
G club
The G Club magazine from greenwood
OCTOBER 2024
BUSINESS UPDATES
Bare root and root ball season gets underway
The science of drought tolerance
SUSTAINABILITY
Glomalin as soil's secret to sustainability
PLANT FOCUS
Laurus nobilis
Case study:
The Old Market Retirement Village, Wimbourne
PLANTING INSPIRATION
Rain Garden
GREENWOOD COMMUNITY
Updates

G club
Client loyalty programme

G Club is better than ever, with enhanced benefits, and greater rewards. Benefits include Luxury event hospitality, charity of choice donation, case study collaboration, and more.

To qualify for G Club benefits, all you need to do is remain within your payment terms each month of the quarter, and the level of benefits you will receive will increase in line with the value of your quarterly spend.

	G club GOLD TIER	G club SILVER TIER	G club BRONZE TIER
Credit bonus based on quarterly spend	3% Credit bonus	2% Credit bonus	1% Credit bonus
Complementary delivery	all orders over £500	all orders over £750	all orders over £1000
Charity donation of your choice	£500 rewards nominated charity	£250 rewards nominated charity	£100 rewards nominated charity
Fresh Acres HQ Tour	●	●	●
Greenwood Community Project Nomination	●	●	●
Case Study Collaboration	●	●	●
Complimentary copies of Greenwood Specification	●	●	●
Seasonal Hamper	●	●	●
Trip to Greenwood Holland once a year	●	×	×
Luxury Event Hospitality	●	×	×

04
Greenwood sponsors Biodiversity Net Gain conference

10
Understanding the everyday essential hyrdrology cycle process, and the vital role plants play.

Contents

28
In late June, Greenwood donated a number of mixed plants to St Barnabas Hospice.

greenwood

Business update

Bare root and root ball season gets underway

We're approaching the busiest time of the year for the landscaping industry, as the bare root and root ball season gets underway. Bare root is the most cost-effective and sustainable way of planting deciduous hedges, meaning that November to March is the perfect opportunity to order bare root whips for your projects. With Root ball hedges and trees currently being lifted from the ground, and bare roots expected to be in stock by the end of October, now is the best time to pre-order hedging for the season.

G Team focus – Dominik Jakubczak

Dominik is the Nursery Manager for the Northern Nurseries, overseeing the growing and dispatching operations at Willaston and Acresfield. As of September, Dominik has now been with Greenwood for 20 years, being one of the longest serving current G Team members. He's a valued member of the team, always bringing joy to the company meetings with his natural sense of humour!

Greenwood wins Essex County Council tree supply contract

Greenwood is delighted to announce that it has won a contract to supply trees to Essex County Council. The project is part of Essex's ambitious strategy to enhance its level of tree canopy cover across the region, which, covering 4637 square kilometres and home to more than 1.5 million people, is one of the largest in the UK. The project is Greenwood's second significant infrastructure supply contract award, following the awarding of the Three Million Trees project by National Highways last year. Greenwood are looking forward to working with Essex County Council, helping to enhance biodiversity and bring green infrastructure to the County.

Greenwood sponsors Biodiversity Net Gain conference

Greenwood was delighted to sponsor Pro Landscaper Magazine's Biodiversity Net Gain workshops, held at the Park Plaza Hotel in London, in early September. The event, attended by a variety of key stakeholders within the landscaping industry, featured a panel of experts on the new legislation, offering their insights and advice, before several workshops were held, covering topics such as planning, implementation, and maintenance. Managing Director Melanie Asker said "It was useful to have the right people in the room to create momentum for change, and it was great to be part of it".

The science of drought tolerance

Understanding the cellular response to drought in plants, and viewing drought tolerance as a spectrum.

BY CHRIS WILLIAMS

In the changing climate of the UK, there is an increasing emphasis on plants resistant to long periods of drought when designing green spaces. It can, however, be unclear what makes a plant tolerant to a lack of rainfall or irrigation. In the landscaping industry, whenever we refer to a plant's drought tolerance, we often use a scale of absolution, either referring to a plant as 'yes' or 'no' when it comes to its ability to survive dry conditions. Once we understand the science behind the way in which different plants deal with drought, it becomes clear that a 'yes' or 'no' does not give a full picture of how much or how little a plant can tolerate dry conditions. The truth is that drought tolerance is much more of a spectrum than a simple binary answer. There are plants which are far more tolerant than others, or plants that lie somewhere between the two extremities, being either moderately tolerant or intolerant of drought. In this article, we're going to look at the importance of drought tolerant species, as well as discuss the specific elements which make a plant drought tolerant, how plants react to a lack of water, and how we measure a plant's ability to withstand dry conditions.

Historically in the UK, the temperate climate and abundant precipitation has usually provided enough water and protection from direct sunlight for most plants to thrive with little maintenance. Due to climate change, however, these conditions are already beginning to rapidly change. Research carried out by the Crowther Lab in Switzerland has suggested that by 2050, London will have the same climate as present day Barcelona, a city almost 1000km closer to the equator. London is expected to see an average temperature increase of around 5.9°C, and with it, much more extreme weather events, such as heatwaves and droughts. It is likely that, if left unchecked, much of our native plant life will struggle to cope with the sudden change in climate, resulting in widespread species lost, and a general reduction in well-being of green spaces.

This is why, in order to ensure the long-term survival of landscapes and gardens, planting with an emphasis on drought tolerance will be key as we move into the future. Despite their better suitability to native wildlife, in the future, many species of British native plants will no longer be able to tolerate the future climate, having not evolved to cope with soaring temperatures and long periods with no rainfall.

Additionally, long, hot summers with little rainfall will create a strain on the water supply for human consumption, with more frequent hosepipe bans and rationing being expected in the coming decades. As a result, creating landscapes that require little to no additional irrigation will be crucial to ensuring that we have thriving green spaces in the future, and to ensure that water is properly conserved.

PARK GÜELL, BARCELONA

Drought avoidance vs drought tolerance in plants

When it comes to a plant's ability to withstand a lack of water, there are two different strategies that are employed. These are drought avoidance, and drought tolerance. The goal with drought avoidance is to avoid water loss within the plant, attempting to maintain full water potential within the cells of the leaves and stem. When a plant is at its maximum water potential, it is able to maintain its rigid structure within the stems and the leaves. This is because the water will exert an outward pressure on the walls of the cells, which is measured in megapascals (MPa). As long as a plant maintains this water potential, it will be able to function normally. Access to water is often maximised in dry soils by an extensive expansion of its root system, in an attempt to absorb as much of the available groundwater as possible. Once the soil moisture has been exhausted, a plant will then often begin to conserve its existing water potential, through waxy foliage, or small, fine hairs, in order to prevent overheating, and thus reducing the required water expenditure via transpiration to keep the leaves cool.

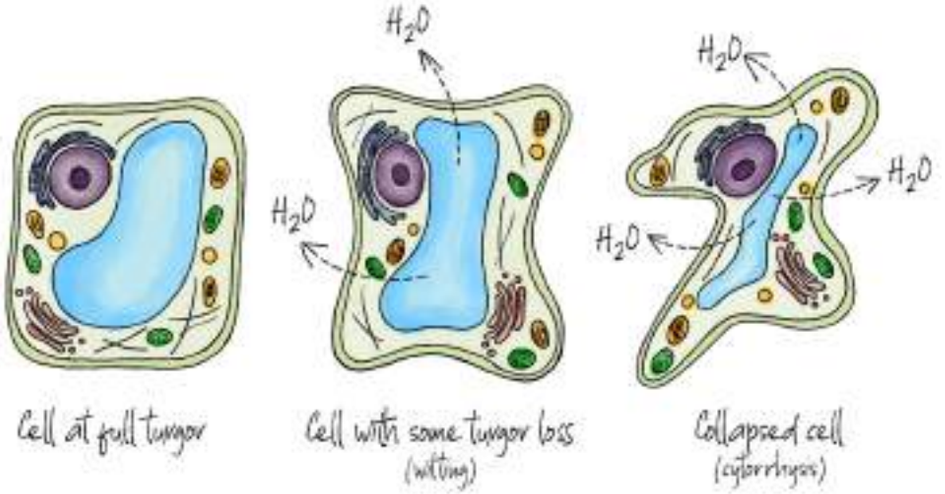


DIAGRAM SHOWING TURGOR LOSS IN A LEAF CELL AS WATER POTENTIAL DECREASES

The difference between drought avoidance and drought tolerance is that with drought tolerance, the plant is already at the point where water potential loss is inevitable, and it has exhausted all options of drought avoidance. Once water loss has reached a certain level, the plant will begin to exhibit more visible levels of drought stress. The loss in water will result in a reduction in the pressure exerted on the outer cell wall, which is responsible for a plants' rigid structure. We're able to see this pressure loss with the naked eye, in the form of wilting. In sustained period of drought, the cells will continue to lose water, and cell pressure, until the cells eventually collapse and die. Drought tolerant plants are defined as those which are still able to function during water potential loss, without sustaining serious and irreparable damage as a result. This tolerance comes from plants which have evolved to survive in dry conditions, in regions with little rainfall and a scarcity of available water. Drought tolerant plants often have more robust cellular structure, which has adapted to better withstand lower water potentials and a loss of internal pressure. Additionally, the cells are also able to make an osmotic adjustment, where they generate solutes within the cell, reducing water potential and allowing it to maintain function. Every plant has its limit however, and eventually, the plant will begin to wilt and wither away. The point at which the plant is unable to withstand the pressure loss without irreversible damage is known as the leaf turgor loss point. This is when the cell is no longer able to exert a positive pressure, and the cell begins to collapse inwards, causing wilting.

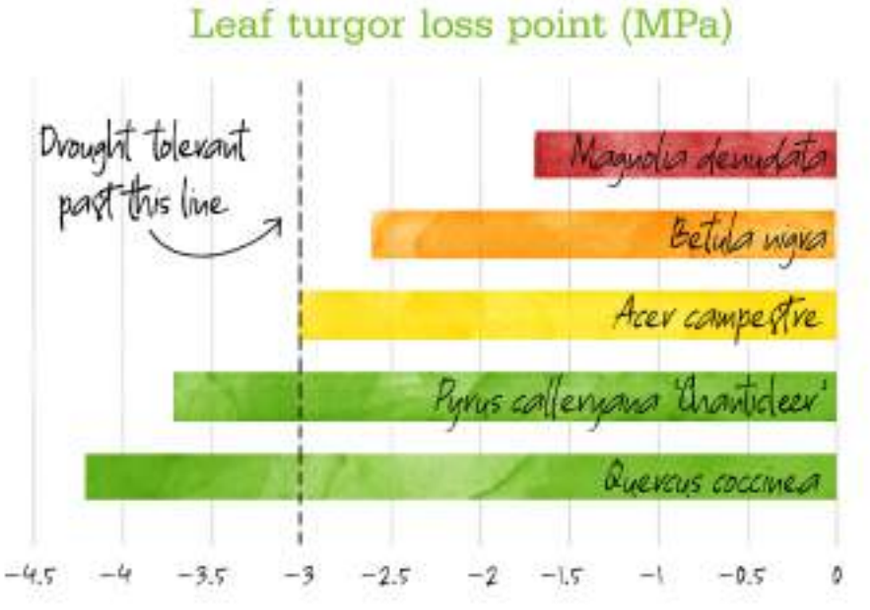
Drought tolerance as a scale

As we are able to quantifiably measure the point at which a plant can no longer stand the drop in leaf turgor before it causes irreversible damage, we are then able to build a solid comparison within all different species of plants, and from that, develop a spectrum of drought tolerance, on which all plants lie. From this we are then able to create an average leaf turgor loss point, and from that, identify which plants fall above the average tolerance, and which fall below it.

In order to measure the turgor loss point, scientists use a vapour pressure osmometer (VPO). This device determines the concentration of osmotically active particles in a solution. There are two chambers to the osmometer, one which is filled with a solvent containing the polymer we want to measure, in this case the plant cells, and the other chamber contains pure solvent, and acts as a control. The test then conducts several measurements of the vapor pressure in each chamber, and determines the average molecular weight of the polymer inside the chamber. An equation first established by Bartlett et al (2012) then determines the leaf water potential at turgor loss point.

Whilst this approach is relatively new and yet to have been measured widely amongst plant species, the research conducted by Kew Gardens amongst others, has given us a glimpse into the future of determining the drought tolerance of various plants. Currently, the botanical gardens at Kew are collecting seeds from the Romanian Steppe, an area with similar climate conditions to those predicted in the UK's future. Their plan is to test these plants for their turgor loss point, to determine their suitability to the UK's future climate.

Deciding if a plant is drought tolerant or not, as evidenced by the vastly differing points at which studies consider a plant to be so, is not as straightforward as it might appear on the surface. One of the key factors to consider is the extent of the drought conditions to which the plants are being subjected. Another factor is the sample of plants from which you're determining drought tolerance. Plants from Northern Europe, where typically there is more abundant rainfall and less drought, will on average not have an evolved tolerance to drought, as it is not essential to survival. In the mediterranean, however, where hot summers and periods of drought are common, the resistance to drought will be more prevalent. This means that a plant with a lower than average turgor loss point amongst Northern European plants won't have a lower average turgor loss point amongst mediterranean plants. This is why context plays a key factor in determining a plants suitability for a planting location, and why drought tolerance shouldn't be looked at as a simple 'yes' or 'no' answer, rather an approach to plant and tree selection based on the current climate, and the climate of the future.



SOURCE: ROYAL BOTANICAL GARDENS KEW – TREE SELECTION GUIDE

The hydrology cycle and the environment

Understanding the everyday essential process, and the vital role plants play.

BY GIULIA DATTIS

The hydrological cycle, also known as the water cycle, is a natural process that is fundamental to life on Earth. This continuous cycle involves the evaporation of water from the Earth, the formation of clouds, precipitation, and the return of water to land and sea surfaces. Water is a precious resource that supports biodiversity, agriculture and human life. However, inefficient use and poor management of water resources can lead to serious social problems, such as droughts, floods and water shortage. Plants, as well as infrastructure such as reservoirs and water basins, can play a crucial role in creating local hydrological cycles, helping to solve some of the most pressing water-related challenges and improving environmental sustainability.

Water, present in all three of its physical states (solid, liquid, gas), plays a crucial role in shaping the Earth's landscape.

In solid form, water manifests as ice and snow, covering polar ice caps and mountain peaks, in liquid form, water is present in oceans, lakes, rivers and streams, forming the basis for marine and terrestrial life, and in gaseous form, water is found as water vapor in the atmosphere. The transition between these states through warming and cooling is critical to the water cycle, which supports ecosystems and life on Earth. The water cycle, powered by solar energy, guarantees the continuous movement and exchange of matter and energy between the spheres.

The hydrological cycle involves several interconnected phases that circulate water throughout the Earth's systems. It begins with evaporation, where solar energy heats water, mainly from oceans, causing it to transform into water vapour and enter the atmosphere. This vapour then cools and condenses around particles in the air, forming clouds—a process known as condensation. When these droplets become heavy enough, they fall to the Earth as precipitation in various forms like rain or snow, replenishing terrestrial and aquatic ecosystems. Some of this water infiltrates the soil, recharging underground aquifers and improving water quality.

The excess water that the soil cannot absorb becomes runoff, flowing over the land to rivers and oceans, distributing water and sometimes causing erosion or flooding. Finally, plants contribute to the cycle through transpiration, releasing water vapour into the atmosphere, which aids in cloud formation and maintains the continuous movement of water through the environment.

BETULA PENDULA

Climate change has a significant impact on the hydrological cycle, influencing various key processes such as evaporation, precipitation and stream flow.

Rising global temperatures, caused by the greenhouse effect, intensify evaporation from oceans, lakes, and rivers. A warmer atmosphere not only increases the amount of water vapour, but also makes the hydrological cycle more energetic. This leads to more intense rainfall and frequent extreme weather events, such as floods and droughts. Drought periods tend to become longer, whilst rainfall events become more intense, a phenomenon known as "hydrological cycle intensification".

The UK has seen a significant increase in extreme weather events, which have been widely attributed to the effects of climate change. A study by World Weather Attribution (WWA) has shown that average rainfall on stormy days in the UK has become around 30% heavier compared to pre-industrial climates, which were 1.2°C colder.

Plants play a crucial role in the hydrological cycle, helping to maintain the balance of water on Earth. They actively participate in the water cycle through the process of transpiration. During photosynthesis, plants absorb water from the soil through their roots, before releasing it into the atmosphere as water vapour through pores in their leaves, known as stomata.

Plants, especially those with deep roots, help retain water in the soil. The roots create channels in the soil that improve the infiltration of rainwater, reducing surface runoff and increasing aquifer recharge. This is especially important in drought-prone areas, where this water-holding capacity can make the difference between fertile and barren soil.

Plants such as *Salix alba*, *Betula pendula*, *Alnus glutinosa*, *Crataegus monogyna*, *Quercus robur,* and *Rosa canina* all have properties such as stablising root systems, or a natural affinity for absorbing pollutants from infiltrated rainfall, preserving the quality of water in the cycle, whilst also all being UK native plants, which contribute best to biodiversity within their ecosystem.

Human activities have a significant impact on local hydrological cycles, influencing the availability and quality of water resources. These include the construction of reservoirs, water tanks, and basins. Although designed to improve water resource management, they can create local hydrologic cycles with both positive and negative effects.

These structures are designed to store large quantities of water, which can be used for various purposes, including irrigation, urban water supply, hydroelectric power generation, and flood control.

Using plants in water infrastructure provides an innovative and sustainable approach for the management of water resources and land. Planting trees and shrubs along the banks of reservoirs helps stabilise the soil, preventing erosion and improving water quality; creating artificial wetlands around reservoirs can also treat wastewater and improve water quality.

Integrated land and water management projects combine different strategies to improve the sustainability and resilience of communities. These projects often involve collaboration between public and private entities and local communities.

FLOODING BEDS AT FRESH ACRES

At Greenwood, we have taken a number of steps to reduce water use and improve sustainability. We use rainwater collection systems and water recycling to reduce dependence on external water resources. Additionally, we have invested in advanced technologies such as the MP2000 Rotator sprinklers, which offer water savings of up to 30%, as well as the flooding bed system at our Fresh Acres nursery. This irrigation system uses an underground tank connected to central tunnels that flood the beds for a scheduled time and at a specific height. The water is then drained, filtered, and returned to the tank, allowing efficient and sustainable use of water resources. This system not only promotes plant growth and protects foliage, but also helps prevent diseases such as leaf spot.

Our long term target is to be 100% water self-sufficient across all of our UK nurseries, and we are already at 90% of this goal. Sustainability is one of our core values, and we aim to be industry leaders in demonstrating responsible planetary stewardship.

PLANTING INSPIRATION:

Rain gardens

Rain gardens are a great solution for capturing, filtering, and absorbing rainwater, reducing the amount of rainwater runoff that ends up in our rivers and streams. A rain garden is a shallow constructed depression, planted with deep-rooted native plants and grasses, located in the landscape to receive runoff from hard surfaces such as a roof, pavement, and driveway. Rain gardens also serve a valuable function in reducing the amount of pollutants reaching waterways.

Rain gardens work by capturing rainwater runoff and allowing it to infiltrate the soil naturally. Garden plants and soil filter pollutants from water as it filters through soil layers, helping to recharge local groundwater supplies whilst protecting downstream streams from pollution and erosion. A rain garden can successfully cope with the rainfall from an equivalent surface area five times the size of the garden, meaning that for a 100m² area of a roof or hard surface, the rain garden need only be 20m².

To create your rain garden, choose a location at least three meters away from your home to avoid potential water damage. The garden should be located in a naturally low area of the garden where rainwater tends to collect, avoiding areas above septic systems or underground utilities. The size of your rain garden can be determined by the amount of runoff it will have to handle, the type of soil, and the amount of space available. The shape can be natural and curvilinear, or more formal and geometric, depending on preferences.

Rain gardens need well-draining soil. If the soil in your garden is clay, you may need to amend it with compost and sand to improve its infiltration rate. Choose a variety of native plants that can tolerate both wet and dry conditions. Native plants are adapted to local conditions and will require less maintenance once established. They also provide habitat for local wildlife.

The placement of plants in a rain garden is critical to its success. Plants should be arranged according to their water tolerance. Moisture-tolerant plants should be planted in the centre of the garden, where water collects. These can include plants such as *Iris pseudacorus*, perfect for humid areas, the fern *Matteuccia struthiopteris*, or *Persicaria bistorta*, suitable for areas with stagnant water.

In the intermediate part of the garden, where there is moderate water stagnation, you can plant species such as the *Deschampsia cespitosa*, tolerant to humidity, or the *Astilbe*, which blooms well in conditions of moderate humidity, and the *Luzula nivea*, suitable for conditions of medium moisture levels.

Finally, in the external part of the garden, where there is less water stagnation, *Cornus alba* 'Sibirica', which prefers well-drained soil, could be a good choice, as well as *Sambucus nigra*, which can tolerate a variety of conditions but prefers not to be in standing water, and *Viburnum opulus*, which does best in well-drained soil.

Initially it is recommended to water the garden regularly until the plants are stabilised. Once established, they should require no further watering. Mulch the garden to conserve moisture and eliminate weeds.

Rain gardens are a subset of a broader concept known as Sustainable Drainage Systems (SuDS). SuDS represent a new approach to managing surface water runoff in urban areas, with the aim of mimicking the way nature absorbs and moderates rainfall runoff. They provide a mixture of natural and man-made solutions.

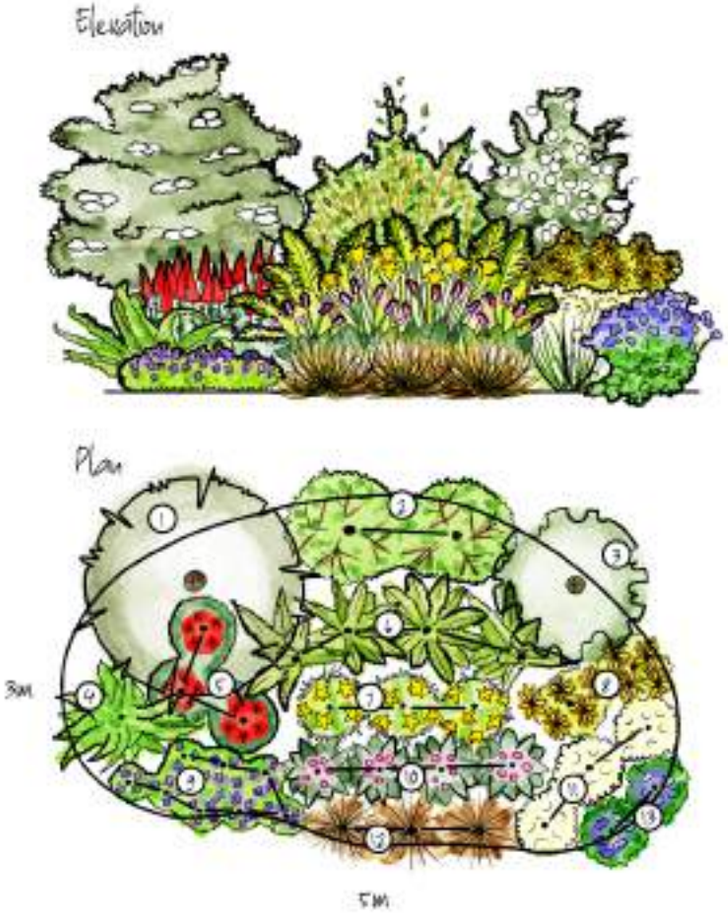
PERSICARIA BISTORTA* 'SUPERBA' AND *IRIS PSEUDACORUS

As companies build roads, buildings, pavements, and other spaces with hard, impervious materials like concrete, asphalt and stone, they need to think about stormwater drainage. If left unchecked, the accumulation of excessive rainfall can cause severe flooding, damage infrastructure, pollute water and cause widespread disruption.

At the back of our rain garden planting plan, we have *Sambucus nigra* **(1)**, a large, bushy shrub or small tree, with green foliage and heads of fragrant, cream flowers which are followed by black elder berries. *Viburnum opulus* **(3)** is a vigorous shrub that provides many seasons of interest. It has with lobed, maple-like leaves that provide autumn colour, snowball-like clusters of white, or green tinted flowers that appear in late spring, and translucent red berries.

Nestled in between is *Cornus alba* 'Sibirica' **(2)**, a deciduous shrub with slender, deep red stems, clusters of cream-white flowers in late spring, followed by blue-white berries, and ovate leaves which transition to red in autumn.

Centrally, we have included *Matteuccia struthiopteris* **(6)**, a deciduous fern of erect rosettes with lacy, pale green fronds, alongside shorter, brown fronds. *Iris pseudacorus* **(7)** is a vigorous perennial that forms clumps of green foliage, alongside bright yellow flowers. Ideal for the front or middle of a flower border, *Persicaria bistorta* 'Superba' **(10)** is a clump-forming, vigorous semi-evergreen perennial with dense spikes of soft pink flowers from summer to early autumn, and veined, ovate, rich green leaves.



***ASTILBE* 'FANAL' (X *ANDRESII*)**

Along the righthand side we have *Rudbeckia fulgida* var. *sullivantii* 'Goldsturm' **(8)**, a perennial with striking daisy-like, yellow flowers with black-brown centres from summer to autumn. *Luzula nivea* **(11)** is a slow growing evergreen grass with a loose clump of hairy, dark leaves and clusters of shiny, white summer flowers upon arching stems. At the front of the plan, *Geranium pratense* **(13)** is a clump-forming perennial with saucer-shaped flowers in different colours, depending on the variety, alongside lush, green foliage.

Moving over to the lefthand side, *Astilbe* 'Fanal' (× arendsii) **(5)** is a compact herbaceous perennial with narrow, fluffy, dark crimson flowers and serrated, dark green leaves on stems. Adding a unique leaf shape and texture, *Dryopteris filix-mas* **(4)** is a large, deciduous male fern with green, feathery, lance-shaped fronds forming a shuttlecock shape, which transform to a coppery shade in autumn. Providing groundcover alongside, *Vinca minor* **(9)** is a pretty, evergreen shrub with pale blue-violet flowers from spring.

Completing the planting plan, in the front centre we have *Carex testacea* **(12)**, a lovely evergreen sedge with olive green, arching leaves which transition to a copper-bronze throughout winter, and brown spikes in summer.

Whilst providing many benefits from being a sustainable planting plan, rain gardens also bring a wealth of beauty with a variety of native plants of different shapes, textures, and colours.

MATTEUCCIA STRUTHIOPTERIS

greenwood

Why have my plants been cut back?

You may have noticed that some of your new plants have been cut back.

Don't worry! This is normal. Cutting back certain perennial plants during the autumn and winter months concentrates the plant's resources toward root growth, ensuring the plant is able to survive through the colder months, and grow back even stronger in spring.
Not only that, but removing old or dying stems protects the plant from vulnerabilities to pests and diseases, ensuring the plants' hygiene and long-term health.
Please note, this may affect the actual height of the plants received when compared to the height specified.

If you have any questions regarding your plants, don't hesitate to get in touch.

CASE STUDY:

Graduate Landscapes
The Old Market Retirement Village, Wimbourne

Greenwood Plants provides instant impact and structural interest to new-build retirement village.

BY CHRIS WILLIAMS

In early 2024, Greenwood supplied plants to long standing clients Graduate Landscapes, for planting in a large new-build retirement village, based in Wimbourne, Dorset. The site, constructed by McCarthy and Stone, features a mix of apartments and bungalows, with a village garden, and state-of-the-art amenities, such as a homeowners' lounge, a bistro, a beauty salon, and more. Surrounded by the Dorset countryside, the project is characterised by an abundance of soft landscaping, to help blend into its natural surroundings.

The aim of the project was to provide plants for instant impact to the newly constructed facilities, and also plant long term, low maintenance plants. These will not only provide year round interest, but provide resilient green spaces, which attract biodiversity and serve as a source of enjoyment to the residents.

For instant impact, spiral topiary trees were planted in pots either side of the main entrance doorway, providing an ornamental effect. This was coupled with additional topiary balls of *Ilex crenata*, which were planted either side of the main pathway, not only adding height to the central planting scheme, but also some structural interest.

On top of this, *Phormiums* was planted in the middle of the communal areas to provide some upright growth, and to give the plan an ornamental feel.

Along the main pathway, within the borders, *Persicaria affinis* 'D. Don' was planted, which produces long spikes of pink and white flowers in summer, as well as *Heuchera* 'Plum Pudding', which gives a nice colour contrast with its large purple foliage, and spring to summer spikes of flowers. For elevation and structure, *Nandina domestica* 'Firepower' was planted behind, providing year-round colour with its autumnal shades of orange and red foliage.

Year-round colour will be provided with plants such as *Mahonia* 'soft caress' which produces yellow flowers in autumn to winter, along with berries, as well as many Viburnum varieties, such as *Viburnum tinus* 'Eve Price' which produces clusters of pinkish-white flowers in winter. *Viburnum davidii* and *Viburnum opulus*, which provide winter berries, and spring flowers, were also included.

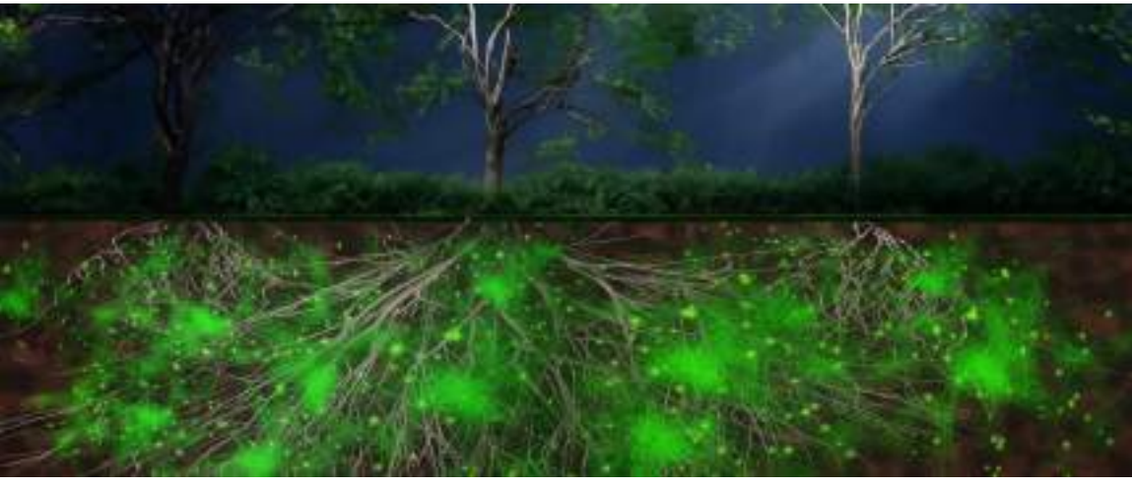
Hedges were created with plants such as *Osmanthus* x *burkwoodii*, which produces flowers in spring, along with autumn berries, and *Taxus baccata*, a bushy shrub which boasts flowers and berries in the same seasons. The dense growth habit of these trees makes for an effective option for screening, and they have been placed in front of the residences to provide privacy for the future inhabitants. Other hedging plants used include *Crataegus monogyna*, which is a deciduous shrub or small tree that has edible red berries in autumn, as well as *Eleagnus* x *ebbingei*, which is a versatile evergreen shrub, flowering late into the year.

For trees, *Cornus kousa* 'Chinensis' and *Acer palmatum* 'Osakazuki' were planted, which are small to medium varieties, that provide year-round colour and interest to a planting scheme.

Other varieties planted of note include *Photinia* × *frasieri* 'Red Robin', which produces shoots of new foliage that initially appear red, before turning green as they mature. This shrub not only provides structure to the project, but a splash of year-round colour as well. In addition, *Lavandula angustifolia* 'Hidcote' was used to provide aromatic border coverage, with shoots of purple flowers in summer and year-round foliage with a sweet scent, providing visual interest and a sensory element to the residents.

Overall, the project has been a major success. Not only have the plants provided an instant impact, such as the *Phormium* and container grown topiary spirals giving the project an immediate visual interest, but many hardy, long term options being chosen will ensure the green spaces of the retirement village will continue to thrive for years to come. Graduate Landscapes Commercial Estimator Patrick McTernan said "This project had some complicated elements such as a high level of quality control, scarce varieties and large call offs which required delivery on trolleys. Greenwood overcame these obstacles with ease and played a massive part in the successful delivery of the scheme. I would like to thank Claire, Charlie, Dan, Lucy and the rest of the team for their exceptional work on this project – they continually went above and beyond as usual."

Glomalin as soil's secret to sustainability



The role of glomalin in enhancing soil health and stability.

BY GIULIA DATTIS

Glomalin is a glycoprotein (protein with a carbohydrate chain attached) produced by arbuscular mycorrhizal fungi (AMF) which plays a crucial role in soil health and structure. A relatively recent discovery, glomalin has been identified as an essential component in the formation of soil aggregates, contributing to soil stability and water-holding capacity. These are vital to sustainable soil management.

Its importance lies in its ability to improve soil quality through several mechanisms. First, glomalin acts as a natural glue, binding soil particles and forming stable aggregates. This process, in addition to preventing erosion, also improves soil porosity, facilitating water infiltration and aeration. Glomalin is rich in carbon, which makes it an important storage of organic carbon in the soil, contributing to climate change mitigation.

VISUAL REPRESENTATION OF GLOMALIN UNDER THE MICROSCOPE

Early research has shown that glomalin is rich in carbon and can provide a significant reserve of organic carbon in soil. This has important implications for combatting climate change, as soil carbon sequestration is a key strategy to reduce atmospheric carbon dioxide concentration. In addition, subsequent studies have highlighted the role of glomalin in improving plant resistance to environmental stress, from drought and soil salinity.

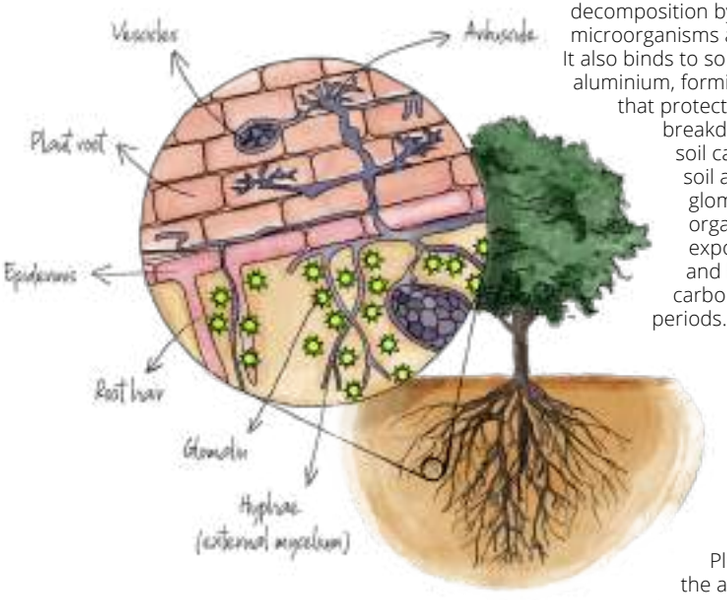
Over the past 25 years, various studies have attributed numerous benefits to glomalin, including soil aggregation, carbon storage, soil nutrient content and distribution, soil biodiversity, removal of heavy metals and other pollutants via chelation, and plant productivity. Despite some controversy over the exact nature of glomalin, its association with a long list of plant and soil health benefits has been consistently confirmed.

The properties of glomalin

Glomalin has a complex structure that gives it unique properties: recalcitrance for slower decomposition, ability to sequester carbon, hydrophobicity to aid water retention, and chelation, binding itself to heavy metallic pollutant particles in the soil. These characteristics make glomalin a crucial component for soil health and climate change mitigation.

Glomalin is a glycoprotein, which means it is made of a protein part and a sugar part. The sugar chains and protein residues are linked by glycosidic bonds that give glomalin a complex and stable structure.

Glomalin's complex structure and hydrophobic nature make it resistant to microbial decomposition by limiting access to microorganisms and degradative enzymes. It also binds to soil minerals like iron and aluminium, forming stable complexes that protect organic carbon from breakdown, thereby stabilising soil carbon. Additionally, the soil aggregates formed by glomalin physically shield organic carbon, reducing its exposure to decomposers and helping to sequester carbon in the soil over long periods.

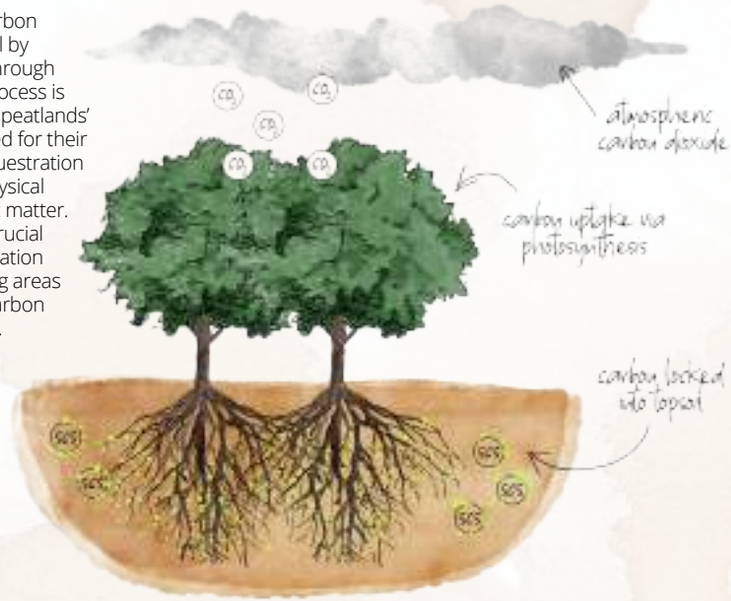


ARBUSCULAR MYCORRHIZAL FUNGI FORM ARBUSCULES AND VESICLES WITHIN THE CORTICAL CELLS OF THE ROOT. THE EXCHANGES THAT OCCUR BETWEEN THE FUNGUS AND THE PLANT CELL TAKE PLACE AT THE LEVEL OF THE ARBUSCULES. AMF PRODUCE GLOMALIN, WHICH PROTECTS THE HYPHAE FROM NUTRIENT LOSS AND DESICCATION.

Its ability to resist decomposition means that the carbon sequestered in glomalin can remain in the soil for decades, contributing to climate change mitigation.

Plants absorb CO_2 from the atmosphere through their stomata. When plants die or lose leaves, roots, and other organic materials, they are broken down by microorganisms in the soil. During this process, the carbon in plant residue is converted into various forms of organic carbon. Glomalin binds to soil particles and forms stable aggregates in the soil. These aggregates protect the organic carbon from microbial decomposition, allowing the carbon to remain sequestered in the soil for long periods of time, helping to reduce the amount of CO_2 in the atmosphere.

Glomalin sequesters carbon at a microbiological level by stabilising it in the soil through chemical bonds. This process is quite different from the peatlands' one, which are renowned for their exceptional carbon sequestration capacity through the physical accumulation of organic matter. Both mechanisms are crucial for climate change mitigation and represent promising areas of research for future carbon management strategies.



Increasing glomalin production through sustainable practices can significantly contribute to reducing greenhouse gas emissions and promoting environmental sustainability.

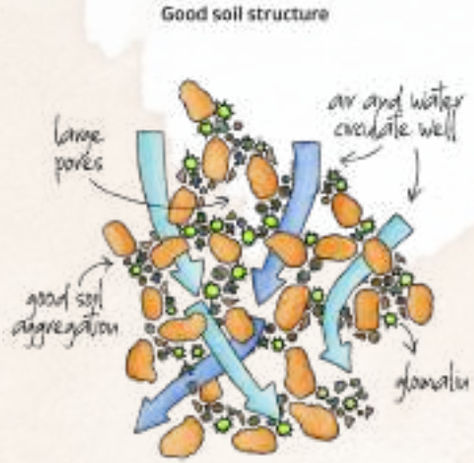
Another distinctive property of glomalin is its hydrophobicity, or its tendency not to dissolve easily in water. This property is due to the presence of hydrophobic chemical groups in its structure, which repel water. The hydrophobicity of glomalin also contributes to its persistence in the soil.

The presence of glomalin and its hydrophobicity are closely related to soil health and ecosystem productivity. Glomalin helps improve the soil's water-holding capacity, reducing erosion, and improving nutrient availability for plants.

Glomalin contributes to the formation of stable aggregates in the soil, so improving its physical structure. Soil aggregates are essential to maintain good porosity, which facilitates infiltration and water retention, as well as aeration. The presence of stable aggregates also reduces soil erosion, preserving its integrity and fertility in the long term.

Glomalin also plays a key role in nutrient cycling. It binds essential nutrients, such as phosphorus and nitrogen, making them more available to plants. This process is particularly important in nutrient-poor soils, where nutrient availability can limit plant growth. Additionally, glomalin can positively influence soil microbiology, promoting the growth of beneficial microorganisms that further contribute to nutrient availability.

Glomalin's ability to improve soil structure has a direct impact on water retention. Soils with good aggregate structure retain water better, reducing the need for irrigation and increasing plant resilience under water stress. This is particularly relevant in areas prone to drought, where efficient water management is crucial for agricultural productivity.



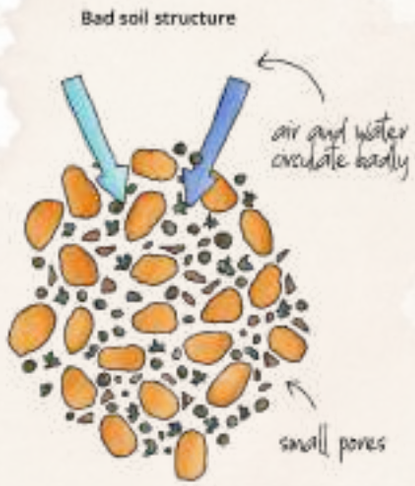
Plants that grow in soils rich in glomalin tend to develop more robust root systems, improving nutrient and water uptake. This leads to more vigorous growth.

Glomalin plays a vital role in the remediation of lightly contaminated soils due to its ability of binding heavy metals, and this process is called chelation.

Glomalin interacts with heavy metals through adsorption and complexation processes. Adsorption occurs when heavy metals physically bind to the surface of glomalin, whilst complexation involves the formation of chemical bonds between metals and functional groups in the glomalin structure. These processes reduce the solubility of metals, making them less available for plant uptake and decreasing the risk of groundwater contamination.

Glomalin bonds strongly with heavy metals such as cadmium (Cd), lead (Pb) and zinc (Zn). When these metals bind to glomalin, they form stable complexes that prevent their mobility in the soil. This is particularly important in slightly contaminated soils, where the mobility of heavy metals can lead to contamination of plants and water resources.

The long-term stability of glomalin means that its benefits in remediating contaminated soils last over time. The continued presence of glomalin in soil ensures that heavy metals remain immobilised, reducing the risk of future release of contaminants.



Tips on how to increase glomalin in soil

Increasing glomalin in soil is crucial for enhancing soil structure and plant health. To boost glomalin levels, inoculate soils with Arbuscular Mycorrhizal Fungi (AMF) to improve nutrient uptake, especially in nutrient-poor soils. Practice plant rotation to maintain microbial diversity, which supports AMF growth, and reduce tillage to preserve soil structure and mycorrhizal fungi. Additionally, use compost and manure to enrich soil organic matter, whilst avoiding excessive chemical fertilisers that can harm AMF. Lastly, incorporate plants that encourage AMF growth, further promoting glomalin production.

Plants that promote arbuscular mycorrhizal fungi (AMF) growth and glomalin production share some key properties. They form symbiotic relationships with AMF, enhancing the uptake of essential nutrients such as phosphorus and nitrogen. They are adaptable to different soil conditions, even thriving in less fertile environments. They contribute to the formation of stable aggregates in the soil, improving porosity, infiltration and water retention. They also increase organic matter through leaf fall and litter decomposition, providing nutrients to soil microorganisms and improving soil structure. Many of these plants are also resistant to various soil diseases, maintaining a healthy population of AMF, which is crucial for glomalin production. Such plants include *Abelia* × *grandiflora*, *Acer campestre*, *Cornus alba* and *Aucuba japonica* amongst many others.

Future applications

The potential future applications of glomalin are promising, with significant benefits for sustainable agriculture, climate change mitigation, bioremediation, and biodiversity conservation. In agriculture, glomalin could lead to bio-fertilisers that enhance soil health, water retention, and reduce erosion without chemical fertilisers. Its ability to stabilise soil organic carbon makes it valuable for climate change mitigation by increasing soil carbon storage through sustainable farming practices. Glomalin could also aid in bioremediation, improving soil structure and accelerating contaminant degradation. Additionally, it could support soil biodiversity, enhancing ecosystem resilience and essential ecosystem services.

Glomalin is a promising area of research with potential applications in a variety of sectors. Further research and innovation could unlock new opportunities to harness the benefits of this soil protein, contributing to a more sustainable and resilient future.

ST BARNABAS HOSPICE NATIONAL GARDEN SCHEME OPEN DAY

Update October 2024

Providing plants to community backed projects to enhance local green spaces.

Despite the mixed weather, the summer of 2024 has provided much activity for our Greenwood Community initiative, with many long-time collaborators, as well as new partners, taking plant donations from Greenwood to help regenerate and enhance local green spaces. At the beginning of the year, we set a target of 24 donations to local projects, and we're delighted to be well on our way to achieving this goal. Below are some of the most recent collaborations.

St Barnabas Hospice – National Growers' Week Plant sale

In late June, Greenwood donated a number of mixed plants to St Barnabas Hospice. The organisation, who are frequent collaborators of the Greenwood Community scheme, aim to provide dignity and comfort for adults who require specialised, supportive care. The hospice is dear to a lot of members of the G Team, as many have had relatives who spent time receiving treatment there in the past. The plants were used as part of their National Garden Scheme open day, where they were sold to visitors and staff alike, raising a total of £527 on the day for the hospice. Nicholas Robert-Jones, who works for the hospice, said "Everyone was really pleased with how the day went. We had some lovely feedback and will certainly be looking to open the garden again next year. Thanks to Greenwood for the donation of plants."

Sussex Wildlife Trust

Greenwood's thirteenth donation of the year went to Greenwood Community debutants, Sussex Wildlife Trust. The trust is an organisation of over 38,000 members, who are helping to protect the rich natural Heritage of East and West Sussex. Their aim is to ensure that future generations can experience the joy and well-being that comes from connecting with nature. Greenwood donated 40 mixed sensory plants, which have been planted in a small wildlife garden in Woods Mill.

G TEAM MEMBER KEVIN MERRITT WITH POLLY KITSON FROM SUSSEX WILDLIFE TRUST

The site receives many school visits a year, and aims to teach children about biodiversity and nature. We're delighted to be working with Sussex Wildlife Trust, and look forward to making more donations in the future.

LISA LEACH AT BREATHING SPACES COLLECTING THEIR PLANTS

Chichester Community Development Trust

In July, Greenwood donated 75 mixed native hedging plants to Chichester Community Development Trust. The trust, with whom Greenwood have collaborated in the past, aims to help local communities create bright futures. They manage projects and initiatives that raise aspirations and create volunteering and job opportunities for local communities. The hedging plants were used to create a natural barrier at a local cricket ground near Chichester, which will not only provide some natural screening, but will also help to create wildlife corridors, which will improve the local biodiversity, allowing birds and other small animals to take shelter and find safe passage within the hedges.

Breathing Spaces

This summer, Greenwood donated plants to Breathing Spaces, a project set up and backed by Transition Town Worthing, which aims to oversee, maintain, and improve several community gardens around the Worthing area. The group is entirely volunteer-led, and host various gardening events, encouraging the local community to get involved with the project. The plants Greenwood donated were planted in a small garden project, with the aim of improving the quality of the planting scheme, and providing more overall interest to the green space.

Barnham Community Garden

Earlier this year, we initially donated a series of plants to Barnham Community Garden, which is a new scheme set out by the Barnham Parish Council, to give local residents a green space to use and enjoy. In August, we were delighted to further boost the planting of the garden, by providing an additional donation to the scheme. The plants, which were a mixture of shrubs, grasses, and ornamentals, were not only used to plant in the community garden, but will also be used to underplant the village signs. Penny Wycherley, who is a councillor Barnham and Eastergate Parish Council, said Barnham is very close to Greenwood's Fresh Acres headquarters, with a lot of the G Team being residents of the village themselves. It is a pleasure to be able to contribute to the visual appeal and biodiversity of the local area. The project is still ongoing, with completion expected by 2025.

Storrington Bloom group

Our sixteenth donation of the year was to a new organisation to Greenwood Community, but one which helps to provide green spaces for social benefit to residents of Storrington, a village in West Sussex. The group initially formed in 2013, with the aim of entering the Royal Horticultural Society's 'Bloom for Britain' award. Since then however, the group has shifted its focus to providing plants to local projects, and bolstering the green spaces of the Storrington community. Greenwood donated a series of mixed shrubs, to help enhance the communal gardens of the village. Cherril Castle, a member of the group, said "We at Storrington Bloom would like to thank Greenwood for their generosity in donating the plants. They will be used to help bring life back into some previously neglected sites in the local village, which we now look after."

STORRINGTON BLOOM GROUP COLLECTING THEIR PLANTS

Plant focus:
Laurus nobilis

An ornamental, aromatic evergreen with a rich cultural heritage.

BY CHRIS WILLIAMS

Laurus nobilis, commonly known as bay tree or bay laurel, is an evergreen tree or large shrub, with smooth, ovate foliage, that gives off an aromatic scent when aggravated.

Native to the mediterranean region, originally *Laurus nobilis* forest covered most of the continent, in an era where the mediterranean climate was more humid. Much of this forest retreated around 2.5 million years ago during the Pliocene era however, when the climate in the region become much drier, with the last remaining vast forest areas disappearing about ten thousand years ago. Despite this, the bay tree features prominently in much of Europe's history and culture, with the plant not only having symbolic significance, but also significance in medicinal and culinary applications.

The name of the genus, *Laurus*, originates from the fact that the tree was mistakenly labelled as a Laurel tree of the *Prunus* genus, the most common species of which are also referred to as 'laurel', such as the cherry laurel (*Prunus laurocerasus*). Despite both commonly being referred to as laurel trees in the modern age, they both actually belong to different genera.

In Ancient Greece, the 'Laurel wreath' became a symbol of the highest status in Greek culture. Laurel wreaths were given as prizes at games in honour of the god Apollo, and the leaves of *Laurus nobilis* became a symbol of Apollos favour. The tree's significance was also recognised by the Roman Empire, where it was regarded as a symbol of victory, immortality, purification, prosperity, and health. From this, its name has been used in many different terms regarding significant achievement, which are still in use today, such as 'baccalaureate', 'poet laureate', and 'to not rest on ones laurels', in which the laurels refer to wreaths given as recognition of achievements or victories.

Fun fact: In medieval Europe, *Laurus nobilis* was planted on the borders of cemeteries and people's homes as a measure of protection against supernatural threats. It was thought that the bay tree was capable of repelling witches, demons, sprits, and even the undead!

The *Laurus* genus contains only 4 known species of plant, of which *Laurus nobilis* is the most popular. It's slow growing, taking almost 50 years on average to reach its full height, but can grow to 8-12m ultimately, spreading as wide as 8m. *Laurus nobilis* loves full sun, or partial sun, and grows best in sheltered areas, avoiding overly harsh winter conditions. They are often container grown, as they take well to being potted, and are used frequently in topiary, providing an ornamental, instant-impact option to any planting scheme.

LAURUS NOBILIS CG **1/2** STANDARD **60-65**CM HEAD

The leaves of the bay tree have been used in cooking for thousands of years. 'Bay leaves' are a common ingredient in dishes from cultures all across the world, although contrary to popular belief, they do not always originate from the *Laurus nobilis* species. For example, Indian bay leaves, which are a staple of many popular curry and rice dishes, are actually picked from *Cinnamomum tamala* trees, which belongs to a genus of trees that also produce cinnamon spices. In Mediterranean cooking, the laurel bay leaf is used as a common ingredient. Their flavour is described as somewhat herbal and floral, reminiscent of oregano or thyme. Whilst the leaves are used for their fragrant flavours, the berries are poisonous, and should be avoided or discarded.

In addition to its application in cooking, the leaves of the bay tree are also proven to possess many medicinal benefits. They aid digestion, relieve stomach ulcers, and can ease respiratory conditions like colds and sinusitis. Their anti-inflammatory compounds help reduce inflammation and pain, while their antimicrobial properties fight infections. Bay leaves also support heart health by lowering cholesterol and improving circulation, and they may help manage diabetes by regulating blood sugar levels. Additionally, they have a calming effect that can reduce stress and anxiety, and their topical application can treat skin conditions like eczema and acne. The leaves contain an essential oil, which is extracted and used in various applications. The leaves are also often boiled in hot water to make a tea, and the steam from boiling leaves is often inhaled to relive respiratory issues.

LAURUS NOBILIS CG **40-45** CM CLIPPED BALL

LAURUS NOBILIS CG 170CM CONE

Bay trees are extremely versatile, and can be grown in a variety of conditions. Part of their suitability for ornamental purposes is characterised by their ability to grow well in containers, as well as in the ground, making them a perfect specimen plant to be placed either side of a doorway, or in a hard landscaped space. *Laurus nobilis* prefers well-drained soil, planted in sun or partial shade, preferably in a sheltered location. A soil-based compost is preferable, with plenty of grit to improve soil stability and drainage. Bay trees are somewhat hardy against the cold, and should be able to survive typical British winter conditions. Ground planted trees are more tolerant than their container grown equivalents, but provided they're planted in a sheltered location, they should be fine.

Generally, *Laurus nobilis* is trouble-free when it comes to pests and diseases, but can be affected by a few different varieties. Bay trees are attractive to bay suckers, which are small insects which suck the sap of the tree. They leave behind a white residue, and can create dry spots on the tree where they have fed. Whilst not inherently dangerous to the overall survival of the plant, bay suckers can alter the appearance of the tree. The leaves can thicken, turn yellow, and curl downwards toward the ends. Other pests include horse chestnut scale, soft scale, and tortrix moth caterpillars. Whilst all of these can affect the visual appeal of *Laurus nobilis*, none will pose any significant risk to the tree's wellbeing.

Bay trees can be susceptible to powdery mildew, which can be avoided by planting in a sheltered location, and in full sun, whilst making sure the leaves do not remain damp for extended periods.


greenwood
Choice
show home quality, expert advice
Our trade sales centre is open for business, five days a week.
Come and browse our extensive selection of plants and sundries, ready to take away today. We stock a range of specimen shrubs, herbaceous perennials, topiary, grasses, and more.
Monday to Friday 7am - 4pm | Fresh Acres Nurseries, BN18 0AS