

Woodland Heritage

£5

2021



Putting down roots
Hulls Mill Farm 30 years on
Latest on Acute Oak Decline
Exciting plans for Whitney Sawmills

Patron HRH The Prince of Wales



**WOODLAND
HERITAGE**

for the future of British woods

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Putting down roots and branching out – *Action not Words*

by Lewis Scott, Co-Founder and Trustee of Woodland Heritage

Photo © Tony Kirkham



From the inception of WH, Peter Goodwin and I wanted to operate with the maxim “*Action not Words*”.

Well, we are certainly now working on projects spanning the whole wood chain, from planting beautiful trees to supporting a showcase for artisan designer makers of furniture and other wooden products. We really are beginning to rediscover a wood culture in this country and to create a woodland heritage for our children.

On “putting down roots”, we are about to embark on the creation of a new woodland. Thanks to a generous legacy this woodland will be called James Wood in memory of James Stratton, taken too early from this world.

Photo © Forestry Commission / John McFarlane



Woodland Heritage will be planting James Wood soon

This will not be single species monoculture and there will be no clear felling. James Wood will be a broadleaf and conifer mixed planting, a judicious choice of species that will give the best defence against tree diseases and pests, as well as designed in resilience to climate change.

So, individual trees may come and go throughout the years, but there will always remain a James Wood, in perpetuity and with trees of all ages. Let’s remember that it is young trees vigorously growing that perform the vital task of converting Carbon Dioxide to Oxygen, and not old moribund trees.

If possible, I would like to see us being able to offer investment opportunities in woodland development for businesses and individuals wanting to off-set their carbon footprint and we will look into this option further.

Putting down other roots, we are currently negotiating the next stage of our tenure at Whitney Sawmills. We have clear aims now in that regard as it’s important to secure our tenure to dovetail with the planned new investment in machinery and buildings. But looking longer term I would love us to aspire to provide low-cost start-up units for apprentices and budding artisans in wood.

In terms of “branching out” we are working very hard to deliver the Celebration of Craftsmanship and Design Exhibition that for 25 years was held annually in



Plans for Whitney Sawmills



Passing on skills anywhere along the timber supply chain is fundamental to Woodland Heritage's beliefs

Cheltenham, but then could not proceed in 2020. This is an important showcase for designer-makers and has been supported for many years via our sponsorship of the 'Best use of British timber award'.

With the likelihood of 2019 having been the last exhibition, we have stepped in to stage it again and so to help underpin and sustain important craft skills. With the exhibitors' support and subject to the relevant regulations at the time,

we intend that the event will be a great success in 2021. COVID-19 has proved the importance of people developing craft skills of every kind, and it's shown how therapeutic it is to fashion items by hand and how soothing it is for mental health and well-being. It has also taught us how our spirits are lifted by a walk in the woods. Verily, from Woodland to Workshop.

Truly "*ACTION NOT WORDS.*"



The 'Ark' – Adrian McCurdy. Best use of British Timber Award winner 2019 (Oak)



'Grace' circular dining table – Daniel Harrison. Best use of British Timber Award winner 2018 (Ash)

The Lord Gardiner of Kimble

Winner of the 2021 Peter Savill Award

The Peter Savill Award

for a significant contribution to British Forestry

THE PRIZE

Each year Woodland Heritage awards a prize to recognise the contribution of an individual who has significantly benefited British forestry.

CRITERIA

The contribution to forestry made by the selected individual must be in sympathy with the objectives of Woodland Heritage and in one of the following areas of forestry: silviculture; research; wood processing; marketing; education.

Normally the prize will focus on a contribution to one of the above with an emphasis on Britain, broadleaves and lowland forestry, although not exclusively so.

Woodland Heritage is delighted to announce that the winner of this year's Peter Savill Award is Lord Gardiner of Kimble, Parliamentary Under-Secretary (Department for Environment, Food and Rural Affairs).

At the end of twelve months when there has been so much emphasis on the importance of stopping the spread of a human disease, it is perhaps most fitting that the winner of this year's Peter Savill Award is a person who for many years has fought for and has promoted the threats posed by diseases (and pests) affecting the UK's trees.

As Minister for Rural Affairs and Biosecurity, Lord Gardiner's brief includes landscape such as National Parks and 'AONBs', but it is his drive to improve the health of animals and bees, but particularly for the forestry sector, the health of the nation's trees, that has made him such an effective champion, with the country beset with so many pests and diseases affecting our treescape.

Biosecurity, including endemic and exotic plant and animal disease,

Image © Stephen Taber Photography



Lord Gardiner at Sotterley discussing the merits of the Oaks there

invasive alien species and even Kew Gardens, are all within Lord Gardiner's portfolio, which has meant that Woodland Heritage has had the pleasure of working with Lord Gardiner for the last five years, itself a remarkable length of tenure for a ministerial appointment.

From the outset, Lord Gardiner saw the potential of Action Oak, launching it to an invited audience initially in the House of Lords in October 2017, before the full public launch at the RHS Chelsea Flower Show the following May.

Later that year, at the launch of Action Oak's 'Celebrating our Oaks' book and tour, Lord Gardiner both celebrated the progress with research into key threats to the Oak, but at the

same time, showed his strong desire to turn the science into practical guidance for woodland managers. This would have been music to the ears for Peter Goodwin, whose film 'Saving our Oak' Lord Gardiner had launched in November 2017.

A practical countryman, Lord Gardiner is a partner in a family farm, as well as having held high-level positions with the Countryside Alliance between 1995 and 2010.

Since 2018, Lord Gardiner has championed the Tree Health Resilience Strategy, itself now an important component in the creation of the forthcoming Tree Strategy.

His strong advocacy of both the GB Plant Biosecurity Strategy and the work of Defra's Plant Health Team, has led to the creation of the new Plant Healthy self-assessment and certification schemes, timed to coincide with the International Year of Plant Health in 2020, which also saw the launch of the inaugural Plant Health Week. Indeed a worthy recipient of the Peter Savill Award.

Adieu Gavin Munro – but don't be a stranger!

by Lewis Scott, Co-Founder

So, it's a fond farewell to one of the original tutors and architects of the Woodland to Workshop (W2W) course.

I first met Gavin on the first day of our first W2W course in the spring of 2008. That's thirteen years, circa twenty-three courses and two hundred and sixty graduates ago.

When I came face to face with Gavin the first thing I noticed was the "signature braces", larger than life, like the man sporting them. It took me but a few moments to realise that we had hooked a "character". Will Bullough another of the founding tutors said to me recently, "Day one of the first course was the first time I'd met Gavin with no idea as to whether we'd get along. A great relief."

In fact, the chemistry between Will and Gavin brought the course alive, so much so that they were the proud joint winners of our prestigious Peter Savill Award for a significant contribution to British Forestry. There was never a shortage of entertaining banter between them and the late Peter Goodwin also warmed up the delegates with his repertoire of amusing tales, often about "how not to do it!". Look at Gavin's picture and you can see from the laughter lines, that a smile is never far from his face.

Gavin started off working for the Forestry Commission in the early sixties and this included four years in its training branch at Dyfi Forest, North Wales. In 1976, he entered the private sector working as a log and timber buyer and as a trainer. As a tutor he is someone with the innate ability to cast a spell over the audience, so they hang on his every word. Both Gavin and Will made sure the course was highly inter-active, which made the learning fun. They became a very effective double act, just as Geraint Richards and Graham Taylor are on our course forestry day.

Gavin has always been in the thick of it and involved with so many organisations across the forestry and timber industries: The Royal Forestry Society, Association of



Gavin Munro

Scottish Hardwood Sawmillers (ASHS), Confor and Future Trees Trust to name but a few, and thankfully with Woodland Heritage. His contributions during our many Field Weekends were always insightful and often stimulated some animated discussions.

Gavin started in the industry when he was twenty-one and now at the age of eighty-one has finally hung up his measuring tape and braces. So, if my maths is correct, we have just lost sixty years of experience. Gavin has done a marvellous job during his career of handing down his prestigious knowledge and lore to younger generations.

As Gavin always said to participants at the end of the course: "If you've ever got any questions, feel free to pick up the phone, it won't cost you anything, but if you want me to visit, it'll cost you".

Personally, I hope it is au revoir and not goodbye, as I will always be happy to stand him a pint of Butty Bach.

Bede Howell OBE MICFor

1935 – 2020

by Geraint Richards and Guy Corbett-Marshall



Geraint Richards with Bede Howell at Highgrove

As Margaret Lunn so rightly stated in 'Forestry Journal', of which she had been editor for some years, John Bede Howell OBE, who died in August, was a towering figure in the forestry world for many decades, renowned for his encouragement and sound advice on how to manage woods sustainably and profitably.

An energetic and unstintingly positive member of Woodland Heritage for over two decades, Bede was a most worthy winner of the Peter Savill Award in 2015.

Recognition of his status within the forestry world was wide and he became one of the few within the industry to receive the Royal Forestry Society's Gold Medal. A fellow Gold Medallist, and Woodland Heritage Trustee, Geraint Richards, was one of the first to reflect on Bede's unique status:

"I often tell people that the forestry sector is an immensely welcoming and friendly working environment. There are so many people whose company I enjoy but amongst that large group there is a small number of individuals that I consider it a great privilege to know or have known. The late, great, Bede Howell most certainly belongs to that elite group.

Over the course of the past two decades, I grew to know Bede through the Future Trees Trust, The Royal Forestry



Bede Howell with the Peter Savill Award in 2015

Society, Woodland Heritage and other such organisations and initiatives. If you arrived at a meeting and Bede was present, then you were assured that the trip was worthwhile, and you would learn a lot.

Field meetings, such as Woodland Heritage's Field Weekends, were always made the more lively through Bede's presence. Sharing his immense learning, and not afraid of challenging the norm, but always with great politeness and humour, he was a positive addition to any event.

Well read, with years of experience in the forest, a scientist and practitioner in one body, Bede would have excelled in any career that he chose to pursue. Thankfully, he chose forestry and contributed so much to our sector. Many will simply remember him as a kind man who would give time to anyone, always approachable and affable. We will miss 'The Venerable Bede' but I for one will always consider it a great honour to have known such a remarkable individual."

Many Woodland Heritage members will know what astounding knowledge Bede brought to each Field

Weekend, an event that for some will never be the same without him. Described by one Woodland Heritage Trustee as ‘a true guru’, other adjectives include friendly, unfailingly kind, jovial, and inspiring.

Not the largest in physical stature, with microphone in hand, his presence electrified each Field Weekend. Still managing some unforgiving terrain at the 2015 event, by 2018 Bede had taken to four wheels with a memorable tour on a mobility scooter around the woods at Weston Park. By 2019 and the Woodland Heritage Reception at Highgrove, Bede had become far more frail but still was a magnet to fellow guests, keen to hear his latest views.

The world may not be able to enjoy Bede in person again, but for the foresters of today and of the future, amongst his many legacies will be ‘Oak: Fine timber in 100 years’, Bede’s translation of the seminal publication ‘Le Chêne Autrement’ by Jean Lemaire.

May the wisdom within those pages, and the memories which all who met him will savour, be at least some recompense for this great loss to British forestry.



Bede Howell – Field Weekend 2013

Oak: fine timber in 100 years

by Jean Lemaire. Translated by Bede Howell OBE MICFor

This book which was translated by Bede Howell from the original French publication, continues to arouse much enthusiasm and interest.

It is the outcome of over 30 years research which has demonstrated that Oak can be grown on a much shorter rotation than was previously practised.



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John Evelyn

by Professor Julian Evans OBE

Few in forestry today would disagree that John Evelyn is among the pantheon of greats, perhaps even the greatest. But how did a 17th Century diarist and author become so pre-eminent and what is his legacy?

In part the answer is that Evelyn was asked to address a national emergency that concerned no less than the defence of the realm: the supply of Oak timber for the navy. He would come to urge the nobility to plant more Oak trees to relieve 'the impolitic diminution of our timber' which so alarmed the Commissioners of the Navy Board. And this leads to the second answer: Evelyn assayed the problem and published a report that was substantial, thorough, and well researched, and which was delivered to the fledgling Royal Society set up by Charles II after the restoration of 1660. Indeed, the two-volume book was the first major publication of the body which became Britain's premier scientific establishment. The work itself is, of course, 'Silva: or a discourse of forest-trees, for the propagation of timber in His Majesty's dominions'. It is known today simply as Evelyn's Silva.

John Evelyn was born in Wotton, Surrey, in 1620, the son of a wealthy landowner. He began keeping a diary of sorts from the age of 11 but regularly throughout his adult life from about 1640. It is this record right to the year of his death in 1706, that provides such insight into his life and times though the diary was never intended for publication. It reveals a keenly observant man, principled and of strong moral and religious persuasion. Besides the diaries he wrote some 30 books on issues ranging from classics, to science, to matters affecting national life: he was a true polymath. During the Civil War Evelyn lived in France and Italy only fully returning and settling on his estate at Sayes Court, Deptford, Kent from about 1651. The influence of Europe can be seen in Silva from his descriptions of Cedars of Lebanon, Holm and Cork Oak, Olive and many other Mediterranean species. And we know, for example, that the first introduction to Britain of Cedar of Lebanon was during his lifetime in 1638; an early indication how exotics (a term Evelyn uses) would come to play such a major part in our future silviculture.



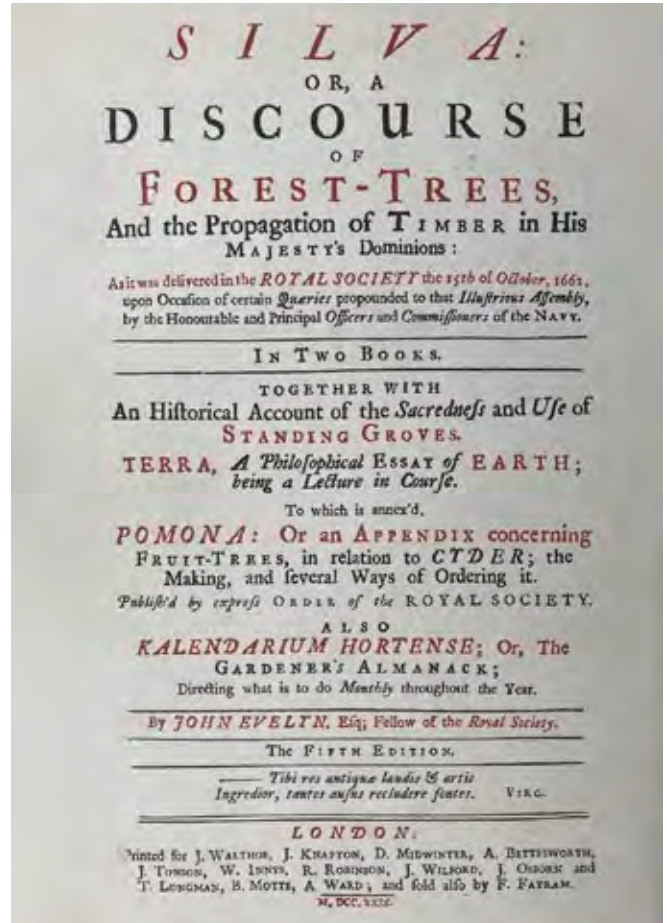
Patrick Evelyn (left), a direct descendant of John Evelyn, at the annual presentation of the 'Woodland Competition Challenge Cup'

It is Evelyn's Silva which has so marked him as a forestry hero. The book has been almost continuously in print since 1664. By 1729 it was in its fifth edition, as the illustration of its frontispiece shows, and in 1776 an annotated and richly illustrated edition by Dr A Hunter was prepared which ran to three editions by 1801, from which the engraving of the famous Welbeck Oak is taken (notice the horse and rider!). More recently – and by way of example – in 1979 Stobart & Sons brought out a limited edition facsimile of the 1729 Silva; in 2012 Cambridge Library Collection published a version edited by John Nisbet with an essay on the life of John Evelyn; and in 2014 Gabriel Hemery and Sarah Simblet published a contemporary version, updating Silva a bit like Hunter had done 240 years earlier, entitled, 'A New Silva: A Discourse of Forest and Orchard Trees for the 21st Century' (Bloomsbury). It has wonderful artwork. These examples show how John Evelyn's renowned Silva still captivates and still influences forestry today.

And John Evelyn's name lives on in other ways. Ten years ago, a direct descendant, Patrick Evelyn, presented the 'Woodland Competition Challenge Cup' to the Royal Forestry Society to be awarded 'In memory of John Evelyn author of Silva'.



Illustration from 1776 edition of John Evelyn's 'Silva'



John Evelyn's 'Silva' – frontispiece from fifth edition, 1729

I have a personal interest in Evelyn for not only did my parents present me with the wonderful Hunter edition of *Silva* early in my career, but part of the 30-acre wood I own in Hampshire once belonged to the Steventon Estate. This estate was co-owned from 1651 to 1692 by Evelyn's sister-in-law, his younger brother's wife, Elizabeth.

Let John Evelyn's own words (and punctuation) bring us the final remarks. It demonstrates his passion for trees and for his Christian faith. In *Dendrologia*, published as part of the fifth (1729) edition of *Silva*, he begins with an historical account of the sacredness and uses of standing groves. Near the end of the first long paragraph, we read:

'In a word, (and to speak a bold and noble truth) Trees and Woods have twice saved the whole World; first by the Ark, then by the Cross; making full amends for the Evil Fruit of the Tree in Paradise, by that which was born in the Tree in Golgotha.'

Forestry Greats

I wanted to start a series of articles on "Forestry Greats" and to kick off the process I wrote to one of our current Forestry Greats, Professor Julian Evans, to ask him to write about his choice. It was no great surprise that Julian chose John Evelyn. Would any of our other members like to write about a Forestry Great that inspired them?

Who's your Forestry Great?

Lewis Scott

Students fund new ten-year relationship between Bangor University and Woodland Heritage

by James Walmsley, Senior Lecturer in Forestry, Bangor University and Woodland Heritage Trustee



Photo © James Walmsley

A group of Bangor University students and alumni at the Woodland Heritage Field Weekend, 2012

Woodland Heritage has been a fantastic supporter of Bangor University for much of this century, providing financial assistance to many forestry students, as well as over £800,000 of funding for a string of important research projects focused on Acute Oak Decline.

Woodland Heritage has also provided invaluable mentoring, advice and assistance for students, alumni and staff, as well as guidance to prospective students and partners. This relationship is also of great benefit to Woodland Heritage: by working with Bangor University, it is able to meet many of its charitable objects, support and inspire the next generation of foresters, and deliver high quality research into tree pests and diseases.

There is, nonetheless, a tension between the long-term business of protecting, managing, conserving and creating forests and woodlands, which is at the heart of everything

that Woodland Heritage does, and the short-term and unpredictable income from the annual renewal of membership on which the charity relies.

Recognising this tension, James Walmsley, Woodland Heritage Trustee and Senior Lecturer at Bangor University, came up with a plan to address this in relation to Bangor University's partnership with the charity: finding a way to fund a ten-year Premium Corporate Membership.

Clearly well out of the ordinary, there was no way such a membership could be funded by the University itself: it would create an impossible precedent given the huge number of partner organisations and charities that are associated with the University. So James approached the Bangor Forestry Students' Association (BFSA) committee and put the idea to them. The response from Peter Roe, BFSA President 2019-2020, on behalf of the committee was hugely positive:

"BFSA recognises the support that Bangor University students and alumni have received from Woodland

Heritage over many years, including Garthwaite bursaries, subsidised places on the excellent Woodland to Workshop course, financial support for attendees of the SelectFor Irregular Silviculture training, and more. In particular, it's highly likely that the International Forestry Students' Association's highly successful conference, the Northern European Regional Meeting 2019, organised by BFSA, may not have happened without the incredible support and guidance of the Chief Executive, Guy Corbett-Marshall.

"BFSA is delighted to be in a position to contribute £1250 towards this ten-year membership. The committee all agree it's an excellent investment in our wonderful relationship with Woodland Heritage."

Ken McNamara, a part-time distance learning student on the Bangor University MSc Forestry programme, had (in early 2020) made a very generous donation to the University of several thousand pounds, to be used to support the forestry programmes. So, James approached Ken, proposing that part of his donation be used to fund the remaining £1250 of the ten-year membership.

Ken responded:

"I think the proposition represents fantastic value and a really effective way to use part of my donation. It will clearly generate benefits for many years to come for my fellow forestry students and for forestry at Bangor University in general. I love it!"

And for Woodland Heritage, Guy Corbett-Marshall:

"Working with the staff and students at Bangor University is always most rewarding, so it is wonderful that this new membership relationship will guarantee that continuing for another decade at least. We have achieved a lot together already to benefit forestry in such diverse ways long into the future, and now have the foundations in place to carry that momentum forward throughout the 2020s."

Professor James McDonald, who leads research into Acute Oak Decline at Bangor University, commented:

"We are incredibly grateful to Woodland Heritage for their unwavering support for our efforts to understand the causes of Oak decline, which will hopefully inform management practices. This long-term collaboration has been fundamental in maintaining continuity within our research team, in training the next generation of forest pathologists, and enabling us to react more quickly to new challenges and scientific developments."

Reflecting on this new relationship between BFSA, Bangor University and Woodland Heritage: a membership



Woodland Heritage trustee and Bangor University alumnus Geraint Richards, MVO FICFor, with forestry students in Bangor, early 2020



BFSA members and alumni from the forestry programmes at Bangor regularly attend the Woodland to Workshop course. This image, from 2010, features Graham Taylor (first on left), James Walmsley (third from left), Martin Price (second from right) and Andrew Pickup (first on right)



This photo, from 2010, features James Walmsley (top left), Andrew Pickup (top right) and Martin Price (third from right below)

that runs up until 2029, James Walmsley said: "At a time when there is so much uncertainty and budgets are generally so short-term, it's fantastic to formalise this long-term connection between Woodland Heritage and the University. The next generation of foresters will face many exciting challenges during their careers and this partnership will ensure that they are able to continue learning from the invaluable experience of the members and partners of Woodland Heritage."

‘Branching Out’ leads to ‘A New Leaf’

by Guy Corbett-Marshall

In autumn 2019, internationally respected British designer and furniture maker, John Makepeace OBE, working with Woodland Heritage, of which he is a longstanding member, launched a Brief via the Royal Society of Arts (RSA) aimed at extracting value from broad-leaved woodlands and their resources to increase their economic, social and environmental value.

One of nine challenges set within the RSA’s Student Design Awards for 2019–20, a scheme then in its 96th year, ‘Branching Out’ aimed to encourage higher education students and recent graduates to explore innovative ways to utilise locally grown hardwoods, woodlands, and their resources for the benefit of people, place, environment, and the economy.

The challenge looked for surprising and sustainable design proposals (of products or buildings, as well as organisational and societal structures) to increase the value of woodlands and/or make clever use of the materials produced.

Last July, and after a comprehensive judging process, it was announced that the joint winners of ‘Branching Out’ were Simon Feather of Leeds Beckett University and Sandra Reith of University of Leeds, both becoming recipients of the John Makepeace Award.

The ‘Branching Out’ brief was particularly interested in making better value use of small diameter hardwood roundwood to help improve the economics of woodland management and to maximise the benefits of this largely overlooked but adaptable timber resource.

One of the great successes of ‘Branching Out’ was how the brief was interpreted, reflected perfectly in the two winning entries: Sandra undertaking an MA in Design

Future Study and Simon an MArch in Architecture. The winners also reflected the almost perfect split of UK and international students entering, showing that the opportunities woodlands provide know no boundaries.

Simon’s winning entry was called ‘Re-Foresting’ and was a holistic approach to mobilising local woodland resources, proposing nine model villages set along the M62 corridor. These villages were designed to grow and harvest diverse forests in order to build timber homes, whilst also addressing the housing crisis, increasing woodland cover, supporting ecology and generating healthy places to live. ‘Re-Foresting’ would also help the climate crisis and support the British timber industry.

Sandra’s ‘TRĒOW’ is a new material for high quality processing made from small-diameter logs. This is intended to support the use of domestically grown wood to strengthen the local timber industry and envisages using it in products such as wall panelling, flooring, chair seats and backs, boxes and even plates. ‘TRĒOW’ is a material in the field of Engineered Wood Products, which is intended to be seen due to its appearance. ‘TRĒOW’ can be used for different shapes due to its malleable raw mass.



‘TRĒOW’ by Sandra Reith, University of Leeds



'Re-Foresting' by Simon Feather, Leeds Beckett University

Reflecting on her success, Sandra said: “It has inspired me not to limit myself and to go different ways. I am not into product design, but it was a great experience to experiment and get physical results.”

The ‘Branching Out’ brief was launched in September 2019, was downloaded 2,221 times, and attracted 37 entries from 20 different universities. The RSA Student Design Awards 2019/20 presentation event was held online in July.

Due to Covid restrictions, Sandra has continued her development of ‘TRĒOW’ in Germany and we wish her well for her own and the product’s future.

Thanks to the success of ‘Branching Out’, John Makepeace launched a new RSA Student Design Award challenge, in association with Woodland Heritage, in the autumn. This 2020/21 Brief is called ‘A New Leaf’, posing the question: ‘How might we utilise local woodland resources to stimulate inclusive and sustainable economic activity?’

A development of ‘Branching Out’, ‘A New Leaf’ places greater emphasis on multi-disciplinary working, with the final assessment looking for evidence of market analysis, business administration and manufacturing skills. A joint entry in collaboration with those studying subjects other than the lead applicant’s was encouraged.

The brief for ‘A New Leaf’ challenged applicants to tap into different perspectives to bring innovative approaches to

the design, marketing, and manufacture of products from woodlands, at the source, or very near to, the woodland itself. Careful thought was required regarding the specific product from woodlands and how this could be utilised.

Successful entries were expected not only to consider product range and market analysis, but also to demonstrate how the manufacturing process could benefit local communities through employment, skills, or community relationships.

The judges made clear that they will be looking for surprising and innovative approaches to integrating manufacturing processes into a specific woodland context, a woodland that could be anywhere in the world.

Applicants were also asked that whilst creating their products they should bear in mind that wood products can help address climate change if they displace higher energy materials and are designed to have a long life, so that they don’t quickly release carbon into the atmosphere.

‘A New Leaf’ was open for entries from late-January to mid-March. The two-stage judging process will take place in late-spring with the results due to be announced on May 28. The Awards ceremony is due to take place on June 29.

More information on ‘Branching Out’ can be found at thersa.org/student-design-awards/design-briefs.

The growing pains of the Wild Service Tree trial

by Guy Corbett-Marshall and Christopher Guest

The first half of 2020 was a very hard time for most of the UK's human population, but it wasn't the easiest time to be a Wild Service Tree sapling out in the English countryside for the first time.

Inner strength was what was required of 576 Wild Service Tree saplings of nine different UK and European seed sources that had been planted at Fontmell Hill Estate in Dorset in November 2019, another 576 planted at Sotterley Estate in Suffolk in the same month, as well as another 576 saplings planted at Sernal in the Heart of England Forest in January 2020.

The owners of all three properties, as well as forestry advisor, Christopher Guest, and Woodland Heritage, are all part of a five-year Wild Service Tree provenance trial first written about in last year's Journal.

But back to the saplings, and particularly the ones planted in the Heart of England Forest in January 2020 in ground that was on the cusp of waterlogging, soon to be followed by a very wet February in the Midlands and indeed much of the UK.

Water, water, everywhere... then nowhere!

In terms of water availability for the young trees, 'boom' (via some late and unwelcome frosts) soon became 'bust' as following fairly low rainfall in all three areas in March and April, the hottest, driest May ever recorded left the struggling saplings high and dry. The three sites received rainfall between just 3–5mm in the last month of spring, ending a period that was the toughest for growing trees in the last 30 years at the Sotterley Estate.

The focus of the trial is the Wild Service Tree with another, almost 3,000 saplings of a variety of admixed species also planted at each site, so for them (bar some very small Maple at Fontmell) there could not be the luxury of benefiting from the irrigation that was carried out by the dedicated owners at all three sites from the last week of May.

At Fontmell, just one watering was needed of about ten litres per sapling. A bowser was also used at Sotterley, five applications delivering up to 20 litres per sapling in total, helped by adding a barley straw mat after the first watering, supplemented with rotavating between lines to help absorption. At Sernal access to a mains supply meant that around 160 litres could be applied over five weeks.



Wild Service Tree establishing at Fontmell



Carefully labelled and lifted reserve Wild Service Tree saplings for beating up at Sotterley



Impressive height increment and tree form following one year's growth at Fontmell. Seed source: Lugny, France

Ironically, a combination of a wet winter and slugs led to the Triticale that had been sown to suppress weeds failing at all except Fontmell, although it was also too dry for other weeds to establish in the first half of 2020. By October, some flailing or mowing of invasive plant life was needed at Sotterley and Spernal that also helped with the measurements that took place in December.

Casualties of the 'nurse' trees were less than 3% at Fontmell, but were exceptionally high at Spernal and Sotterley, with both likely to have needed to have replaced at least 50% of these important components of the trial. Thankfully, losses of the Wild Service Trees were just 1% at Fontmell, 7.5% at Sotterley and 8.7% at Spernal; 6, 43 and 50 trees respectively.

With a little human help, the sturdy Wild Service Trees had bounced back by December when Christopher Guest visited all three sites and managed to take measurements of around 1,630 survivors. He also supervised the replacement of those that had perished, itself an operation that needed careful management to ensure that, wherever possible, the extra saplings that had been grown at each site to act as 'reserves' were planted in the right places: German for German, Italian for Italian, Lincolnshire for Lincolnshire, and so on.

End of first year report

The results for each of the nine seed sources at each of the three sites vary, but some clear trends did emerge for the Wild Service Trees after their first year in the ground. Due to delays with receiving seeds from Italy and France

in late 2018 and early 2019, it was the case at all three sites that the four French provenances and the Italian one were, on average, smaller than the three English provenances; the tallest saplings planted at each site were German.

By the end of the first year, a full growing season still saw the French and Italian provenances as generally the smallest on average (two French sources averaging just 47cm), except at Sotterley where the Italian and two French had overtaken two of the English seed sources. At all three sites, the German saplings put on the second lowest average percentage rise in height at an average of 78cm, with the French and Italian provenances almost always putting on the greatest increment in height in 2020, although that growth varied between around 20% for a couple of seed sources at Spernal to an amazing 80–90% for four provenances at Sotterley.

Across the board, the trend was for all the smallest saplings that went into the ground to catch up some differential on their larger cousins in 2020; what stood out though was the difference in progress at round +20% for all at Spernal, c30% at Fontmell and over 50% at Sotterley. Mortality rates varied too, not just between sites, but also by provenance. The lowest losses were with the Tortoiseshell Wood (Lincolnshire) saplings, where just five of 192 saplings died across the three sites. Not far behind was the Herefordshire provenance (eight), the German and one of the French (nine each), but none fared too badly as 16 was the overall highest count for another of the French saplings.

Losses across all three sites were fairly evenly spread by seed source, although it was noticeable that none of the French or Italian succumbed at the Fontmell site in Dorset.

For the three English seed sources, at all three sites there was a trend to narrow differences in average height at planting to where they all stood after one year.

Height increment will be measured again at the end of 2021, 2022 and 2023 by which time more robust trends are likely to have emerged. What we must hope is that the growing conditions henceforth will be kinder than those in 2020.

Woodland Heritage is indebted to a number of charitable trusts for their support for this trial, including The Scottish Forestry Trust, as well as to the landowners who have so kindly hosted and maintained the three plots.

A more detailed report will be available from Woodland Heritage later in the year.

Tree related photos from my iPhone

by Charles Sainsbury-Plaice

Lockdown has been a great opportunity for many of us to get out and about walking in the country. My professional photographic career has, over the past two decades, focused in the broadest terms on country life.

For many years I drove around Britain and other countries lugging thousands of pounds worth of heavy professional photographic equipment which is back-aching. With work and travel being postponed due to the pandemic, I have enjoyed spending time exploring our local habitat with my iPhone 12. Mobile phone camera technology has vastly improved over the past few years and the images are of better quality, good enough even for printing. The development of numerous apps unleashes similar control and functionality to that found on traditional SLRs bringing the great advantage of a near weightless camera easily accessible from a trouser back pocket.

It also has the added advantage of built-in photo-editing – it's like having a studio and editing suite all in your back pocket, but without the cumbersome weight of traditional kit. There are limitations – obviously no massive zoom capability, or a fast acting shutter for sports photography but for static shots and close-ups it is brilliant. I also invested in a small tripod and remote Bluetooth operated shutter release making it possible to use it for nature photography – although patience is required.

Over the years my love and interest in trees has grown, largely influenced by the knowledge and passion of HRH The Prince of Wales and his trusted forester, Geraint Richards, with whom I have worked professionally for two decades.

countrysidegreetings.co.uk

Instagram @countrysidegreetings



Old uprooted tree stump



Oak leaf with snow and frost



Winter berries



Oak bark



Backlit winter Oak leaf



Lone tree on Dovers Hill



Winter sunset on Dovers Hill



Old bees nest in an Oak trunk



Oak trees in autumn



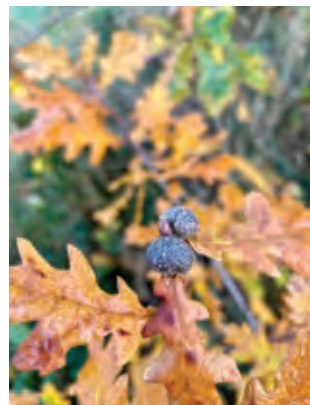
Sunset on Dovers Hill



Old animal shelter in front of an Oak wood



Oak leaves in water



Oak apple



Nighttime Ash

University of Creative Arts × Woodland Heritage 2020

by Kelly Morss

In February 2020, before social distancing and restrictions would become a regular proposition, a group of around 60 students gathered in the woods to help Woodland Heritage get creative, and to gain some ‘real world’ experience in their subject: not forestry, but illustration and animation!

The group comprised post-graduates and final year undergraduates from the University of Creative Arts, Canterbury. The brief was simple: to help Woodland Heritage communicate our maxim ‘grow trees, use wood’ to new audiences.

David Saunders of Woodnet (woodnet.org.uk) kindly hosted the day at The Woodland Enterprise Centre in East Sussex, starting off in the impressive hall built from locally sourced timber, a perfect location to hear the opening presentations.

A tour through the 20 hectares of woodland followed, and the group was then free to explore and discover for themselves. As an added bonus, ongoing works meant students were able to see tree felling, which is usually so

far removed from most people’s experiences and ideas of woodland. This type of environment was certainly a new experience for some and perhaps a bit of a shock!

They went away with their sketches, foraged bits, photos and videos, and were split into groups, naturally all named after trees, and were tasked with coming up with their responses to the brief within an extremely tight schedule. It was fascinating to see the various ways in which they responded to the brief, and we were delighted with the results, which included drawings and short animations. The quality of the work produced was excellent, especially given the short timeframe, and the way students understood a totally new subject so quickly was very impressive. The results will be used on WH social media – some already have been – and for those who are not users, the results have been replicated here where possible.

We hope to build on this success and continue our collaboration in the future. With the move to remote teaching this year and pressures on all involved, the project is most likely to return for the 2021–2022 academic year with a whole new brief to challenge the next generation of young designers, and perhaps to challenge the way forestry engages with broader audiences, too!



David Saunders leading the students’ tour of the woodlands



Dr Hugh Williams, a WH trustee, explaining tree growth



Team Oak produced an illustration which was then split into a set of nine which is designed specifically for Instagram. Each panel then reveals a fact



Team Chestnut's colourful illustrations celebrate diversity and vibrancy



Team Willow came up with this story of a forester working from planting to end product



Team Sycamore gave us a short video about who the charity is and why we do what we do

Whitney Sawmills – coping with 2020 whilst planning for the future

by Guy Corbett-Marshall



Plans for improvements to the main sawing shed

At the centre of the timber supply chain, Whitney Sawmills helps to maintain hardwood sawmilling in the UK, which has declined greatly over recent decades, playing its part in staving off obsolescence for this centuries' old industry. In doing all this, the mill helps to fulfil Woodland Heritage's charitable objectives.

Whitney Sawmills supports UK timber growers by buying logs grown in sustainably managed British woodlands, with all the benefit they bring to people and wildlife. The mill also contributes towards sustainable wood supply to the public in the UK. In recognition of how it is run, Whitney Sawmills had its Grown in Britain certification renewed in February of this year.

Of course, since the report on the mill's progress in the 2020 Journal, the global pandemic has turned on its head so much of what, to that stage had been perceived by us all as normality. For many industries, last year was one that brought lasting changes, a few for the better, but the vast majority for the worse.

The instruction to 'stay at home' was made by the Prime Minister on 23 March 2020. For businesses, a raft of

new rules was introduced along with significant support packages. As both evolved, Whitney Sawmills closed to the public in April, sustaining the barest level of service compliant with the new legislation.

But as April wore on, it became clear that one of the knock-on effects of the restrictions was that people were spending time and money maintaining and improving their homes. Many of Whitney Sawmills' business customers were also able to carry on working within the rules, so demand for timber from the mill started steadily to revive.

Remaining compliant throughout, Whitney Sawmills started trading again at more normal levels in May which has remained the case to-date. As well as the necessary social distancing and sanitising, interaction with customers has been minimised, which has been accepted and complied with by everyone picking up orders.

A spirit of cautious optimism, buoyed by often record sales since the mill has been run by Woodland Heritage, meant that a focus could be applied in the summer to developing the mill, to help boost its future trade and efficiency.

Thanks to the time given voluntarily by Trustee, Alex Mowat, and Malcolm and Susan Bell (Susan is a former Trustee and



Plans for improvements to the dry timber sales area

is a Director of W H Timber Limited that runs the mill for the Charity), plans were drawn up and then submitted to the Planning Department of Herefordshire Council to improve two of the buildings onsite.

The aims were twofold: to move the office closer to the car park, on the opposite side of which would be the relocated dry-timber sales area, and to free up the current sales area to make it the main sawing shed, into which a new saw was planned to be installed.

To help with the costs, a grant was sought in August, helped by having secured the relevant permission from the Council for the proposed building works.

At the end of January, the good news arrived that a grant of almost £60,000 had been won, which should enable work to start on the building improvements in April. The aspiration is that the works will be completed, and the new saw installed, by the end of the year.

The COVID restrictions meant, of course, that the educational side of Woodland Heritage's work at Whitney Sawmills could not take place in any way in 2020. The intention is that the popular Woodland to Workshop course will recommence as soon as restrictions permit. If it is not possible to run a course in the spring (which will be influenced by the latest rules in both England and Wales, both in terms of the size of gatherings possible and how the hospitality industry can operate), it is hoped that the much delayed 24th edition of Woodland to Workshop will go ahead in the autumn.



Dermot Doyne dwarfed by the Douglas Fir at Bala



Oak curved kite staircase by Woodfellows Joinery

In the meantime, the core work of the mill goes on with the best quality UK timber being bought, then milled at Whitney, before being converted into often remarkable and beautiful objects by skilled British makers for the benefit and enjoyment of a multitude of customers and other users.

As well as an example of a stunning recent project featuring in this article, other customers of Whitney Sawmills appear in this Journal: Fred Dodson (Tatara Workshop) and Winterborne Zelston Fencing.

whitneysawmills.com

Learning lessons in Lady Park Wood

by David Cracknell

There was no denying it. I was stuck. My car wheels were spinning and sloshing in the mud. And I was beginning to panic. I tried everything.

Taking a calming deep breath, I tapped the accelerator pedal lightly, and I wrested the steering wheel from side to side. But still no joy.

I got out and hastily arranged soggy wet logs beneath the wheels. But – dammit – the car just seemed to be sinking and sliding backwards, as if sucked into the woods.

The rain was coming down hard on the roof. I thought to myself then: why would anyone drive into an ancient woodland and park off the main track, straying from the stony path? I thought I may just have to abandon the car here in this nook of the forest – forever.

‘Bloody Lady Park Wood,’ I cursed. ‘It’s sucking me in. What the hell am I doing here?!’

Ten minutes earlier I had parted ways with George Peterken, the legendary woodland writer and curator of Lady Park, the ancient semi-natural woodland in Monmouthshire that was set aside for research in the 1940s. He had warned me not to block the main track the previous day “just in case someone from the Forestry Commission might want to get through with a machine”.

I wished then that someone from the FC would come along with a lovely great big Land Rover to pull me out.

Instead, I grabbed my coat and phone and headed for help. Luckily one of the neighbours a mile or so away had a vintage red tractor and readily agreed to return to the site and pull me back onto the track.

This was my second summer in Lady Park. Twice now I have spent part of August recording the Ash trees in the reserve’s permanent plots (known as “transects”), in order to find some correlation between the different site conditions and the extent of the disease. I am completing a Masters in Forestry at Bangor University and this is my dissertation subject.

George Peterken has been of invaluable help as has my tutor, Professor John Healey, and we hope to be able to publish the results next year.

George (‘GFP’) lives locally and his dedication to Lady Park is absolute. If it wasn’t for him, who knows what would have happened to this research station. Even now, it’s longer-term future is uncertain. Deer have invaded and last summer I discovered a section of the fence had come down, with little likelihood of repair. The wood was originally set aside in the 1940s and left undisturbed except by nature’s forces. Oxford University researchers led by Dr Eustace Jones set out the transects, each section



Hand-drawn maps from 1977 (left) and 1985 (right)



Original Oak marker from 1940s



1977 marker



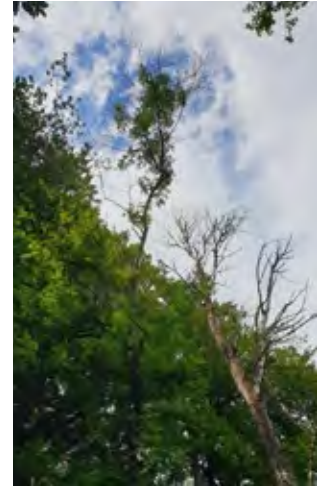
The only Oak sapling in the wood



Wych Elm survivor



George and Professor John Healy with 1940s Sorbus torminalis



Not much left of this Ash

marked at 100ft intervals with stakes of Oak, and began recording the girth of the trees. It was GFP who later interpreted their Delphic early records and carried on the work over the past four decades, assisted along the way by various volunteers and academics.

Our work still relies on hand-drawn maps first drafted in 1977 by an enthusiastic young school-leaver looking for a summer job. (The heroic Alan Orange has now retired, so much time has passed.) These maps have been diligently updated over the years with George’s pencil annotations but they would really benefit from digitisation and open-source publication of the spreadsheet data.

This would mean that they could be accurately updated for decades to come; but also that students could access them around the world and make new sense of the collected data, find new patterns perhaps. All species – not just Ash, but Lime, Beech, Yew, Elm, Hawthorn, Hazel to name a few – have been recorded at various moments over the decades. But the work has usually relied on volunteers or specific academic programmes, and never a dedicated and well-funded research team.

A few of the original Oak markers are still in place, with peeling red paint. An inscription on one veteran Beech tree marks transect six. But even some of the stubby galvanised steel posts that replaced them in 1977 – just a few feet sticking out of the ground – are very hard to locate. You have to rely on George’s navigation skills, and only after several visits do you begin to recognise snags and tracks, and distinctive landmark individual trees.

Even GFP has had problems locating parts of the transects. One of the old markers under the limestone cliff that

runs along the eastern edge of the wood close to the Wye was lost for decades until one of his sons tripped over the metal spike during an exercise.

It is great to get lost there. You can feel wonderfully isolated in parts of the wood furthest from the fence. Few people have the luxury of roaming there alone.

George knows all the trees in this woodland of 45 hectares. He bounds around like a much younger man, skipping over familiar fallen trunks and undergrowth. At one point on my first visit he suddenly stopped as we were making our way down the slope through bracken to point at a sapling at his foot. “There is the sole example of regeneration of Oak in the wood,” GFP said.

My favourite tree is the lonely Wild Service of no more than a few centimetres girth, that hasn’t put on more than a few millimetres growth in 70 years since the records began (see picture above).

My hope is that I can make a start on digitising some of the maps and transferring them to GIS software, but I will only really be scratching the surface.

As to the Ash Dieback (ADB) angle, it seems likely that genetics play the main part in resistance to the disease – in about 10-15% of trees. However, complex ecological processes are at work and studying site conditions is still significant and worthwhile.

For example, a recent study from northern France which attracted much excitement concluded that trees in agricultural settings were less damaged by the disease than those in the forest.



Lovers left their mark 100 years ago



Huge lianas caress a mature Beech



Fallen Ash split asunder



Beginning of Transect VI

With that in mind, my research has now turned its focus to near-neighbour analysis and examining what the effect of tree density is on ADB within the forest. The logical extension of the French study would be a hypothesis that the more crowded the trees are within the forest setting, the more affected by disease they are.

Yet anecdotally, George and I had found that one tree can be completely unaffected, while its closest neighbour is ravaged by ADB. Indeed, there are encouraging signs that at least 10% of trees are resisting the disease.

So who knows what we shall finally discover in Lady Park Wood? Hopefully not an abandoned Skoda with cobwebs and a skeleton in the driving seat!



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www.gazeburvill.com

The Next Generation

by Kelly Morss

Despite all the warnings that it could happen, the world has been blind-sided by Covid-19 which will have long term consequences for many aspects of our lives, but especially on the development of young people. In a particularly concerning study carried out by the Prince's Trust in September 2020 (The Aspiration Gap), 44% of 2,000 16-25 year-olds surveyed said their aspirations are lower as a result of the pandemic, with 36% saying they had lost hope in the future.

These grim statistics, and the hasty adaptation to online learning, presented me with an opportunity to find out how some of our early-career and student members and supporters are getting on, and specifically how they now view their future career in forestry or related fields. (Due to the personal nature of the interviews, the people who took part will remain anonymous and a general overview of their collected experiences is reported here.)

It has been four years since the release of the Forestry Skills Study which Simon Lloyd, Chairman of the Royal Forestry Society (RFS) summarised for us in the 2018 WH Journal. The study identified significant shortfalls in some key professional and technical skills, concerns about the provision of education, and an impending shortage of mid-career professionals. Consequently, a Forestry Skills Plan was drawn up to address these concerns and work has continued apace within the Forestry Skills Forum (FSF) of which Woodland Heritage is a member. The plan targets four themes:

Talent Attraction
Skills and Technical Knowledge
Education Provision
Employer Support

Based on these considerations, I approached a range of students and early career professionals and asked them to offer their experiences of their entry into the industry and their current situation.



A group of forestry students from across Europe in North Wales in 2019

How did it all start?

With the Forestry Skills Study finding that ‘None had any family connection with forestry and had found out about forestry as a career mainly by accident, as a result of visiting a forest as a child for example, or observing forestry abroad on gap years. None had come across it as a result of careers advice at school’, how did our interviewees decide on their current path?

Although every experience was different, they all shared a common theme – that the path to forestry was not a linear progression from school, nor an early declaration of just being something they wanted to do; it was very much self-motivated reflecting the findings about careers advice.

There was also a theme of having an ‘outdoorsy’ upbringing with parents more likely to support them in a choice of environmental career (although not always the case). This led to some expressing a concern that ever more time spent in front of screens in a sedentary lifestyle may affect the future choices of children. Only time will tell if the increase in popularity of Forest Schools will be an effective solution.

How are you finding the current situation?

For those in employment or placement years there was a general feeling of gratitude that forestry had for the most part continued and remained open. One interviewee said



Hannah Whyatt Graduate Forester at Norbury Park, Staffordshire for the 2020 Forestry Roots Program

FORESTRY ROOTS

Forestry Roots is an RFS project made possible by the ALA Green Charitable Trust. The project matches college and university leavers with employers, helping to address acknowledged skills gaps within forestry and to increase employment prospects for young people in forestry.

Host recruitment opens in January
Student recruitment opens around June

For more information contact Adam Pickles
adam.pickles@rfs.org.uk

that they felt positive for their future as they felt it was a more secure proposition in a growing industry with more engagement from a newly motivated, environmentally-minded generation. Another was clearly thriving in employment under the leadership of a head forester and again was grateful for the opportunity.

For those who are studying, there was little support for the continuation of online learning as students look to have the full experience with their peers, to partake in field trips, and learn from each other. The return to 'normal' must be wished for by more than just the students!

The positive aspect of the move to online working has been increased access to events, courses, seminars etc, to people on tight budgets and with restricted schedules and limited access to transport. These learning opportunities have been vital to keep people connected. Again, our interviewees did express a desire to attend events in person for the networking opportunities and the altogether richer experience, and would like to see a balance between virtual and in-person events in the future.

Another common theme, and one that is reflected in the Forestry Skills Study, was that of trouble accessing work experience and gaining hands-on practical learning. Those interviewed felt that they were happy with their studies but that valuable time in a woodland setting was lacking. It was incumbent upon the individual to find their own opportunities but that these were hard to find.

The Diversity Issue

We seem to be quite comfortable talking about mixed, uneven-aged stands, irregular silviculture and biodiversity, and we understand the benefits that all these bring, but that does not seem to have quite stretched as far as the demographic of the sector's workers. The statistics show that forestry is almost devoid of gender and ethnic diversity.

The people (both men and women) interviewed reported feeling as though the issue of diversity was not going to be solved by quotas or box ticking exercises, but that it came down to fundamental equal opportunities; that each person, no matter who they are, is given the recognition they deserve for hard work and dedication. This was seen as a much broader issue that affects all parts of society, not specifically forestry, and it is something we have a joint responsibility to keep challenging at a fundamental level.

In terms of gender diversity, the report commissioned by Confor ('Gender & Diversity in Forestry in Scotland' by Dr Eleanor Harris, published in 2016) concluded that 'All the evidence suggests that women in forestry now are valued and supported well once they are in the industry: the difficulties are at the recruitment stage.'

This goes hand in hand with the industry's general lack of visibility and promotion. When the subject of social media was addressed, most people reported that they could not identify any particular forestry role models, but that there were plenty of people they followed who are in closely related



Rachel Johnson, the 2019 winner of the Prince of Wales Award for her outstanding contribution to our Woodland to Workshop course and a past apprentice with Ben Law at Prickly Nut Wood

environmental positions. As some of the interviewees were keen to point out, you may not necessarily be the sort of person that has a phone permanently to hand if you prefer to be in the woods all day.

On to the future

There was a great feeling of positivity amongst the small cohort of people I spoke to; none of the desolation reported by the Prince's Trust study, but perhaps just the natural frustration we all feel about the current situation. I would challenge anyone not to come away at least a little more positive about the future for the industry if this group is anything to go by; that the future and our trees will be passed to them should give us cause for hope. We cannot be complacent though, and it is up to all of us to nurture the next generation, as we would a new wood of freshly planted saplings, and challenge our own attitudes as to how we can contribute.

This is no moment to let up on our early efforts. Time is needed to see the effects of the work the FSF has already done to attract more highly motivated and passionate people to the sector, like the ones interviewed here. Many thanks to all who contributed; everyone at Woodland Heritage wishes you well for your future studies and careers.

The advice from our young foresters to aspiring entrants:

- Be proactive in asking for advice and opportunities. It may seem daunting, but many people are happy to share their knowledge with you.
- Get as broad a range of learning and opportunities as you can. With more events now happening online and

either free or relatively inexpensive, it is easier than ever to take part.

- There is a wide variety of careers available within the sector so there should be something for everyone, from working with machinery, tree climbing, administration, research.
- It does not matter what your background is; all are welcome.
- Take full advantage of the organisations of which you are a member. Don't forget that Woodland Heritage offers grant funding for various projects and courses to help in the development of skills and careers. Find out more details on how to apply on the website woodlandheritage.org/grants-bursaries-awards

Are you an experienced professional or woodland owner who feels they would like to do more? One positive experience is all it takes.

- Get in touch at office@woodlandheritage.org if you think you could offer one or more of our student members a valuable development opportunity.
- If you are a social media user then why not share your experiences? #ilooklikeaforester
- Offer access to your woodlands to local groups and schools. (See article in WH Journal 2020 'How to support schools and groups visiting your woods' by Becky Wilkinson, RFS).
- Keep in mind that it can be daunting for young people when reaching out for advice, opportunities, or even just asking a question at an online event. Please be supportive.
- If a career starter asks for advice, then point them towards some of the organisations that are there to help. These include:

Institute of Apprenticeships and Technical Education
Institute of Chartered Foresters

Focus on Forestry First

Lantra

National Careers Service

Royal Forestry Society/Royal Scottish Forestry Society

Have your say!

If you are at the start of your studies or career, we would love to hear from you. Send us your feedback and let us know how the pandemic has affected you and how you see the future; go to woodlandheritage.org/get-in-touch.

Winterborne Zelston Fencing – the world of cleft

by Guy Corbett-Marshall

Nestling beside the ever increasingly busy A31 that connects the south coast to the west country, is the tranquil village of Winterborne Zelston, at its heart a collection of thatched cottages and a seasonal stream so typical of the chalk landscape of Dorset: a winter borne.

Driving along its no-through road, the eye is drawn to a fairly infrequently seen type of fencing that is quite common in this village, and which adds charm and character in equal measure.

The cleft Oak style that appears so regularly is the handiwork of Winterborne Zelston Fencing (WZF), a business that has thrived since Richard Bower and his wife Carole set it up 35 years ago, after a career in the Army.

The breadth of the company's business includes far more than its staple of cleft Oak fencing, neatly encapsulated in its Standard Industry Classification: '43999 – Other specialised construction activities not elsewhere classified.'

Pale fencing, many styles and sizes of gates, pergolas, bothies, stiles, tree guards, animal shelters, chicken, boat or summer houses, garden furniture and buildings, bridges, roof shingles it's no wonder that the online brochure runs to 39 pages, each beautifully illustrated with pen and ink drawings of the products that WZF produces, all of which can be made to bespoke designs.

The principal material used in nearly all the constructions is wood and for WZF that mostly means responsibly sourced English Oak (and Sweet Chestnut), although many designs include ironwork that is judiciously applied, and when beside the wood, always in a complementary and never dominating manner.

With many of the products made from relatively short lengths and never requiring great diameters (in fact not the best option for cleaving), WZF fills a very useful niche



Photo © Gary Lewis

A new footbridge complements its setting



Posts and rails being made in the shed with some finished shingles behind

in the timber supply chain. There is no need, and the cost prevents it anyway, for competing for planking or even beaming grades in most cases, so 'second' lengths, or relatively small diameter logs can be ideal. For the grower, this will yield a higher return than selling the less marketable parts of an Oak for firewood.

Walking the yard at WZF reveals not just what might appear to be quite spindly branches that one day will find their role in a suitable design, but also logs emanating from both well-known estates (often in the south of England) and from nature reserves, including quite recently from the Bentley Wood Site of Special Scientific Interest, which as well as a haven for wildlife describes itself as a 'working wood'.



Offcuts are turned into charcoal by the neighbouring business

The offcuts and any other timber that cannot have a use in WZF's products nearly always end up at the next-door business, The Dorset Charcoal Company, which like WZF has created its own wide range of products, which in this business' case are all based on charcoal. Even WZF's sawdust is now able to be recycled as a fertiliser ingredient.

When Richard left the Army, he had innumerable options for his future career, but, after careful research and reflection, he chose to enter what he now terms 'The World of Cleft'. Although he had no history of working wood in this way, he was driven by what he describes as a great yearning to address "the unmanaged, derelict thickets and woodlands".

Starting small and at times earning little, Richard learned the trade and found his niche, inspired, as he is to this day, by Professor Oliver Rackham's 'History of the English Countryside'. After ten years, the business won its first large job on an estate, based on the principle of fencing an estate with its own products. As well as developing that particular market, WZF has also gone on to reach new audiences with its products being central to Best in Show gardens at Chelsea (twice), Hampton Court, Paris and Brussels, in addition to its regular advertisements in 'Country Life'.

As an incomer into an industry with its established ways of working, Richard soon made his mark as an influencer. Never seeking to make a difference by quantity (the business remains a manageable size), he has done so instead by quality. A former Royal Warrant holder, Richard ran two woodland conferences at Highgrove that challenged thinking at the time, and which were driven by his passion for well-managed woodlands and how their



A newly installed rose draped pergola leads to a new gate and fence

products can make them self-sufficient into the future. Never a fan of the shifting sands of grants and subsidies, Richard believes in a wood chain that takes care of itself financially and which not just manages its money well, but also the environment from which it takes its raw materials. He believes that in using timber we should do the tree that provided it justice and he often sees that process through himself from standing tree to an installed final product.

Ethos, education and ethics are key to Richard's approach for the timber supply chain and of course for WZF. These underpinning principles have continued to keep Richard energised to run a thriving business through several economic downturns, well past what many would be happy to term retirement age, and he and his team have even coped with COVID-19 with minimal disruption.

Many have followed Richard into cleft which has grown in popularity in recent years, and he is very proud of the number of trainees who have worked for WZF.



Garry Lewis cleaving

Photo © Garry Lewis

Photo © Garry Lewis



Tree guards, a variety of fencing, and a distant pergola exhibit a range of products in situ



A new gate ready for despatch

Garry Lewis, his manager, has been with WZF for many years and benefitted in his early days from a QEST scholarship that enabled him to visit many timber yards around the UK to get to know his raw materials and reliable suppliers, many of whom he still does business with today.

Inspired by a mission to improve woodland management and to make beautiful products from this process, Richard Bower has created a thriving business that has made the English countryside the better in so many ways.

With his customary drive and passion, there is no doubt that Richard will strive to ensure that Winterborne Zelston Fencing will be well placed to achieve its potential over the next 35 years.

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Winterborne Zelston Fencing, Winterborne Zelston,
 Dorset, DT11 9EU

From Winterborne Zelston Fencing's 'The World of Cleft' leaflet



Cleaving (the art of splitting wood) is an ancient practice dating back to the Anglo Saxon age and beyond, when it was discovered that a standing tree was more useful felled and the shoots allowed to grow to a useful size (for up to 20 years depending on use required) then coppiced and cleaved. Each would then regenerate sometimes four-fold thus rendering the original stump immortal. By this system England's woodlands were managed and ensured a plentiful supply of wood throughout the ages.

The neglect of woodland management is a crime to our heritage. The woods of the English countryside, still existing, have not changed much and are still capable of being managed and harvested. These woods are for free. There are still enough woods to provide the raw materials required, and it is possible to buy a cleft fence post cheaper than a treated one.

Advantages of using cleft

- 1 Cleft is a sustainable product – the more the woodland is managed, the more that can be produced
- 2 Cleft is long lasting, if maintained
- 3 It is very strong because it splits with the grain, thus preventing rot from water.
- 4 It is aesthetically pleasing and absorbed easily into any background. (Nature never made anything straight).
- 5 Cleft is versatile to use and can be made up into all types of stock fencing, buildings, gates and other items.
- 6 It is traditional and in keeping with its surroundings
- 7 Can be converted when green

Woodland Heritage welcomes new Trustee Alex Mowat

Woodland Heritage was delighted to welcome London based Architect, Alex Mowat, as a new Trustee in March last year.

Alex designed the UK's first commercially available range of wooden door handles, along with many large and small architectural projects in timber. However, he wanted to learn more about how to grow and source UK timber.

In 2019, he attended our unique Woodland to Workshop course. These three days opened up this little known and under-represented world to Alex. He was captivated and his involvement with the charity began.

Very soon after Alex attended his first Board meeting which was held at Whitney Sawmills, the country entered 'Lockdown'. Not one to let time pass by, Alex became the driving force behind two very focused Board meetings held online in April and May that confirmed the importance to the charity of Whitney Sawmills, and which then led on to how that property could be developed.

Alex proceeded to design the improvements to two of the buildings at Whitney Sawmills, a process which is described in more detail elsewhere in this Journal, but which includes a new reception and timber drying facility and sales area.

When not busy running his practice, Mowat & Company, Alex has



Alex Mowat

devoted some of his spare time to creating a small plantation on the edge of Exmoor; one of his beloved Oak saplings is the subject of this Journal's front cover.

Alex said of his appointment:

"Since joining Woodland Heritage, I have been spellbound by the wisdom, generosity and skills of everyone involved in the organisation.

I hope that my involvement in the charity's exciting plans and huge ambition, will make a real difference to growing more trees and using more wood in the UK."

Woodland Heritage's Co-Founder and Acting Chairman, Lewis Scott said:

"There is so much potential for wood to be used in positive ways in buildings, both new and old. The Trustees had for some time wished to welcome an architect to the Board to both improve our knowledge as to how this sector could develop, but also to have an ambassador for our



Two of Alex Mowat's wooden door handles

work and what we believe in. It was a pleasure, therefore, to welcome Alex to both Woodland to Workshop and the Field Weekend in 2019, and then as a Trustee last year.

Alex's arrival could not have been more timely in helping to advance our plans for Whitney Sawmills, but he has already done so much more than that in just the first year. As well as opening the door to beneficial corporate connections, Alex's skills in design have already proven invaluable and he will be an important source of advice and a support for activities such as the Celebration of Craftsmanship and Design."

Unique carpenter's workshop approaches 200 years of unbroken productivity

by Tim Chilton



Ty Coch by Roger Allen



The carpenter's workbench

There is a Carpenter's Workshop in rural Mid Wales. It looks like those you see in a working museum, such as The Weald and Downland, or more appropriately as we are in Wales, St Fagan's, or the closer one still at Blists Hill.

Indeed, St Fagan's described here, at Ty Coch, Pontdolgoch, is an exemplar of an unchanged, untouched, village carpenter's workshop, and yes, as with so many, they made coffins. Their main skill though was being wheelwrights. Wooden cart wheels continued to be made here commercially until the mid-1990s; I still have a supply of seasoned felloes, spokes and hubs.

To say it's untouched is misleading for it has been touched, and touched for well over the last 150 years. It is preserved is by being in such daily use.

You would instantly recognise its ambience. Perfectly level, totally solid, carpenter's bench with its tool-well running under the windows, those windows best for light, with tool racks on the wall holding a series of subtly graduated chisels all bearing the family name. Overhead shafts

and belts, some leather, some joined with door hinges, clattering, and keeping time as they work.

But first to describe the workshop. It's Victorian both in build and flavour. It's been working continually since being built in the 1830s. It's had only three owners since then. None of the owners have changed it: all just used it and made minor adjustments. For instance, it now has electricity but the main items are still water-driven from a powerful metal overshot water wheel. Actually, there was a major change in mid Victorian times – when the saw pit was replaced by the water wheel and a line shaft-driven rack bench installed. It still has the wartime blackout curtains.

The main metal heavy rack bench runs on rollers and has a choice of sawblades up to 44 inches in diameter. To change the sawblade a blacksmith-forged spanner is used. Made specifically for the task, two-foot long, the type you see hung on walls to create ambience in restaurants, but this one is kept under the bench, handy for when it is needed. The most striking such spanner is older, bespoke, cranked and used for the headstock and tool-rest of the lathe. Being water driven, excessive strain and use will not damage but simply slow the bench: no motor to burn out or crankshafts to bend.



A general view of the workshop with the cranked spanner

The water wheel drives not only the rack bench, but an elegant three-wheel bandsaw. That is the tool I find most useful: it's well positioned for light, has a wide throat and is stable. Less used is the oldest item – it's late Georgian – a wonderful long bedded lathe. This needs to run faster but with less torque, so it is geared up with supplementary shafts and pulleys – all the internal machinery is line shaft driven – and it's the lathe which, when used, causes the mill to shake and rattle.

Finally there is, and again working and used, a wide sandstone sharpening wheel, excellent for spades and hoes – a luxury when gardening.

The mill is used by me for my interest in restoring early longcase and lantern clocks. Apart from the severe winter months – though it does have a woodburner – it's ideal and above all right. It's right because I'm working on antiques in a setting which itself is as antique as the clock; there is a harmony. Further the mill has never been tidied. There are all the offcuts of period wood, of the right age and colour match, and should not hand tools, family hand tools, be used?



"Exactly like staying at St Fagan's" – B and B guest

The Mill is listed, Grade 2*, a high listing, putting it in the top 6% of all listed property. CADW (the Welsh heritage listing body) rightly says it's unique in Wales, and others say in England too. Unique as a survivor. As you have guessed, period buildings and furnishings are important to me, especially what is here, the once everyday, vernacular, the ordinary, but now rare. Now nearly all have been restored out of existence – apart from key features – the bread oven door and central beam which will be painted black anyway.

In contrast to the National Trust, I believe in the unrestored (but maintained). I believe in keeping the elusive spirit which lurks everywhere but is undefined. The National Trust utilises the working back parts – the estate workshops, the stables, the kitchens as the location for their café and the snare which you must exit by – the glossy shop sales. In my opinion, their houses are preened to the point of being sterile.

When I first started clock restoration the fashion was to restore back to the point of being new, as if it had just left the original clockmaker's workshop. Now in horology a more sensitive approach is applied – don't remove the



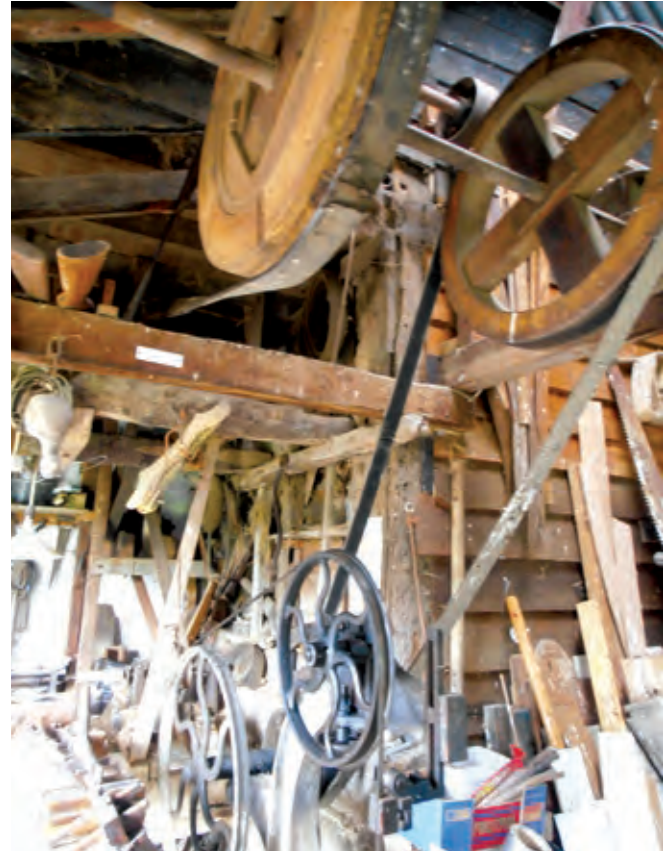
The overshot wheel

patina of history. For me it's the same with the Mill. It's special because it's used, it has all the patina. The wooden sluice control has that polish from years of hands touching it.

Further it's as it was: unguarded. Blades are sharp. You can use the water powered bandsaw. But you can't use the one I saw in a National Trust mill, a black ribbon replaced the band – health and safety – the band was sharp, the ribbon safe. They disguised what they had done by scattering curls of wood from planing on the table of the bandsaw.

My maternal family (Warburton) were professional carpenters. In boxes I had all their tools, all embossed with their name, some duplicated, as there were two brothers. When you live in a Finchley semi these remain boxed apart from those you can use in a shed, and then only after you have taken the bicycle out.

A lifelong dream of a life in the countryside with space, workshops, a point of interest, running water, magically was made possible when I brought Ty Coch in 2005. Ty Coch is a smallholding of ten acres, a period house from 1650 – also Grade 2*, for like the Mill it's a time capsule, which has everything you'd expect – wattle and daub, wide planked flooring, an internal well, and a bread oven – working. It was assumed I would use the oven and I

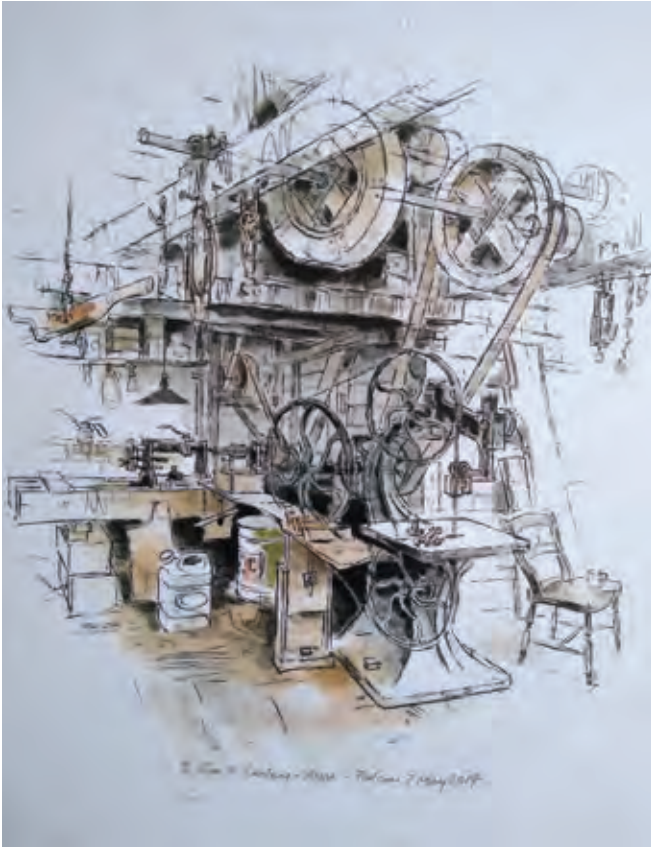


Line-shaft and pulleys

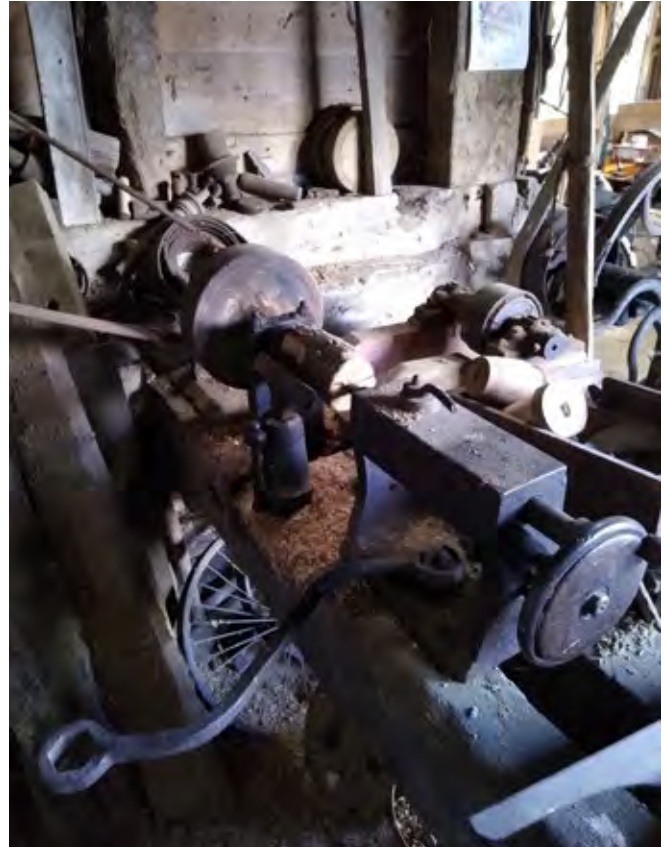
was shown how to seal the door, fallen a bit on the hinge, with dough. Outside, the two Mill ponds and its jewel, a working village carpenter's workshop. Suddenly all the boxed tools were liberated. Rather like buying a property with empty library shelves and you have all the family books, boxed, waiting to be read and seen.

Shortly after my purchase the vendor returned, gently concerned, and I could see that he had something to say or ask, but questions are approached from the side or even behind here in Wales. It was only after some time the question was revealed – had I found a tin of powder? Apparently, they drilled and then blew up tree stumps after felling. I couldn't find the tin of poison either.

The property always was a working holding and one associated with wood. A few years ago, via the Land Registry, a claim was made for all the mineral rights under my fields. Simply, if I did not resist, the mineral rights would be the claimant's. Unlike many of my neighbours I researched and fought. So, I now know my ten-acre holding is as it was in 1650, minus one turnpike road and two house-plots. Further and interestingly, the entire case rested on the enclosure maps of the early 1800s. Amazingly these enclosure awards are still legally relevant. I had the paperwork from prior conveyances; the last



Detailed pen and wash by Falcon Hildred



The lathe

from 1904 showing ownership was in Fee Simple (ie total exclusive rights). But we had to go to the Land Tribunal before the claimant withdrew and I had to pay my costs. I was prepared to go to court, and dressed as a serf too.

The turnpike road caused a problem. Built in the early 1800s it separated the property from its fields. More importantly it separated the Mill from the main mill pond. That's no problem you think: just culvert under the road and run the water through the culvert; indeed that was done. But how do you control the water? Turn it on and off?

Well remember the owners were carpenters so they solved this with wood. Two telegraph poles were erected, one on either side of the road. From inside the Mill, they ran a wire, a cable, over a wooden roller, then a second roller, then over two wooden pulleys one on the top of each pole and away down over (nowadays) a motorcycle wheel, to the sluice arm in the mill pond. To open the sluice, you pull down a lever in the mill; it's a hard pull, which tensions the wire on poles running over the A470, a major road, and down into the mill pond to pull a cast iron plug out of the bottom of the mill pond. Visualise it as a bit like an oversized bath plug. It closes under the weight of that iron plug, shaped a bit like a lemon: tapered to fit. I found out – separate story – its tapered to jam too. And that's

how it works today: a moving wire high over one of Wales' major roads.

A property such as Ty Coch should be preserved and its recent listing as Grade 2* – previously unlisted – will assist. But I firmly believe that our heritage should be enjoyed by many. I am open for interested visitors by arrangement and am open on SPAB's (The Society for the Protection of Ancient Buildings) Open Mills weekends. Indeed, the Times once listed Ty Coch in the top six Open Mills. You are welcome to visit, to inspect, enjoy and with enough water, to see it working.

tycoch.org.uk

Sources

CADW listing 87804

PG Barton 2002 Pontdolgoch Sawmill, Caersws, Powys, Melin, 18 14-24

The Times 21 May 2001 "Six of the best working Mills open this weekend"

National Library Of Wales – enclosure maps and letters of Tudor, a former owner, Tithe Map and Schedule 1846
Powys County Record Office – M/B1/2/5/1 The trading records of the Owens – former owners and Wheelwrights conveyancing records held by the Author.

Laurence Gagen passes on almost 30 years' experience of woodland creation and aftercare

by Gary Battell in an interview with Laurence Gagen

Strong partnerships, good advice, great support and family commitment, and hard work, has created some of the highest quality new woodland in East Anglia.

Woodland creation started at Hulls Mill Farm in February 1993. The soils on the farm are nice alluvial valley soils with valleys running through the main woodland planting. It varies from almost pure sand and, within a few yards, to very heavy clay soil. The Walnuts were planted in the rich soil with the two main Black Walnut plots planted on a south-east facing aspect with shelter behind.

The Black Walnut was something that we planted on our second and third plots of woodland, because we had planted English Walnut in the first plot, and then, through reading about Black Walnut, the family heard that it was a better timber tree than English Walnut, so we gave it a go in the spectrum of trees that we planted in our second and third plots.

When Woodland Heritage came on the scene in 1995, they saw that we had got a few occasional Black Walnut saplings dotted about, and they said they were doing trials using different varieties of Walnut, and they asked how I felt about having a Black Walnut plot at Hulls Mill Farm? I said, 'If that is what you want, then we can find a piece of ground', and so consequently, Gabriel Hemery came and designed the combination of nurse trees that went with about three or four different varieties of Black Walnuts. We also planted a small 0.2-hectare plot solely of Black Walnut without any nurse crop. This plot was too small to be a true experimental plot like the two or three others that Gabriel had set up elsewhere at the time.

The Walnuts were spaced at 5x5 metres, so there were 80 Walnut saplings planted on the plot. There were 20 *Juglans regia* variety *Lozerrone*, there were 20 *Juglans regia* of standard British nursery quality, 20 hybrid-Walnut



1995 – Lewis Scott presenting the Gagen family with a grant towards the new wood

Juglans nigra, of British origin, and then approximately, 320 other trees and shrubs, including Italian Alder, Birch, Cherry, Hazel, and *Elacagnus*. The Alder and the *Elacagnus* were planted because they are nitrogen fixers which aid and encourage enhanced growth in the Walnuts. The nurse crops were grown to encourage the Walnuts to grow upwards towards the light.

The plot was planted in 2000 by Gabriel, with us giving assistance to his expert knowledge. After 20 years' growth, I am very pleased with how the Black Walnuts are doing, although it is noticeable that some of them did better than others; this was down to the different species or variety of Walnuts, and the different nurse crops. This proved to us that growing good trees is down to a combination of factors.

FURNITURE OR FIREWOOD?

British-grown hardwood timber is in strong demand - from cabinet makers to boat builders - so why is much of our young woodland only fit for firewood? Steele Haughton, a Chartered Forester with Bidwells Chartered Surveyors, poses the question.

THE returns from quality British hardwood have increased steadily since the Great Storm of 1987.

Relative scarcity assures upward pressure on values and there is currently strong demand from UK users ranging from cabinet and instrument makers to building and boat restorers. In addition there is a big European market, with large volumes exported for veneering and furniture making.

Be it from the point of view of timber returns, added capital value or environmental benefits, well managed broad-leaved woodland can be a real asset to a country estate or farm. Particularly so, given that any income is now completely income tax free.

The key word, though, is quality.

Poorly managed woodland produces poor quality wood and premium prices are not paid for scrub firewood. That being the case, it is difficult to understand the tendency over the past decade to leave so much of our young woodland to its own



Steele Haughton is a Chartered Forester specialising in forestry management. He can be contacted on 0222 841641.

devices.

The trend has been for farm land tree planting at very wide spacing and to keep maintenance to an absolute minimum - particularly if the cost is likely to be any more than the grant available.

As a result, while providing some conservation benefits, these woodlands have no real prospects of ever providing timber returns. And, in a world of rapidly changing land and grant policy, how can any woodland that is unlikely to show a return be secure in the long term?

With more care, commitment and cash, well planned and maintained young woodlands can be the start of a quality crop of timber, a sustainable landscape and conservation treasure chest that can significantly add to the capital value of an estate.

Given that more than 90 per cent of British broadleaved woodland is privately owned and much of it has been handed down the generations in a tradition of quality management, shouldn't we continue the act of faith that is broadleaved tree planting and grow trees for furniture and not for firewood?

Article from NFU magazine by Steele Haughton

The best Black Walnuts growing here are the *Juglans nigra x regia*, that is the NJ 23 hybrid, which is growing in plots 2 and 4, with a tree and shrub nurse crop of Cherry and Hazel. These Walnuts and species mix have proved to be best for our soil and aspect, with the *Elaeagnus* improving tree growth.

The trees were planted into existing grassland that had a hay crop taken off, it was then grazed and sub-soiled and rolled, before screefing, and planting the Black Walnuts in 0.75m tree guards, or mesh guards that I personally like because of the issues you get with ants and voles. Due to this we now use only mesh guards.

Gabriel insisted short 0.75m guards with wooden stakes were the ones to use. He said the tall guards would make the trees grow too quickly and become very whippy and fall over their guards.

We never had deer when we planted the main part of the woodland, but in subsequent years we have progressively got more muntjac, roe and fallow. The deer and grey squirrels are now our biggest issue. We do have the odd shoot, and I am interested in the new squirrel traps, but I am looking forward to when grey squirrel populations are controlled with contraception or with the introduction of pine martens.

Originally the woodland was planted under Forestry Commission advice and grant support at 3m x 3m (1100 trees/ha). Two years later I phoned the Forestry Commission, enquiring about grants and tree spacing and

they told me planting would be required at 2.1m x 2.1m (2250/ha) to improve timber quality, and so I asked what I could do about my newly created woodlands as I was not growing trees for pheasant cover, and the response was, 'Do not worry about what you have planted'.

It was at that time I came across an article by Steele Haughton in an NFU magazine about the poor quality of British woodlands and the work of the fledgling charity, Woodland Heritage, to address this. So I rang Steele and he put me in touch with its Chairman, Peter Goodwin.

Peter visited and got very excited as it was the first new woodland the Charity had been involved with since its inception, all the others being woodland improvement projects. We came up with the new planting spacing of 3m x 1.5m (2,222 trees/ha) as this would bulk-up the numbers per hectare to improve timber quality, but still give us access for maintenance for tractor and toppler, and for spot spraying with an approved herbicide for three years.

As there were no deer at the time, all the planted trees were ring-fenced with rabbit fencing, with a hare wire along the top; how times have changed. All the trees have been formative pruned and high pruned to the height of my superb Silky pole saw that was recommended by Peter Goodwin.

The Black Walnut and Cherry trees are pruned in the summer, between July and August. The standard economic pruning recommendation is that you only prune final crop trees, but we pruned all the trees as we



Laurence with his hand on one of the in-filled trees that was planted following advice from Peter Goodwin demonstrating superior form to two of the original plantings

wanted to produce high quality firewood that was knot-free and easy to process. Trees with very poor timber form, but high ecological value have been left unpruned, and we also thin to favour these trees. I have been pruning for the last twenty years, and time and effort spent has created good form that has produced high quality, easy to harvest firewood, that I hope will increase the final crop value too. Woodland Heritage funded the additional planting costs and the Silky pruning saw.

It was our vision that Ash and Oak were to be the final crop timber trees in 100-120 years. It is often forgotten that Ash has been taken for granted and that it has provided a good return from firewood and timber for landowners over many generations, and when that woodland component is lost, so is a large amount of commercial return and economic reason and incentive to manage many woods, and that was the reason for our woodland enrichment planting in 2018.

We are expecting the majority of the final crop to be Oak, but we have retained the healthy Ash, so hopefully they will be final crop trees and a seed source for future natural regeneration. We have not undertaken wholesale felling of Ash; we are felling them as they die for two reasons:



Off to a great start: the new woods at Hulls Mill Farm in 1995



Laurence can be rightly proud of his family's planting and pruning achievements

- 1 We believe whilst Ash trees are growing, they are putting on growth increment and they are a seed source, and
- 2 If we fell too many Ash at any one time we may have a windblow issue, as we have tall young trees in young woodland, and the root systems are not as substantial as they would be in ancient semi-natural or ancient woodland, so we decided to take the approach we would fell Ash trees as they die, and then still sell them for firewood.

However, in 2018 we planted two areas within the woods because of Ash dieback: one was planted with Sycamore and the other with Hornbeam, both of which coppice



Woodland Heritage's Steele Haughton and Lewis Scott giving advice and support to the Gagen family in 1995



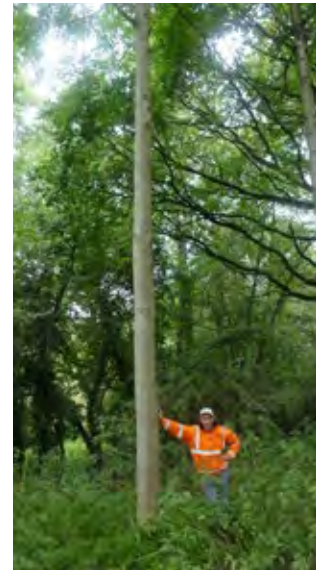
The astonishing growth of hybrid-Walnuts in 2005



The astonishing continued growth of hybrid-Walnuts in 2020

The pure hybrid-Walnut crop planted in 1998. Good advice, planting and aftercare have created woodland with high quality multiple values

(Right) A 25-year-old hybrid-Walnut! A passion for good provenance, planting, aftercare and pruning produces the deserved results



and naturally regenerate. The choice was also because both make good firewood, and as we had lost the Ash component within our woodland, and with a good firewood trade to serve locally, we needed replacement species. In 2021 we are adding some Wild Cherry, as neither deer or squirrels like them and they make good timber trees. We did not contemplate anything else apart from six foot plastic deer fencing to protect the planting, even though deer management is undertaken on our farm by a local stalker who manages the deer in the area on a landscape scale and sells the venison produce locally.

Timber quality is also rooted back to its provenance; as Peter used to say you cannot make a silk purse from a pig's ear. In what we call the 'twenty-acres', the provenance of particularly the Oak was not good, but we were on a steep learning curve and we did not know. By the second year, when we wanted to plant up the next two fields, we could see there was a problem with the Oak provenance, and so we changed our supplier and got far superior stock, and we had saplings from Woodland Heritage. We did some

beating up in the first planting with these Oak trees that Peter had sourced and grown from acorns.

We planted nearly half the farm which covered almost 30 acres. I still get really enthused to go out and do work in the woods, although admittedly I have a man to do the felling for me. I would say that it was probably one of the best investments we did for this farm, because at the time we had 60 acres of farm that included arable with water meadows, and that is not a big enough farm to do arable farming with the way grain has to be stored nowadays. All our arable equipment was getting elderly too, and I thought there was some good money available from the Forestry Commission and Defra for the woodland grants. It just seemed a good idea, and it helped because we have always liked and grown Cricket Bat Willows, and Christmas trees since the 1960s, so it was an extension of those trees, and it just seemed like the right thing to do.

I would tell anybody else to do the same if they have got some ground, and that they really ought to be planting it



Growing quality Cricket Bat Willow gives us a good annual income

with trees, because there is a popular Chinese proverb that says: “The best time to plant a tree was 20 years ago. The second-best time is now”.

Tree planting, maintenance and pruning has given me great satisfaction over many years. I think you must be part of the management process and put in the dedication, or train up a member of staff to have that dedication, as opposed to a contractor who will be in and out of the woods and send a bill. Although they have done their expert job, they cannot have the feeling for that patch of trees that is yours. I get quite possessive about the pruning, and I do not like other people pruning for me. This sounds silly, but that is because each tree is personal to me.

Cricket Bat Willow gives us a good return on a shorter rotation. We have about 600 Cricket Bat Willows growing on the farm at any time, from newly planted to ready to fell after approximately 20 years. We sell between 20 and 30 stems each year and get approximately £280 to £400 per stem along with the lop and top for firewood. We undertake all the planting, pruning and maintenance and that also includes coppice and pollard management of the Alder on our water meadows.

I look around my locality and see many woodlands that have been planted without thought, and poorly maintained. Most have been left with no passion for management at a time when maintenance really needed to go on continuously. My tree feller lives in a cottage on the farm, and he works in local young woodlands. We have an arrangement with local farmers that we have the wood in exchange for improving their woodlands.



I never tire of seeing the pure stand of hybrid Walnuts

You can walk through those woodlands and see there are very few trees that will ever come to be of any value; they were simply planted for pheasant cover, and they are now very hard work to resurrect into managed woods and to get firewood out of them. The message is if you are growing anything it must be high quality, it should not vary between habitat, firewood, timber, or natural capital and ecosystem value, however you want to look at it, rather than just becoming firewood.

I hope my woodland legacy will be that it will have changed the scenery, and that there will be something of value there that Mr. Gagen planted and managed back in the 20th century. Part of it is for my ego, but I would like it to be that my children and possibly their children will carry on managing the trees and woods. Obviously, they may have different ideas about what they want to achieve and do, but I would hope that they might look after the trees and woods and carry on the family tradition.



The first thinning waiting for conversion into firewood, 2017

I am a big fan of Woodland Heritage, and the linkages and multiple improvements they make within the timber growers and craftspeople sectors. My ultimate plan is to produce as much high-quality timber that can be used for Cherry and Walnut veneer after 60 or 70 years, for Oak beams, and in fine British furniture and other joinery. The firewood component, the thinning money, is currently our bread-and-butter money that keeps us going and will continue to have an important role to play in that quality timber production. Currently we have an £8,000 to £10,000 income from firewood that is used to prepare the trees and woods to yield greater income and profit in the future.

We have a 20-year woodland management plan that was produced in 2012. Apart from three acres of Sweet Chestnut, out of the 30 acres the rest we have split into five compartments, and we are rotating around the compartments four times in the 20 years. We are marking the final crop trees and high pruning them as high as is sensible, to approximately 60 to 70% of the trunk. We are on the second rotation of the five compartments this year, and we are adding a few more Oaks into the final crop trees to give us more options as they are closer than 10-12 metres. The aim is to have final crop trees at approximately 10-12 metre spacing.

The squirrels are a pain. They have taken the bark off some of the tops of the trees, they seem to go for the high pruned final crop trees. My theory is that once these trees have been pruned, they are transporting richer and sweeter sap to the crown of the tree to give themselves a boost after the side branches have been removed, and the squirrels can sense, smell, or maybe hear the movement of the sap in the trunk, and simply see this as sweeter nutritious food. The worst damage was not in the winter, but early summer when they may have been using the bark to line their nests.

Through our thinning, we are specifically trying to make a certain amount of clearance around the final crop trees to give a variation on the French free growth system, and a way of growing Oak trees for timber in 100 years.

We are very happy with our achievements and are most grateful for the amazing support we have received from Peter Goodwin, Lewis Scott, Woodland Heritage, the Northmoor Trust, Gabriel Hemery, and many others, but I must highlight my tree feller, Roy Edwards. Roy is sympathetic to our management, he is a cottage tenant, who works on an hourly rate as and when required and is a big asset. But he is as much a friend, whose skills and hard work are always greatly appreciated.

Top Tips

- Bring in advice and specific expertise and use it effectively.
- Think carefully before you use non-native and hybrid species for planting and enrichment; those species maybe more susceptible to pests, pathogens, and disease.
- Use the correct provenance for your site and planting objectives.
- Appropriate site preparation is essential, especially deer, squirrels and other pests, sub-soiling, weed control and past, current, and future drainage management. These things have great impacts on tree and woodland health.
- Add your own money to the Government tree planting support to get what you want.
- Continue to introduce and re-introduce species. We have planted 20 Wild Service Trees, we now have 30 beehives, and we are erecting barn and tawny owl, and kestrel nesting boxes on the farm.
- 3 x 1.5 m spacing was far better than 3 x 3m spacing as it allows for maintenance at the same time as helping to improve timber quality.
- Stress consequences from under and over management can have an impact on tree health and timber value.
- Continuity of management by different generations of the family and new staff is essential and brings great benefits.
- We should always be aware of the woodland heritage, ecosystem services, timber quality and natural capital we are managing and leaving behind to future generations. Our tree and woodland management are bringing maximum ecosystem services, and natural capital benefits to our farm and we are very proud of that.

The Fenland Black Oak Project – part two

by Roger Richardson

Last year's article described how this thirteen metre long Black Oak tree trunk was raised from the grave in which it had lain for five thousand years, how it was milled into ten beautiful boards and how these were dried.

Now the five best boards have been made into an amazing table top. Read on!



In fact the log was only a half in section as can just be seen above. It was milled standing on one edge so that the boards would be mainly quarter sawn with the wider ones showing a superb medullary pattern.

It needs to be said that once again this article is a very much shortened version of the new parts of an excellent and fascinating website. Read it all here: thefenlandblackoakproject.co.uk. Woodland Heritage is greatly indebted to the Trustees of the Project for permission to use its text and images.

The story continues...

Once the boards could be laid out and fully inspected, the design process began. A special team was brought together by Hamish Low, the pre-eminent Black Oak expert, with lead designer Mauro Dell'Orco, a furniture designer and architect, alongside other designer makers, specialist bronze fabricators and structural engineers working in consultation with Ely Cathedral, the table's destination. The constraints there led to a decision to create what is actually a gigantic drop leaf table with an overall width of 1600mm but just 900mm with the leaves down.



A most ingenious invention, the 'river joint', preserves the wany edges of the boards of both the centre section and the two outer boards as this mock-up shows. The base will be in patinated bronze with wheels concealed within the pedestals allowing the entire table to be pushed to the side of a space and used as a serving table.

One book-matched pair of boards and one narrow centre board were selected for the main panel and another book-matched pair for the two flaps. (Hamish Low second from left below.)



The drying process had reduced the thickness of the ten boards from 69mm to 35mm and these were planed to an even 30mm. SCM UK presented a planing machine, the main workshop of the Building Crafts College was cleared and a bed 29 metres long was constructed.

However, before being planed, the boards which had splits in them were turned over and specially made laminated



wave-shaped components were glued into 20mm deep routed grooves to stabilise these areas and then hand-planed flush.



Then, turned over again, the edges could be machined to form the 'river joints'. Templates drawn to provide interlocking shapes with removal of the least material from either side

provided the shaping jigs. These edges were machined and the top is now complete.

And there the Project rests while funds are secured to allow the base to be made. Funding is well under way but a further £70,000 is required to complete the project. So please, dear readers, go, in a generous mood, to justgiving.com/fenlandblackoak and give.

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Influencing the future of woodland management grants

by David Cracknell

Now that we have left the EU, the future funding regime for woodland management is at a crossroads.

With the Government undertaking a large-scale consultation on the Environmental Land Management Scheme (ELMS), there is a great opportunity to refocus public policy to encourage more woodlands back into management.

With that in mind, I agreed to run the ELMS consultation on woodland funding in the south-east region of the UK, as part of my role at the Small Woods Association (SWA). I am part of a team of forestry professionals and experts from seven 'test and trial' regions across the country.

All of us have held a series of regional workshops (online of course due to Covid restrictions) with local small woodland owners, who have enthusiastically taken up the opportunity to contribute ideas and solutions for future funding and policy.

Our work will contribute to a report to the Department of Environment, Food and Rural Affairs (DEFRA) later this year, and we very much hope that the Secretary of State, George Eustice, will take on board our recommendations and that all our hard work will not be in vain.

When I worked as a political editor on national newspapers, I shared many a pint with 'Farmer' George, who was then press secretary to David Cameron. When he wasn't spinning for the Tory leader, I learned of his family's fruit farm in Cornwall; so I am hopeful that he will put his expertise in that field to good use by encouraging more agriculturalists to plant trees and acknowledge the multiple benefits of silvopasture to soil and livestock alike.

At the time of writing, while filleting our woodland consultation returns and poll results, a clear picture is already emerging of what woodland owners and managers are seeking from the future funding and policy regime post Brexit.

Sadly, we have confirmed that around half of woodlands remain unmanaged throughout the land. Around four in ten of our respondents were not aware of the UK Forestry Standard and didn't even have a management plan.

Despite this rather depressing picture, we have found there is strong support for the woodland management grant application to be a much simpler and shorter process. Additionally, around three-quarters of people would be in favour of clubbing together with neighbours and working to a joint management plan – or at least say they could be encouraged to do so.

At the moment, applying for a management plan takes far too long (about 18 months even with a Masters in Forestry) and it is widely acknowledged that there simply is too much form-filling, GIS map making and chasing of overworked civil servants from the Forestry Commission and Rural Payments Agency. And this is all just to get the £1,000 management plan grant.

Secondly, we found very strong support for a new 'Woodland Restoration Grant'. After all, while many woodland owners take pleasure and fulfilment out of their 'hobby', it is also of wider public benefit; not only are forest managers preserving precious soil which has taken centuries to develop and bring forth the likes of wood

Photo © David Woolfall



Rt Hon George Eustice MP – Secretary of State for Environment, Food and Rural Affairs



Yellow archangel (Lamium galeobdolon)

anemone and yellow archangel, many of these wonderful sites are also enjoyed by dog walkers and joggers from public footpaths over their land.

Currently there is only a small amount for woodland restoration or upkeep: a mere £100 per hectare for assistance with coppicing, ride management or making glades and creating wildlife-friendly clearings for the public good. Most people would regard this as an ecosystem service indeed! Yet you could get up to £6,000 per hectare to plant a field with trees under the current regime.

Is it any wonder why so many small woodland owners simply don't bother with the system at all, and just 'get on with it' themselves. But this is a legacy of the 20th Century policy towards non-native fast-growing coniferous plantations on ancient woodland sites (PAWS), forestry tax breaks and supporting large estates which already have profitable and repeatable forest businesses. There are big political issues here far above the SWA's pay grade.

From our feedback also, we have found that many small woodland owners just do not want the interference of state bureaucracy either, or just want to be 'left alone'. Those who are keen on managing their woods will fund their own training and education from books and local courses. This presents a problem for our reporting, as even if there is more money and a simpler system, will small woodland owners simply carry on doing their own thing anyway, some even treating their lots as an extension of the garden?

My regional expert group has even toyed with the idea of some form of obligation on new woodland purchasers, a kind of charter they would have to sign upon completion,



Photo © Stephen Craun

The trend towards wood lotting makes the need for collaboration on management all the more pressing

akin to the responsibilities one has as an owner of a Grade II listed home, for example.

Our work comes in the wake of two decades or so of the wood lotting trend, where larger woods are divided up into smaller plots for sale. Thus, many members of the SWA own wood lots of under five acres, and do not even qualify for the woodland management grant which currently only applies to sites of over three hectares.

This raises significant issues for policymakers and administrators such as the Forestry Commission, who may struggle to cope with multiple grant applications if the system is reformed anyway.

The question we raise is who will administer a new funding regime even if the Government agrees to refocus its funds and political drive towards woodland restoration as well as new tree planting.

Surely, if we want to encourage more woodlands back into management, we need a simpler grant system with no red tape. Or perhaps limited Government funds would be best spent funding generous free education and training for woodland owners, who could access useful management advice and be encouraged to sign up without any strings attached.

The general public would also surely welcome more nature education, given the popular interest in tree planting and climate change. Our report may well point the way for a Government information campaign that highlights the ecological differences between native species and fast-growing conifers, and between monocultures and



Around four in ten woodland owners do not have a management plan and are unaware of the UK Forestry Standard

biodiverse ancient woodlands; and why trees need to be cut down and coppiced in order to save them – something that is counterintuitive to the regular person on the street.

The benefits of natural regeneration (‘trees for free’) needs to be explained also, and in the parts of the country where tree planting is seen as an easy panacea for climate change, people need to know that aftercare and good silvicultural practice is crucial.

I hope the many schoolchildren who are enthusiastically planting a million trees in Wales will not be disappointed to find half of them will need to be thinned out by the time they are adults – even if the forests are managed properly – or worse dead from neglect and over competition.

A further strong theme emerging from our ELMS project is the call for some kind of state support for local timber, charcoal and firewood cooperatives. As a single small woodland owner, it just is not financially viable to hire contractors to harvest half an acre a year, get it to roadside or mill and store it for seasoning.

However, if the state can in some way support a local market for timber and firewood, this would be an excellent way of

encouraging more woodlands into management. Surely people would appreciate firewood and 2x4s from the local woodlands, knowing they are supporting a neighbouring enterprise, than continue to buy imported and often warped timber from large retail chains. After all, it was repeated timber and firewood production that for centuries saw sustainable woodland management result in the wonderful by-product of flourishing wildlife, flora and fauna.

We are trying to make sensible and realistic recommendations in our report to Defra. But, overall, the wider question is how much of a slice of the (already small) funding cake woodland owners will be allotted. Farmers will, of course, get the lion’s share. But we very much hope that they will be encouraged to undertake more silvopasture and other creative agroforestry, which research has shown improves soil and livestock productivity (shade in summer; shelter in winter).

Despite all this we are optimistic that our recommendations will be taken forward by ministers and our report will not simply gather dust in Whitehall.

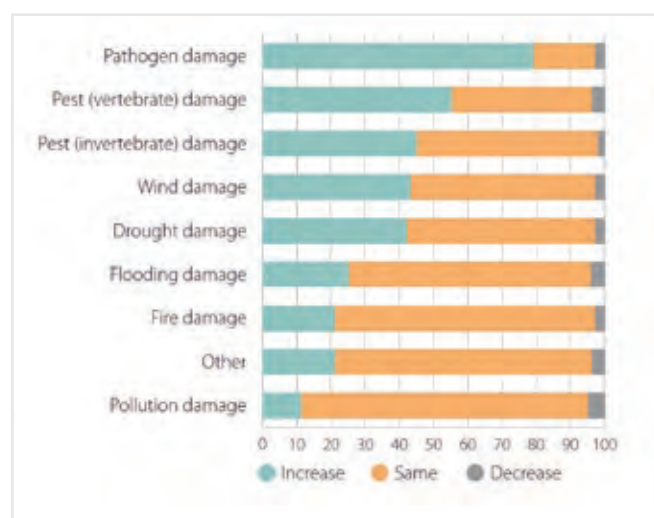
Change is coming but are we prepared?

by Dr Gabriel Hemery FICFor

Dr Gabriel Hemery, CEO of the Sylva Foundation and lead author of the British Woodlands Survey 2020 report, says more needs to be done by those who care for woodlands to help our trees, forest ecosystems, and forest industries adapt to environmental change.

Environmental change is having far-reaching impacts on the health and productivity of our trees and woods. Woodland owners and managers have always managed risk and uncertainty, but the pace and scale of environmental change experienced over the past 25 years and anticipated over the next 50 years are unprecedented. The latest British Woodlands Survey report highlights that those who care for woodlands and forests across Britain are increasingly aware of the threats from environmental change, especially drought, wildfires, and pathogens, yet there is little evidence of action being taken overall to improve woodland resilience.

The 2020 edition of the British Woodlands Survey, funded by the Forestry Commission and co-ordinated by the Sylva Foundation, attracted the views of 1,055



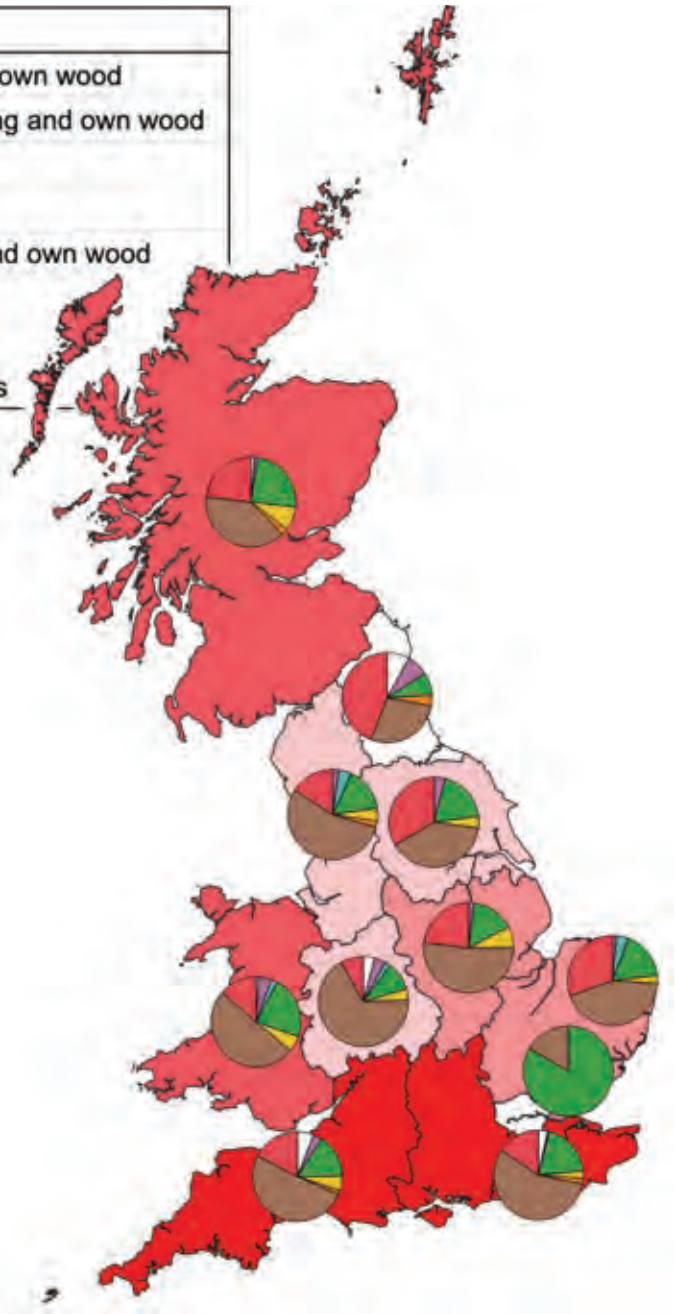
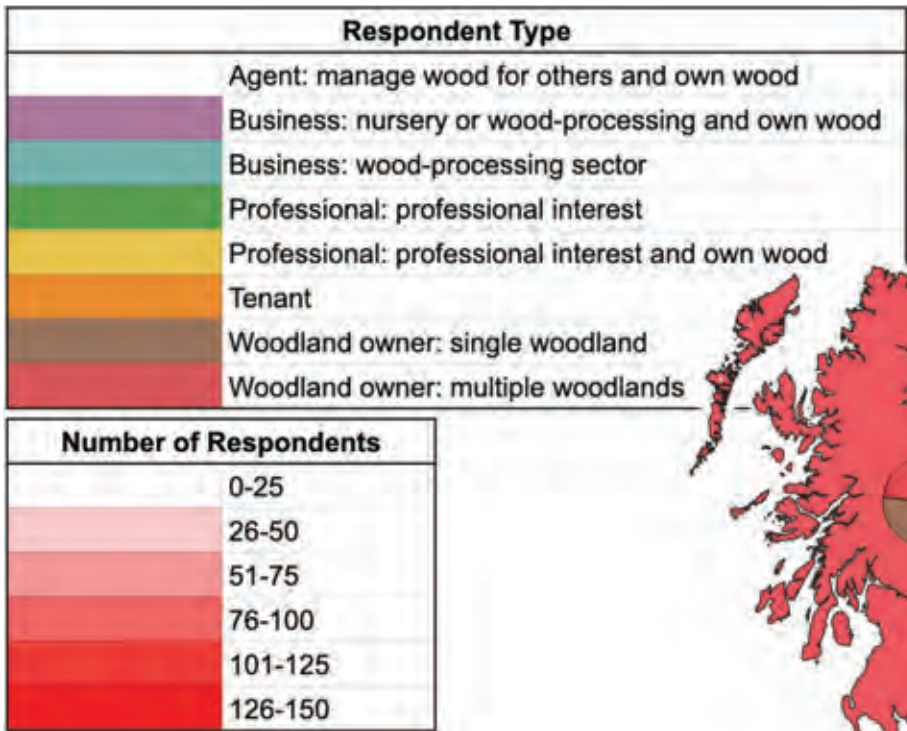
Observations by woodland owners across Britain of changes in environmental damage

2020 BRITISH WOODLANDS SURVEY

About the British Woodlands Survey

The British Woodlands Survey (BWS) gathers evidence about Britain's woodlands and those who care for them. The BWS aims to provide an evidence base on which future policies and practice can be developed. The first British Woodlands Survey was held in 2012 which itself built upon an important series of surveys undertaken by the Department of Land Economy at the University of Cambridge since 1963. The intention was always that a major survey was repeated every five years, while any number of additional surveys on specific themes may be run as required. The British Woodlands Survey is coordinated by the Sylva Foundation and run in partnership with a large number of organisations. Summary results are always published in a report and made freely available. Where possible data collected is also used to support peer-reviewed scientific research. For more information visit: sylva.org.uk/bws

woodland owners, agents, and forestry professionals representing 3% of privately-owned woodland in Britain. With environmental change as its main theme, the research team from Sylva Foundation and Forest Research explored awareness, action, and aspiration among the private sector which cares for 73% of forested land in Britain.



Distribution and frequency of respondents types by regions and countries

Hand-in-hand with increasing awareness and observation of environmental threats, the report has highlighted concerns that many of those who own or manage woodlands are not actively planning or managing in ways which would make woodlands more resilient in future. For example, a minority of respondents had considered local climate change projections or studied the soils that support their woodlands. A key indicator that an owner or manager has considered threats from environmental change while planning to make a woodland more resilient is having a management plan compliant with UK Forestry Standard. The report highlighted that a minority (31%) of respondents had a UKFS management plan in place.

The research team also explored how different motivations among woodland owners might impact upon the actions undertaken which might support resilience in the face of environmental change. It was clear that lack of action, or ‘adaptation deficit’, is largest among owners where timber production is not a major management objective.

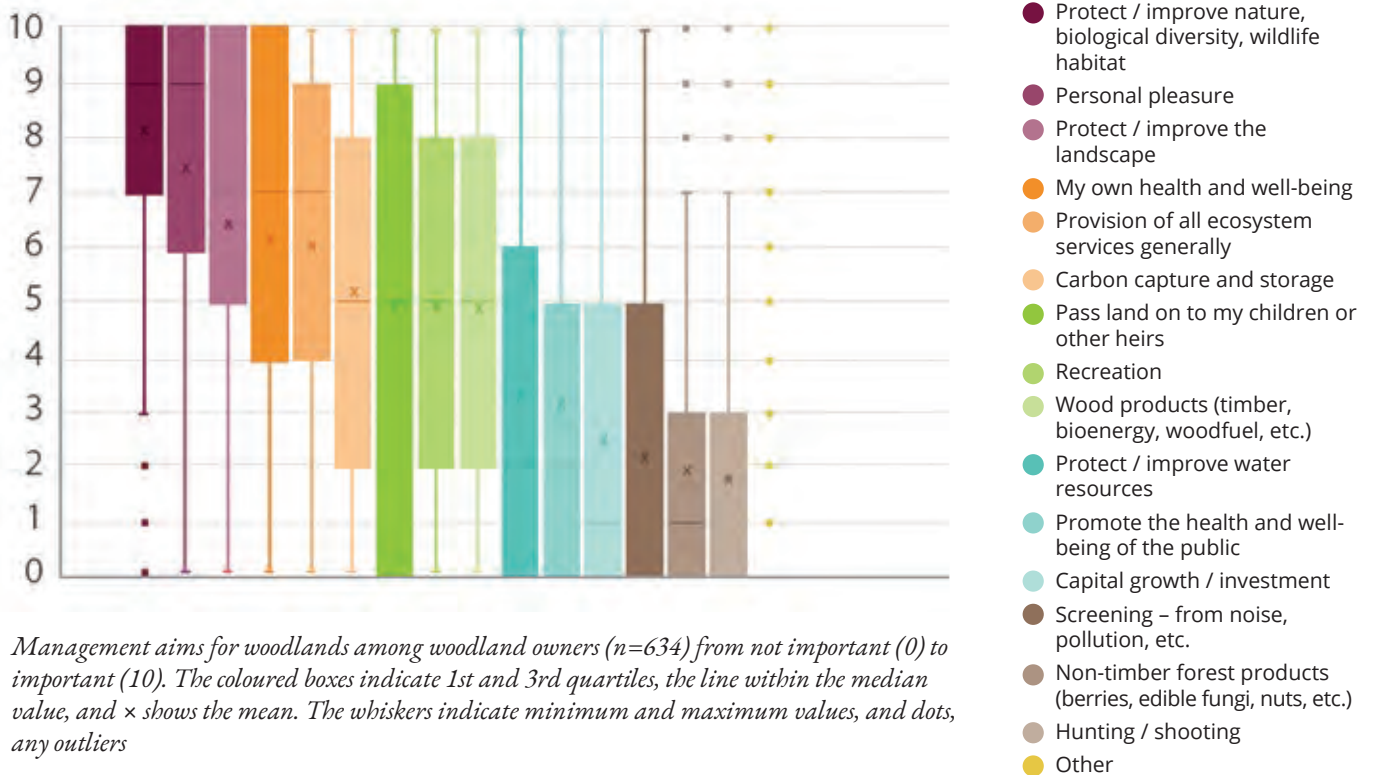
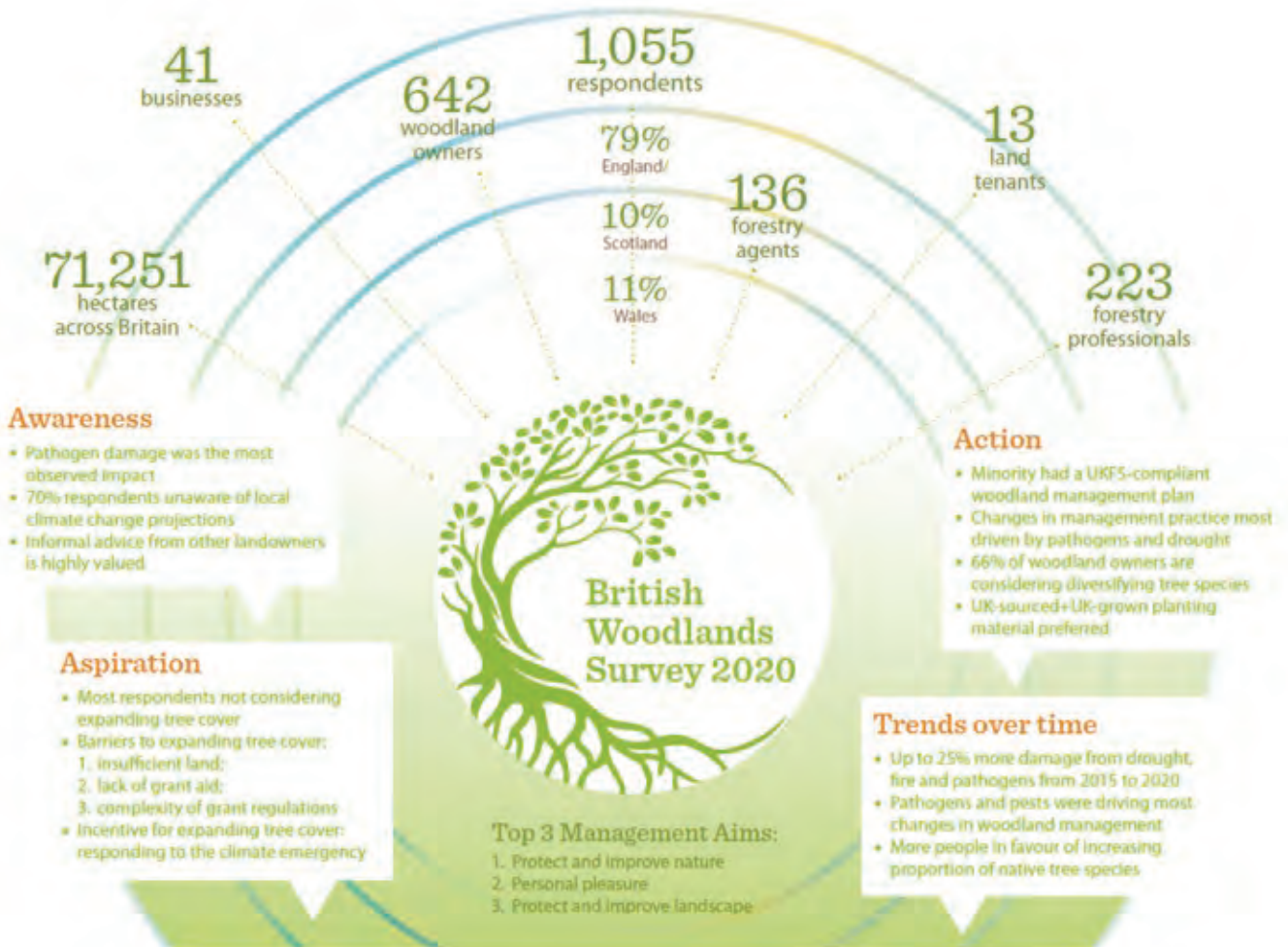
Looking to the future, many respondents indicated that they might consider creating new woodlands and planting new hedgerows or agroforestry systems in the longer-term. In the short-term, however, complexities of regulations and bureaucratic grants were seen as significant hurdles preventing more landowners from considering woodland creation. This is a concern given ambitious woodland creation plans to plant

30,000ha of trees across the UK by 2025 to help the country meet targets to become net-zero by 2050.

Of interest to social scientists was a very strong relationship between current activity and future intended actions among land managers. This is significant because it points to the importance of investing more in advocacy and support for those who own or manage our woodlands. The benefits will be realised not only in their woodlands, but by nature and by society as a whole, long into the future.

The British Woodlands Survey 2020 report is freely available at: sylva.org.uk/bws

Finally, I am very grateful to all Woodland Heritage members who took part in the survey.



Action Oak report 2020/21

by Sarah Jeffery, Action Oak Project Manager

With the dramatic shift in our working lives and despite public events being unable to be staged at which Action Oak planned to be an active participant, 2020 turned out to be a very positive year for advancing and consolidating its research work, tackling the grand challenges identified through its Knowledge Review.

Under the Action Oak banner, the initiative's partners have now established or are planning a total of eleven PhDs.

The students based at Royal Botanic Gardens, Kew studying Oak tree metagenomes from five Acute Oak Decline sites are the two of the longest standing researchers working within the Action Oak initiative.

Established at a similar time and funded by the JABBS Foundation, two more students are based at the Birmingham Institute of Forest Research (BIFoR) studying the genetic and metabolomic markers of resistance to the Acute Oak Decline (AOD) bacterial complex and the Oak powdery mildew fungus.

Significant progress has been made in Wales to enable four funded Oak PhDs to run under the 'KESS 2' programme with match-funding supplied by Defra/FR, Royal Forestry Society, Woodland Trust, the Welsh Government and Woodland Heritage. The studies focus on:

- Characterising the Oak microbiome in health and disease
- Oak powdery mildew and tree health in the Celtic rainforest
- Decay of standing Oak trunks
- Vulnerability of Welsh sessile Oak woodland to outbreaks of native, and invasion by non-native insect herbivores under projected climate change through the 21st century

The host universities are Aberystwyth, Bangor, and Cardiff. Across the Severn estuary, a further PhD is based at University of West of England, Bristol, part-funded by

Woodland Heritage, carrying out a genomic investigation of soil microorganisms.

The most recent PhD student is facilitated by Future Trees Trust with part-funding from Action Oak. The focus of this project is Oak masting, with partners at Reading University and Forest Research, addressing which environmental factors determine Oak masting and the differing quality of acorns produced. The aim is to help to ensure supplies of UK acorns for Oak propagation.

The eleventh PhD, part-funded by Action Oak via a donation by HSBC, is currently being recruited at Newcastle University. This will investigate the effects of climate change on Oak trees, seeking interventions to reduce the impact of climate change and other environmental stresses on Oak health.

As well as all the research described above, there was further exciting news in 2020. Two Action Oak supported consortia had been successful in securing funds via the Biotechnology and Biological Sciences Research Council (BBSRC) Biological plant pathogens funding call. This enabled them to start their programmes in September with full teams appointed for the next three years. The programmes which are described in more detail elsewhere in this Journal are:

Bacteria: Advancement of Control and Knowledge to Save Threatened Oak and Protect them for Future Generations (abbreviated to Bac-Stop, led by Dr Sandra Denman at Forest Research.)

FUTURE OAK: Characterising and engineering the Oak microbiome to future-proof the arboreal icon (led by Professor James MacDonald at Bangor University.)
Action Oak public engagement and awareness raising – with public gatherings unable to take place due to COVID-19 regulations, Action Oak moved its focus away from in-person events and learning, to online and social media events.



The new Action Oak website went live in July and is a useful platform for information on Oak research. It also has downloadable resources, a news section with stories from across the sector, as well as links to the Action Oak social media platforms.

Helped by the new website, the social media reach of Action Oak continued to increase with over 1,500 followers on Twitter, with visits up by nearly 30 times. The newly launched Instagram account has over 240 followers and Facebook posts reach thousands of users, reflecting the interest of people in their local environment, especially during lockdown.

With funding from Defra and the Forestry Commission, Action Oak also worked with some of the researchers to develop short videos talking about their love of trees, research, and the importance of their work. These were released as part of National Tree Week in November. In total, the three videos have attracted over 3,300 views. At the BIFoR annual meeting in January 2021, members of the Action Oak initiative presented updates including ‘Tree diseases: wider ecological impacts and management implications’, by Dr Ruth Mitchell and ‘Genomics of tree health and adaptation’ by Professor Richard Buggs.

Plans for the future

Looking forward to this year, and thanks to the ongoing support of The Prince of Wales’s Charitable Fund, we are working with partners such as the Small Woods Association to deliver online learning opportunities and webinars, publishing an update on the research currently being carried out, and delivering the first Action Oak Awareness Centres, making information on tree health

and biosecurity available to the wider public.

Work is underway with partners in Wales, including the Botanic Garden of Wales. This will tie in the Welsh National Forest developments. We are also working with the Welsh Government and Observatree on using the Welsh Sentinel Tree health sites to promote the key messages of Action Oak.

Yorkshire Arboretum is also keen to support Action Oak by becoming an Action Oak Awareness Centre and will be looking at developing a scheme of trails, leaflets and interpretation during 2021 to tie in with the opening of their new plant health centre.

Discussions are in the early stages with a number of potential hosts to have information on site, linking in with their education and interpretation effort, regarding the importance of the UK’s Oak trees, tree health and Action Oak’s work.

Work is progressing with the Heart of England Forest to develop a new Action Oak woodland. This will provide the possibility of demonstrating a variety of topics including species selection, planting techniques and tree protection. The site will provide a valuable academic opportunity, as well as a chance to show woodland managers the latest research findings being implemented via different management practices.

Plans are also underway for an Action Oak partner event at Kew in 2021, as well as for a fundraising dinner in 2022 in the Guildhall, with the support of the City of London.

actionoak.org

Acute Oak Decline research update

by Sandra Denman (Forest Research)

Last year I finished off my notes on 'Progress on Oak Decline Research' for the Woodland Heritage Journal by emphasising just how much trees and tree research were needed, and what an important time it is for tree health specialists. The past year has certainly borne witness to this.

Both government and charitable sectors have major tree planting initiatives underway and are grappling with multiple questions, for example: what tree health risks are seedborne, and where are the best places to plant different tree species to achieve the widest scope of benefits for the environment and society? Such considerations are crucial to ensure long term tree health and resilience in a changing world.

Consequently, there is great demand for evidence to guide and support tree programmes and accordingly an increase in tree related research grants available. We certainly have been extremely lucky in winning significant funding to further support our research on Acute Oak Decline (AOD).

My close colleague Prof. James McDonald and I each submitted grant applications to the BBSRC (Biotechnology and Biological Sciences Research Council) Bacterial Plant

Diseases (BPD) call for research proposals. Both our proposals were about research on AOD and both won funding; we were absolutely thrilled. These represented two of nine selected projects. More information about the BPD and the projects that are supported is available on their website bacterialplantdiseases.uk. The BPD is jointly funded by the BBSRC, Defra, NERC and the Scottish Government. The project led by James is called Future Oak, which he describes further on, and the project I lead is called Bac-Stop.



Before elaborating on these new projects, it is worth pointing readers to a recent overview of our AOD research findings to date, which is published in the Quarterly Journal of Forestry. Katy Reed has done an excellent job of summarising current knowledge about the causes and distribution of AOD, and advancement of management



Characteristics of AOD on Oak tree stems

guidance to reduce AOD impacts. She reiterates that Oak Declines are not new phenomena, but simply put, they are complex diseases with multiple causes, and no single explanation describes how or why they occur.

Thanks to Woodland Heritage, Forestry Commission and Defra support on AOD research over the past decade, we have been first in the world to identify a suite of bacteria responsible for killing live Oak tissue and causing associated cracks in the outer bark with black weeping patches that characterise AOD. Furthermore, we have identified the bacterial genes used in breaking down live inner bark and showed that in the presence of the larvae of *Agrilus biguttatus*, the variety and activity of destructive bacterial genes is increased. However, it is unknown why this happens and questions regarding the interactions between bacteria and beetle are now being investigated in the Bac-Stop project, including whether the bacteria are carried by the beetle. (More information is given in the summary of Bac-Stop Work Package 1.)

Together with the fact that *A. biguttatus* is unable to colonise healthy Oak stems, evidence from our laboratory testing has made it apparent that bacterial destruction of Oak stem tissue does not occur (or easily occur) on vigorous, healthy stems.

Bac-Stop will investigate the drivers and mechanisms that cause heightened susceptibility or predisposition to decline diseases. Predisposition, as a prerequisite for decline disease to take hold, has been discussed by a number of eminent forest pathologists but was popularised by Paul Manion in 1980 through his diagrammatic representation of the Decline Disease Spiral model. Last year I wrote about how we found correlations between the occurrence of AOD and low lying, warm areas of the country with low rainfall together with high levels of atmospheric nitrogen oxides. These nitrogen gas particles settle on the leaves of trees and during rainfall get washed off and enter the soil as nitrogen throughfall increasing soil nitrogen, sometimes to pollutant levels. This results in chemical imbalances in soils and plants, which upsets normal functioning within plants (Fig. 1 below).

Schematic diagram of the findings and interactions that occur in the soil acidity driven scenario in AOD vs healthy Oak trees

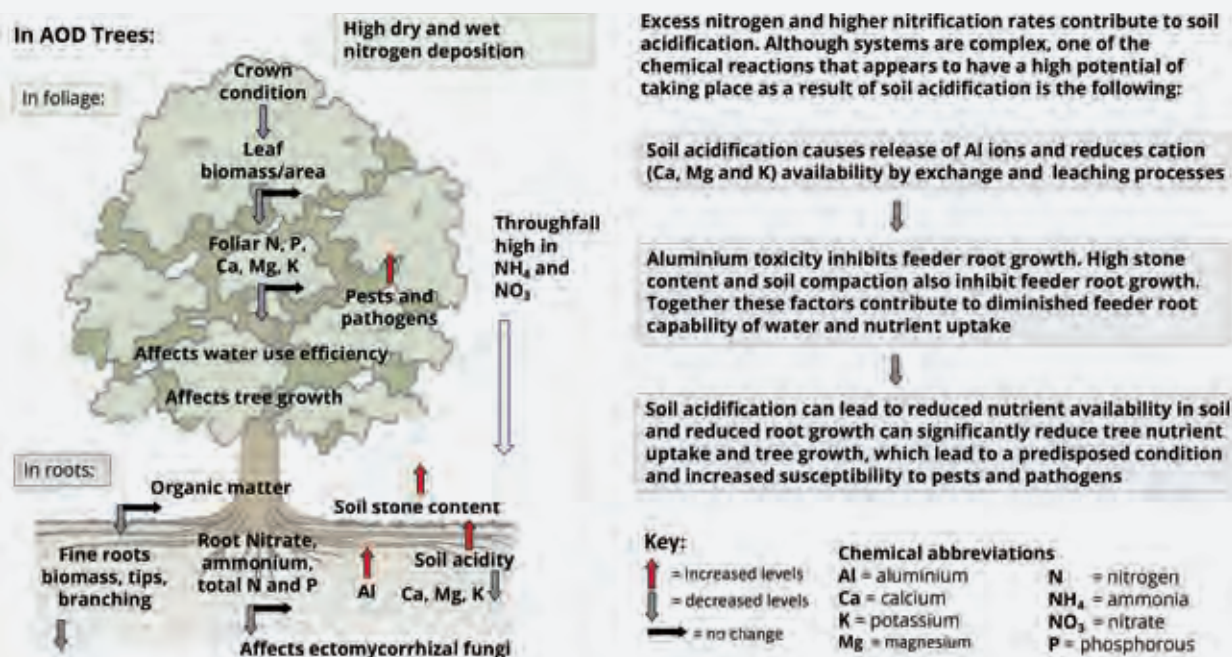


Fig. 1. Schematic diagram depicting the soil acidification scenario detected in some AOD affected trees

Significant differences detected in AOD trees were:

- Soil acidification (low pH)
- High Al reaching toxicity levels in some cases
- Cation (Ca, Mg, K) depletion
- Higher stone content
- Lower root density, biomass, tips, branching
- Lower carbon and water holding capacity
- Lower specific leaf area but similar biomass
- Lower tree uptake of N, P, Ca, Mg and K

Note: In the FPPH and Bac-Stop projects we address host response through measuring growth, water use efficiency and ectomycorrhizal colonisation of feeder roots.

There are two parts to our findings that require further investigation: (i) the effects of low water availability i.e. drought on AOD, and (ii) the effects of nitrogen imbalance on plant health and AOD development. In the Bac-Stop project we are conducting a field trial examining the effect of drought on AOD establishment and development. This is such an exciting and ambitious piece of work, which during the COVID-19 situation has presented us with huge challenges. You can read a little more about this in the part summarising Bac-Stop WP2 aims.

The Bac-Stop project has also afforded us the opportunity to extend investigations into a new area of science around AOD, that is Social Science. In the past years almost all our funding was devoted to discovering the causes and developing management guidance around AOD, but of course central to forest management are the landowner, forest manager and the management objectives. To this end, our project sets out to discover the extent to which people value Oak trees, what attitudes to management are, whether there are barriers to uptake of management guidance, and how these may be changed. Furthermore, we are keen to find out how those involved in management would like to receive communication and information, and how our work can deliver relevant impact. You can read more about this in the summary of WP3 by Liz O'Brien and if you are interested in participating in this aspect of our research, we would like to hear from you.

The final aspect of our Bac-Stop project is to find out whether other tree species with symptoms of stem bleeds harbour the AOD bacteria, or indeed other bacterial species, and whether they pose a risk to our forest trees. More about this aspect of Bac-Stop can be read in Bridget Crampton's description of WP4.

Aside from the Bac-Stop project, we were also lucky to receive funding to begin an investigation into 'Seedborne' pathogens on acorns. The aims of the project are to develop techniques for detection of microbes and to profile the microbial communities on and in acorns, with a view to assessing the risk these would pose to producing healthy trees. This funding is enabling us to use traditional isolation and culture techniques to obtain in hand, fungi and bacteria carried in/on acorns so that we can test beneficial or detrimental effects on seed germination and seedling development. We are also able to use 'single gene community profiling' (a molecular method) to get a fuller picture of the complete microbial community on the seeds (the seed microbiome), because our previous work on

AOD demonstrated that a number of microorganisms go undetected as they are intractable to culture.

Although this is a short project, and only a beginning to this highly relevant area of tree health, at the end of this project we should be able to comment on whether we detected the AOD bacteria on acorns, what harmful organisms were present, and whether there were beneficial organisms present. Although further sampling and testing will need to be carried out for veracity, the findings will have implications for management.

This year we also give you an overview of research being carried out with our team members based at the University of the West of England (see note given by Carrie Brady and Woodland Heritage funded student Dan Maddock). It is really heartening to see our experienced scientists training young people, providing expertise for the future.

Jasen Finch, a longstanding recipient of Woodland Heritage support, updates us on the development of an online tool that he and the Aberystwyth University team developed that assists in assessing the condition of Oak trees. Furthermore, he provides exciting news of developments towards a rapid diagnostic that can be used to ascertain the levels of predisposition stress individual trees experience.

The past year has been really exciting for us as tree health specialists. There certainly have been challenges, but the relief gained from growing recognition of the huge importance of tree health, together with increasing financial support for more sustained periods, has boosted our motivation, which drives our enthusiasm and dedication to do our best for the health and resilience of our trees. Thank you all for your support.

Bac-Stop Work Package 1

Transmission of bacteria in AOD, and linkages between vectors, microbial pathosystem elements, host interaction and functions

Lead: Jozsef Vuts (Rothamsted Research)

WP1 centres around the role of *Agrilus* in AOD. It aims to determine whether the beetle vectors the AOD bacteria and whether there are linkages between vectors, microbial pathosystem elements and host responses.



Dissecting gut and ovipositor out of an *Agrilus* beetle



Agrilus eggs and bacterial implants

Whether or not the beetle plays an essential role in AOD is not yet known. Although there are compelling indications, such as an almost 100% co-occurrence of *Agrilus biguttatus* larval galleries in AOD trees, and high similarities in the distribution range of the beetle and AOD, the involvement of *A. biguttatus* is controversial creating an impasse that affects development of effective management. A key question is about whether the beetle vectors the AOD bacteria. We thus hypothesise that AOD bacteria, specifically *Brenneria goodwinii*, are present in *A. biguttatus* (eggs, larvae, adult gut, ovipositor and frass). Determining if this is true or not would lead to answering the first part of the question ‘does/can the beetle carry the AOD bacteria?’. If it is shown that beetles do carry the AOD bacteria, the next step of the investigation will be to find out whether or not the beetle introduces bacteria to the inner bark tissues of Oak stems. Answering both these questions will provide evidence to support the idea that *A. biguttatus* is a vector of AOD bacteria.

However, to better understand if there is anything in particular about the relationship between the beetle and the bacteria that causes AOD, needs detailed research. Activation of bacterial pathogenicity genes appears to require certain triggers or conditions. Recent evidence from log inoculation pathogenicity experiments suggests that lesion development is more likely to occur and be more severe in the presence of beetle larvae. Amplification of expression of *B. goodwinii* destructive genes in the presence of *A. biguttatus* larvae was found. The interaction between the beetle and the bacteria will be further investigated by testing if *A. biguttatus* larvae are attracted to/arrested by the volatiles emanating from AOD bacterial species. We will decipher the chemical interactions between bacteria and larvae/beetles and identify whether any molecules given off by larvae are able to activate destructive bacterial genes.

Demonstration of whether or not *A. biguttatus* vectors AOD bacteria will yield insights into the arrival of bacteria to tree stems. Laboratory tests will clarify whether the beetle is able to introduce AOD bacteria into trees during larval entry, and also what specifically about the interaction of the larvae and bacteria causes activation of damaging bacterial genes. Results of this work will inform management guidance. Furthermore, the identification of molecular and/or chemical factors that elicit the activation of bacterial virulence genes will aid discovery of potential enzyme inhibitors that could be applied to lesions in the early developmental stage to halt further spread of AOD bacteria within infected Oak trees. A better understanding of host-beetle-microbiota interactions at the gene expression level may create a pathway for follow-on work exploring regulators antagonistic to AOD bacteria. Bacteria-derived attractants for adult beetles will also serve as a platform for the development of detection and monitoring tools for use in forestry practices.

Bac-Stop Work Package 2

Testing drought and nutrient stress as pre-disposition drivers of AOD

Leads: Sandra Denman and Elena Vanguelova (Forest Research)

Recent dendrochronological studies by Katy Reed confirmed that trees with long term AOD symptoms (i.e. those that cannot overcome the bacterial infections) showed weaker growth for decades prior to the arrival of AOD, supporting the idea of weakening factors underpinning tree susceptibility to AOD. Our current work shows correlations between soil nutrient imbalances, soil microbial communities and AOD, linking these to tree resilience ability (see Fig. 1).



Drought shelter in the Bac-Stop WP2 field trial

In WP2 we will obtain empirical data about drought as a predisposing factor using a field experiment that will quantify the effects of drought and nutrient stress on soil processes and tree physiology, as well as tree metabolism and disease development. The microbial communities associated with trees will also be profiled. This information will be linked with the environmental monitoring taking place in WP3, also see Nathan Brown's description of Oak monitoring.

The field experiment will test two environmental treatments and a control. The environmental treatments are: (i) drought, simulated by constructing rainfall exclusion structures and drainage ditches around blocks of trees (above), and (ii) limited nutrient and water supply, using ring barking as a proxy for drought and nutrition limitation.

Within each environmental treatment various disease treatments will be applied which are designed to determine: (i) whether *Agilus* is able to colonise healthy trees, (ii) AOD can establish on healthy trees and (iii) the effects of drought and wounding on disease development.

We will gather data revealing the impacts of treatments on tree defence and metabolism, disease development and composition of the microbiome (i.e. the microbial communities associated with the trees and soil). Data may also give insights into the mechanisms that cause tree susceptibility to AOD. At the end of this work we hope to have evidence of the effects of drought on host susceptibility to AOD, and some understanding of the mechanisms by which this occurs. We will also have information on how drought affects the Oak microbial community, whether its composition is affected and can be used to provide a signature of tree health, or reveal microbial triggers and mechanisms that underlie AOD lesion formation, or even remediation potential.

Scientists involved: Sandra Denman, Elena Vanguelova, Bridget Crampton, Michael Crampton, Nathan Brown, Sue Benham, Frank Ashwood, John Draper, Jasen Finch, Manfred Beckmann, James McDonald, Marine Cambon, Usman Hussain and FR TSU teams including Liz Richardson, John Lakey, Andrew Ross, Mitchell Jacobs, Hannah Gatland, Mark Oram, Harry Kalusznik, Darren Atkinson and Nick Moody.

Bac-Stop Work Package 3

Investigating managers' and the public's attitudes to Oak, AOD and its management, and monitoring Oak health

Lead: Liz O'Brien (Forest Research)

Bac-Stop is an interdisciplinary research project involving different natural and social science disciplines. In WP3 we are focusing our data gathering on managers of woodland and parkland that contain Oak, and the wider public. In our work with land managers we want to include those who manage sites with or without AOD. We will carry out a series of interviews to explore awareness of the threats to Oak, specifically AOD. We want to understand the ways in which managers value their Oaks, management actions to reduce threats to Oak and barriers to taking specific management actions. We will also work with a small number of managers over the course of the project to evaluate management options and explore how guidance could be targeted to encourage uptake of specific management options.

Last year we held pre-project discussions with a range of stakeholders in an Oak resilience workshop held in Alton, Hampshire in March 2020 (see photo below). At the workshop we discussed how best to raise awareness of Oak health and the threats that Oak faces. This provided useful information to inform and feed into our new research.



Some items on display at the ObservaTree information table at the Oak Resilience Workshop in Alton

If you are a woodland/parkland owner/manager and would be interested in being involved in this research and are willing to be interviewed, then please do contact Liz O'Brien at Forest Research (liz.obrien@forestresearch.gov.uk).

To get a view of the wider public opinion on Oak, the threats it faces and what to do about these, we will be carrying out an online survey of a representative sample of the population to explore people's values for Oak woodland and heritage Oak trees, awareness of the threats to Oak health, acceptability of management practices, and willingness to engage in actions for Oak such as citizen science. We will also engage the wider public and create a webpage known as a 'Tribute to Oaks'. Through this online approach, which we will publicise via social media, people will be invited to contribute a short story, poem, or comment on their relationships with Oaks from single trees to Oak woodlands.

Another part of WP3 led by Nathan Brown links with WP2 and investigates predisposition through detailed monitoring of "sentinel trees". Underlying Oak health will be observed by measuring growth and estimating density of leaves within the tree crown. We have recently published a paper detailing how this is best done. Volunteers will be trained to assess tree health and asked to monitor seasonal and annual changes. We aim to foster greater awareness of Oak and increase the ability of individuals and groups to detect change and record it. This monitoring programme will link with and expand FR's network of Oak condition plots established in the 1980s to monitor long term changes in forest health. The FR tree health monitoring programme has recently been revived (see the article by Nathan Brown on the next page).

Bac-Stop Work Package 4

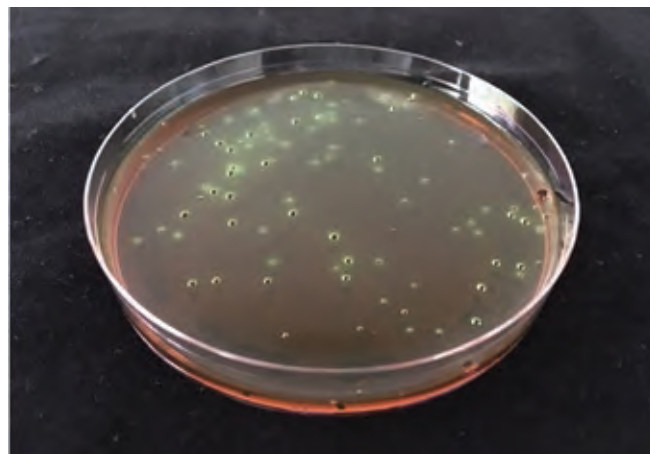
Bacterial cankers in broadleaved tree species and analogues to AOD development

Lead: Bridget Crampton (Forest Research)

In Work Package 4 we aim to determine whether bacteria play a role in stem bleeding canker formation on broadleaf forest species, and to specifically assess whether *Brenneria* species are involved in canker formation. *Brenneria* species are well known tree pathogens causing cankers on Walnuts (*Juglans* spp.) (pathogens are *B. nigrifluens* and *B. rubrifaciens*); Alder (*Alnus* spp.) (pathogen – *B.*

alni); Willow (*Salix* spp.) (pathogen – *B. salicis*); Poplar (*Populus x euramericana*) (pathogen – *B. populi*); and on Oak (*Quercus robur*, *Quercus petraea*), Lime (*Tilia* sp.), and Hornbeam (*Carpinus* spp.), where the pathogen is *B. goodwinii* and there could be more. To date, Tree Health Officers, Forest Research pathologists and citizen science volunteers have collected swabs from bleeding cankers on broadleaf trees, from which we isolated bacteria and performed real-time PCR analysis to detect the presence of AOD bacteria. Carrie Brady is in the process of identifying bacteria by sequencing taxonomically informative genes, and any new bacterial species of interest will be fully taxonomically classified. Collection of swabs and identification of bacteria from non-Oak cankers is ongoing. In addition, we will undertake single gene community profiling on bleeding cankers from broadleaf trees. This will allow us to determine whether there are any plant pathogens present that were not identified through isolation studies. Interesting plant pathogens, especially *Brenneria* spp., will be inoculated onto logs of various broadleaf trees to determine if they are able to induce bleeding cankers. If these tests are positive further testing will ensue to find out whether the bacterial pathogen is host specific or induces symptoms on several tree hosts. This work package will shed light on the types of bacteria that are involved in canker formation on broadleaf trees.

Scientists involved: Bridget Crampton, Carrie Brady, Sundeep Kaur, Ana Perez, Sandra Denman.



Petri dish with bacterial colonies isolated from swabs taken from diseased broadleaf trees



Swabs

Woodland Monitoring: Understanding long term changes in Oak health

Nathan Brown (Woodland Heritage)

Nationwide Oak monitoring sites were established by Forest Research in 1987, as part of a multi-species Europe-wide monitoring network called the 'Forest Condition Survey (FCS)', and they were monitored until 2007. The original aim was to document long-term changes in tree health in relation to pollutant deposition (such as acid rain), but now this same information is vital in informing the study of predisposition to decline.

The underlying health of Oak trees is observed by measuring tree growth (height and girth) and estimating the density of leaves in tree crowns. Trees with larger crowns and a denser covering of leaves photosynthesise more, creating more sugars with which to grow and fight off pests and diseases. It is hoped that by understanding the changing status of Oak health we can better plan for future change and spot unwanted trends early and apply correctional management. Sites with Oak in declining health will be investigated to reveal the drivers behind this change and enable mitigation efforts to be developed and deployed in good time.

Thanks to support from Action Oak, Woodland Heritage and the Forestry Commission we gathered further data during 2019 and 2020 at all the remaining FCS sites in England, Scotland and Wales. In addition to this, as part of the Bac-Stop project, work is underway to develop the methods for site owners, managers and volunteers to observe parkland and sentinel trees at sites they visit frequently. Volunteer groups will be trained to assess crown condition and asked to follow the seasonal and annual changes in the health of individual trees over time. In the summer we plan to work at a limited number of sites to develop our training methods and materials, before encouraging wider participation in 2022.

This year has presented a number of challenges to a project that intended to gather large groups of volunteers for workshops and training, however thanks to the experience that Peter Crow and Suzanne Sancisi-Frey have built through the Observatree programme, we have developed novel ideas for online training and virtual tree assessments, which can support our work this summer.

Research update from Carrie Brady

(University of the West of England)

In September 2020, I started working in WP4 of the Bac-Stop project where I will be identifying and classifying bacteria from cankers and bleeds of broadleaf tree species. Covid-19 restrictions on travel have made it difficult for us to collect field samples, but luckily we've had help from Ana Perez-Sierra (the head of the Tree Health Diagnostic and Advisory Service at FR) and various volunteers who have been taking swab samples of bleeding cankers. So far, I've identified bacteria from Lime (*Tilia* spp.), Beech, Spruce, Red Oak and London Plane trees. Initial identification of the bacteria from these swabs has already revealed some interesting results with the same bacterial species isolated from several different broadleaf trees. The next steps will be to carry out a deeper identification of these bacteria using a range of techniques, and to include them in pathogenicity trials on logs to determine if they are responsible for the bleeding symptoms.

A second aspect of our research at UWE, which will run in parallel to the Bac-Stop project, is a new collaboration with Westonbirt Arboretum. Late in 2019, I identified a novel bacterial species isolated from a *Tilia* species displaying symptoms of bleeding canker. With over 50



Tilia x moltkei bleed, Westonbirt

different *Tilia* species, Westonbirt was the obvious place to start searching for further strains of this bacterium. We have a new MRes student, Helene Kile, joining our research group in March and her project will focus on comparing the bacteria isolated from healthy *Tilia* trees (collected last September from different *Tilia* species and hybrids) to those isolated from symptomatic trees. She will also be screening the trees for the presence of the AOD bacteria. We plan to return to Westonbirt for a spring sampling trip to determine if the bacterial community in the *Tilia* trees changes depending on the season.

Daniel Maddock
(PhD student, UWE)



Daniel Maddock

With so many factors contributing to the development and spread of AOD it's of no surprise that soil, the physical support system and its associated biotic and abiotic factors are of interest. The rhizosphere was first proposed in 1904 and is an essential feature of plant health, being the first point of contact between microbial communities found in soil and trees. Bacteria in the rhizosphere are well known for their ability to mobilise nutrients, defend against potential pathogens and even cause disease themselves.

I am a second year PhD student at the University of West England (UWE), jointly funded by Woodland Heritage and UWE. My project aims to highlight the differences in the soil bacterial community of healthy versus diseased trees. During a recent field trip to Hatchlands Park, eighty rhizosphere samples (roots and all) were collected from AOD symptomatic and non-symptomatic trees in a paired model system. Using DNA extractions from soil for genomics-based identification of bacteria coupled with traditional microbiological culturing techniques, members of the rhizosphere will be identified, and novel species

classified. After identification, potential differences in the composition of bacteria isolated from the rhizosphere will be highlighted, furthering understanding of their potential roles in AOD development.

New management guidance aid: Oak health assessment tools

Jasen Finch (Aberystwyth University)

Recent work by Forest Research and Aberystwyth University has developed a novel tool for assessing the visual health and decline status of Oak stands. The tool determines severity and type of Oak decline using a series of simple observations and measurements describing the Oak trees' size, stature, crown health and stem symptoms. It enables trees to then be assigned a decline index score on a continuous scale between 0 and 1. This method has proven useful for allowing researchers to objectively describe the spectrum of Oak decline in study trees, and it also has great potential as a management tool guiding thinning operations and management interventions. The methodology for this tool is outlined in a recently published article in the *Forest Ecology and Management* journal, titled "Index measures for Oak decline severity using phenotypic descriptors". The article is available at doi.org/10.1016/j.foreco.2021.118948. An interactive web application accompanying the article is also available online at jasenfinch.shinyapps.io/decliner.

Jasen Finch and the team at Aberystwyth University are also investigating the chemical composition of living woody Oak tissues using a technique known as metabolomics. It is thought that this will identify chemical changes that take place when trees transition from healthy to a diseased condition and vice versa if they recover. Recent findings indicate that the levels of sugars found within these tissues could have potential for predicting the likelihood that a tree suffering from Acute Oak Decline could transition into remission and in time recover from the syndrome. The sugars present in the trunks of Oaks are key indicators of the general health and vigour of a tree. This exciting finding could enable the development of tests, suitable for use in the field, and could provide vital information guiding forest management and intervention strategies.

Oak health and the microbiome

A new research project aims to identify beneficial microorganisms on native Oak and explore how they could help suppress diseases.

by Professor James McDonald

Much like humans are colonised by trillions of microorganisms, trees also live in close association with bacteria, fungi, and other microorganisms. Different communities of microorganisms are associated with tree stems, roots, and foliage, where they play important roles in acquiring nutrients for the plant, regulating plant immunity, and suppressing pathogen attack. These collections of microorganisms, their interactions, and the parts of the host plant where they are active is called the 'microbiome'.

FUTURE OAK, a new research project, will unravel the microbiome of Oak in the search for ways to promote the health of this native species. Despite the well-documented importance of microorganisms in plant health, the role of the microbiome in Oak health is still poorly understood. The research will be led by Prof James McDonald at Bangor University, and undertaken in collaboration with Forest Research, Aberystwyth University, Woodland Heritage, and the Sylva Foundation. The FUTURE OAK team will analyse the microbiome of trees across England, Wales, and Scotland using DNA sequencing technology and by growing microorganisms from healthy Oak trees in the laboratory. By comparing the composition of the microbiome with tree health status and testing isolated microorganisms for their ability to suppress Oak pathogens, we will identify beneficial members of the Oak microbiome community.

Following on from this, the second major aim of the FUTURE OAK project is to explore the use of 'engineered microbiomes' to suppress disease in Oak trees. Microbiome transplants have been used in human medicine to treat people with bacterial infections such



Professor James McDonald

as *C. diff* (*Clostridium difficile*) and have also been demonstrated to effectively suppress disease in plants. Ultimately, the FUTURE OAK team would like to develop new microbiome-based treatments to promote Oak health and disease suppression.

Introducing the microbiome to our thinking about tree and forest health presents a distinct challenge. Consequently, a major component of FUTURE OAK will be to work with land managers to explore their understandings of the role of the microbiome in plant health. In particular, the team will be exploring perceptions and views on the potential to use 'engineered' microbiomic products to prevent and treat Oak disease. We are keen to hear from land managers who might want to get involved in the research, and we encourage them to get in touch.

For more information about the project:

future-oak.com

Twitter: **@FutureOak_**

or email James McDonald: **j.mcdonald@bangor.ac.uk**




A mature Oak tree at Chirk, North Wales


The FUTURE OAK project is part of the UK Research and Innovation's (UKRI) Strategic Priorities Fund (SPF) programme on Bacterial Plant Diseases funded by Biotechnology and Biological Sciences Research Council (BBSRC), the Department for Environment, Food and Rural Affairs (Defra), the Natural Environment Research Council (NERC) and the Scottish Government, and supported by Action Oak. FUTURE OAK is also collaborating closely with a sister BBSRC project 'BAC-STOP', led by Dr Sandra Denman.

Team members: Bangor University – James McDonald, Norman Dandy, Jim Downie, Seumas Bates, Alejandra Ordoñez, Usman Hussain. Forest Research – Sandra Denman, Anparasy Kajamuban. Aberystwyth University – John Draper, Jasen Finch, Manfred Beckman. Woodland Heritage: Nathan Brown. Sylva Foundation – Gabriel Hemery.



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Growing Oak faster

by Miles Barne

Overview

In some European forests, Oak is grown on rotations of between 240 and 300 years. Often in Britain, Oak is not felled until it reaches 180 or even 200 years. This failure to fell earlier is caused by low timber prices, concern for the landscape, a reluctance to cut down old friends and a desire to avoid disrupting the shoot, paint balling and other recreational activities.

If we want the practice of growing Oak to be more financially attractive, then we need to grow it faster. To see if this is possible, we should look to France and Wales.

After 30 years of trials, scientists working for *Forêt Privée Française* have determined that prime Oak timber can be grown to 60 cm girth for coeprage in 90 years. The Forestry Commission's free growth experiment in Crumblands Plantation, South Wales, supports this claim.

So, we know that we can achieve this in Britain, but we don't have a coeprage industry and British sawmillers pay better money for logs with a girth of 80cm.

So, this should be our target diameter. Given good soil and provenance and what the French call *active silviculture*, it may be possible to achieve a tree of 80 cm girth containing nearly three cubic metres of planking Oak in 120 years.

At 2019 prices, this suggests a standing value of nearly £1,000 per tree, or £70,000 per fully stocked hectare, representing an annual increase in value of £583 per Ha during the life of the tree. In addition, income will have been earned from the sale of thinnings, recreational rents, and, in the case of new woodland, grants and carbon capture.

The form of active silviculture described in this note has been inspired by the work of French scientists Jean Lemaire, Eric Sevrin and others whose findings were published by the CNPF in 2010 under the title *Le chêne autrement*.

In 2014, Bede Howell translated this excellent manual as *Oak: fine timber in 100 years*. It may be purchased from Future Trees Trust for £30, with 50% of the net proceeds of these book sales being received by Woodland Heritage.

Experience at Sotterley

The 165 Ha Sotterley woodland in northeast Suffolk lies seven miles south of Lowestoft at Latitude 52.26 N. Elevation is 24 metres, average rainfall 600 mm (25 inches). Estate woodland cover is 11%.

This part of Suffolk can experience dry springs so planting takes place before Christmas. The principal Oak compartments are on clay with a pH of 5.2. The Oaks are mainly *robur*.

Soil Preparation

The old crop is felled in August while ground conditions remain firm. A tracked, 360-degree digger then breaks the

pan by loosening the soil to a depth of 12 inches. Even after heavy rain, no water lies long following this treatment.

Restocking

Care has been taken to select the better provenances found in Britain, the Netherlands and Denmark. Acorns from these stands are delivered to Forestart in Shropshire for treatment and storage. In the spring, they go to a nursery near Newent.

After two summers, the bare root plants are graded to 40/60 cm and planted out at a density of 6,250 per Ha arranged as one metre spacing in the rows and 1.6 metres between the

rows. This allows an annual mowing, using a flail mounted on a garden tractor until canopy closure at year six.

From the first summer it may also be necessary to trim within the rows until the canopy closes. This is particularly important if climbing bramble or honeysuckle and taller weeds like willowherb and nettle persist. Cleaning of volunteers such as Sallow and Birch is undertaken as required to prevent competition with Oak. The plantation is fenced against hares, muntjac and Chinese water deer.

In years two or three, Hornbeam is planted within the rows at a rate of 400 per Ha. This ensures that by year 20 when halo thinning takes place, stems of the winners will be shaded to discourage the growth of epicormic shoots. Should Hornbeam compete with the young Oak, it can be cut back until required.

Early silviculture

Wolf trees are removed at about year 12 and by year 17 some 50% of the remaining trees should have been removed. During this period, about 100 of the most vigorous and best formed stems per Ha are favoured to encourage the start of crown development.

By year 20, it should have been possible to select 70 or 80 potential Winners per Ha. Ideally, these will be 12 metres apart but often between six and 15 metres. They should show superior girth and height (vigour), the potential for at least six metres of clean timber, straight stems and well-structured crowns. Thereafter, silvicultural attention is concentrated on these Winners.

When pruning, forks and heavy branches are cut first, but care must be taken not to rob the crown of its energy by over pruning. Where this is a risk, smaller branches lower on the stem are left for a few years. To guard against over pruning, the clean stem should not exceed 60% of total



Five year old Dutch robur



Images © Stephen Taber Photography

27 year old English robur

height. Pruning is spread over several years and aims to achieve at least six metres of clean timber by year 30.

Some 70 of these Winners per Ha will form the final crop. The remaining stems provide shelter, lateral shade and possible replacements.

Halo thinning

The crown is the engine of growth and, viewed from the ground, the crowns of the Winners should be surrounded by “an unbroken ring of sky” to allow unfettered expansion. Companion trees are removed as the winning crowns expand. This is a crucial element of “free growth” if a short rotation is intended.

The Estate’s eldest close-planted trees are presently 27 years old and have recently undergone their third halo thin.

Grey Squirrel Control

Growing Oak for timber in Britain should not be attempted unless it is accompanied by the continuous and systematic control of grey squirrels. As in Ireland, the arrival of pine martens here should release timber growers from this costly and onerous task.

Annual Wood Awards winners 2020

by Francesca Gregson, Distrikt Communications

The judges of the Wood Awards 2020 selected six structures and three products that represent the best of British architecture and product design in wood. Established in 1971, the Wood Awards is the UK's premier competition for excellence in wood design. The competition is free to enter.

The Wood Awards was one of the few design competitions to go ahead despite COVID-19. The independent panel of judges always visits all the shortlisted projects in person, making this a uniquely rigorous competition. For 2020, the usual judging process had to be adapted, but the competition persevered, and the judges still managed to see each project.

The Gold Award, the winner of winners, was given to the Private category winner, which was London-based The Rye Apartments by Tikari Works. The development of ten sustainable apartments sits on a prominent corner site. A mix of one, two, and three-bedroom units are set in two blocks that respond independently to the changing scale across the site. The user's quality of life is at the heart of the design. The project was driven by two key considerations; how to resist standardised or default positions within housing design, and how to minimise the materials, embodied carbon and cost. CLT (Cross Laminated Timber) was used for the superstructure and all the internal walls and staircases.

The Commercial & Leisure winner was Frindsbury Manor Barn, a conservation project by Dolmen

Images © Jack Hobhouse



Gold Award – The Rye Apartments by Tikari Works



Frindsbury Manor Barn by Dolmen Conservation Ltd

Conservation Ltd. This Grade 1 listed medieval barn, originally built in 1403, was damaged by fire in 2003. At 210 feet it is the longest barn in the UK. A third of the barn was re-built in locally sourced green Oak. Large quantities of curved timber were selected for braces and tie beams. In total, 1400 cubic feet of Oak was used. The judges admired the attention to detail and the scale of the conservation project.

The Swimming Pool Hall at King’s College School, Wimbledon, by David Morley Architects was selected as the Education & Public Sector winner. Judge Kirsten Haggart said, “The different timber elements all have the same, white-washed tone and coordinate perfectly with the reinforced concrete columns, creating a beautiful place which has an intimacy that most pools lack.” The building’s design has strong visual connections between indoors and outdoors to encourage physical activity among students. Curved glulam beams support CLT roof panels with integral timber acoustic linings.

The Interiors winner was Bickeridge Stair, entered by Future Joinery Systems Ltd. The prototype staircase is part of a UK government funded R&D project to enable digital fabrication directly from BIM modelling environments.



Swimming Pool Hall by David Morley Architects

The stair rises three floors and is cantilevered from flush mounted stringers. The parts were CNC machined and assembled onsite using standard tools. The new platform developed during research allows designs to be defined parametrically, enabling the user to configure bespoke objects to specific requirements. Items can be locally fabricated through a distributed manufacturing network model open to any CNC enabled workshop.

Image © Morley von Sternberg



Brockeridge Stair by Future Joinery Systems Ltd

The Small Project winner was *Wooden Roof* by Tsuruta Architects. One solid piece of wood, enclosed by four seasons glazing units, forms the entire structure and acts the building's envelope, structure, insulation and cladding. The diagrid frame is a combination of falls that are either short and steep or long and shallow. The pieces were all CNC fabricated and were light enough to be assembled manually onsite. The beam cross junctions were fixed without any glue or mechanical fixings.

The Structural Award winner was the National Automotive Innovation Centre, chosen from all the shortlisted buildings. Structural judge Nathan Wheatley commented, "We are looking for a scheme that has challenged the engineer, where the concept has been delivered in spite of that challenge and where the resultant structure is in some way integral to the success (and architecture) of the building." The Centre is the largest research and development centre of its kind in Europe. The walls were assembled using a pioneering system of prefabricated, self-spanning timber and CLT mega-panels that could be erected quickly. As one of the largest timber roofs in the world, the glulam CLT lattice structure unifies the many activities housed beneath a single umbrella. Primary



Wooden Roof by Tsuruta Architects

and secondary joists are arranged on a diagrid, spanning onto supporting beams on a 15m grid.

The Furniture & Product judges selected two winners within the Bespoke category; *Duo* by Studio Woodgate and *The Beehave* by Marlène Huissoud. Both projects were produced by Benchmark Furniture.

Duo is a pair of deceptively delicate sofas designed for Alex Beard CBE, Chief Executive of The Royal Opera House. The light rectangular arms have a curved chamfer detail with cleverly hidden metal rods to ensure the sofa is robust. A subtle two-millimetre radius runs around the edge of the wood throughout the piece. The two end frames for the arms were made up from solid timber and shaped on a five-axis CNC machine. The seat and back are made from a solid timber frame and sit on a nook cut into the end-frames secured by a metal dowel.

The Beehave was commissioned by Sir Ian Blatchford for a new permanent collection at the Science Museum. Rather than a traditional, house-like beehive, Marlène created something more organic. The piece was hand carved and the red Oak was then blackened using a scorching technique. It took 100 hours to add the tactile engraving details to the surface using a pyrograph.

Tenon Table by Daniel Schofield for L.Ercolani was the Production winner. The judges admired the design and were particularly impressed by how well balanced the tables are. A pragmatic approach was taken to the design of the table. The oversized wedged tenon has become a focal point which highlights the construction of the piece and the quality of craftsmanship. A combination of wood turning, CNC machinery and hand jointing were used.

Plans for the Wood Awards 2021 will be announced in the spring.



National Automotive Innovation Centre



Duo by Studio Woodgate



The Beehive by Marlène Huissoud



Tenon Table by Daniel Schofield

The past, present and future of Hooke Park, the Architectural Association's (un)usual forest

Location: Beaminster, Dorset

by Zachary Mollica and Christopher Sadd



Image © Raza Kazim

A view of the AA's forest campus from above. The site's buildings are found at the centre of Hooke Park's 350 acres

Zachary Mollica is Hooke Park's Warden. He arrived in 2014 as a student of the MArch Design + Make programme and has since 2018 led the AA's operations in Dorset.

Christopher Sadd is Hooke Park's Head Forester. He has managed the school's forest for 30 years and has provided the raw materials for every project you will find on the site.

In 2002 the Architectural Association School of Architecture (the AA), a design school found within a line of Georgian townhouses in London's Bedford Square, took on a bold new venture, acquiring a 350-acre forest in Dorset to establish a second home. As grounds of an ancient woodland and host to an earlier design college, Hooke Park is an unusual site which since the early 1980s has fostered a productive collaboration between forest management and design practices. A growing educational campus is located at its centre; there's no place quite like it.

Hooke Park is home to the AA's MArch/MSc Design + Make programme and hosts short residential workshops



The Wood Chip Barn's robotically fabricated 'tree fork truss' is made of 20 distinct beech forks. Through digital design and fabrication tools the inherent form and structural capacity of the tree is employed directly. Completed in 2016

for visiting students throughout the year. Collectively, the site's woodland, innovative buildings and expert staff create a unique educational environment for students who have the good fortune to spend time here. Away from the city, exploring design at the point of physical production, Hooke Park students are tasked with developing alternative ways of making buildings with trees. They are supported by a diverse team which includes foresters, engineers, artists, roboticists and scientists amongst others.

Hooke Park first appears in the Domesday Book (1086). From then until the mid-20th century, it was used variously as a common, a deer hunting enclosure and then as an investment. In 1949 the Forestry Commission acquired the forest in addition to 90 acres of adjoining rough grazing. To help fuel post-war rebuilding efforts, they set about the progressive felling and replanting of most of Hooke Park's forest between 1951-60. Except for a few areas of Alder carr and the odd Oak stem, native species were replaced with those predicted to be of greater value, including Beech, Norway Spruce, Douglas Fir, Western Red Cedar and more. These were planted in mono-specied compartments which suffered from overcrowding due to minimal thinning taking place until the 1980s.

In 1982 the Parnham Trust, a nearby educational institution led by furniture designer John Makepeace, acquired Hooke Park and set about building a new campus in the woods. Three buildings developed in this period by teams including ABK Architects, Frei Otto, Edward Cullinan and Buro Happold deployed long slender Spruce poles within their structures – each taking advantage of the tree's great strength along its grain. It was the Trust's vision to source the material for these buildings by thinning the forest compartments around them, and to this end, they appointed Andrew Poore as their Head Forester to set a course of management. Despite their rough finish, these buildings were far ahead of their time: a visceral commentary on the common disconnect between design concept, construction method and material source.

When the AA took on Hooke Park in 2002 it inherited 350 acres of forest, three extraordinary buildings (one each to eat, sleep and work in) and a few staff members who remain central to activities today. It also inherited an ethos demonstrated by the campus' first buildings – adding value to low-value products of the forest through design. In 2010 Martin Self, then Director of Hooke Park, founded the Design + Make postgraduate programme



Designed by Richard Burton of ABK and Frei Otto, with the engineers Buro Happold, Hooke Park's main workshop is an impressive long-span enclosure built using low-value material from the surrounding forest. Completed in 1989

whose students have since been responsible for extending the campus through ambitious design-build projects generously funded by the Wakeford Bequest.

Introducing new digital methods to an old material, the programme has produced a series of provocative buildings whose strategies, if applied at scale, might enable a greater diversity of forest products to be applied within buildings with minimal processing. In recent years Design + Make has become well known for deploying bent, forked and otherwise non-straight timbers through the combined forces of digital 3D scanning and a six-axis robotic arm.

The last 30 years have seen a transformation of Hooke Park's forest structure, targeting the less stable crops through felling and restocking with mixed species. Thinning of the broadleaf dominated stands remains an annual operation following the forest's current Woodland Management Plan. These and other forestry processes fit well into the Design + Make curriculum, enabling students to consider the material of timber firsthand. Further links between theory and practice are made through lectures on forestry and also in understanding and participating in practical skills such as high pruning and planting.

At the end of 2019, the AA launched a new research unit known as the Wood Lab, with funding from John Makepeace. In its first year, the lab is working towards a long-overdue publication which will tell the full story of



Students in Hooke Park are not only taught to use traditional tools. They are also taught to instruct complex digital machinery, and even to make their own as needed

more than 30 years experimenting with trees, while casting an eye forward to building the case for the increased use of native forest products. In the face of an imminent climate emergency, trees are the source of essential building materials for the future. Too often the relationship between foresters and those who will use their products has been a disconnected one requiring a degree of crystal ball gazing. Work in Hooke Park points to the exciting potential outcomes of a collaborative relationship between those producing and those using trees – resilient woodlands and extraordinary buildings made from their products.

The spaces we occupy influence us considerably. Through an unnerving 2020, Hooke Park's unique resources have enabled our students to continue their work in person; to stay on the tools. Beyond any project, Hooke Park's most impactful product will be motivated individuals, who, having learned from many professions, will leave the forest's boundary equipped to take on the urgent issues ahead.

Follow our antics on Instagram [@hookepark](https://www.instagram.com/hookepark)
For more information on the AA please visit [aaschool.ac.uk](https://www.aaschool.ac.uk)



Design + Make students participate in a roundwood joinery class in Hooke Park's Big Shed

Woodland Heritage

Events and Courses Programme 2021

The country is on course to be free of COVID-19 restrictions by the longest day, June 21.

As this date for removing all restrictions is not certain, however, Woodland Heritage's Trustees have decided not to run a Field Weekend this year.

Instead, the Trustees would love to welcome you to one of the events or courses currently planned for 2021, though all arrangements are subject to the COVID-19 rules and guidance applicable at the time:

Field Days

Thursday July 8

Visit to Hooke Park (see article opposite) including the AGM, as well as a visit to John and Jennie Makepeace's home at nearby Farns in Beaminster, Dorset, where John has his design practice, gallery and an impressive range of indigenous trees seasoning for future commission, and Jennie has created the wonderful garden.

Book via the website, by contacting office@woodlandheritage.org, or by phoning 01242 467356. Places are free, first-come-first-served (with donations gladly welcomed).



Celebration of Craftsmanship and Design (CCD)

August 21-30 in Cheltenham

Woodland Heritage has been sponsoring the Best Use of British Timber Award at CCD for several years.

Unable to be run in 2020 due to COVID-19, the exhibition was not going to be run in 2021. Our reaction was that famous old saying: "the show must go on!". And with a positive response from exhibitors, we are committed to making this happen.

Plans are still coming together for the exhibition, so please keep in touch with it via celebrationofcraftsmanship.com, through phoning 01242 467356, or by e-mailing office@woodlandheritage.org.

Tickets will go on sale later in the year via the CCD website.



Woodland to Workshop (W2W) courses

September 20-22 and 27-29, Whitney Sawmills, Herefordshire

W2W is due to be run for the 24th and 25th times this autumn. An innovative course linking 'tree growers with wood users', to broaden horizons and raise awareness by educating participants about the forest through to the workshop and beyond...

The course will be based in the woodland, timber yard, sawmill and joinery workshop. Limited numbers to make the most of the interactive nature of the learning. Grants towards the cost of the course can be applied for.

Download an application form from woodlandheritage.org/woodland-to-workshop.



Forthcoming attractions

Please keep an eye out on the Woodland Heritage website (woodlandheritage.org) for details of other Field Days in 2021 as they are confirmed.

Members: we will send out details of forthcoming events by email* when you will then be able to book via the WH website. (*unless you have previously opted out of email correspondence)



**WOODLAND
HERITAGE**

for the future of British woods

The Forest Book

by *Gabriel Hemery*

Former Woodland Heritage Trustee and author Dr Gabriel Hemery explains the vision behind his latest book – *A guide to the copses, woods, and forests of Britain* – and invites woodland owners to get involved.

I've been humbled by the support received from people who share my silvan passion since I announced my intention to write a guide to the copses, woods and forests of Britain.

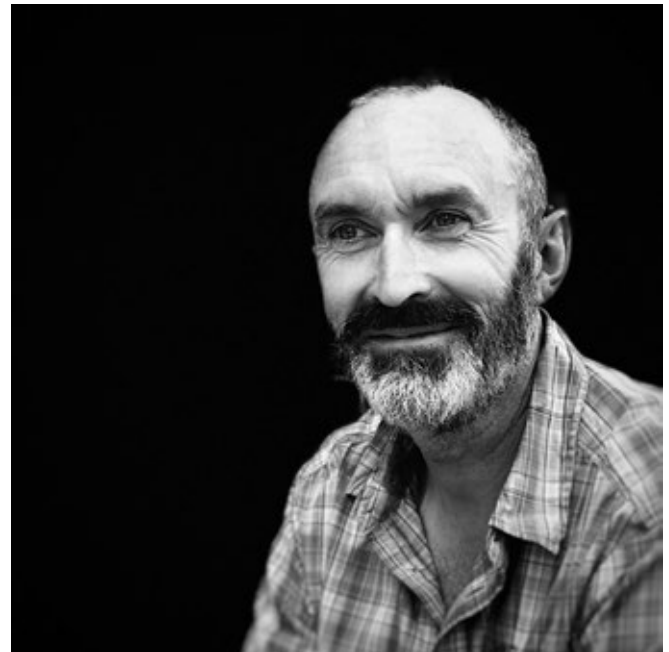
My main motivation is to produce a book that opens the eyes of the British public to the diversity and importance of our forests (shorthand for wooded land at whatever scale) and their owners. I hope that the book will describe the less well-known forests alongside our more famous ones, and that it will celebrate the inspiration and sheer hard work of those who care for them. This is why I am so pleased that Woodland Heritage has agreed to promote the project to its members.

About the book

Originally my intention was to produce a Domesday Book of forests, but the idea soon became tempered by the reality of my single lifespan, and of course the marketeers of the publishing houses. The aim therefore is to write a guidebook to a selection of copses, woods, and forests across Britain which can be visited and enjoyed by members of the public. Ultimately, I aim to reconnect the British public with the forests on their doorstep, to rekindle their interest in the natural world, and help them develop an appreciation of those of care for our forests.

At the time of writing (January 2021) I am on the cusp of a book deal with a major publisher, and we have agreed that the book will contain about one thousand entries; that's only 20 or so entries for every county or authority across the country, so I will need to be quite selective.

Some forests will be comprehensively described, others less so, to be presented gazetteer style. The focus will be on forests that provide public access in some form. While the forests will be the star, the owners will be the co-stars, and this is what I hope will set the book apart from a



All images © Gabriel Hemery

Gabriel Hemery

predictable guidebook format. Likely publication date is 2023.

Get involved

I have created a dedicated website to help collect information from contributors at copsewoodforest.com. While the public are able to suggest a woodland for inclusion, the main purpose of the website is to enable woodland owners to register information directly at: copsewoodforest.com/register. I expect to spend the next two years researching and writing the book, but I am keen to finalise contributions by the end of 2021.

The contribution form is straightforward and should take about ten minutes to complete. Owners are able to *register* a woodland but request that their names remain anonymous in the guide if they choose. Other questions deal with size, location, forest type and tree species, and history. I've included a text box to collect the main descriptive entry with a limit of 100 words. I'm aware that this may be limiting, but in the first instance it can help the contributor focus on essential information, and there is another box which allows more space for comment. I'm hoping personally to visit a selection of forests, to meet the owners for an interview and to take photographs, so there

A Guide to the Copses, Woods, & Forests of Britain



are some final questions which allow owners to agree to this if they wish.

I am also offering the opportunity for individuals or companies to help support the research and production of the book by becoming a *Book Patron*. In return, Patrons will be listed prominently in the front of the book, much like they were in John Evelyn's 1664 *Sylva*, and receive a signed copy through the post when it's published. If Woodland Heritage members have any questions or suggestions for the project, then I would be very grateful to receive them. Please use my contact form which is available on the project website at:
copsewoodforest.com/contact

About the author

Dr Gabriel Hemery is an author, tree photographer, and silvologist (forest scientist). He co-founded and is CEO of the *Sylva* Foundation, and is a former Trustee of Woodland Heritage. He has written three books, both fiction and non-fiction. He appears regularly on TV and radio talking about trees and the environment, and writes a popular forestry blog.

gabrielhemery.com



All woodland owners are proud of their vision and hard work. Now is your chance to join author Gabriel Hemery in celebrating your achievements.

Woodland Heritage is pleased to support this major project and encourages all members to consider taking part.

Visit copsewoodforest.com to find out more.

Pruning timber trees – it's more than just wood quality

by Rowan Reid

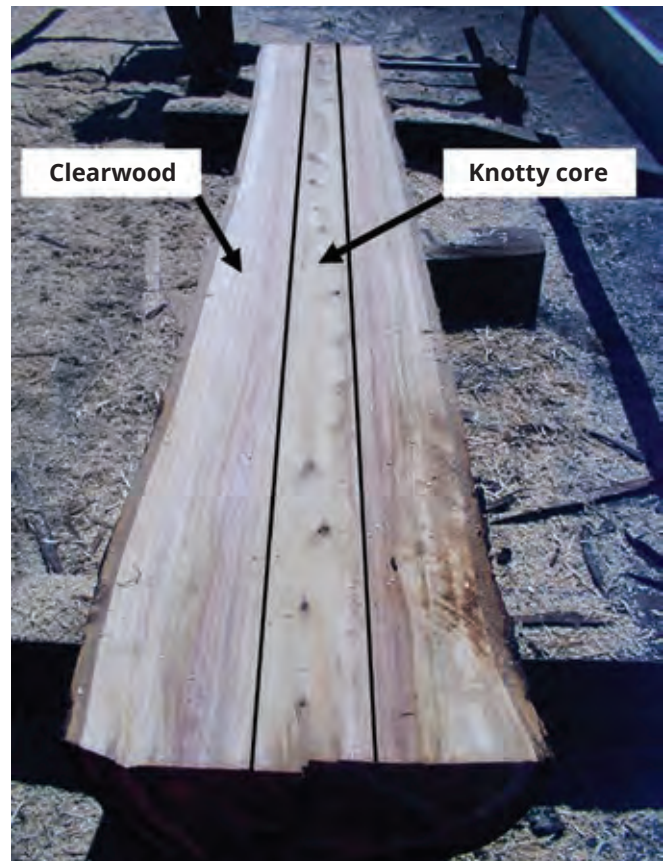
When I was a student of Forest Science in the early 1980s none of my lecturers talked favourably about branch pruning. It was the industrial forestry era; Australian plantation management was aimed at maximising wood volume to feed the house framing industry. Pruning was something for gardeners, not foresters!

When I graduated, I travelled to New Zealand to work with the agroforestry project team at the Forest Research Institute; I'd already decided my future lay not in the public native forests or with an industrial plantation company, but in the agricultural landscape. My family had been involved in farming in Australia for 120 years and in Scotland before that. By inheritance, I had accepted some responsibility for the land degradation and the cultural annihilation brought about by clearing trees, and people, off their land.

It was the progressive Kiwi farmers and foresters that introduced me to pruning trees for wood quality. Whilst the forest economists and industrial silviculturists continue to argue whether pruning is worth the cost, for farmers and family forest owners pruning is, in my view, essential.

The primary purpose of pruning is to increase the proportion of knot-free clearwood in the lower log. The aim is to create a slender branch-free trunk, the scaffold, over which knot-free wood can be laid down with each year's growth. Knots reduce the strength of timber and its appearance value. They also cause grain deviations that make it difficult to dry boards without checking (cracks) and distortion.

As a farm tree grower, I've come to understand that wood quality is not the only, and maybe not the most rewarding, benefit of pruning. Pruning allows us to space our trees more widely without the risk of encouraging large branches on the valuable butt log. As a result, our forests

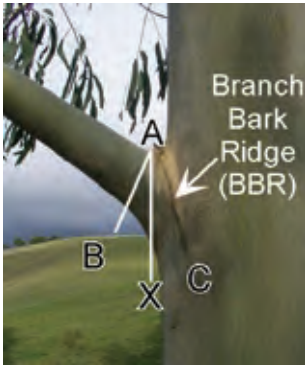


Regular pruning confines the knots to the centre of the log

look more like parklands than plantations.

Growing trees at wider spacings has many benefits: Spacing promotes diameter growth thereby reducing the time it takes to produce a high value sawlog. Because we prune, we have been able to achieve 80cm diameter Eucalypts and Coast Redwoods in less than 30 years. Even our Oaks and Black Walnut are maintaining a diameter increment of more than 1cm/year. For most hardwoods, rapid diameter increments have no impact on wood quality; for the ring porous Oaks, wood density is actually higher.

With early thinning (mostly to waste) and wider spacings, we avoid the need to find markets for large volumes of



Avoid cutting into the branch collar. The correct cut is A–B, approximately perpendicular to the branch



Pre-emptive pruning of large branches ensures the main stem grows straight



Epicormic shoots often arise on the pruned stem on our English Oak. We remove them in early summer

small diameter logs or the need to harvest large areas to justify the cost of engaging machine contractors. We selectively harvest individual trees with a chainsaw and farm tractor fitted with a logging winch. We then interplant shade tolerant timber in the gaps therefore maintaining continuous canopy cover across the site.

There are also non-timber benefits of wider spacings. Most of our plantings are mixed species, multi-aged parklands under which we graze sheep to reduce the fire hazard and control the weeds. Where we don't graze, the space between the timber trees is available for understorey shrubs for biodiversity or non-timber products such as flowers, native foods and foliage.

It's what the forest economists don't see that makes pruning worth doing. As a farmer who lives amongst his trees, pruning is a simple tool to improve wood quality and log value, reduce market and environmental risk, enhance the multiple benefits of owning trees and make on-farm value adding a viable option.

How I prune

Here I present my standard approach to pruning for clearwood timber. Of course, in practice, I do vary this a little to suit different species and product options, but these notes provide a good starting point for growers:

Visit every tree every winter from year one and

- 1 Remove any multiple stems or double leaders to leave a single straight leader reaching at least as high as the anticipated log length.
- 2 Remove any branch on the stem, up to the anticipated pruned height, that is over about 2.5 centimetres in diameter. This 'pre-emptive' pruning maintains good

form, reduces the workload in future years and lowers the risk of infection due to large wounds.

- 3 Remove every branch on the stem up to a point where the trunk diameter is eight centimetres. Stem pruning stops when you have reached the desired height.
- 4 Control any epicormic shoots that may arise on the pruned stem.

I make my own pruning gauge that has an 8-centimetre mouth on one side for stem pruning and a 2.5-centimetre mouth on the back for pre-emptive pruning.

For small, special timber species like Pear or Cherry, a pruned log of just two or three metres would be acceptable. For Eucalypts and Pine, I tend to go to 6.5 metres to ensure I can produce one 6.1-metre-long log (the longest length I can mill on my bandsaw and fit in my kiln) or two 3.1 metre logs (close to the shortest practical length for most Eucalypt timbers). The only species I prune higher is the Coast Redwood. I prune them to eight metres because they have small horizontal branches and grow tall.

When cutting, remove the branch close to the trunk without cutting into the branch collar. The branch collar is the swelling at the base of the branch where the fibres in the trunk overlap with the branch fibres. If the collar is damaged, sugars flowing down the trunk cannot feed the cells that form the callus to overgrow the wound. Do not apply any coatings over the wound. A healthy tree will confine any decay to the branch stub and central core. I use secateurs, long-handled loppers and a handsaw. To work at height, I use a vertical ladder and harness. The ladder is specially made to fit against the tree and is tied off to provide a firm footing. I fit the pole belt around the tree before I leave the ground. Rules regarding working



Rowan's pruning gauge, 8cm for stem pruning and 2.5cm for branch pruning



Image © C. Hamahan

Rowan high-pruning an Australian Silky Oak (Grevillea robusta)

at heights vary in different countries so check the rules, particularly if you are employing workers. Occasionally I use a pole saw instead of a ladder but only on species with small, horizontal branches, like Coast Redwood.

Recently I purchased electric pole secateurs that can reach about 5.5 metres. These are ideal for double leaders and pre-emptive pruning. I do not use, nor recommend, a chainsaw. If you prune on time, every year, the branches should not get very large.

Cutting off the lower branches has no effect, either positive or negative, on height growth. This is evident from the spacing trials: the self-pruning effect that occurs in a plantation at higher tree stocking rates does not reduce or increase height growth.

Many of the species we grow commonly develop epicormic shoots off the pruned stem. If not removed within the next year or so these shoots will develop into branches, negating any benefit to wood quality

that pruning may have provided. Epicormic shoots are a common and natural response in many tree species including our Coast Redwood, English Oak, Poplar, Black Walnut and Silky Oak (*Grevillea robusta*). They tend to develop following a sudden loss of leaf area due to fire, insects, drought or pruning.

Epicormic shoots arise from cells below the bark that can differentiate into buds, either in anticipation of future canopy loss or in response to it. A common misconception is that they arise in response to light reaching the stem when the branches are removed. Any stroll through a suburban park will provide plenty of examples of widely spaced trees with clear trunks fully exposed to the sun that have no epicormic shoots. Naturally, once initiated, shoots on the sunny side of the stem do tend to be longer and thicker than those that arise on the dark side, but light is not the cause.

In fact, to ask what initiates bud development is to miss the point. The real question is: what is it that holds epicormic shoots back, inhibiting their development on



Rowan high pruning a Black Walnut with the electric secateurs

an unaffected tree? The bigger and healthier the canopy the less likely it is that any epicormic shoots will develop, suggesting that the suppressant agent must originate, or be derived, from the products of a healthy active canopy, including carbohydrates and hormones such as auxins.

In my experience, once the canopy has recovered from pruning the number and size of epicormic shoots drops off dramatically. In our Coast Redwoods and Oaks this occurs two or three years after my final pruning lift. In later years, if the canopy becomes stressed due to competition, drought or disease, epicormic shoots can develop in response to improved conditions including thinning of neighbouring trees.

Pruning for profit

Pruning is expensive, but the rewards make it a worthwhile option for many, if not most, small timber growers. You don't need to prune every tree in your forest, particularly if you are growing them for many reasons. I often leave some unpruned trees in our shelterbelts to reduce windflow under the canopy.

The key point is that if you prune a tree for timber then you need to ensure that there is adequate space around it to avoid competition for light. There is little point pruning two trees growing close together: it takes twice as long and the competition effect means the benefits are halved. One of the biggest problems I see is that farmers are reluctant to thin: I tell them to think of a parkland not a plantation. They often start by pruning every tree but lose motivation due to the workload and the slow diameter growth due to competition. Thinning every second tree would halve their pruning costs and more than double the benefits on the retained trees.

When we purchased our small farm back in 1987 my aim was to make forestry, the act of growing and harvesting trees for timber, attractive to the farming community. As in the UK, most Australian farmers have little interest in growing large dense monoculture plantations that produce lots of smallwood that is expensive to harvest. Pruning offers farmers a point of difference and an opportunity to grow a variety of timber species in parklands that enhance the multiple values of owning a forest.

Rowan (B.For.Sci. & M.For.Sci.) is a forester amongst farmers. His latest book is "Heartwood – the art and science of growing trees for conservation and profit". He has lectured in agroforestry at Melbourne University since 1991 but left full-time academia in 2010 to work more closely with farmers around the world as director of the Australian Agroforestry Foundation that delivers the Master TreeGrower programme.

Most importantly, Rowan is also a farmer and tree grower in his own right, with a family farm in the Otway Ranges of southern Victoria, and he is a founder of one of Australia's most successful Landcare groups, the Otway Agroforestry Network. More than 12,000 visitors have toured his Bamba Agroforestry Farm, which is set up as a 42-hectare outdoor classroom for farmers, scientists, students and tree lovers, and a living laboratory for his own learning.

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Instagram: [bambra_agroforestry_farm](#)

The Ash – a 21st century conundrum of threat and opportunity

by Alex Mowat

The good thing about WH field weekends is that you learn something new. At Cirencester Park we learnt how they had grown huge, straight, knot-free Beech over the last 300 years.

An equally important aspect is that people ask questions. Like growing trees, some questions take time to find answers. Walking between the trees, Graham Taylor (former WH Trustee, a current Director of Whitney Sawmill, as well as MD of Pryor & Rickett Silviculture) asked an open question: “How can we create a high value market for Ash and make it economically desirable for foresters to fell diseased trees and stop the spread of Chalara Ash Dieback?” We were looking at a few sad isolated diseased Ash trees among the magnificent woodland.

Graham’s question got me thinking. I have always rated Oak for its durability and associated it with premium quality. This way of thinking is too simplistic. Each tree has its qualities, each tree gives timber that is suited to different things.

I set about learning more about Ash. I bought a small, beautiful Ash coffee table from UK furniture company, Another Country. I read both Robert Penn’s great book, ‘The man who made things from trees’, and I tracked down an old copy of HL Edlin’s, ‘Trees, woods and Man’.

Robert Penn’s contemporary book explains the current low value and perception of Ash. Edlin’s book from 1956 describes the opposite. He describes fast grown Ash as highly valuable and premium. Somewhere between 1956 and today we have lost some of our ‘Woodland Heritage’, knowledge and appreciation.

I made drawings of Ash trees to understand what both authors describe as their whippy and energetic form. By studying the tree, I easily saw the strength and elasticity of its timber.

I learnt about steam bending Ash as a way of maximising these qualities. During the World Exhibition in Paris in 1889, Michael Thonet’s wooden chair fell from the Eiffel



Tree to chair

Tower 57 metres to the ground. It survived the fall. It was not an accident. It was a publicity stunt to show its strength. The stunt worked. By 1930, Thonet had sold fifty million chairs.

The secret of the chair’s success and strength was that it is made from the Ash tree. The Ash tree has one of the highest tensile strengths of all European trees. In modern terms it is super-bendy and ultra-snap resistant. Today the Thonet furniture company still makes the chairs, now in Ash with a Beech alternative.

Sadly, European Ash trees are being wiped out by Chalara Ash Dieback (a fungus called *Hymenoscyphus fraxineus*). This fungus originated in Asia and our trees do not have immunity. Current estimates suggest that we may lose up to 95% of our Ash trees in the UK. The disease effects the new growth and leaves. The heart and sapwood of a diseased tree is unaffected and still useful, if felled early enough in the progression of the disease.

However, as the qualities of Ash are not currently appreciated, it has low value. The cost of felling and milling diseased trees is not high enough to incentivise landowners to remove the diseased trees and slow the spread of the fungus.

There are three ways that we as members of WH can help answer Graham’s question:

Firstly, use its strengths and properties in contemporary furniture just as Michael Thonet did 130 years ago. I have started this. At the next field weekend, I hope to show Graham a new Ash desk especially designed for those who are working from home. If each member of WH does something in Ash, then we can help create a market for the timber. Foresters can clear out diseased trees, cover the costs of felling, and reduce the spread of the fungus. Secondly, if sustained with long lasting designs, we can create an incentive to further the research into why a very small percentage of Ash trees appear to be disease resistant. Is it species or location?

Thirdly, we must learn (or perhaps re-learn from our heritage) how and where to grow our own saplings and avoid importing new stock and spreading disease.

There is a simple, natural and plastic free answer to the complex question of a response to Ash Dieback. It's embedded in everything Woodland Heritage stands for: "GROW TREES – USE WOOD"!



A Thonet chair

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My year at Prickly Nut Wood

by Olly Moses, a Ben Law apprentice 2019/20

I left Prickly Nut Wood towards the end of 2020 having spent the best part of eleven months living and working in this beautiful, predominantly Sweet Chestnut coppice woodland. Ben Law has lived in and worked these woods for over thirty years. This seems a long time compared to my and, my fellow apprentice, Jasmin's brief stay here, but Ben always reminds visitors that he is still learning about the woodland every day. We certainly learnt a huge amount from being a part of just one year's cycle in the woods.

The main area of coppice that we cut this year was around 27 years old, incidentally as old as I am now. The fact that coppice rotation is closer to a human timescale than other forms of woodland management is perhaps why I find it so appealing.

That is not to say that coppicing allows for short term thinking; far from it. Coppice that is regularly cut in rotation will improve every time it is cut. I like to think that the next person to cut the stools that Ben, Jasmin, and I cut this year will be cutting even straighter, cleaner, Chestnut than we did.

However, the quality of the timber is not the only thing that will improve. The benefits of coppicing for the flora and fauna of the woods is something that Ben would regularly point out to us as we were working, be that stopping to show us wild-flowers that were growing where the light had been let in, naming the butterflies flitting along a newly opened up ride, or rushing out excitedly one evening at the end of May upon hearing the first call of the nightjar which had nested in the newly cut coppice just next to my cabin.

Living and working in the woods is the best way to appreciate and understand the impact that our presence as humans can have on the woodland environment and its biodiversity, and I must say that it is an overwhelmingly positive one; something which cannot be said for most other human activities.



Olly Moses

After coppicing was finished in March, it was time to make use of the resource that we had cut. Ben would often give us a shopping list in the morning with the sizes of poles that we were to find in amongst the coppice. The smaller diameter poles were used for pales, trellis fencing, cleft woven panels, and gate hurdles. We used the larger diameter poles for gates, post and rail fencing and of course round wood timber frames.

Because of COVID the round wood timber framing courses scheduled for April and June couldn't take place. This meant that Jasmin and I were able to spend more time on the chisels than we would have otherwise done. In the spring an order came through for a small office building, the frames for which we built over a few weeks. This gave us a good amount of practice on the iconic butter pat joint.

After finishing the office frames, I had an idea in the back of my mind to build a round wood workshop for my friends at my local APTGW (Association of Pole-lathe Turners and Green Woodworkers) group back home in Cambridge. When the framing courses were able to run from July to September Ben suggested that we build the frames for this workshop over the remaining courses. The courses were a lot of fun and it was lovely to have such good company around the fire in the outdoor kitchen, especially after lockdown!



Cleaving chestnut



Using a pole lathe



Making a butter pat joint

The five frames we built over the three courses will make up a 12-metre by 3.5-metre workshop, due to be put up this spring. The beauty of framing with round wood is that shrinkage happens more evenly than with sawn or hewn timber and as a result the frames can be taken apart to be moved and reassembled later. That's not to say there won't be a lot of head scratching; this will be my first raise so I am a little nervous, but of course very excited.

Since leaving Prickly Nut Wood I have moved to a smaller woodland in the Surrey Hills. I will be working alongside David Seal, an alumnus of a Prickly Nut Wood framing course. David has taken over the management of ten acres of roughly 40-year-old Chestnut coppice and five acres of mixed Hazel and Ash coppice with Oak standards. We have a sawmill, a tractor, and a timber trailer, and our plan is to set up the infrastructure for a woodland business where we will eventually be able to run courses

on a variety of woodland products, from spoons to timber frame buildings. All the timber we need for the framing bed and workshops will come from the first acre of Chestnut coppice and the few Oak and Ash standards we will cut this winter.

I am incredibly grateful to Ben Law for his generosity in sharing his woodland and knowledge with me over the past year. I am also very grateful to Woodland Heritage for its financial support towards my chainsaw tickets, and to Jasmin for putting up with me.

A celebration of trees

by Chris Baylis



Chairs, chairs and more chairs – mid-1980s

A life in wood started for me, by chance, soon after leaving university in 1976 with a degree in German and Swedish, fuelled with a desire to find some kind of self employment which would allow me the flexibility to pursue a love affair with creating music.

After a false start as a freelance translator, I ‘fell’ into the antiques trade which was enjoying a boom period, and over the next thirteen years I became a well known dealer in antique English country chairs, mainly rush seated and Windsor style dining chairs from the early to mid 19th century, earning myself the moniker of ‘The Chairman’ in the trade.

It was during this period of handling literally tens of thousands of antique chairs and pieces of country style

furniture, that I was, almost by osmosis, soaking up a wealth of knowledge of design, proportion, finish etc, and an appreciation of why some things sell and others do not! There is nothing more instructive about what is appealing to the market than offering something that reveals itself to be difficult to sell.

At the same time my musical career flourished as a guitarist, recording engineer and producer, including a major label record deal, the release of numerous records with a variety of bands, gigs all over the country and setting up my own 24 track recording studio.

The recession of 1989 necessitated a re-evaluation of a hectic life, not least because for the first time in my ‘furniture life’ I noticed a sea change in taste. The market in antique dining chairs was becoming resistant to chairs that did not offer

comfortable seating, however pretty they were and despite their previous ‘desirability’. This was in fact the beginning of a gradual decline in the market for, in particular, antique rush seated ladder back and spindle back style chairs, such that from heady heights in the 80s they have now become all but worthless. (I still have two 40ft containers full of the same, if anybody is interested!!)

The opportunity thus presented itself to fulfil the market’s requirement for chairs offering comfort and practical usage for the larger frame and lifestyle of 20th century man and woman, by the making of chairs which drew on the same aesthetic and design appeal of the best of their period counterparts. I thus sought out craftsmen capable of making chairs, and later tables and cabinet furniture, to my specification and The Real Wood Furniture Company was born.

Challenges faced over the years

The first hurdle for a business involving the relatively low volume production of hand crafted pieces, (at our peak, some 1500 chairs and 300 tables a year), lay therein, that supplying to the trade, as we did, came with its own restrictions on the prices we could achieve. We therefore decided, in 1996, to embrace 'retail', to access an end-user market, giving us the flexibility to make things better and to a higher specification. We opened in Woodstock in 1996 and traded in the town from two locations for twenty years.

The next challenge came with the influx of French made 'blonde' Oak furniture, replicated soon thereafter with offers from China and Central Europe. We felt we had to differentiate ourselves from the vast offer of 'bland' and inexpensive Oak being offered to the market, more than just through our designs and quality of craftsmanship, to justify our price point. Through a long established relationship with Vastern timber, we were able to source amazing burr Oak and latterly wide plank Elm from Scotland, as well as English Walnut, alongside an ongoing requirement for Ash, to make our offer 'different' and more appealing.

The next, and the largest challenge to our business by far, came around 2006/7. Up to that point, most of our clients seemed 'secure' in their desire to buy a good refectory or farmhouse style table, a set of country style Windsor or rush seated chairs and some kind of dresser / sideboard. This, despite the fact that the antique trade was finding it increasingly difficult to sell the period pieces which were the inspiration for our offer. Clients seemed, for the first time, confused about what they were looking for....

not least due to the ever increasing offer of furniture of hugely varied designs made from a myriad of new materials being offered to the market. We met this with new designs of a more contemporary style, based on my appreciation of simple early Chinese furniture and the Shaker and Arts & Crafts movements, allowing us to establish a resonance with a new and wider client base.

Then of course, we entered the recession of 2008 from which it could be argued that some high street retail has never recovered, not least due to the burgeoning 'internet marketplace'. We finally left the high street, moving to a 'destination location' outside Chipping Norton at the beginning of 2017, since which time, trading has been more buoyant, more relaxed and more focused, albeit against a backdrop of ever higher client expectation.

The Future

I have decided to close the business...it's time for a new chapter....why...??

I love what I do, but I work all the time. The impetus of impending mortality, (having turned 65 over a year ago), the untimely and unexpected death of close friend and colleague of some 30 years, Tony Smith (Bates and Lambourne) and the acknowledgement to myself that I am a 'control freak' who cannot 'let go', leaves me asking myself how I would like to spend the time I have left...and the answer is simple. I want to play more music, paint, walk on the beach...more guitars and less chairs.... (but maybe a couple of furniture exhibitions each year...watch this space!)

I am in the throes of finishing a new album 'Farewell to Venice', which will be released under my name in all formats later this year via 'The Real Wood Recording Company'. I have



'The Shark' Armchair - Ash, Elm and burr Elm, 2020

already re-released two earlier albums on all streaming formats under the name 'Chris Baylis and The Guitar Orchestra' and am looking forward to the opportunity to play live again.

I would like to thank all our clients, supporters, co-workers, makers, polishers and suppliers who have contributed to the success of the company...it's been 'a blast'! One of the feature tracks on the forthcoming album is titled 'A Celebration of Trees'...says it all really!

Chris Baylis
The Real Wood Furniture Company
realwood.co.uk



Air-Pot® containers

Good root structure and why it matters

by Jamie Single

During the 2019 Field Weekend WH members saw Air-Pot containers in use in the tree nursery at Westonbirt Arboretum. Here Jamie Single of the Caledonian Tree Company, which manufactures these pots and distributes them worldwide, explains how they work and why they were developed.

The Air-Pot container today, made in Scotland and sold throughout the world, is a far cry from the original rudimentary version developed thirty years ago. The objective remains the same – to create the best root system possible – but the product is much more user-friendly and effective, as the understanding of how to achieve the maximum benefits of the system has grown, with its broader use by the world’s best growers.

The original challenge – eliminate root circling

The early air-pruning pot was designed in Australia to overcome the problem of container grown Eucalyptus toppling at the first puff of wind on account of spiralling or ‘pot-bound’ roots. It is an established fact that container growing is fraught with problems which damage root systems from propagation onwards. However, the practical advantages of container growing and the ever-increasing demand for year-round stock has ensured continued bad practice and the depressing, almost universal acceptance of poor-quality root systems.

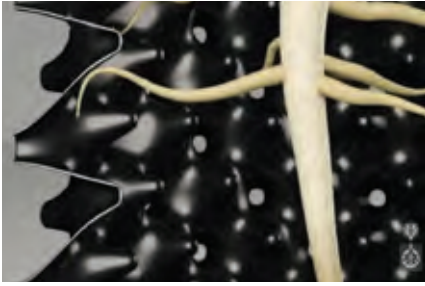
Vigorous species such as Eucalypts are particularly prone to problems, with roots quickly spiralling and compacting in conventional pots before growers can pot-up, but any woody species can be adversely affected. Root deformities like these can seriously impact a woody plant’s projected lifetime, ‘choking’ the root collar, reducing the uptake of water and nutrients, and in many cases destabilising the plant. Young trees ‘rocking’ in the ground, for example, is nearly always a symptom of a root system unfit for purpose.



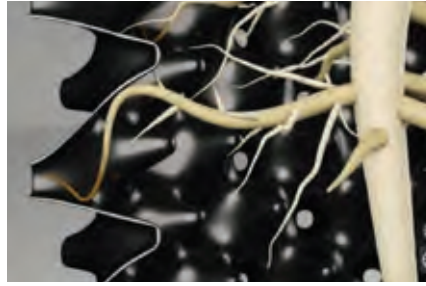
Scottish grown Eucalyptus gunnii. From seed – no root deformity

These early root deformity issues never go away on any species. Recent research, over eight years in Germany, firmly highlights the ongoing issues caused by ignoring and planting bad root systems. Please follow the link to view the full research results, which show that only the Air-Pot system, of the 5 systems trialled, did not cause permanent deformities. air-pot.com/nursery/wp-content/uploads/2020/08/Axel-Schneidewind-report-corrected-final.pdf

Fortunately, awareness of these issues is growing. The Caledonian Tree Company has been working with expert horticulturists and botanists for many years now, equally obsessed with the power of roots!



Initial lateral roots emerge



Air pruning occurs



Repeated air pruning leads to a dense fibrous system with no circling

Thanks to the cooperation and determined efforts of centres of excellence – such as the Royal Botanic Gardens of Edinburgh and Kew, the Forestry Commission’s arboreta at Westonbirt and Bedgebury, and some of the best commercial growers in the UK and Europe – roots are finally receiving their due attention.

The solution – the Air-Pot system

With their help, the Air-Pot system has evolved and is now in its sixth generation. The combined effects of the 3D Air-Pot design – increased aeration, increased drainage, and physical air root-pruning – not only achieves the original objective (the elimination of root circling), but also the huge additional bonus of a much healthier growing environment.

Here’s how it works: After a seedling or young plant is potted into an Air-Pot container, the tap root grows

downward, reaching the raised lattice base where it is exposed to air; this dehydrates the tip, pruning it, and stimulates lateral root branching further back in the root system; each of the lateral roots is then steered by the shape of the wall towards an air hole, where it is also air-pruned, causing yet more branching. The process is continually repeated until the plant has developed a dense mass of fibrous roots.

The Air-Pot system can deliver maximum benefits when used with automated drip irrigation systems which allow for precise application of water and nutrients, and minimal waste. In combination with an amazing root structure this leads to an increased take up of nutrients, faster growth, healthier plants, and bigger yields. The results have astounded even the most experienced academics and commercial growers.



Washed cell grown root systems of one-year old Quercus virginiana and Taxus baccata. It is doubtful whether these trees would ever reach maturity. It is hard to believe that these are not unusual, but few people ever get to see the roots or ever know what the soil disguises



Magnolia x soulangeana from a nursery in France, ready for sale with 'excellent' roots, a photo that could be taken anywhere. But this reinforces the fact that many growers do not care, and customers do not understand, what makes a good root system or the importance of the roots as the engine of the plant

The growth of Air-Pot grown stock is accelerated compared with stock in conventional pots, allowing growers to pot up to the next stage or sell on dramatically faster than when using traditional containers or growing in-ground. An ongoing trial in Holland showed three different species were found to grow between 40 and 70% faster than the same species planted in the nursery field. Follow this link to see the research results.

air-pot.com/nursery/wp-content/uploads/2020/08/Cultus-report.pdf

Once planted in the environment the all-important re-establishment is almost instant, with survival rates approaching 100% (but it should be noted that even a tree with an ideal root structure will fail if humans try their best to parch or poison them!)

The crucial bonus – recycle, reuse, reduce carbon

From 1997, the Air-Pot wall has been made in Scotland from 100% recycled HDPE (high-density polyethylene). Sourcing good waste plastic and then processing it has always presented (and still presents) enormous challenges.

From its inception in 1990 the company's policy has been to avoid virgin plastic, never to 'offshore' any element of production, and to encourage its reuse year after year at nurseries. The majority of growers producing Air-Pot grown trees, therefore, send out their stock from the nursery wrapped in biodegradable materials, ensuring there is no waste. The company's current challenge is to



Shows the poor root system of a Tilia cordata from a standard container four years after planting



Shows the even poorer root system of a Tilia cordata from a standard container eight years after planting

develop a biodegradable wrap system for smaller stock too, to facilitate further the use and reuse of the system.

The world has at last woken up to the perils of single use plastic and runaway carbon output. Used and reused properly, plastic has its place and does not have to present an environmental threat. It can be a positive and practical alternative.

In the case of the Air-Pot system, the 3D form allows the development of the most vigorous and effective carbon reducing machines – plants! Faster growing Air-Pot grown trees, thriving in the environment, can absorb many times more carbon than their slower, punier relations, which can take years to catch up. The Air-Pot container’s durability ensures a useful working life on the nursery up to ten years, and third-party analysis, using the Carbon Trust template, gives the Air-Pot system a negative carbon footprint rating.

Varied growing applications

The Air-Pot system is used around the world by a varied range of growers. Several of the world’s leading Botanic Gardens use the system to grow trees and shrubs in conservation programmes to save threatened species. The system is also being used more and more widely by commercial growers, such as the Citrus and Pecan industries in the USA, and ornamental tree nurseries in Europe and North America.

Growing in extremes of temperature – whether it be an arctic freeze or tropical sun – is another classic problem of container growing obviated by the Air-Pot system. With the roots active throughout the growing media, right back to the stem, rather than at the container wall, plants in Air-Pot containers are markedly less vulnerable, hence the system is proving successful in Canadian and Scandinavian nurseries, as well as in the desert environments of the Middle East, and in tropical Florida.

Forestry – a new frontier?

Commercial forestry is an industry that Air-Pot containers have yet to break into, and an area where we would love to see trials designed to examine the effects of their use; what if raising young Oak transplants in Air-Pot containers could double, or better, the number of potential ‘winners’ in a planted stand? The American pecan industry has already proven the superiority of Air-Pot technology in establishing young trees of the Walnut family by conserving the all-important tap-root; why not capitalise on this benefit in establishing timber trees? We may only have scratched the surface when it comes to their potential application!

For further information please contact ctc@air-pot.com or visit air-pot.com



Hot conditions in Oman



Cold conditions in Norway



Covered Cherry production in Holland – trees moved out to over-winter and moved back in early spring. The Cherries come on to the market at least one month before the orchard cherries, fetching more than double the price



Mass production of Quercus virginiana in 12.5L Air-Pot kits for the landscape market across the southern USA



Moving, recovering and re-establishing protected or listed mature palms in southern Spain

BOOK REVIEW

'Living With Trees' – grow, protect and celebrate the trees and woods in your community, by Robin Walter

Review by Kelly Morss

In December 2020, a video appeared on Twitter that took aim at work being carried out by the Woodland Trust where they were removing diseased Ash from next to a footpath; work that was passionately decried as 'eco-vandalism'.

This was certainly frustrating; however, it was the comments from the public that caught my attention, more than the views of the video maker whose forestry credentials were not apparent in the film.

Credit must be paid to the person or team in charge of the Woodland Trust Twitter account that day because they showed remarkable restraint in their response which explained why the work was being carried out. The not insignificant percentage of negative public comments were disheartening indeed. They ranged from disappointment to anger directed towards the Woodland Trust and, more worryingly, withdrawal of support; 'Health and Safety gone mad' was a common theme.

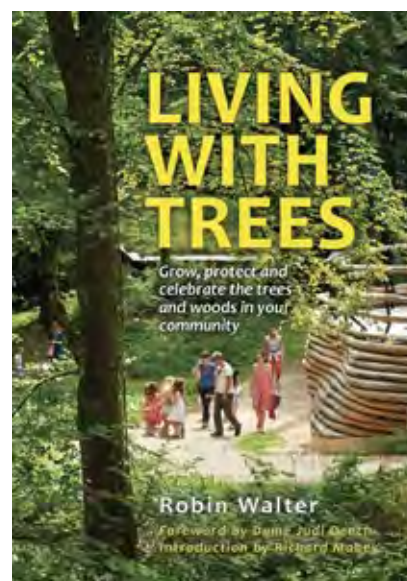
This should serve to remind us that just because of an increased awareness that trees bring a great number of benefits from climate change mitigation to mental health considerations, those with knowledge and experience should not take for granted that the general

public will actually understand what the realities might look like with forestry remaining relatively invisible. Where and how do you start to persuade people to change this mindset?

The book *Living with Trees* by Robin Walter describes itself as a 'cornucopia' which feels like the right word when you discover inside a vast array of tree related topics covering art, history, folklore, architecture, ecology, the urban environment and forestry. For the latter, Walter acknowledges that 'People love forests but hate forestry!' and then goes on to talk about why we should reconsider our relationship with the 'F-word'.

The text is interspersed with some beautiful illustrations, photographs and facts which support the writing and provide an attractive and accessible alternative to the sometimes heavy academic nature of much environmental writing. It is an impressive feat to capture a broad spectrum of tree related topics into one book and still give each one enough space.

If you find yourself in a conversation with someone who is struggling with the idea that 'Woods and forests are dynamic places of change, never a static landscape' then recommend this book; it may just be enough to encourage reconsidering the potential



of trees and forestry, or at the very least try to find out more.

Living with Trees is published by Little Toller Books
littletoller.co.uk

All royalties from sales are being donated to the arts and environmental charity Common Ground.
commonground.org.uk

Little Toller was started in 2008 with a singular purpose: to revive forgotten and classic books about nature and rural life in the British Isles.

They also offer a subscription service which would make a wonderful gift for the nature-minded book lover in your life.

Discovering the artform of Kanna, the Japanese arboreal stethoscope

by Fred Dodson

Kanna (pronounced kah-na) is a handplane from Japan used for forming and finishing wood. It consists of a slab of metal, or more precisely two slabs forged together, and the block of wood which holds it. The latter can be made by the craftsman who uses it giving great freedom. You can control exactly how the tool performs, how it fits into the hand, and how the work fits into the tool. It is a silent dialogue.

The blade is forged by a skilled blacksmith dedicated to producing a highly refined laminated steel that can get extremely sharp. Traditionally this starts with a hunt for iron sand in river beds, because Japan has scarce iron ore. Using a Tataru, a volcano-like furnace that is destroyed in the process, the iron is smelted to make a steel called Tamahagane famed for its use in samurai swords. The metallurgist Cyril Stanley Smith of Massachusetts Institute of Technology regarded the samurai sword as the ultimate craft object to use the internal characteristics of steel. Using Kanna it is possible to make shavings thinner than a human blood cell.

But it is the quality of finish that distinguishes the Kanna's work. The character of the tree shines more clearly: the patterns of growth, the stress, the decay, the beauty. And also the character of the artist is left in the form and lines made by the sharp steel moved by the fingertips. Curved surfaces are formed from subtle facets which can be seen up close; line after line after line, the tactile invitation softens and smooths with each hand that is met. This intimate relationship between tools, trees, and technique allows for creation of new works that try to reach into and express the majesty of English Oak or the colour and flex of vibrant Yew.

"Tools act as an extension of hand and mind, enabling him to transform practical intention and aesthetic desire into physical form... Design and execution are inseparable;



Finishing steam-bent Beech with Kanna

tools are instruments of both the mind and the hand, particularly at the critical creative junctures that arise in the invention of new forms."

– WH Coaldrake, 'Way of the Carpenter'

My journey to the discovery of Kanna was anything but straight forward. Disillusioned with my studies in psychology, I decided to build a bicycle out of bamboo and to travel east. On the road, in Bosnia, I met a man who knew of a cabinet maker in Hawaii. To my amazement, this lead turned out to be my way in. After four months working with wood on the Big Island, I was sent an article about "Tokunaga and the art of working with no sandpaper"....

Eight months later I found myself sitting opposite Toshio Tokunaga in his studio in Yokawa, Japan. A craftsman and artist of the highest order, apprentice of Hekigai Takeuchi, a Japanese national treasure, and now through a stroke of good fortune I was to become his first western apprentice. Tokunaga believes that the objects we use in our daily lives should be made with human hands. He also believes there is a timeless and objective quality to beauty that should be aspired towards. He feels Kanna is the best way to attain these standards, and was led here with a serendipitous meeting in 2008 with Ohara Yasuhiko, the blacksmith. This meeting transformed Tokunaga's way of working



New designs with English Oak handcrafted for DEYA brewery (timber supplied by Whitney Sawmills)



Tatara furnace used to make Tamahagane (steel)



Samara chair in Ash

and allowed him to express himself and the trees more freely. I knew this was a man worth learning from, and wholeheartedly threw myself into his way of Kanna.

My year long apprenticeship in Japan was initially funded by a local government agency which supported Tokunaga's use of their local and famed *Yoshino Sugi* (*Cryptomeria Japonica*). For 500 years the foresters have been planting, thinning, tending the trees to create beautifully straight grained, knotless timber with a red hue.

I had found my door into the old craft world, amongst one of the rare and enduring lineages of traditional artists still alive.

Tap tap tap, swoooosh, swoooosh, swoooosh. That was the music of our daily work. "When you use kanna your mind is in the wood". Tokunaga would say, his verbal teachings few and poetic.

Living with a teacher, lessons are absorbed like a child learning a language. What he practices is more than a job: it is a way of life. The house is home-made, so are the table, the vegetable patch outside the kitchen.

Nearing the end of my stay I ask tentatively, "I feel I could stay longer and learn more from you".

Tokunaga responds, "There is a saying in Japanese, when a man wants to build a house but needs to clear the land of shrub and thicket, he doesn't go to the sawmill to buy wood, he first uses what he has". About to enquire what he meant, and the doorbell goes..

So it was, after a year immersed in Japanese culture, language and ancient craft I had been profoundly affected by a foreign perspective. I understood that maybe I had what I needed. Returning to England with my toolbox of Kanna and all I had learned, I embarked on building a studio dedicated to establishing this nascent artform in my home country, working with trees to make objects that endure and inspire; connecting people with the mind in nature.

This year my aim is to hold my first exhibition. It will be titled "Inside the Artform of Kanna", with existing pieces, new work, photography and poetry, to tell some of this story. If anyone is interested in coming, I would love to see you.

tataraworkshop.com

Instagram @tataraworkshop

UK Squirrel Accord 2020

by Kay Haw, UKSA Director

The UK Squirrel Accord (UKSA) is a UK-wide partnership of 39 leading conservation and forestry organisations (including Woodland Heritage), Government agencies and companies, with links to voluntary red squirrel conservation groups.

We work collaboratively to preserve the UK's wooded landscapes and associated biodiversity through aims to:

- secure and expand UK red squirrel, *Sciurus vulgaris*, populations beyond current thresholds; and
- ensure UK woodlands flourish and deliver multiple benefits for future generations of wildlife and people.

To fulfil these aims we work to tackle the threat posed by the invasive non-native grey squirrel, *Sciurus carolinensis*. This species was intentionally introduced to several sites in England and Ireland between 1876 and 1929. After establishing viable populations, they started to spread and cause serious problems. In 1937, a law was passed prohibiting their importation and keeping in Great Britain.

They are classed as a UK invasive non-native species (invasive alien species in the EU) due to their negative impacts on:

- **Native red squirrel populations:** red squirrels are endangered on the Red List for Britain's Mammals. The main threat is competition for food and habitat from grey squirrels, which also carry and transmit squirrel pox virus that is deadly to reds. Grey squirrels have directly caused local extinctions of red squirrels in large areas of the British Isles and conservation work continues to protect our remaining reds.
- **Broadleaf tree health:** grey squirrels actively bark strip ecologically and economically important broadleaf trees of 10-50 years old. Damage creates open wounds, weakens, stresses, and kills trees. This is a serious problem at a time when the UK is working to increase its tree and woodland cover for the many essential benefits trees provide.



Image © Red Squirrel South West

Grey squirrel bark stripping

While 2020 was certainly a challenging year for many reasons, the partnership still made successful progress towards achieving our aims.

Fertility control research

A key focus is our five-year research project to develop a grey squirrel oral contraceptive and species-specific delivery mechanism. Hopes are high that this innovative work will provide an effective, less labour intensive, non-lethal method for managing grey squirrels.

Across the world, fertility control is increasingly seen as a complementary and alternative method for wildlife management. The work is being delivered by scientists at the Animal and Plant Health Agency (APHA) and is funded by UKSA and supporters. We are fundraising to secure the final sum needed to complete our research.

The project is still in its third year, which had to be extended due to the initial global lockdowns in early 2020 that caused delays to our work. Thankfully, we now have various protocols in place to allow our work to continue and this third year will end in September 2021.

There are two strands to the work:

- Developing an oral contraceptive.
- Designing a species-specific delivery mechanism.

Oral contraceptive

In 2020, we were able to expand the research to trial three different methods to reduce fertility and create an effective product that could be taken orally. The best of those being

tested will be taken forward for further development in years four and five.

Two methods focus on turning an already successful injectable contraceptive vaccine – GonaCon developed by the National Wildlife Research Center – into an effective oral format. The contraceptive vaccine stimulates the production of antibodies that bind to the Gonadotrophin Releasing Hormone (GnRH), a hormone in an animal's body that is responsible for the production of sex hormones (e.g. oestrogen, progesterone, and testosterone). By binding to GnRH, the antibodies reduce the GnRH's ability to stimulate the release of these sex hormones. Animals remain in a non-reproductive state providing a sufficient concentration of antibodies is present.

The third method studies the use of DiazaCon, a cholesterol-inhibitor. Cholesterol is needed for the synthesis of sex hormones. By decreasing the levels of cholesterol synthesis in the body, DiazaCon indirectly inhibits reproduction. All three methods look promising and we will decide on the best to take forward by the end of year three.

Species-specific delivery

The oral contraceptives being developed are mammal but not species specific. So, it is important to ensure non-target species are not negatively impacted. To this end we are designing a feeding hopper, which will ultimately contain the oral contraceptive in a bait, that only grey squirrels can access.

Originally two field trials were planned for 2020, both aimed at optimising the delivery of bait to grey squirrels. One trial aimed to test whether the bait hopper could exclude red squirrels, while still allowing access to bait by the majority of greys.

This would enable operators to deliver a bait containing a contraceptive in areas where both species exist and where red squirrel populations are most threatened. As the work was to be carried out in collaboration with voluntary red squirrel conservation groups, restrictions on social distancing resulted in it being postponed until summer 2021.

Thankfully the go ahead was given for the other larger and more complex field trial. The main aim was to assess patterns of bait uptake and the amount of bait consumed by individual grey squirrels. The results will answer questions such as:

- How often will a grey squirrel visit an individual hopper?
- How many hoppers do male and female grey squirrels visit on consecutive days?
- How much bait does a grey squirrel consume each day?



Image © APHA

Red squirrel by research feeding hopper

This information will ultimately be used to formulate a bait that contains the most effective dose of contraceptive for grey squirrels.

Online communications

2020 saw the increasing use of platforms such as Zoom for online meetings and webinars. While many of us miss the value of face-to-face meetings, this also offered opportunity to expand involvement and audiences in an environmentally friendly way. We held several red squirrel and/or tree health webinars with experts that were recorded and can be seen via our YouTube channel.

Grey squirrel bark stripping is a major concern for many in the tree and woodland sectors of the UK. However, this issue is far less well known than the negative impacts grey squirrels have on red squirrel survival. Therefore, the UKSA partnership secured funding from the Forestry Focused Future, Knowledge Transfer Grant Scheme to create a short film to raise awareness of the issue.

We placed wildlife cameras in woods to try to capture grey squirrel bark stripping in action. We were successful in capturing one clear piece of footage in an area of The National Forest and Red Squirrel South West contributed another. We will continue to gather video evidence in 2021.

Along with interviews from tree and woodland experts, the final film has been well received and shared widely. This can also be seen on our YouTube channel: [youtube.com/channel/UC624MbtIKevZxwxwKQ5R5zQ](https://www.youtube.com/channel/UC624MbtIKevZxwxwKQ5R5zQ)

Please see our website for further information about our work, upcoming events and if you wish to donate to help us complete our important research: [squirrelaccord.uk](https://www.squirrelaccord.uk)



Future Trees Trust in 2020



by Tim Rowland – Chief Executive Officer, FTT

Like everyone else, we have had a very different year. The pandemic, especially the travel restrictions, made assessing many of our trials impossible and, working in pairs everywhere else, challenging too. But we all adapted to working from home and no staff were furloughed, so we escaped quite lightly compared to many others.

Not only did we continue to operate but we undertook significant changes last year. The transition to a charity employing three people has enabled us to undertake much more tree improvement work, to consolidate the work we've already done and to establish the foundations for a wider scope of work as we develop further.

Working with the Royal Forestry Society, the Patsy Wood Trust grant enabled us to create an annual student placement. Jonas Brandl became our first Patsy Wood Trust Scholar and has undertaken a wide range of forestry duties while learning more about tree improvement and our work. The second Patsy Wood Trust scholar, James Cryer, is being hosted by forestry consultant William Hamer in the Chilterns.

We also recruited a student to undertake our Oak masting PhD study, supported by the Patsy Wood Trust grant, Action Oak, the DG Albright Charitable Trust and the Mabel Cooper Charitable Trust. This study aims to find the answers to the key questions about Oak trees' tendency to produce abundant quantities of acorns only very irregularly. Ryan McClory started the study in September at Reading University.

We are proud to announce a new corporate partner – Vastern Timber is supporting our work in creating new, expanded Sycamore progeny trials at various locations across the UK. Operating one of the largest sawmills in the UK, Vastern Timber specialise in cutting and manufacturing native-grown timber. We are delighted to be working with them.



Jonas Brandl



James Cryer

The year ahead

As a charity dedicated to providing improved seed to the industry, we recognise the impact that pests and pathogens are having on many of our tree species. Future Trees Trust is a key partner in the Living Ash Project which was extended this year. We secured a further five years of support from Defra to fund the planting and ongoing monitoring of 2200 potentially tolerant Ash trees at a site in Hampshire. These trees, grafted from cuttings taken from trees showing some tolerance from across the UK, could well be the 'parents' of the next generation of Ash trees that stand a good chance of surviving Ash Dieback.

Future Trees Trust is also a member of Action Oak – the cross-sector initiative to research the many diseases threatening our Oak trees. Jo Clark sits on the Research committee and Tim Rowland works with the Fundraising and Communications committee.

Tree improvement

While recognising that tree health is of paramount importance, we will continue our tree improvement work to deliver better quality seed to industry in terms of form and vigour. An important aspect of this work is to ensure that the populations we put together as seed production units are genetically diverse, recognizing that genetic diversity is the key to combating new pests and diseases.

We now have grafted seed orchards of phenotypically superior trees for Sycamore, Birch and Cherry. These orchards produced more than two million improved seeds in 2019! Although an amazing achievement, we still have a long way to go. We also have orchards for Sweet Chestnut, but these are still too young to be producing any seed. Oak seed supply is also a problem, largely because of its infrequency in masting and that even when there is a mast year, the seed cannot be stored. We are therefore very excited to be planting out first clonal orchards for Oak, one for Pedunculate Oak with the Woodland Trust in the National Forest, and three with Sessile Oak, two in England and one in Northern Ireland.

Oak is notoriously difficult to graft and we have had poor results, particularly with *Quercus robur*. We climb an additional 20 – 25 trees each year to obtain the best quality graftwood (one-year old wood from the very top

of the tree) and so our seed orchards will be planted over the next few years, adding to the number of grafts each year to ensure genetically diverse seed orchards for Oak.

Seed from all these orchards will fall in to the *qualified* category of Forest Reproductive Material (FRM). We will continue with our work on progeny testing to quantify levels of genetic gain and raise seed to the highest category of FRM, that of *tested*.

We are now working with Hornbeam for the first time as part of the Sustainable Seed Source Project in partnership with Woodland Trust. After surveying 25 sites, recommendations were made to register five stands as source selected, and ten stands as source identified. These will be the first stands on the National Register of Hornbeam and an important first step for seed supply.

Conclusion

The scale and range of the projects we are now undertaking has grown significantly this year – we have committed more funds than ever before to tree-breeding and ongoing research for the year ahead.

It is too early yet to predict the likely long-term impact of the Coronavirus pandemic on our work. But it is undoubtedly true that many of our current funders will shift their focus to support those in more pressing, immediate and drastic need for support than us. Although we hope this not to be too damaging to our work, we do understand this and will adapt our research priorities to suit the funding we have available to us.



FTT chair of Trustees, John Leigh Pemberton, presenting Miles with a grafted copy of the Sotterley Oak at the location of the original tree

Last November Miles Barne turned 80. To commemorate this occasion FTT presented Miles with two grafted copies of the Sotterley Oak, which was felled in 2013, due to suspected Acute Oak Decline. The Sotterley Oak was an outstanding timber tree, with superb, gun barrel straight form. Miles has contributed a great deal to British forestry, and is particularly famous for his work with Oak. The estate has many fine examples of superb Oak trees, but FTT have also selected Ash, Chestnut and Sycamore plus trees on the estate. The estate is home to an Oak progeny trial, a Cherry clonal trial and more recently, a Wild Service Tree silviculture trial.



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BOOK REVIEW

'The man who made things out of trees' by Robert Penn

Review by Alex Mowat



There is a dedicated section on my bookshelf for four special books; books so cherished that I try and read them at least once a year. One of them is Jean Giono's classic tale: "The man who planted trees".

When I saw that Penguin had published the book called "The man who made things out of trees" I was slightly annoyed. It seemed to tread on the toes of my favourite classic. I shunned buying the book in deference to my old favourite.

Subsequently, when I learned that the book involves Woodland Heritage's sawmill at Whitney on Wye I succumbed and bought a copy. Curiosity had got the better of me.

"The man who made things out of trees" describes Robert Penn's two-year journey of discovery with the timber from a single Herefordshire Ash tree, milled at Whitney Sawmills, and describes what he learned along the way.

"I decided the best way to learn more about the Ash tree was to fell one. Once the idea had germinated in my mind it grew quickly. I would find a tree in a wood close to my home. It would be milled by my local sawmill. The best timber would be distributed to artisans and makers to be converted into artefacts and products. There will be chopping boards, bowls, wooden wheels, spatulas, arrow shafts, catapults, tent pegs, coat racks, coracles, and a paddle. I can even smoke food with the sawdust. The brush and some of the branches would be

left behind on the woodland floor to rot away slowly and eventually to be returned to the earth. Every part of my Ash tree will be used: a zero-waste policy would fence the project – to exalt the worth of a single tree. How many uses could I get from one tree, I wondered – ten, twenty, thirty or more?"

He explains many practical techniques of using Ash: how to dry the timber, how to harness Ash's elasticity and how different parts of the tree suit different things. Many of the objects employ traditional techniques and traditional knowledge. Highlights include wheel-wrighting, steam-bending for toboggans, and the technique of using a pole lathe that dates back from the Middle Ages. He explains that the skin of dogfish was an early form of sandpaper.

Not all the book is nostalgic and traditional, however. He visits experimental Ash bicycle makers in southern Ireland and the makers of CNC machined Premium baseball bats in Kentucky.

There is a deeper theme throughout the book; I suspect one close to the hearts of many Woodland Heritage members. He describes the deep psychological benefits of cutting wood, carving wood, splitting wood, and creating wooden items. He is eloquent about a subject that is very difficult to describe: how wooden things bring you close to nature. Why we feel that they grow better with use and age. How they hold the spirit of

both the maker and the original tree. He balances the pleasure a tree gives while growing and the excitement at the prospect of what it might be converted into once it has been felled.

He is honest, open, and personal about how the project of turning one Ash tree into as many things as possible brought him personal psychological benefit.

"Throughout my adult life I have suffered from mild depression. It comes in bouts, often arriving when I don't expect it. I'm not saying that the only way to keep the "black dog" off my back is to spend time among trees. I'm merely observing that my personal experience has been good for my wellbeing. The whole project with this Ash tree has been positive ... having my cereal out of an Ash bowl, I'll take that over Prozac any day."

As a member of Woodland Heritage, I expect you will love this book as much as I have. You may know some of the characters in the story; there are several characteristically wise quotations from Will Bullough to name just one WH connection.

"The man who made things out of trees" and the "The man who planted trees" now sit side by side on my shelf of books that I re-read at least once a year.

Go to your local bookstore, buy it, read it and whatever your experience of trees or timber you will find something revealing, insightful and new.

Letters to the Editor...

Thomas Allen
20 December 2020

Hello Kelly

Sorry I'm only getting back to you now – I haven't been regularly checking my emails while living in the woods!

The chainsaw course was brilliant – James, our instructor, is such a good teacher and a lovely guy – and both Bob and I are very happy to now be qualified with the chainsaw. It's quite empowering, and we're excited to get started with coppicing in the new year. A big thank you again to Woodland Heritage for the funding. I'll be sure to supply you with a write-up of my experience on the course and at Prickly Nut Wood by the end of next year, as requested – it's been such a wonderful experience so far.

All my best,
Thomas

Daphne Vivian-Neal
13 April 2020

Dear Lewis,

Thank you for an excellent, stimulating, informative magazine. Truly absorbing in these difficult times. The articles are all interesting, well written and very encouraging. We need to make full use of all our different woodlands and help the farmers etc. Also it is important to highlight the dire consequences of importing seedlings.

The articles are easy to comprehend to non-foresters.

Thank you for all you and your team do to support UK Forestry.

Yours sincerely etc
Daphne

PS I will lend the magazine to several keen tree enthusiasts.

News from the Continuous Cover Forestry Group (CCFG) February 2021



Just like all other organisations in forestry, the CCFG's programme for 2020 was severely affected by the impact of the Covid-19 pandemic. We were unable to hold any field meetings or training events, and the ProSilva Annual Meeting in Luxemburg was also postponed. At the time of writing, our plans for 2021 are subject to considerable uncertainty while we wait to see when restrictions on forest-based events will be relaxed. We have provisionally planned for a series of field meetings starting in early autumn and further details will be available from our website (ccfg.org.uk). We also intend to run a series of webinars dealing with different aspects of continuous cover forestry (CCF) which should begin soon after Easter – further details from our website.

Despite the pandemic, we did achieve various things during the year as well as producing two newsletters for our members. At the beginning of 2021 we released an animated video which provides a short introduction to CCF for people who are learning about

forestry. This video is on our website and has been well received. In late summer 2020, Confor released a report on 'Biodiversity, Forestry and Wood' which contained some misleading comments about the use of CCF in British forests. The CCFG committee published a detailed rebuttal of these elements of that report. Our commentary was widely reported in various sector journals and can also be read at our website. A couple of articles encouraging greater use of CCF were published in the Quarterly Journal of Forestry, while online presentations on the role of CCF were made to the Institute of Chartered Foresters and to other professional bodies. British foresters and land managers are showing increasing interest in managing forests by CCF and we will build on that interest in the year ahead. We are grateful for the support and friendship provided by members of Woodland Heritage and look forward to welcoming you either to a virtual event or even to a real field meeting in 2021.

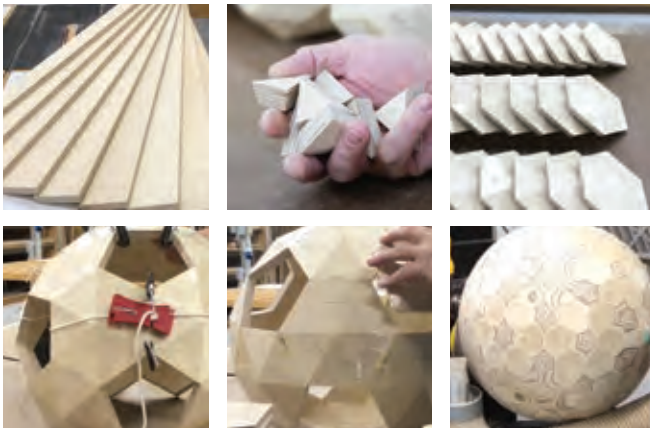


Is this the ultimate in high precision woodworking?

by Roger Richardson

Meet Keith Williams, a one man firm in Minier, a village a hundred miles south west of Chicago, who has worked out how to make highly decorative hollow wooden spheres. How does he do it? "Each sphere is made up of 180 precisely cut triangles with bevelled edges. The triangles are assembled into 12 pentagons and 20 hexagons. These shapes are all glued together to form a ball with 180 flat facets. This rough ball is sanded on a lathe to form a true smooth sphere and then lacquered." What could be simpler?

The website is oddballgallery.com. An article in this Journal shouldn't urge readers to leave its pages but Keith's website is a must.



Peter Savill Award 2020



Professor Julian Evans



Dr Gabriel Hemery with Michelle Savill

Image © Gabriel Hemery

With no Field Weekend at which to present the Peter Savill Award to the worthy recipients last year, congratulations are sent to both Professor Julian Evans and Dr Gabriel Hemery for recording the moments when they both received their trophy.

Towards the development of a monitoring trap for *Agrillus biguttatus*

by Philip JL Gould¹, Sandra Denman², Zoltán Imrei³, Jozsef Vuts¹

1: Rothamsted Research, UK

2: Forest Research, Alice Holt, UK

3: Plant Protection Institute CAR, Hungary

Agrilus biguttatus Fabricius (Coleoptera: Buprestidae) is a key component of the Acute Oak Decline (AOD) complex, which decimates native UK Oak trees. Our hypothesis is that if beetle numbers are reduced, AOD incidence decreases.

Manion's Disease Spiral Model (Manion 1981) captures the complex mechanisms behind tree decline. Predisposing factors are the first of three progressive phases in the model and broadly encompass environmental stresses that reduce plant resistance, including underlying genetic potential, or unsuitable soil and climatic conditions to which the tree has been exposed.

The second phase is a collection of inciting factors that serve as tipping points during the decline process, such as drought, insect defoliation, frost or air pollution events.

Contributing factors come at the final stage and define cumulative biotic effects that overwhelm the whole or parts of the host plant, and include fungal, bacterial and viral diseases and wood-boring beetles. We have increasingly found during our AOD research that this model provides a useful framework for us to define testable hypotheses.

Although the exact nature of the inter-kingdom relationship between necrotic AOD bacteria and *A. biguttatus* beetles is still unclear, the nearly 100% co-occurrence of larval galleries and bacterial stem lesions suggest a strong link between them (Denman *et al.* 2014). Whether adult beetles vector the pathogens, or the wood-boring larvae induce bacterial proliferation under the bark,

is the subject of an ongoing project (BB/T010886/1 – BAC-STOP). However, it is clear that 1) for a necrotic lesion to form to its full extent, the presence of both of them is necessary (Denman *et al.* 2018), and 2) new stem bleeds occur on trees in close proximity to trees with beetle exit holes (Brown *et al.* 2017). These have prompted us to hypothesize that *A. biguttatus* is key in AOD development and spread; thus, by reducing beetle numbers at a locality, AOD cases will also be reduced.

This article describes the outcomes of a project funded by Woodland Heritage and The Grosvenor Estate. The funding was provided to undertake beetle trapping experiments in the field over the summer of 2020, with the aim of optimising a monitoring device for *A. biguttatus*.

During a previous project in 2019, supported by the RPA via the EIP-Agri scheme (107477), we compared two distinctive trap types to assess which was most suitable for further optimisation and potential future application (Gould *et al.* 2020). One was a so-called prism trap, painted purple and covered in sticky sheets, that was previously found to catch *A. biguttatus* in the UK (Brown *et al.* 2017).



Figure 1: Multi-funnel MULTz trap used in the project

The other was a non-sticky, light green multi-funnel trap developed for the capture of buprestid beetles (Imrei *et al.* 2020) (Fig. 1). The data indicated that the multi-funnel traps were as efficient at collecting *Agrilus* spp. (including *A. biguttatus*) as prism traps and had the advantage of being easy to work with, so we therefore decided to use these to compare different treatments in the 2020 season.

The reflectance spectrum of the green multi-funnel traps, codenamed MULTz (Csalomon®, Plant Protection Institute CAR, Budapest, Hungary), has been published previously and is shown in Fig. 2. The green colour is attractive to a number of *Agrilus* beetles, and it is supposed that these insects are sensitive to the 500-540 nm region of the electromagnetic spectrum.

Previous field observations revealed that *Agrilus* species prefer to land on attractive surfaces (coloured or those with jewel beetle silhouettes), and MULTz traps exploit this characteristic of beetle behaviour by providing a large landing surface. Just as in 2019, the upper panels were coated with a dry PTFE lubricant spray to make the plastic panels more slippery, making it more likely that the beetles would fall into the catch container below.

The four treatments tested included MULT coloured traps with and without a three-component synthetic mixture of volatiles identified from fresh Oak foliage that would act as an olfactory lure to the beetles, and transparent MULT traps with and without the synthetic mixture. This experimental structure allowed us to assess the effect of colour and odour on beetle catches, independently and in combination. The lures were replaced every week, when all traps were also inspected, and the insect material removed and retained for identification.

Trapping started at four sites across England in mid-June, these were: Sherrardspark Wood in Hertfordshire, Helmingham Hall and Staverton Park in Suffolk, and at Eaton Hall, part of The Grosvenor Estate in Cheshire (Fig. 3). Four trapping areas or “blocks” were chosen at each site, based around a tree or trees identified as having recent *A. biguttatus* activity (D-shaped exit holes) and obvious signs of AOD (stem bleeds).

Previous work found that greater numbers of beetles were trapped in open areas as opposed to within woodlands; therefore, each block was also in the open and preferably on the northern edge of a clearing, thus providing a southerly aspect (a preference shown by the beetle) within which to place the traps at a height of approximately 5 m

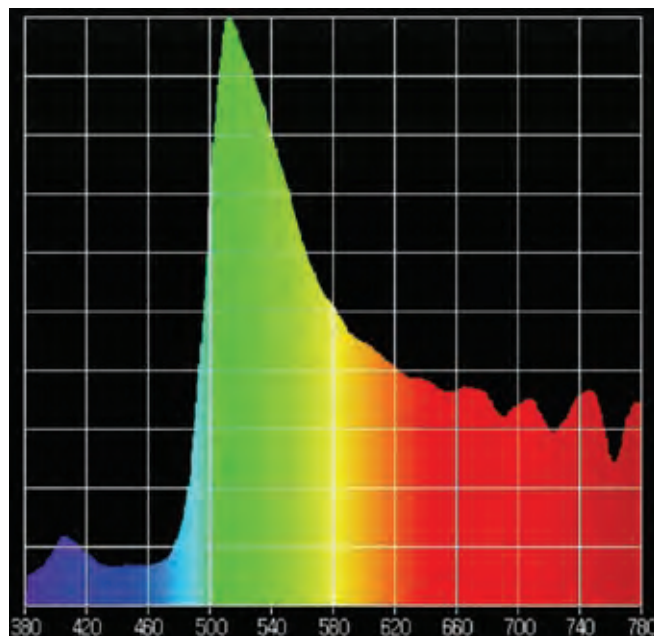


Figure 2: Reflectance spectrum of the green surface of the multi-funnel MULTz traps. Horizontal axis: wavelength (nm), vertical axis: reflectance



Figure 3: *Agrilus biguttatus* trapping sites in 2020



Figure 4: Funnel traps in situ at Staverton Park, Suffolk

(Fig. 4). Blocks were all situated at least 20 m from each other, with most being considerably more than this. The fieldwork finished in mid-August.

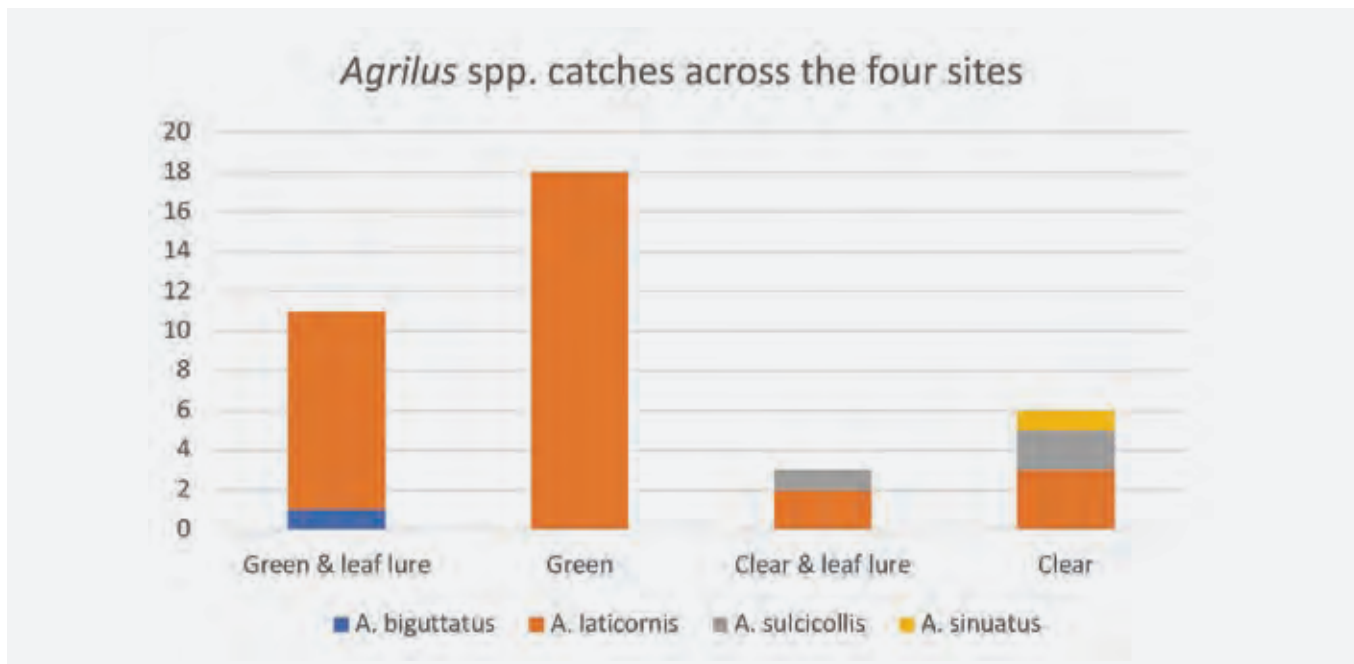


Figure 5: Total *Agrilus* catches in the 2020 field trapping trials in multi-funnel traps

Results

In total, 38 *Agrilus* specimens were caught during the 2020 summer field season, which is considerably fewer than in 2019, when 363 specimens were recorded. Only a single *Agrilus biguttatus* beetle was trapped, quite large numbers of *A. laticornis* were obtained, and specimens of *A. sulcicollis* and *A. sinuatus* were also caught (Fig. 5). The three other *Agrilus* species are all broadly similar, but noticeably smaller than *A. biguttatus* and lack the distinctive white spots. *A. laticornis* has a uniform blue- to bronzy-green colouration; *A. sulcicollis* is usually iridescent blue but can sometimes be green; and *A. sinuatus* (the hawthorn *Agrilus* beetle) has a coppery-brown colouration, sometime with a violet hue. The larvae of the first two develop in the bark of Oak trees, whilst those of *A. sinuatus* are most often associated with Hawthorn. Green traps were more effective at trapping *Agrilus* than clear traps. The four sites also differed markedly in the number of *Agrilus* beetles trapped: disproportionately more at Helmingham Hall (24) and Staverton (12), compared to Sherrardspark Wood (2) and Eaton Hall (0).

Our results showed the dominance of the green trap colour in attracting the most abundant species, *A. laticornis*. This is in agreement with what we saw in 2019, when *A. laticornis* responded strongly to the green colour of the multi-funnel traps. The single *A. biguttatus* specimen collected in 2020 was also from a green trap equipped with the leaf blend which, although it does not yet allow us to draw fundamental conclusions, points in the right direction in terms of trap development. In

2019, almost 90% of *A. biguttatus* catches were found in green traps with leaf lure, the first indication that this combination of colour and scent may provide a specific cue for the species.

The composition of the volatile lure is determined by the precise ratio of Oak leaf compounds that excited sensory cells on the *A. biguttatus* antenna, and these bioactive volatiles were found to be preferred by females when mixed into a blend and offered to the beetles in lab tests. We thus consider the three-component blend as an odour that mimics the smell of the adult food plant (Oak leaves) and provides a specific cue for flying beetles to locate food. The fact that *A. biguttatus* more often chose the green multi-funnel traps with lures in 2019 suggests that these traps will be able to “compete” with the foliage for beetles once the right dose of lure constituents (also known as lure strength) is determined.

Interestingly, just as in 2019, parasitic wasps (Hymenoptera: Ichneumonidae and Braconidae) were again caught in our traps in 2020. In total, 71 specimens were collected from the four sites but, unlike 2019, no *A. biguttatus* specialists were found. This might emphasise our assumption that 2020 was a “weak” *A. biguttatus* year, since population levels of the third trophic level, i.e. parasitoids, are directly influenced by those of the prey species. Also, a direct comparison is now possible between the trapping seasons in 2019 and 2020 at the Staverton and Helmingham Hall sites, which shows that fewer wasps were caught in 2020 (30) than a year before (71), again possibly

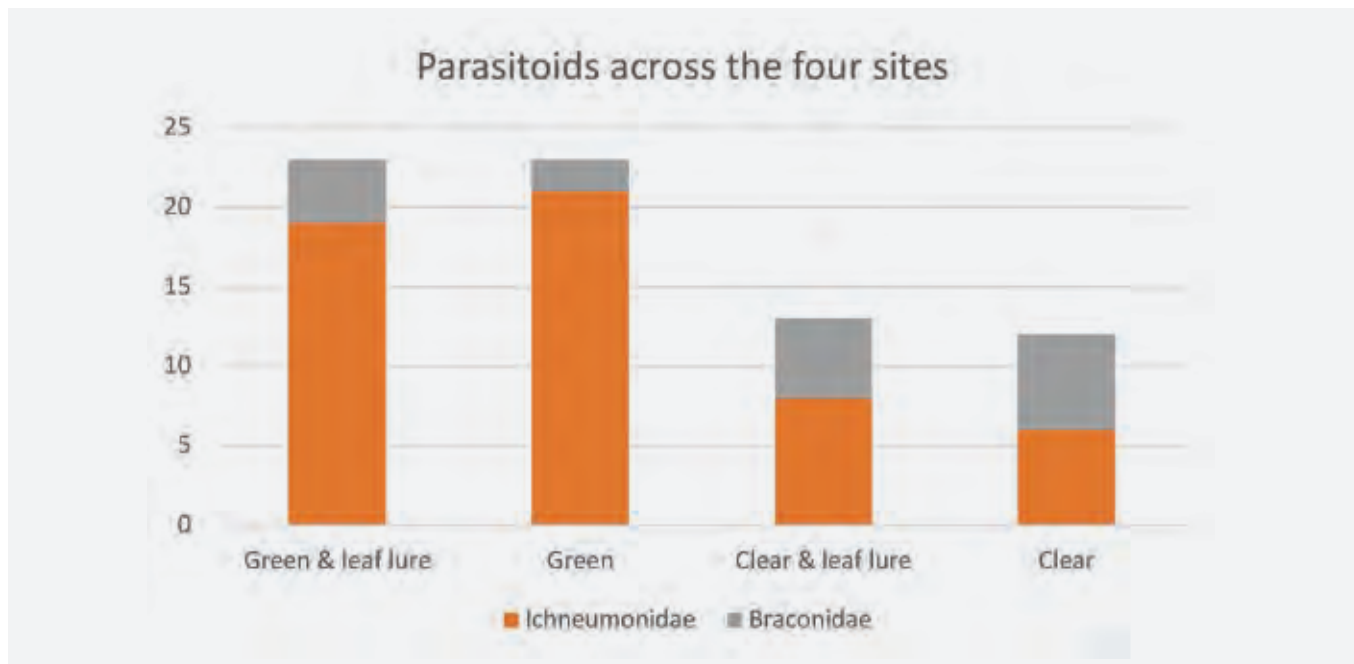


Figure 6: Total parasitoid catches in the 2020 field trapping trials in multi-funnel traps

reflecting a straightforward link between prey and predator numbers. In addition, Eaton Hall with no *Agrilus* catches provided 17 parasitic wasp specimens, which is likely to be because they parasitised species other than *Agrilus*. A closer look at the identity, and hence host breadth, of these wasps would clarify this notion. Fig. 6 shows the overall preference of parasitoids for the green colour of the traps, confirming the trends of our 2019 data.

Conclusions

Together with the 2019 data (Gould *et al.* 2020), it seems so far that the green hue of the traps is a general attractant for *Agrilus* beetles, whereas the chemical lure may be specific for *A. biguttatus*. The relatively high catches in the clear traps in 2020 highlight the inherent problem with sampling low insect populations, when the probability of chance catches in any treatment increases.

Insect abundance can vary widely between years and location, depending directly on local climate and the amount and quality of available food, and buprestid species are no exception. Their larvae develop under tree bark and eat phloem and cambium tissues, the nutritional value of which is dictated by tree vigour and health status. Weakened (stressed) trees mobilise more soluble amino acids, which help wood-boring beetle larvae grow better and positively influence the number of adults emerging later. As the larval stages of *Agrilus* species predominantly develop under the bark on the warmer south-facing section of the stem, warm years enable faster larval development and higher survival, and subsequently more adults appear in the following

seasons. We suspect the 2020 season was a “bad” year for *Agrilus* beetles, possibly for reasons highlighted above, which also underlines the nature of field-based research being strongly influenced by seasonal changes.

Practical lessons

Because of indications from the EIP-Agri project in 2019 that green multi-funnel MULTz traps with a leaf lure, combining visual and odour stimuli, are a promising candidate for catching *A. biguttatus*, we decided to focus on this type of trap during the 2020 project. Our aim was to confirm this observation and optimise the trap to make it a suitable monitoring device. A definite advantage of the MULTz trap is its light weight, compared to the Lindgren traps used for catching *A. planipennis* (the emerald ash borer) in North America, that also operate with multiple upper panels that channel beetles into a container below. Compared to prism traps, in addition to being much less heavy the MULTz design is non-sticky, making it cleaner to handle, so more user-friendly. Using a long telescopic pole, it is relatively easy to hang them on branches and take them down for inspection. Catches of other insect species are also reduced by the trap shape compared to non-selective sticky surfaces.

Our efforts in 2020 were hampered by a field season with a really warm spell in late May – early June (when Covid-19 restrictions prevented our work from going ahead) and a cool and rainy period in the middle of the summer. We suspect this is partially the reason for the low *Agrilus* catches, as these beetles prefer to fly in bright

and warm weather. Also, there may simply have been fewer beetles around, possibly as a knock-on effect from previous years. Furthermore, great efforts were made by the Grosvenor Estate team to reduce beetle numbers by wrapping many Oak trees in double layers of plastic and netting to prevent emergence and spread. This, as we observed, was an effective way of keeping *Agrilus* beetles from escaping!

Whilst the coronavirus restrictions hindered the organisation of field visits and prevented trapping in what may have been a more productive period early in the season, we still managed to have the trials operating throughout much of the same timeframe as 2019.

Overall, we can conclude that the attraction of *Agrilus* species to the green colour of the traps is confirmed, but another field season is necessary to show the synergistic effect of the synthetic leaf volatile lure on *A. biguttatus* catches. For this, sites with higher beetle populations are needed, and we are now looking into the possibility of collaborating with continental European labs to set up trapping trials that will run in parallel with UK tests. If these prove successful, a detection and monitoring device will be available for use in forestry to aid management decisions concerning AOD.

Finally, we find the catches of parasitic wasps in the MULTz traps particularly encouraging, because they pinpoint the direction of new research on the behavioural manipulation of natural enemies, using semiochemicals (behaviour- and development-modifying compounds). Parasitoids are known to utilise chemical cues that characterise their insect hosts' environment or activities, such as feeding. Where such chemistries will come from needs to be addressed by future studies, but our recent work on the capacity of microbial volatiles to lure aphid parasitoids supports this optimism.

Future work

Ongoing research within the framework of the BAC-STOP project is identifying volatile cues from AOD bacteria that may be a new source of powerful chemical attractants for both *A. biguttatus* and, if it is lucky, also its parasitoids. It would be sensible to combine the odour lure with the green colour of the traps in the form of attractant stations to exploit a possible synergism, because the key aspect of any biological control programme is to achieve a critical mass of the natural enemy. This is especially important in open environments such as woodlands, where the wasps have the chance to scatter across the landscape, as opposed to

more enclosed greenhouses. Thus, a successful colour and scent combination is expected to be able to keep enough parasitic wasps in and around AOD areas to reduce host beetle (*A. biguttatus*) populations locally, even at an individual tree level. Lacewings are similarly exploited for aphid management in orchards, where the device consists of a scent and an optimised ovipositing surface and draws in lacewings from local populations. The underlying mechanism in such approaches is thought to be that the scent component provides an ecologically honest signal for prey-searching natural enemies which, because they are rewarded, will not evolve resistance against the cues.

Acknowledgements

We are very grateful to all of the landowners and site managers that allowed us access to each of our trapping locations. Without their help and support, none of this work would have been possible. This work was funded by The Grosvenor Estate and Woodland Heritage.

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