenced by leading a community forestry practice at least once during the year, such as tree planting, monitoring, or other activities that engage community residence in the project.

4. Celebrate and educate by sponsoring an event such as Arbor Day or a campaign to highlight the connection between trees, nature, and human health.

5. Financial commitment towards the implementation of the above through a suggested investment of at least $2 per full-time equivalent employees in cash or in-kind contributors.

Recognizing the importance of this new program to overall community wellness, Jon Utech, senior director of the Office for a Healthy Environment at the Cleveland Clinic, says, "Participating in the Tree Campus Healthcare Program is an integral part of our strategy to invest in the health and well-being of the population we serve. We want to inspire other health providers to join us, as tree planting is critical to keeping our cities cool, improvising the quality of our air and water, and enhancing both the beauty and climate resilience of our neighborhoods."

CHEMICAL CLUES IN LEAVES CAN REVEAL ASH TREE RESISTANCE TO DEADLY DISEASE

Science Daily • Source: University of Warwick • November 11, 2020

Naturally occurring compounds in ash leaves could be linked to susceptibility of individual trees to the fungal disease ash dieback (ADB). But selecting trees with lower levels of these compounds and breeding for resistance could leave the UK ash tree population open to attack from invading insect pests in the future, according to scientists at the University of Warwick.

Secoiridoid glycosides are naturally occurring compounds found in plant leaves. Researchers from Warwick's School of Life Sciences and Department of Chemistry and the School of Biosciences at the University of Exeter looked at the abundance and diversity of secoiridoid glycosides in the leaves of a panel of ash trees known to be resistant and samples from trees known to be susceptible to ADB from both Denmark and the UK.

Previous research had identified five compounds in the secoiridoid glycoside family that were enriched in susceptible Danish trees, but results published today in Nature Scientific Reports, show UK ash tree leaves produced 27 different individually identifiable chemicals in the group. In the paper

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entitled Diversity of secoiridoid glycosides in leaves of UK and Danish ash provide new insight for ash dieback management, researchers have identified particular secoiridoid glycoside compounds that could potentially be used as biomarkers for tolerance or susceptibly to ADB.

Lead author, Dr John Sidda, from the School of Life Sciences at Warwick, said: "Ash dieback is an enormous problem for the UK, as ash makes up 5.5% of British woodlands. It is the third most abundant tree species in the UK with numbers exceeding 100 million trees. Ash dieback could be devastating to the British landscape and it is estimated it could cost the UK economy up to £15 billion. Currently there is no treatment for the disease so it is vital we understand all the possible pathways to developing resistance.

"Our work shows that the small molecules in leaves could give a pretty reliable indication of a tree's resistance as well as new insight into possible resistance mechanisms. Work is already underway to validate our results on a much larger panel of UK trees, and to identify other compounds that contribute to ash dieback resistance."

If potential ADB tolerant ash could be identified via a rapid test, they could be selected for breeding to begin repopulating the UK countryside. However, there may be another enemy on the horizon.

The Emerald Ash Borer (EAB) beetle is an insect pest of ash which has devastated the ash tree population in North America. The pest is moving towards Europe and has already been identified in Russia and Ukraine. At the current rate of spread it will reach central Europe in 15-20 years.

Dr Sidda said: "We know that secoiridoid glycosides play a number of roles in plants, and some of these compounds act as a defense mechanism against herbivorous insect pests. In selecting trees with lower levels of these compounds in order to help protect the ash population against ADB, we may run the risk of reducing the UK's ash trees' natural defense against the EAB.

"However, our results indicate that there may be higher concentrations of secoiridoid glycosides in UK ash compared to Danish ash, so UK trees might be better protected against future herbivore threats such as EAB. There is also much more structural diversity of secoiridoid glycosides in the UK and Danish trees than we first thought.

"Researching and understanding these chemical compounds further will help us plan for protecting the UK ash population over the next few decades."

Professor Murray Grant, Elizabeth Creak Chair in Food Security at the University of Warwick and report co-author said: "These results are exciting as they reveal an unexpected diversity in this class of chemical compounds

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between ADB susceptible and tolerant UK trees, and also between Danish and UK ash. These may act as a potential reservoir of protective compounds that contribute to tree health.

"Our ongoing research is focused on better understanding the biology of these compounds. We are grateful to funding from UKRI that allows us to expand this study to identify other chemical markers that discriminate tolerant and susceptible trees with the goal of developing a screen for ADB tolerant ash."

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