Developing new hardwood markets for Irish timber – the Hardwood Focus group's study tour to Wales

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Introduction

A discussion-group called Hardwood Focus (HF) was formed in Limerick in 2018 among broadleaf-forest owners in the region. This initiative is part of the Limerick Tipperary Woodland Owners (LTWO) Group and is facilitated by Jonathan Spazzi, the local Teagasc Forestry Development Officer. The group's initial aim was to provide a forum for sharing ideas and to help develop markets for hardwood material originating from intermediate thinning, additional to firewood. This is part of a wider discussion about the timber production potential of Ireland's broadleaf forest estate which has now reached 194,000 ha (29% of the total forest area), with a growing stock volume of 22.6 million m³ (19% of the total forest standing volume) (DAFM 2018). In 2018, Ireland imported 42,000 m³ of sawn hardwood with a value of €41.1 million, which included 13,000 m³ of tropical hardwoods. In contrast, in the same year only 5,000 m³ of commercial hardwood roundwood was reported as "available for processing" in Ireland. During the period 2014-2018, wooden furniture imports increased by 54% to a value of €243 million (O'Driscoll and Moore 2019).

One of the topics discussed by the group concerned the opportunities to substitute, in the coming years, some of these imports with finished goods made in Ireland from home-grown timber and in so doing facilitate the development of a local timber supply chain from growers to end users. Many of the participants in the group had applied Woodland Improvement thinning (a DAFM-funded scheme) to their forests, had managed trees in their plantations to good size and quality and are now looking to explore markets to add value (beyond that of firewood) to produce from future thinnings.

The volume of hardwood roundwood is projected to increase as the broadleaf growing stock resource matures and enters thinning cycles. Whilst the firewood market has been, and continues to be, of great importance as an enabler for broadleaf forest management, alternative markets should also be sought for the increasing tree sizes and volume of "small-diameter" hardwood logs that will be entering the market over the coming years.

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During various group discussions two general points were arrived at consistently:

- Growers wished to connect with other owners whose forests were at a more advanced development stage and to view/learn from existing small-diameter hardwood producers and processors. Hardwood marketing developments taking place in Wales were of particular interest.
- The importance of sharing findings and to co-ordinate with other Forest Owners' groups and other organisations in Ireland to explore possibilities for adding value to small diameter hardwood produce.

In this context the group successfully applied for support under the DAFM Forestry Promotional programme for 2019-2020 for a range of activities. These included the development of a dedicated webpage for the focus group (http://www.limerickandtipperarywoodlandowners.ie/hardwood-focus-project.html), a study trip to Wales to meet hardwood development agencies, a video production (Irish grower case studies) and a one-day seminar to be held in Limerick in autumn 2020. This short article describes the HF group's experience and findings from their tour to Wales.

The study tour to Wales

A delegation from the HF group, composed of LTWO forest owners John O'Connell, Jonathan Sykes, Martin O'Sullivan and Ned Liston, together with Mark Donnelly (forester/broadleaf specialist), Seán Garvey (GMIT Letterfrack lecturer in furniture design and manufacture) and Jonathan Spazzi (Teagasc Forestry Development Officer) travelled to Wales between 30th September and 4th October 2019. The group aimed to meet hardwood producers and development agencies to explore potential markets for Irish hardwood produce, specifically from intermediate thinnings. The group was also joined by Teagasc forestry researcher Dr Ian Short and Colin Marren, M.Sc. Walsh Scholar (both involved in small-diameter alder utilisation research), as well as Padraig O Tuama (forester/ProSilva Ireland) and John Sherlock (forest owner and chair of the North East Forestry Group).

Wood Lab Pren and Kenton Jones Ltd.

The first stop of the tour took place in Caerphilly near Cardiff where the group met Dylan Jones from Wood Lab Pren and formerly a project manager with Coed Cymru: a Welsh organisation established in 1985 to increase the economic value and performance of Welsh broadleaf woodlands. This includes research and development into new small diameter hardwood products. The Wood Lab Pren project continues Coed Cymru's work and is funded by the European Agricultural Fund for Rural Development and the Welsh Government until 2021. The project's aim is to facilitate the development of a local timber supply chain, from growers to end users, by sharing knowledge and research-and-development findings (Jones and Elvins 2019).

This stop (and the Welsh study tour in general) was an eye opener for many of the participants since very few had had many dealings with timber manufacturers or end users. According to Dylan Jones, the broadleaf forestry sectors in Wales and Ireland share many similar experiences. The Welsh firewood market is buoyant and most Welsh broadleaf forest owners tend to compete in this area and have a "limited understanding of the needs of designers and makers". Also, "furniture makers and designers do not generally connect with the forestry industry". Dylan described how he and his colleagues aim to apply furniture design-and-making to highlight how small-dimensioned hardwood, which is perceived as low value, can be made into high-value furniture products. He explained how developing a strong "design-led supply chain can pave the way to creating skilled jobs and innumerable environmental benefits resulting from well-managed forests producing financially sustainable materials."

The main product discussed with Dylan was the end-grain tile. The end grain tile is probably the most well-known product resulting from research and development by Coed Cymru (see Figure 1). It is intended for use as flooring or wall covering. End grain is exposed when timber is cut across the annual growth rings at 90 degrees (rather than the more usual longitudinal cutting along the length of a log). It has greater impact and wear resistance than that of conventional long grain. It has been utilised in the past for items like mallets, street cobbles and carriage brake pads, all of which take advantage of its wear resistant properties (Jones 2015). The main objective of Coed Cymru's end grain project was to develop a commercial resource from short-length small-diameter logs (in general between 20- and 40-cm mid diameter).

The project has since developed a suite of other products, all made from small-diameter logs. The tiles are made from timber from different species, and of varying thicknesses, sizes and shapes depending on customer preferences and whether they

Figure 1: *Dylan Jones discussing the Wood Lab Pren initiative and describing Coed Cymru range of products (left), including the alder end grain tiles (right).*

will be used indoors or outdoors. Together with other collaborators the project has carried out extensive research to be able to match the most suitable species for a specific product requirement (based on each species' inherent properties). The basic tile measures approximately 100 × 100 × 10 mm (length × breadth × height), but there are many variations on these measurements. Various species were used including ash (*Fraxinus excelsior* L.), oak (*Quercus* spp.), sycamore (*Acer pseudoplatanus* L.), beech (*Fagus sylvatica* L.), birch (*Betula* spp.), alder (*Alnus* spp.), poplar (*Populus* spp.) and larch (*Larix* spp.). Species with relatively low-density timber such as alder and birch perform very well in an end grain orientation.

Many alterations and versions of the tile have been made since the end grain project began. These include hexagonal versions (engineered to make boards of pre-glued tiles) and oblique rectangular tiles made by cutting the log at an angle rather than at 90 degrees.

From the description of the manufacturing process, including drying and fitting, it was clear that the end grain tile production required highly specialised and skilled operations and, as a commercial product, it was suitable for a niche but high-end market.

Other simpler products were viewed and discussed as viable alternatives, such as cross laminating narrow boards from small logs to create larger dimensioned and more valuable hardwood boards, the merits of the "inside out beam" (see Figure 2). Producing skirting board or architraves using narrow boards from small hardwood logs were also discussed.

Of particular importance when trying to develop new products, according to Dylan, "is getting the basics right in terms of understanding hardwood timber properties, sawmilling and drying skills" and not trying to compete with global markets. "It is important to consider the whole chain of supply from producers, processors, designers to end users; we need to first ask architects and end users what products they want/need before we start the design and product development process".

One of the companies which commercially developed the end grain tile in Wales is Kenton Jones Ltd. Designers and Makers. The group met Kenton, the company owner, at his factory workshop in Welshpool and he explained the process of producing end grain tiles and the engineered board (see Figure 3). The latter is a version where tiles are glued to a strip of birch plywood 1.2 m long. This results in a much quicker installation job as individual tiles are not being laid.

Kenton's company has fitted many floors with end grain tiles throughout the UK (e.g. Selfridges and Coach in London) and internationally. They continue to receive regular enquiries despite little advertisement or promotion. According to Kenton, since developing the end grain tile his company has been focusing on a range of new projects and hasn't fully developed the marketing side of this product. When asked if

Figure 2: *The "Inside-out beam" is a large-dimensioned beam derived from a small-diameter log. The process involves machine rounding the log, squaring the edges, sawing the log into four sections before gluing the rotated sections together again.*

Figure 3: *A range of products developed by Kenton Jones Ltd.; an engineered version of the oak end grain tile (top) an alder hexagonal tile (bottom left) and a floor tile made of sycamore (bottom right).*

he was open to collaboration with Irish producers, he seemed positive.

In terms of ease of production, alder and birch seem to fare best mainly because of stability but also because of their colour characteristics (see Figure 4).

Another variation of the end grain tile is the outdoor end grain cobble, measuring 100 × 100 × 100 mm, and is generally made from Welsh oak or larch. Kenton experimented with surface charring of the cobbles to reduce the slip potential of the flooring. They reported a marked improvement compared with uncharred material.

A large part of Kenton's work comprises bespoke kitchens where clients are strongly influenced by current fashions. Customers will often bring along a magazine and say "can you make this for me". The magazine photographs generally contain consistently coloured white oak. In such cases timber choice is usually French or Eastern European oak as Welsh and UK oak have darker brown colouration patterns and the colouring is generally not consistent. However, both Kenton and Dylan Jones were of the view that Welsh oak could be marketed as premium material because of the unique nature of the colour character. The Welsh poet, Clare E. Potter, makes the point eloquently in her poem Dendrochronology (in Jones and Elvins 2019), "In Wales, our trees have their own language – because of the hills, the rain, because of rain, growth, rapid growth of rings that out-tongue the English database, defy accurate dating. And

Figure 4: *An example of a flooring commission recently completed by Kenton Jones Ltd. using end grain birch tiles.*

what of it?" The HF group appreciated that if an indigenous market for hardwood timber is to be developed, that promotion among end-users and manufacturers will be necessary to turn such perceived weaknesses into strengths.

Whitney Sawmills

The group visited Whiney Sawmills (www.whitneysawmills.com/) to attend a specialist hardwood training course. Whitney Sawmills is a well-established and thriving hardwood sawmill based near Hay-on-Wye in Herefordshire, trading since the early 1990's. Since 2016 it has been run by Woodland Heritage (www.woodlandheritage.org/), a charity dedicated to support the productive development of British broadleaf woodlands. Whitney Sawmills supplies a range of different timbers, specialising in oak, although Douglas fir has become increasingly popular in recent years. Other hardwoods supplied include ash, elm, sycamore, sweet chestnut (*Castanea sativa* Mill.), cherry (*Prunus* spp.) and poplar, with walnut (*Juglans regia* L.), alder, lime (*Tilia* spp.) and maple (*Acer* sp.) occasionally available. Customers include joiners, cabinet makers, timber framers, builders, architects and DIY woodworkers. One of the selling points of Whitney Sawmills is the consistent quality of its service and the ability to deliver customised orders.

The course at the mill included two days intensive hands-on training in selecting, grading and valuing logs, in practical milling techniques (Figure 5) and one day in nearby forest stands viewing continuous cover forest management to produce quality hardwoods. This course was an exceptional experience and an eye opener for many in the group.

The course was extremely well designed and skilfully delivered by leading UK-based professionals such as Gavin Munro (hardwoods valuation and marketing expert), Will Bullough (expert sawmiller with decades of experience), Dermot Doyne (Whitney Sawmills manager), Ben Asson (carpenter and wood worker with expertise in sawmilling/wood preparation) and Graham Taylor (director of Pryor and Rickett, a silviculture and management company). The group were introduced to Mark Hilleard, representative of the Welsh Government, who took an interest in the HF initiative. The workshop served as a vehicle to ignite discussions between the diverse members of the group on future prospects for Irish hardwoods as well as offering the group the chance to learn a great deal about hardwood production and marketing.

Compared to Ireland, Wales appeared to have a more active hardwood market, much of which is based on oak. Douglas fir seems to have become an "honorary hardwood" and is growing in demand. Good markets also exist for ash, sycamore and elm but less so for cherry and sweet chestnut. There was little recent market interest in beech. Both Gavin Munro and Will Bullough agreed there was good potential for market expansion for Welsh-grown sycamore as a replacement for tulip

Figure 5: *The group training in log grading (left) and the use of a portable sawmill (right).*

wood (*Liriodendron tulipifera* L.) which is favoured by cabinet makers and currently imported. Given sufficient quality, the minimum dimension required for sycamore logs would be c. 40 cm mid-diameter.

The average log size in the majority of Irish private plantations is still below 30 cm diameter at breast height (DBH) due to their young age. The current lack of larger dimensioned material is clearly a problem for the immediate development of a hardwood processing sector. However, forest owners in the group remarked that, in comparison with ring width of logs on display at the mill, Irish trees' growth rate was reckoned to be greater, possibly suggesting a competitive advantage for decades to come.

An interesting new product viewed at the mill, with relevance to converting smaller dimensioned logs, was a new heat-treated exterior cladding product (Figure 6) developed by Vastern-Timber, a leading UK hardwood processor (www.vastern.co.uk). This could have application for marketing ash logs that might be harvested early by remedial silviculture for stands affected by ash dieback (*Hymenoscyphus fraxineus*). A similar product is also available made from poplar and sycamore.

Small sweet-chestnut logs have a local market for fencing (Figure 7) due to the timber's natural durability which is often greater than treated softwood fencing. This offers greater returns to the owner compared to firewood. The utilisation of oak fencing cut from small logs was also discussed but opportunities seem limited due to the high percentage of non-durable external sapwood present in young oak trees, thereby necessitating a greater log size.

One of the main products at the mill was oak beams to supply traditional oak framing house construction. In this market smaller logs seemed to be ideal for conversion into small beams for which there was strong demand. Small beams are produced effectively from smaller (30- to 40-cm mid-diameter) logs which command roadside prices well in excess of firewood rates. Quality standards for beams were

Figure 6: *Brimstone ash weather cladding – a new heat-treated exterior cladding board developed by Vastern Timber – placed on an untreated ash plank for comparison.*

not exceptional and 3-m lengths were sufficient. This could potentially be a profitable market for Irish intermediate oak thinnings in years to come as an export to Wales and UK, or indeed to supply oak framing construction in Ireland.

In relation to forest management the group visited Whitney Wood and the Duchy of Cornwall's Timberline and Mary Glover Wood, which were all under continuous

Figure 7: *Small logs of sweet chestnut (foreground) for production of split fencing (background) for general farm use.*

cover management. Following from many discussions, it was clear to all that without appropriate and sustained management, little timber value would arise from our own broadleaf resource. One early point discussed was the importance of designing, from planting stage, robust species mixtures that favour vigorous growth and natural pruning of selected timber species while also taking into account the operational needs of thinning operations and marketing opportunities for early and intermediate thinning materials.

We viewed an experimental group under-planting of wild service tree (*Sorbus torminalis* (L.) Crantz), a very high value species for specialist timber use. At the current rate of growth and given market dimension requirements of a minimum 30-cm log size, profitable harvesting is expected to commence at 40 years from planting. This could have applications, on suitable sites, for under-planting in ash plantations undergoing remedial silviculture. The advent of ash dieback and its likely impact, will likely intensify tending, thinning, and alternative silvicultural management options for ash stands (Short and Hawe 2018), as is also seen occurring in continental Europe.

The importance of efficient harvesting of intermediate thinnings was discussed. Given sufficient scale and access, mechanised early thinning has shown to work well with a combination of harvester/forwarder with assistance of a chainsaw operator. In this case the harvesting to roadside cost was estimated in the region of €30-35 m^{-3}. This approach has the potential to greatly enhance the profitability of early hardwood thinning. However, machinery with suitable harvesting heads combined with a small

Figure 8: *Practical training at Whitney Sawmill; the group practiced by converting an oak log (with a diameter of 35 cm) into a beam and assessing the resulting financial return in comparison to its firewood value*.

Figure 9: *Discussing harvesting and marketing of intermediate thinning material at Whitney Wood*.

(thinning-dedicated) forwarder with tree marking capabilities was required at least from the second intervention onwards. The importance of scale and availability of skilled contractors was also discussed. The group viewed a range of mature oak stands where profitable saw-log harvesting takes place every 7-10 years with replanting of oak mixtures in coupes of 0.2-0.4 ha. The general group feedback was that the system seemed robust and relatively simple to execute. A major problem however was the presence of grey squirrel causing extensive damage to young trees. Deer were also present but were a lesser problem because a combination of shooting and tree shelters were proving effective control measures.

Conclusions

The trip was very informative and inspirational. It revealed the many challenges ahead for Irish hardwood producers but also identified a number of opportunities including the possibility to collaborate and partner with a number of Welsh organisations. The purpose of the tour was to explore potential market developments for hardwood material from intermediate thinnings. It was also hoped that it would provide new insights and be a catalyst for further initiatives, ultimately leading to new collaborations with strategic stakeholders in Wales. Happily, all the organisations visited by the group have expressed interest in further collaboration with the HF group

Figure 10: *Discussing continuous cover management for oak saw-log production in the Duchy of Cornwall's Mary Glover Wood*.

and it is planned that Welsh/UK representatives will travel to Ireland in 2020 to attend a hardwood seminar. This will be open to Irish forest owners and timber processing and utilisation stakeholders and is scheduled for the autumn in Co. Limerick as part of the HF programme.

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