THE SHADE TREE

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

Volume 97 — May - June 2024 – Issue 5 & 6

This Issue Presents…

SAVE THE DATE: NJ SHADE TREE FEDERATION 99TH ANNUAL CONFERENCE OCTOBER 17-18, 2024

Location: ***Harrah's Resort Atlantic City, 777 Harrah's Blvd, Atlantic City, NJ 08401***
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Conference Registration to open Summer 2024. We look forward to distributing conference registration and preliminary program information soon!

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BULLETIN OF THE NEW JERSEY SHADE TREE FEDERATION
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REMINDER: WILLIAM J. PORTER AWARD & SCHOLARSHIP APPLICATIONS DUE BY JUNE 30TH, 2024

The New Jersey Shade Tree Federation is pleased to open the annual application period for the William J. Porter Community Tree Project Award and Arboriculture Scholarship. Application deadline is June 30th, 2024. Submissions may be emailed to us at *TREES@NJSTF.ORG*

The William J. Porter Community Tree Project Award is intended to provide up-front funding for a small project to benefit the tree resource in your community. Award details as follows:

- Up to $2,500.00 per award depending on availability of funds.
- Project funds provided upfront upon receipt of the award (this is not a reimbursement grant).
- Project funds can be awarded to a municipality or tree organization working within their municipality (organization must have capability to accept fund – no checks to individuals).
- Awardee must be a current member of the NJ Shade Tree Federation
- Five year moratorium for past award recipients.

To read more and apply for the William J. Porter Community Tree Project Award, visit our website: https://njstf.org/wjp-community-tree-project-award.php to download and complete the application page. Applications may be emailed to *TREES@NJSTF.ORG*

The William J. Porter Arboriculture Scholarship is intended to encourage studies and careers in Arboriculture and Urban Forestry. The award goes to a Rutgers student meeting the following criteria:

Recipient: A Rutgers Student – Application submission deadline is June 30th. The Recipient must be a full-time student enrolled in a program of studies representing a demonstrated interest in Arboriculture or Urban Forestry. The student must be at least sophomore standing with a minimum GPA of 2.5. The ideal candidates would include those majoring in Ecology and Natural Resources, Plant Biology and Pathology, Environmental Planning and Design, or Landscape Architecture, but others may apply.

Awards: Awards will be up to $2,500. Amount may be adjusted annually depending on available funds. Award Recipient(s) will be notified in September and the award will be presented at the

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REMINDER: WILLIAM J. PORTER AWARD & SCHOLARSHIP APPLICATIONS DUE BY JUNE 30TH, 2024

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October NJ Shade Tree Federation Annual Conference.

To read more and apply for the William J. Porter Arboriculture Scholarship, visit our website: *https://njstf.org/wjp-scholarship.php* to download a copy of the scholarship requirements. Applications may be emailed to *TREES@NJSTF.ORG*

THE 3-30-300 RULE FOR URBAN FORESTRY AND GREENER CITIES

By Cecil Konijnendijk, Biophilic Cities Journal, Vol. 4 No. 2, May 2022

Crucial Urban Forests

Urban forests provide a wide range of essential benefits. Current global challenges, such as climate change, environmental degradation, and the COVID-19 pandemic, have resulted in increased awareness of the importance of urban trees and green spaced. We have all experienced the importance of our local trees and green spaces during times of restricted movements, and when lock-down restrictions were eased in Spain, many people flocked to parks and other green spaces. Many studies from across the world have demonstrated the importance and increased use of urban nature during the pandemic. Even indoor plants have become more appreciated, as preliminrary findings from a study at the University of British Columbia show.

When working with cities, national governments, and international organisations, experts like me are often asked for specific guidelines for developing successful urban forestry programs. We have mostly declined, because every city is different, which makes it difficult to set transferable targets (such as tree canopy cover) across various contexts and settings. The situation in Barcelona, for example, is very different from that in Vancouver, and Beijing is a world away from Lagos, even though these are both megacities.

Introducing a New Guiding Rule of Thumb

Although it is difficult to generalise, there are arguments for developing simplified, easy-to-remember rules and guidelines, especially when these are grounded in evidence. Many of us working in this field are familiar with Frank Santamour's 10-20-30 rule for ensuring species diversity in the urban forest. The rule states that no tree species should make up more than 10% of a municipality's urban forest, no genus should have a share larger than 20%, and no single family should make up more than 30% of the urban forest. Although this rule has been debated, it has become widely known and adopted, most likely having a positive effect on urban forest structure and diversity.

The 10-20-30 rule, however, does not have a specific focus on the benefits provided by urban forests. Given the current climate and public health urgencies, as well as a range of other challenges we face, it would be useful to introduce a

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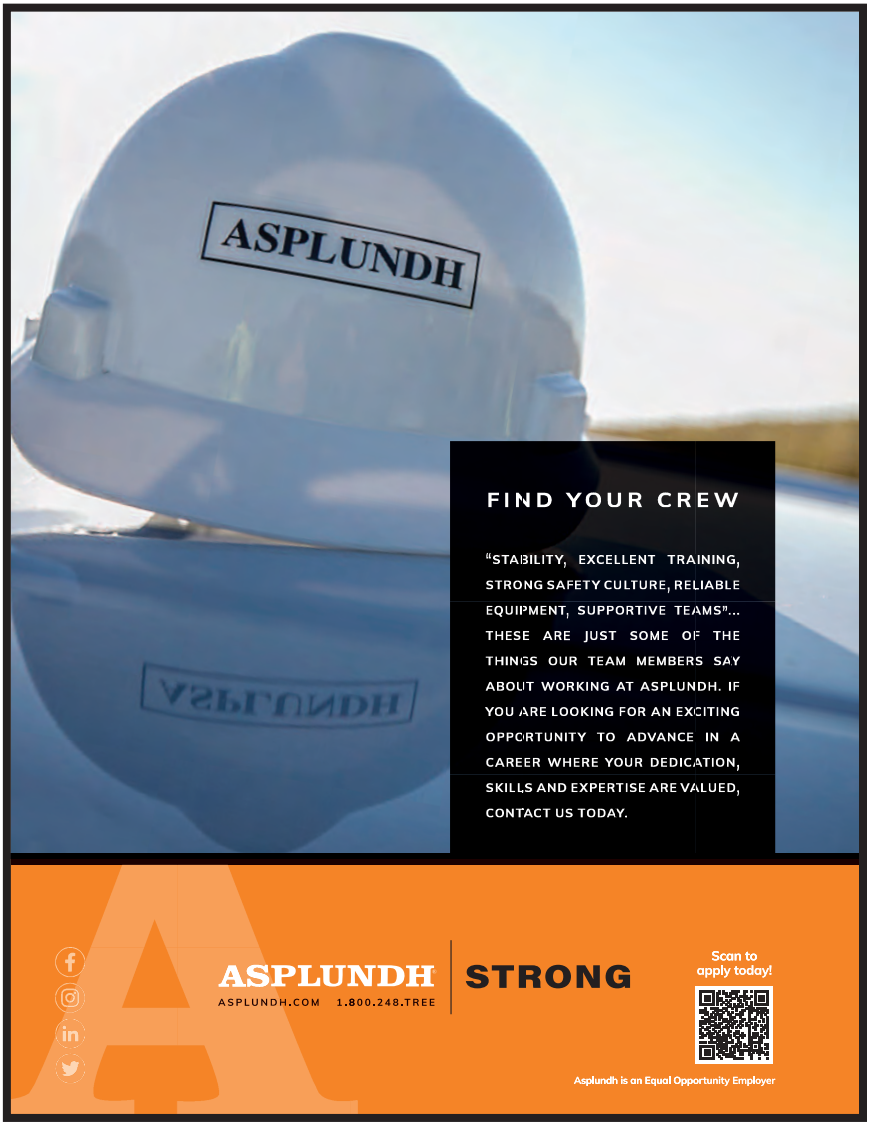
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guiding principle for urban forest programmes, and city greening across the world, that ensures that all residents have access to trees and green – and the benefits these provide.

Based on some of the most up-to-date research on the links between urban forests and health, wellbeing, and climate change, and the work of influential global organisations like the World Health Organization, we would like to introduce a new (guiding) rule for urban forestry: the 3-30-300 rule. We'll explain this rule below and are of course aware that its application will be more challenging – and perhaps less relevant – in some contexts. The rule recognizes that we need to bring trees and nature all the way into people's neighbourhoods, streets, and on their doorsteps in order to capitalise on their many benefits. It is not sufficient for a city-wide tree canopy cover of 30%, because typically the urabn forestry will not be evenly distributed and more marginalized populations usually will have less trees and green in their neighbourhoods. Also, putting most efforts into developing and managing large, high-profile city parks is only one part of the story, as we really have to integrate green infrastructure into all places where we live and work, so that nature is always within sight and easy access.

3 Trees from Every Home

The first element of the rule is that every citizen should be able to see at least three trees (of a decent size) from their home. Recent research demonstrates the importance of nearby, especially visible, green for mental health and wellbeing. During the COVID-19 pandemic, people have often been bound to their homes or direct neighborhoods, placing even greater importance on nearby trees and other green in gardens and along streets. Seeing green from our windows helps us keep in touch with nature and its rhythms. It provides important breaks from our work and can inspire us and make us more creative. The Danish municipality of Frederiksberg has a tree policy that calls for every citizen to see at least one tree from their house or apartment. We should take this one step further and ensure that everybody has multiple trees in sight.

30 Percent Tree Canopy Cover in Every Neighborhood

Recent studies have shown an association between urban forest canopy and cooling, better microclimates, mental and physical health and possibly also reducing air pollution and noise. The work of Prof. Thomas Astell-Burt and his team in Australia has repeatedly found that 30% us an important threshold – a minimum canopy cover percentage that ensures that residents benefit in terms of their health and wellbeing. By creating more leafy neighbourhoods, we also encourage people to spend more time outdoors and to interact with their neighbourhoods (which in turn promotes social health). Many of the most ambitious cities in the world in terms of greening, including Barcelona, Bristol, Canberra, Seattle and Vancouver have set a target of achieving 30% canopy cover. At the neighborhood level, 30 percent should be a minimum, and cities should strive for even higher canopy cover when possible. Where it is difficult for trees to grow and thrive, e.g., in arid climates, the target should be 30% of vegetation.

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300 Metres from the Nearest Park or Green Space

Many studies have highlighted the importance of proximity and easy access to high-quality green space that can be used for recreation. A safe 5-minute walk or 20-minute stroll is often mentioned. The European Regional Office of the World Health Organization recommends a maximum distance of 300 metres to the nearest green space (of at least 1 hectare). This encourages the recreational use of green space with positive impacts for both physical and mental health. Of course, it will be important to work with local context. For example, the needs in lower-density suburban areas will be different from those in denser urban areas. But, in all locales efforts need to be made to provide access to high-quality urban green space, such as in the form of linear green spaces that double as cycle corridors and walking paths. It could be difficult to create new public green spaces of 1 ha in size, especially in existing neighbourhoods where "retrofitting" is needed. In these cases, a decent size of 0.5 ha should be a minimum. Moreover, we don't have to always think of park-like green spaces. Linear spaces like green avenues have substantial vegetation, seating, and areas to play and exercise. Spanish cities offer some really good examples of this type of integration of public space and mobility.

Implementing to 3-30-300 Rule

There has been some initial interest in the rule from cities and organisations in different countries. Using the 3-30-300 rule will allow for benchmarking (nationally and internationally) as well as easy monitoring of progress. The rule is also easy to communicate and can generate interest and support among residents, politicians, businesses, and other key stakeholders. Applying the 3-30-300 rule will help improve and expand the local urban forest in many cities, and with that promote health, wellbeing, and resilience. It will help us create greener, better, and more biophilic cities.

Find this article and its reference list online at: *https://www.biophiliccities.org/bcj-vol-4-no-2*

ARE TREES IN SPECIES-RICH URBAN PLANTINGS LESS SUSCEPTIBLE TO PEST DAMAGE?

By Caleb J. Wilson, Ph.D., EntomologyToday.org, November 17, 2023

Editor's Note: This article discusses species richness and diversity. Species richness is a count of the number of species within a defined region. Species diversity considers the number of species present (richness) and the abundance of those different species (evenness). We commonly use pie charts to visualize our community forest species composition for this reason, you get to see how much of a single genera or species takes up a slice of your forest's pie. Happy reading!

Urban landscapes are characterized by extensive impervious surface cover

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ARE TREES IN SPECIES-RICH URBAN PLANTINGS LESS SUSCEPTIBLE TO PEST DAMAGE?

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in the form of roads, parking lots, and buildings. These surfaces absorb sunlight and re-emit this energy as heat, which makes urban areas warmer than their rural surroundings. This warming effect also favors the proliferation of certain sap-sucking insect pests such as scale insects in urban trees.

In the eastern United States, gloomy scale (Melanaspis tenebricosa) is a pest on urban red maple trees but rarely a problem for red maples in forests. Gloomy scales on hot urban trees produce more eggs than their counterparts in forests, especially if host trees are simultaneously water stressed, which they often are. Gloomy scales are targeted by multiple parasitoid wasp species and are consumed by many generalist insect predators such as lady beetles and lacewing larvae. However, these natural enemies (the collective term for insect predators and parasitoids) rarely reduce gloomy scale populations below damaging densities on urban red maples.

Due to many factors associated with scale biology, it is also difficult and rarely effective to manage species like gloomy scale with chemical insecticides. Therefore, to protect the health and ecosystem services provided by urban trees, it is necessary to identify how landscaping practices can enhance predation and parasitism of scale insects on urban trees. One such practice might be increasing the number of other tree species growing around urban red maples.

Why Tree Diversity Supports Pest Resistance

Trees in species-rich forests often suffer less damage from insect pests compared to trees in forests dominated by a few common species. Many hypotheses have been proposed to explain these findings. Two that have gained prominence among scientists are “the resource concentration hypothesis” and “the enemies hypothesis,” both coined by Richard B. Root, Ph.D., in a landmark publication in Ecological Monographs in 1973.

The resource concentration hypothesis posits that plants in species-rich settings are less likely to be eaten by herbivorous insects because it is harder for herbivores to locate their hosts. Because tree species produce volatiles that attract and repel different insect taxa, forests with many tree species likely contain a diverse mixture of volatiles from multiple species that could confuse an herbivore trying to detect volatiles from a specific host species. Alternatively, the presence of many species in close proximity might disrupt visual signals that insect herbivores use to locate their preferred host.

In contrast, the enemies hypothesis suggests that, where there are more plant species, there are more resources that can support natural enemy communities. These resources—such as pollen and nectar, ideal microclimate conditions, alternative prey, and ideal nesting habitat—could support natural enemy population growth and thus natural predation and parasitism of insect pests.

Does Diversity in Nearby Trees Protect Urban Maples From Scale Infestations?

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ARE TREES IN SPECIES-RICH URBAN PLANTINGS LESS SUSCEPTIBLE TO PEST DAMAGE?

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In urban settings, red maples (Acer rubrum) are often planted in rows with few other tree species surrounding them. Increasing the diversity of tree species in such locations could improve gloomy scale biological control by natural enemies. To test this, we designed a study to see if red maples surrounded by many other tree species were less likely to be infested with gloomy scales and if this effect was attributable to increased biological control by natural enemies.

To do so, we recorded all tree species present within a 25-meter radius of 95 red maple trees in the city of Raleigh, North Carolina. We also used geographic information system (GIS) software to measure the percent canopy cover around trees. We then recorded gloomy scale density and natural enemy abundance in these trees. We quantified generalist insect predation in 30 trees by placing small note cards that had 10 dead fruit fly adults in the canopy of all trees and recording how many were removed after 24 hours. Finally, we quantified gloomy scale parasitism by recording how many scales out of 50 were parasitized in 27 red maples. Our results were published in September in the journal Urban Forestry & Urban Greening.

We found that red maples surrounded by many tree species tended to host lower scale densities relative to red maples surrounded by few tree species. We also found that scale density tended to be the lowest on red maples surrounded by high canopy cover and many tree species compared to red maples surrounded by low canopy cover and many tree species. In other words, it is better to plant red maples in locations where there are many trees represented by many species rather than locations with either few trees or few tree species.

Does this mean natural enemies are more abundant in diverse settings and that they are eating all the gloomy scales? Surprisingly, we found that red maples surrounded by many tree species had fewer parasitoids, while generalist predator abundance did not change relative to maples surrounded by few tree species. Parasitoids appear to become less abundant when red maples have fewer scales in them, while generalist predators are unaffected and likely switch to feeding on other prey. Given these findings, it is perhaps unsurprising that we found no beneficial effect of tree diversity on generalist predation of fruit flies nor on gloomy scale parasitism. However, we found that red maples surrounded by many tree species and extensive canopy cover had fewer scales per natural enemy—or, put another way, there were more natural enemies per individual scale in these trees. Individual scales may therefore be more likely to be consumed or parasitized in red maples in diverse settings.

Resource Concentration, Natural Enemies, or Both?

In sum, red maples in diverse settings have fewer scales, but not because of greater parasitism or predation by natural enemies. So, if natural enemies aren't the reason for lower scale densities, what else is going on here? The resource concentration hypothesis might be the answer.

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Gloomy scales are passively dispersed from trees by wind when immature scales (termed "crawlers") first emerge from their mothers and search for a location to feed. Crawlers floating in the wind from one red maple may be less likely to land on a nearby red maple if it is surrounded by many different tree species. Therefore, tree diversity might protect red maples from gloomy scale infestation by slowing the rate at which scales colonize new red maples.

Meanwhile, since trees produce shade that cools nearby areas, red maples surrounded by many trees, regardless of species identity, may host fewer scales due to cooling effects. The gloomy scales found on these shaded red maples likely produce fewer offspring than scales on red maples surrounded by little tree cover. Over time, red maples surrounded by many trees would accrue additional scales at a slower rate compared to trees with few neighbors.

All of this is to say that multiple ecological mechanisms could explain why red maples surrounded by many trees and many tree species tend to host few gloomy scales. Scale crawlers may be less likely to land on a red maple in an area of diverse tree species, and cooler temperatures in these trees would not favor scale reproductive output. Finally, the greater ratio of natural enemies to scales in these trees could also increase the probability that a predator or parasitoid might encounter and kill scales.

More Evidence for Diversifying Urban Tree Plantings

A small but growing body of research has found that complex vegetation cover and plant diversity can support natural enemy conservation and their biological control services in urban landscapes. Our study indicates that diversifying urban tree plantings may be a sustainable and effective cultural management strategy for otherwise difficult-to-manage pests such as scale insects.

By supporting healthy red maples, tree diversification may reduce the need to treat trees with insecticides to manage scales and reduce the possibility of off-target effects on pollinators, predators, and other insect species. Diversifying urban tree plantings may therefore support insect conservation, tree health, and the many ecological services provided by urban trees.

Note: The author makes references to other publications, including the "red-maple" scientific study discussed in the above, and the original 1973 publication that posed the hypothesized pest damage/species richness relationship being explored. You may read online here:

Tree species richness around urban red maples reduces pest density but does not enhance biological control: *https://www.sciencedirect.com/science/article/abs/pii/S1618866723002649?via%3Dihub*

Organization of a Plant-Arthropod Association in Simple and Diverse Habitats: The Dauna of Collards (Brassica Oleracea): *https://esajournals.onlinelibrary.wiley.com/doi/10.2307/1942161*

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NEWSROOM: INVASIVE, NON-NATIVE, AND NATIVE SPECIES EXPLAINED

By Texas A&M Forest Service, February 20, 2023

The tree landscape in Texas is made up by a variety of species. From ponderosa pines in West Texas to oaks in Central Texas to dogwoods in East Texas, trees play a vital role in our ecosystem and provide countless benefits. But, what about species that cause negative impacts – invasive species?

Simply put, there are three basic categories of tree species: native, non-native, and invasive. Knowing where tree species fall into these categories may seem like trivial information, but species selection is vital to the health of our overall ecosystem.

"All species are good somewhere and all species are bad somewhere," said Gretchen Riley, Texas A&M Forest Service Forest Systems Department Head. "Planting the right tree in the right place, and avoiding invasive species, helps prevent devastating issues and bolsters the benefits a tree will provide over its lifetime."

When selecting trees to plant, it's important to understand where trees fall into these three categories and how that may vary from region to region.

Native species

Native species have evolved and occur naturally in a region, ecosystem or habitat. Loblolly pines, for example, are native to the East Texas Pineywoods and the Lost Pines regions. The species was here long before civilization and reproduces on its own, creating a stable, self-perpetuating population. Native species provide a multitude of values to their ecosystem, filling a specific ecological niche. They provide food and shelter for local wildlife, typically require less water once established and often have a better chance of survival because they are well-adapted to their region.

"Native species are resistant and resilient to disturbances that happen in their specific region because they evolved there and have adapted to that habitat," said Demian Gomez, Texas A&M Forest Service Regional Forest Health Coordinator.

This includes adaptation to temperature variations and extremes, like dry, hot summers or harsh, cold winters, as well as local pests and pathogens because they have co-evolved together, making them more resilient to attacks. Native species can range in how they behave in their ecosystem, though, and some tend to have aggressive or highly prolific characteristics, according to Gomez.

"An example of an aggressive native species is the winged elm in the Brazos Valley," said Riley. "While they are native to the region, they take advantage of ideal local conditions during good rainfall years to rapidly reproduce and expand their range in yards and pastures."

Knowing how species, native or otherwise, perform in your region is key in species selection.

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NEWSROOM: INVASIVE, NON-NATIVE, AND NATIVE SPECIES EXPLAINED *Continued from page 12*

Non-native species

Non-native species do not originate in the area or region where they are found. These species are introduced into an ecosystem, sometimes intentionally and sometimes by accident. While native species are preferred, non-native species are not necessarily bad for the ecosystem, so long as they do not have a measurable negative impact. Some can even be beneficial to the environment, particularly in urban areas where they increase ecosystem diversity.

"Not all non-natives are invasive," said Riley. "Many do well without competing with natives and in fact, can fill gaps where some natives may not perform well, such as is the case in urban areas where not only has the native soil been removed for construction purposes, but the natural ecosystem has been altered by the built environment."

The performance of any species in a specific region may change over time, making non-natives more ideal in particular ecosystems.

"What we call non-native is tricky sometimes," said Gomez. "Because the natural range of a native species may change over time due to changes in climate or even human disturbance, this is called species migration."

Ultimately, while native species are preferred when planting trees, there is a time and place for non-native species to add value to an ecosystem's diversity and resiliency.

Invasive species

Invasive species have two main characteristics: they are non-native to an ecosystem and their introduction causes or is likely to cause harm to the economy, environment or human health.

"Invasive species produce a measurable impact," said Gomez. "If left unchecked, invasives can threaten native species, biodiversity, ecosystem services, water resources, agricultural and forest production, economics and property values."

Invasive species have been introduced into an ecosystem, often due to human activity. This can include plants introduced as ornamentals, experimental introductions that escaped containment and species accidentally introduced in imported shipping materials. Species that are invasive succeed because of their ability to grow in favorable environments and lack of natural predators, competitors and diseases that would normally regulate their populations in their native range. A significant negative impact of invasives is when they outcompete and reduce native species populations.

"If one species reduces the population of many species, biodiversity is reduced," said Gomez. "Often, the new, invasive species does not have fruit or vegetation that can be utilized by native insects and wildlife, causing those

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NEWSROOM: INVASIVE, NON-NATIVE, AND NATIVE SPECIES EXPLAINED *Continued from page 13*

populations to reduce as well."

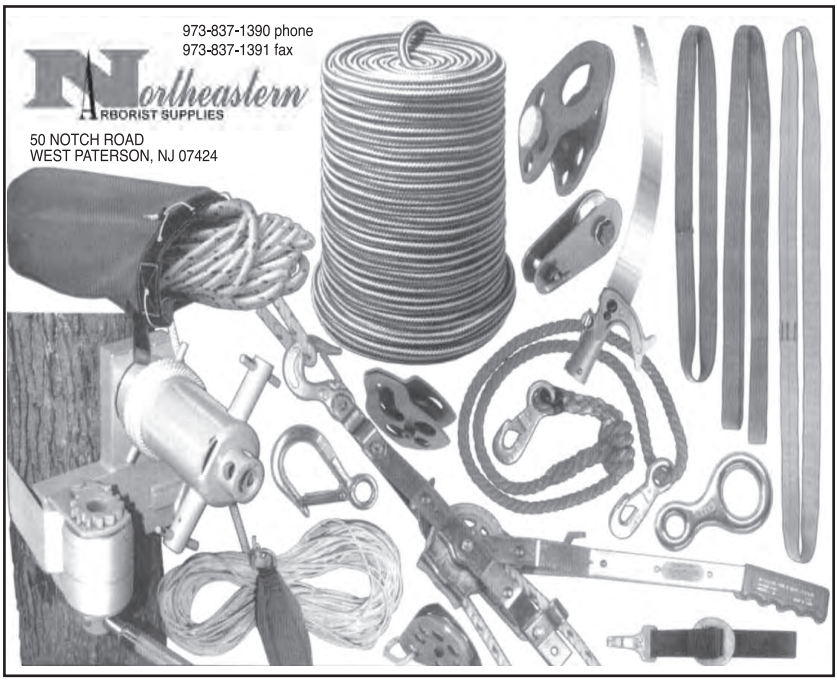
Chinese tallow is extremely invasive to several regions of Texas. It's invasive because it is a prolific seed producer and adapts well to many conditions, easily outcompeting native vegetation. The species has also negatively impacted wildlife, including the displacement of the Attwater's prairie chicken. Invasive species should be avoided when planting and should be removed from the environment when possible.

"The hard part is, once they are in the ecosystem, they are challenging to remove and often mowing them down just makes them come back with a vengeance," said Riley.

While how to remove invasives can vary with species, manual removal is considered the most effective. Treating stumps and any remaining root system with herbicide may be necessary for mature established trees. A local forester or certified arborist should be contacted for species-specific recommendations. Learning how to control invasive species around your property and what tools to use to properly remove them will help improve and maintain ecosystem health.

Selecting species

When selecting a tree species to plant, choosing the right tree for the right place is essential. Evaluate and determine the location and the tree's purpose, then consider tree type by size at maturity.



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NEWSROOM: INVASIVE, NON-NATIVE, AND NATIVE SPECIES EXPLAINED *Continued from page 14*

"When planting trees, native trees are preferred because of their adaptability and resiliency," said Gomez. "But planting a tree that will add value, perform well in the ecosystem, increase diversity and not become invasive are the major goals."

Species diversity is critical for the health of our ecosystems, especially when you consider pests and diseases.

"Diversity is a good thing," said Gomez. "When you have pests and pathogens that affect only one group of species, that's when non-natives can help increase diversity, creating more resilient urban landscapes."

In Northeast Texas, native ash trees are being threatened by an incredibly harmful introduced pest, the Emerald Ash Borer, which is detrimental to only the one family of trees.

"If 10 percent of all your trees are one species and you lose them all to a pest or disease, you lose a significant amount of value," said Riley. "Which means you have to spend more money on heating and air conditioning, water purification, air filtering and health care because all of these benefits are associated with having trees around us."

In urban forests, the goal is to have a tree population include no more than 5% of one species, 10% of one genus or 15% of one family Riley said. While this can be challenging to achieve, it is a benchmark that ensures urban forest resiliency. When planting, choose a variety of species to have a diverse and resilient ecosystem, including trees in your yard and overall community.

"The most important thing is to know your region," said Riley. "There isn't a one size fits all for Texas. Know what is considered invasive or aggressive in your area and what the needs are for the particular region."

Finally, avoid planting invasive species. They are harmful to the environment, and if you have invasive species growing, learn how to control and remove them.

Note: This article is from Texas Forest Service. It refers to the 5-10-15 rule, which is a more stringent version of the urban forest diversity 10-20-30 rule originally posed by Frank Santamour Jr. in 1990. New Jersey Department of Environmental Protection (NJ DEP) has a website about our state's Invasive Plants here: *https://dep.nj.gov/invasive-species/plants/*

CALENDAR OF EVENTS 2024

June 30th	William J. Porter Award & Scholarship Applications Due.
September 4th	NJSTF Tree Talk Zoom, 7:00-8:30pm
October 17-18	NJ Shade Tree Federation 99th Annual Conference, Harrah's Atlantic City, NJ
December 11th	NJSTF Tree Talk Zoom, 7:00-8:30pm

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