

National Forestry Conference

MINOR CONIFERS IN IRELAND



An appraisal of the silvicultural and marketing potential of coniferous alternatives to Sitka spruce.



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of coniferous alternatives to Sitka spruce*

National Forestry Conference
Johnstown House Hotel
Enfield, Co. Meath, Ireland
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Scots pine, Kilballyboy, Co Tipperary. Scots pine, Ireland's only native commercial species has a wide range of uses. Because it takes preservatives well, it can be used externally for fencing, transmission poles and joinery.



Detail from Samuel Beckett Civic Campus, Ballyogan Rd Dublin, winner of Wood Awards Ireland 2016. The building features softwoods Norway spruce, European larch, Scots pine and western red cedar.



The waterwheel restoration project in Kilbeggan Distillery, Kilbeggan, Co. Westmeath used European larch sourced in Coillte forests in Co. Tipperary and sawn by Patrick Sheehan Sawmills Ltd., Clogheen. The project won a merit award in Wood Awards Ireland 2014, organised by the Wood Marketing Federation.

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Agenda for National Conference

Minor conifers in Ireland: An appraisal of the silvicultural and marketing potential of coniferous alternatives to Sitka spruce.

08.15 Registration, refreshments and conference literature.

09.00 Introduction – Donal Magner, Forestry Editor, *Irish Farmers Journal* and Secretary, Wood Marketing Federation.

SESSION 1: SILVICULTURE, YIELD AND QUALITY ISSUES

Chairperson: Dr. Aine Ní Dhubhain, Associate Professor of Forestry, University College Dublin.

09.05 Keynote address: Andrew Doyle, Minister of State with responsibility for forestry at the Department of Agriculture, Food and the Marine.

09.25 Minor conifers – location and performance.

An assessment of Ireland's minor conifer forest inventory. John Redmond, Inventory and Statistics, Forest Service, Department of Agriculture, Food and the Marine.

What's performing best. Results of research trials and case studies. Dr. Niall Farrelly, Forestry Researcher, Teagasc.

09.50 The forester's view: The right trees in the right place. Marina Conway, Chief Executive Officer, Western Forestry Co-operative.

10.20 International perspective – silviculture of minor conifers in Britain – what do we know and what do we need to know? Paul McLean, Research Scientist. Bill Mason, Emeritus Silviculturist (Research Fellow) Forestry Commission.

10.45 Break – coffee, tea.

SESSION 2: PRODUCTION AND MARKETING POTENTIAL

Chairperson: Gerry Murphy, President, Society of Irish Foresters.

11.30 As the sawmiller sees it – developing economies of scale and potential markets for minor conifer species. Gerry Dolan, Forestry Manager, Glennon Brothers Timber.

11.55 Timber properties of minor conifer species in Britain and future marketing opportunities. Dr. Dan Ridley-Ellis, Head of the Centre for Wood Science and Technology, Edinburgh Napier University.

12.20 Minor conifers: past and future. Gordon Knaggs, Consultant, Gordon Knaggs and Associates, and Fellow of the Institute of Wood Science.

12.50 Open forum and discussion.

13.30 Close of conference. Paul Harvey, Chairman, Wood Marketing Federation.

Foreword



Andrew Doyle TD
Minister of State

This year's Conference "Minor Conifers in Ireland" presents an opportunity to determine the current extent of minor conifer species in our forest estate and to ascertain the views of all stakeholders in relation to their potential increase.

The Second National Forest Inventory found that conifer species occupy 74% of our total stocked forest area, with broadleaved species occupying the remaining 26%.

In view of disease outbreaks relating to certain species, it appears prudent to encourage species diversity. The increase in rate for Grant and Premium Category (GPC) 4 in the current Afforestation Grant and Premium Scheme seeks to encourage the planting of certain acceptable conifer species, other than Sitka spruce and lodgepole pine.

If the wider use of species such as Douglas fir, Scots pine, Norway spruce and larch is to be encouraged, it is necessary to enable them to be used in structural applications in conformity with the CEN timber strength class system. (This European Standard establishes a system of strength classes for general use in structural codes. It provides characteristic strength and stiffness properties and density values for each timber class and applies to all softwood and hardwood timber for structural use.)

The recent announcement of the provision by the Department of Agriculture, Food and the Marine of substantial grant aid to the National University of Ireland Galway to carry out a wide range of work around timber standards and innovation in the built environment is relevant in this regard. Among the more immediate tasks will be to characterise the strength properties of a number of species, including Douglas fir, so they can be traded as structural timber.

I therefore welcome the National Forestry Conference focus on minor conifers as both timely and relevant. My thanks the Wood Marketing Federation and the Society of Irish Foresters for organising this important conference and all of the speakers for their contributions to this discussion.

A handwritten signature in black ink, appearing to read "Andrew Doyle". The signature is written in a cursive, flowing style.

Andrew Doyle TD
Minister of State with responsibility for forestry
Department of Agriculture, Food and the Marine

Introduction from the Wood Marketing Federation



Paul Harvey
Chairman
Wood Marketing Federation
and Business Manager, Arch Timber
Protection, a Lonza company

The Wood Marketing Federation supports the need for diversity of conifer tree species providing we grow these successfully and that there is a viable market for the end product during forest thinning and final harvest.

In Ireland, commonly used minor conifers such as Douglas fir, larch, Norway spruce and Scots pine grow extremely well and form the backbone of species used in heavy duty outdoor applications like motorway fencing posts, decking, boardwalks, transmission poles and railway sleepers.

We also need to look further afield at other species including Radiata pine – Monterey pine. While difficult to establish using traditional management systems, Monterey pine has proved its worth with innovative silvicultural practices and could be a very useful addition to forest species mix. It adapts well as modified or engineered wood with long-lasting properties. As a forest tree, it has been successfully established in South America and New Zealand while it has also adapted well as an agro-forestry or farm forestry species.

We can learn from other countries when creating a strategy for conifer diversity. A 'less is more' approach might prove wise based on the experience of other countries. Within the conifer range, Sitka spruce dominates Irish forestry but at 52% of the forest area or 4.5% of the land area, it is not as dominant as often assumed.

At present 74% of Irish forests comprise conifers, which is lower than countries with strong wood based economies such as Sweden with 80% conifer cover, Finland (89%) and Austria (75%).

It is not unusual for countries with high percentages of conifers to rely on one or two species. Sweden, Austria and Finland are heavily dependent on Norway spruce and Scots pine. However most of these countries have built a wide range of industries around broadleaf (hardwood) and minor conifer (softwood) species over the generations as they have traditional expertise and critical mass. For example, while Finland has only 10% birch forests, it has a major veneer industry as birch forests cover 2.3 million ha in a country with 75% forest cover compared to Ireland's 11%.

We look forward to hearing how Ireland can develop a clear strategy on minor conifers at this conference led by Andrew Doyle, Minister of State with responsibility for forestry who provides the keynote address. We look forward too to hearing the views of foresters, timber processors, wood scientists and representatives from State agencies in Ireland and the UK who are responsible for creating a sustainable forestry and forest products sector.

Paul Harvey
Chairman
Wood Marketing Federation

Introduction from the Society of Irish Foresters



Gerry Murphy
President
Society of Irish Foresters

Ireland's mild and moist climate provides ideal conditions for temperate and warm temperate tree species to grow and thrive. While certain species such as Sitka spruce are particularly well adapted to Irish conditions and have come to dominate our forests, there are many other species such as Norway spruce, Douglas fir, Scots pine, western red cedar, western hemlock and Monterey pine which have the potential to become an important constituent of our national forest estate.

The wide range of site and climate conditions that exist in Ireland facilitates the growing of an impressive range of commercial conifer species. Results from trial plots at Avondale, Co. Wicklow (1908), Trench 14 at Clonsast, cutaway bog, Co Offaly (1950s) and John F Kennedy Park, Co. Wexford (1960s) endorse the view that species such as Douglas fir, grand fir, noble fir, western hemlock, western red cedar, Monterey pine and Scots pine offer encouraging potential. While Sitka spruce remains our pre-eminent commercial species, these minor species can provide important silvicultural and ecological benefits for society. For example, Scots pine may offer an alternative on nutrient impoverished sites as a native woodland species. Several of these minor species have greater shade tolerance and thus create opportunities for uneven aged silviculture or mixed stands which assist species diversification objectives.

Though commonly referred to as 'minor species', they play a critical role in our ability to select species for particular sites or specific wood properties (durability, finishing properties, high calorific value, etc.). This allows foresters the option of producing a variety of timbers for different end uses, while at the same time optimising the productivity and biodiversity of the forest estate.

As the effects of climate change become increasingly apparent, it is predicted that our forests will experience greater risks from both biotic and abiotic factors such as disease, drought and windthrow. However, our ability to grow a wide range of minor species will provide greater genetic diversity which will help to mitigate any adverse effects that may impact on our forests.

In summary, these 'minor species' have the ability to endow our plantation forests with increased resilience in the event of catastrophic outbreaks of pests or diseases and also assist in shouldering the burden of commercial forest production. Thus, species which are currently considered of minor importance are increasingly likely to play a critical role in reinforcing the resilience of Irish forests in the 21st Century.

Gerry Murphy
President
Society of Irish Foresters



Donal Magner
Secretary
Wood Marketing Federation

Donal Magner has worked in most sectors in Irish forestry including forest management, marketing and communications. Forestry Editor with the *Irish Farmers Journal*, he holds a master's degree in forestry from UCD. He is the author of *Stopping by Woods: A Guide to the Forests and Woodlands of Ireland* and co-editor of a number of publications including *Woodspec – A Guide to Designing, Detailing and Specifying Timber in Ireland*. He is a recipient of the RDS Forest Service Judges' Special Award for his contribution to Irish forestry. He is the Irish representative on the Advisory Board of SIMWOOD, the EU body addressing timber mobilisation in Europe.

Above right: Natural regeneration, western hemlock, an excellent shade bearer and suitable species for underplanting or enrichment.

Opposite: Douglas fir is an ideal species to form a pure crop or in mixture. Here it is managed as part of continuous cover forest woodland near Laragh, Co. Wicklow.

The road less travelled – minor conifers in Irish forestry

This is the first national conference to assess the future role of minor conifer species in Irish forestry from the perspective of the grower and the processor. Having addressed broadleaves – native and naturalised – in a previous conference, both the Society of Irish Foresters and the Wood Marketing Federation believe it is timely to explore the potential of minor conifers. The term 'minor conifer' refers to alternatives to Sitka spruce and includes any conifer that has yield, market and biodiversity potential in Ireland.



Ireland has a limited commercial native tree species palette. Since the demise of ash and elm, Ireland has only three native broadleaves – oak, alder, cherry and possibly birch – and one conifer – Scots pine – with commercial potential. Small wonder then that Irish foresters looked elsewhere for alternative broadleaves and conifers beginning in European forests. Broadleaves such as beech, sycamore and Spanish chestnut were introduced while the main coniferous species comprised Norway spruce and European larch.

However, Irish foresters looked beyond Europe. Could trees on similar latitudes to Ireland and on another northwestern continent with a maritime climate provide a species selection better than mainland Europe? The plant collector, botanist and forester Augustine Henry believed that the search for commercial tree species needed to be widened. He maintained that the Irish climate had greater similarities with the Pacific North West than continental Europe and encouraged seed collection from this area. He said: 'Prejudice should not exclude foreign trees; the question is whether they will grow as well as forest trees.'

Arthur Charles Forbes put Henry's theories to the test by establishing a series of experimental plots in Avondale from 1905 until 1912. In all, some 40 native, naturalised and exotic species were planted. As the State forestry programme unfolded, the performance of exotics both in Avondale and in the newly established



Scots pine is Ireland's only native commercial conifer. Widely planted up until the early 1960s, it provided excellent woodlands such as this stand in Dunanore Forest, Co. Wexford.

Opposite: Monterey pine research trial, Mount Hillary, Co. Cork. This high volume producer has shown mixed results but at its best requires high pruning early in the rotation.



Norway spruce, Clonbullogue, Co. Offaly. Norway spruce has similar wood properties to Sitka but produces higher quality end uses such as internal joinery and flooring.

Western red cedar, Mount Hillary, Co. Cork, an ideal tree for planting in mixture with other species. Produces naturally durable heartwood, suitable for decking and cladding.



forests supported Henry's view. Not only were these trees thriving in the Irish climate, they were performing well on soils of poor fertility. Within a few years, species selection shifted from predominantly European species to exotics from western North America including Sitka spruce, lodgepole pine and to a lesser extent Douglas fir, western hemlock and western red cedar.



Sitka spruce was the standout species from this list and it continues to be a major species in Irish forestry in terms of yield, site adaptability and market benefits. Its success is the main reason why the Irish forestry and forest products industry has an annual value of €2.2 billion. However, over reliance on one species has led to a one-dimensional forestry sector and could place the industry at risk especially in relation to possible future disease damage.

The following conifer species have adapted with varying degrees of success to Irish soil and climatic conditions:

- Native – Scots pine.
- European – Norway spruce, Corsican pine, European larch and silver fir.
- Western North America – Douglas fir, lodgepole pine, western red cedar, western hemlock, Monterey pine, grand fir, Lawson cypress and coast redwood.
- Japan – Japanese larch.

Based on planting programmes and forest trials, this list could be reduced to seven species comprising Scots pine, Norway spruce, Douglas fir, western red cedar, western hemlock and Monterey pine with hybrid larch substituting for European and Japanese larch, which are susceptible to larch canker and *Phytophthora ramorum* respectively. Lodgepole pine, once a prominent species in low nutrient sites including blanket bogs is rarely planted today as better quality sites are being made available for afforestation.

The challenge is to choose the best minor species that will adapt to Irish climatic and site conditions and that show market potential both domestically and internationally. In this regard less may be more with the emphasis on establishing two or three of the best species in our afforestation programme to provide economies of scale in order to maximise the potential of our best minor conifers.

MINOR CONIFER SPECIES WITH COMMERCIAL POTENTIAL IN IRELAND

Species	Comments	Provenance	Yield class & rotation
NATIVE			
Scots pine <i>Pinus sylvestris</i>	Produces excellent timber. Qualifies as a species under the Native Woodland Scheme. Yields much lower than either of the spruces or Douglas fir.	Irish and Scottish seed orchards and registered seed stands	6-14 m ³ /ha/annum 60-80 years
EUROPEAN			
Norway spruce <i>Picea abies</i>	Similar wood properties to Sitka but produces higher quality end uses. Slower growing than Sitka but not as susceptible to spring frosts.	Ideally Registered Irish and British seed stands and registered seed stands in the low elevations of Denmark and Germany (north of Frankfurt).	10-22 m ³ /ha/annum 60-80 years
Hybrid larch <i>Larix x eurolepis</i>	Not strictly European as it is a natural hybrid between European and Japanese larch. Superior to its parents in terms of form, growth and disease resistance. Attractive timber with wide range of internal and external uses including cladding and joinery.	Irish, British, French Belgian Dutch, Danish, German, Swedish and Polish seed orchards.	8-14 m ³ /ha/annum 45-55 years
WESTERN NORTH AMERICA			
Douglas fir <i>Pseudotsuga menziesii</i>	On correct sites, produces high yield and high quality timber known in trade as Oregon pine. Needs protection against deer damage in some areas. Attractive timber with wide range of end uses including construction, joinery, transmission poles and fencing.	Registered Irish and British seed stands and seed imports under EU derogation from coastal Washington and northern Oregon.	16-24 m ³ /ha/annum 50-60 years
Western hemlock <i>Tsuga heterophylla</i>	Needs sheltered sites and is an excellent shade bearer – ideal species for underplanting or enrichment. Uses include construction, internal joinery but non durable and resistant to preservatives.	Irish and British stands and seed imports from Puget Sound region of Washington state and the coast range and Cascade Mountains of Washington and Oregon.	16-24 m ³ /ha/annum 50-70 years
Western red cedar <i>Thuja plicata</i>	An ideal tree for planting in mixture with other species. Naturally durable heart wood, used for decking, cladding and roofing shingles.	Irish and British stands and seed imports of seed from Vancouver Island (British Columbia) and coastal Washington and Oregon.	12-24 m ³ /ha/annum 60-75 years
Monterey pine <i>Pinus radiata</i>	High volume producer but needs pruning early in rotation. Rarely planted in Ireland. Monterey pine is an extremely versatile timber, finishes well and is suitable for use as construction timber and for engineered and reconstituted timber industries.	Guadalupe Island (Mexico) or stands derived from this origin and home grown Irish healthy, non-yellowing trees	14-24 m ³ /ha/annum 45-60 years



Minor conifers – location and performance. An assessment of Ireland's minor conifer forest inventory

The National Forest Inventory (2012) estimated that the area of forest was 731,650 hectares or 10.5% of the land area. Conifers occupy 74% of the total stocked forest area while broadleaved species occupy 26%. Sitka spruce and lodgepole pine are the most common species, occupying 62% of the stocked forest area. The remaining conifer species comprise an area of 76,854 ha (12%), including: larch (27,414 ha), Norway spruce (26,336 ha), Douglas-fir (10,376 ha), Scots pine (8,012 ha) and Other conifers (4,389 ha).

A range of conifer species were planted in the 1930s and 1940s, including Norway spruce, Scots pine and larch, along with Sitka spruce and lodgepole pine. This reflected the untested nature of the North American species being planted at the time. From the 1950s onwards confidence in Sitka spruce and lodgepole pine grew, leading to their dominance in afforestation up to the mid-90s, after which the planting of lodgepole pine declined.

From 1970 to 1993, the proportion of Sitka spruce and lodgepole pine afforested was on average 88% of the annual afforestation programme. Broadleaves and diverse conifers such as larch received a significant boost due to changes in scheme rules and increased grants following the introduction of a new co-funded afforestation scheme in 1994. From the mid-90s onwards a wide range of tree species has been planted. However the finding of *Phytophthora ramorum* in Japanese larch in 2010, and ash dieback in 2012 and their subsequent withdrawal from the afforestation scheme has contributed to a significant increase in the proportion of Sitka spruce in the afforestation programme from 40% in 2010 to 71% in 2016.

Sitka spruce remains the predominant species used in Irish forestry. It has proven to be one of the most productive conifers in Ireland and as such has become the mainstay in roundwood processing.

The Forestry Programme 2014 – 2020 is designed, amongst other things, to encourage tree species diversity through increased grant and premium aid and other supports for diverse conifers and broadleaves. Given the low proportion of both diverse conifers and broadleaves being planted currently, this will be examined in the context of the mid-term review of the forestry programme.



Japanese larch, Norway spruce and broadleaves in Castlemorris, Co. Kilkenny. The National Forest Inventory estimates that there are 27,414 ha of larch and 26,336 ha of Norway spruce in Coillte and private forests.



Dr. Niall Farrelly
Forestry Researcher, Teagasc

Dr Niall Farrelly is an experienced forestry researcher with Teagasc where his research focuses on the silviculture and management of conifer species in Ireland. Niall's primary interest is assessing how well species and provenances are adapted to the climate and soils of Ireland, and how climate change may affect future species selection. Recently his work on site classification for Irish Forestry has been adopted by the Forest Service for afforestation grant aid. Niall has recently completed a successful term as president of the Society of Irish Foresters from 2015-2017.

What's performing best. Results of research trials and case studies.

Centuries of deforestation have resulted in Ireland being one of the least forested countries in Europe. The restoration of forest cover in successive state afforestation programmes has resulted in the development of a vibrant and competitive forest sector in Ireland. However certain challenges exist in the further expansion of forest cover including the emergence of novel pests and diseases which have reduced species choice. In addition, climate change proposes new challenges to the range of species and provenances used in Irish forestry. While Sitka spruce is the predominant commercial species and will remain so, it may be prudent to consider alternative species to develop a wider species portfolio.

Alternative species options are required where Sitka spruce is underperforming. These include the replacement of diseased threatened Japanese larch stands, extension of species options for afforestation, compatible species for mixed species stands and for use in uneven aged silviculture.

The presentation reviews the range of species that may prove successful under Irish conditions by evaluating the performance of species from forest plots at Avondale, JFK Park and Trench 14, Clonsast cutaway bog, Co. Offaly and experimental trials together with data from wider-scale operational planting.



Noble fir at Trench 14



Western red cedar at Avondale

In total over 200 conifer species are considered with wide representation from the *Pinus*, *Picea*, *Abies*, *Tsuga*, *Larix* Genus. While the performance of species from arboretum plantings is useful it gives more limited information about widescale deployment of species across a range of soils in Ireland. The study focuses on a narrower range of species with operational deployment.



Monterey pine at Trench 14

Predictably, species from temperate/oceanic climates (i.e. the Pacific Northwest) such as Douglas fir, grand fir, noble fir, western hemlock, western red cedar all show good potential.

Other species such as Norway spruce and Monterey pine show good performance, the former particularly useful on frost prone sites, the latter being the most productive pine species. Scots pine while less productive may offer a species option on nutrient impoverished heathland sites as a native woodland species that may satisfy conservation concerns. Other species warrant further investigation and include, Pacific silver fir, coast redwood, giant redwood, Japanese red cedar, Monterey cypress which show impressive production but have more limited representation across a range of site types.

It is important that the best genetic material is available to avoid discounting a species due to poor choice of seed origin and to provide material for widescale deployment in the afforestation programme.



Marina Conway
Chief Executive Officer
Western Forestry Co-operative

Marina graduated from UCD with a B Agr Sc (Forestry) in 1996 and M Agr Sc in 2006. Marina has worked in public sector, private sector and own company and her experience ranges from afforestation, reforestation, harvesting, sustainable forest management to climate change policy, forest carbon projects, emissions trading schemes, training and public procurement. She has also received qualifications in Environmental Auditing, Training and Water Pollution Control.

Lodgepole pine, Greaghmagheeragh Forest, Co. Roscommon.

The forester's view: The right trees in the right places

When considering a permanent land use change from agricultural to forestry, many different elements need to be considered. Planting the right tree in the right place is the most important decision a forester and landowner must make.

As a forester, first and foremost the silvicultural selection of species is most important, matching the species to the soil type, site conditions, exposure, and elevation as well as addressing issues such as suitability of species mixtures.

However many other factors must also be considered such as future markets, forest owners return on investment, the environment, landscape value, recreation benefits and disease and pest risk.

This presentation will look at minor conifer species currently being planted. These include Norway spruce, Scots pine, lodgepole pine and Douglas fir. The paper will examine how they are currently managed, and if there is room for expansion as well as market potential.



Could more conifer species on the acceptable list of conifer species approved for grant aid be planted, and if so why aren't they being planted? What are the restrictions from a forester's perspective, are there optimum site types that could be targeted for these minor conifers to be planted and should they be considered as part of national forest policy.

Grant aided afforestation in Ireland has predominantly been along the western seaboard due to land availability for forestry in a country that has a long and strong tradition of farming and future afforestation will be largely confined to areas of the country that are disadvantaged for agriculture and on lands that have limited agricultural use. Therefore is there a limit to the amount of minor conifers that this land type can support and will landowners consider other minor conifers in an industry that has built its success around one tried and tested species?



Paul McLean
Research Scientist
Forestry Commission

Paul joined Forest Research in 2013. He specialises in the functional biomechanics of trees, biometrics and tree growth for forest products. Paul obtained a PhD from the University of Glasgow in 2007. He worked with tropical tree biomechanics at the University of Montpellier, EcoFoG (French Guiana) and University of Auckland on radiata pine. He returned to Scotland in 2011 to work at the Forest Products Research Institute (Edinburgh Napier University).



Bill Mason
Emeritus Silviculturist
(Research Fellow)

Bill Mason joined Forest Research in 1982 as a silviculturist specialising in forest nurseries and plant production. From 1991 until 2012, he directed silvicultural research first across upland Britain and later across the whole country. He became a research fellow in 2012. Bill's current research interests centre on ways of adapting planted forests in upland Britain to the projected impacts of climate change and other hazards.

We are not starting from zero in addressing alternative conifers as there is operational and experimental evidence from trials in Britain and Ireland since the last century including Avondale, Co. Wicklow (opposite and right).

International perspective – silviculture of minor conifers in Britain – what do we know and what do we need to know?

In Great Britain, as in Ireland, productive conifer forestry has been and is based largely on Sitka spruce. Consequentially, the silvicultural guidelines for conifer crops are heavily influenced by our experience with Sitka spruce. However, throughout much of Europe there is an increased interest in the planting of what are being termed alternative conifer species.

In Great Britain there has been considerable interest for some time in alternative conifers driven mainly by concerns about forest health and the projected climate change scenarios. Diversifying species is seen as a way of mitigating these risks to the forest resource. However we need to consider how we can increase and maintain these species in a way that is economically viable by re-educating ourselves in their silviculture.

We are not starting from zero as there is both operational and experimental evidence from trials in Britain and Ireland during the last century which can inform provenance choice, nursery production regime, establishment methods and other aspects of the silviculture of the alternative conifer species being discussed in Ireland.

We will summarise findings from these past studies that are of relevance, identify some gaps in our current knowledge about how to best grow some of these species and briefly consider some of the challenges faced on the ground. We will finally describe some our current research that looks to address issues such as rotation lengths and potential yields of forest products.





As the sawmiller sees it – developing economies of scale and potential markets for minor conifer species

The main species processed by Glennon Brothers Timber Ltd up until the 1960s were oak, ash, elm, larch, sycamore and cypress. By the 1970s, species use switched mainly to Sitka spruce, but the mill also used Douglas fir, Norway spruce, pine (Scots and lodgepole) and larch (Japanese and European) up until relatively recently. Today, Sitka spruce is the dominant species, which reflects afforestation programmes since the 1970s.

Thus, Glennon Brothers Timber has an excellent track record in utilising alternative species but the company recognises the significant challenges in optimising the value of species that adapt well to Irish site and climatic conditions but, at the moment, do not have the critical mass to ensure a viable line of products for the marketplace.

The main challenge therefore is to build economies of scale. Large sawmills such as Glennons that process up to 500,000m³ annually have adapted their sawmills to maximise the value of Sitka spruce which forms over 90% of their raw material.



Douglas fir is the main species used in Glennon Brothers Timber Ltd's headquarters in Co. Longford.

Achieving economies of scale requires a major increase in afforestation in Ireland. Bodies such as COFORD recommend an annual planting programme of 15,000ha. However, we are currently achieving less than 6,000ha. If 20% of this programme comprises a variety of conifers, it is clear that Ireland will never achieve a significant minor conifer programme.

So the challenge is to increase planting the tried and trusted Sitka spruce, but when planting minor species we should concentrate on the following four species:

- Douglas fir – ideal for timber and cladding. We have used this species extensively in our company headquarters in Longford.
- Scots pine – takes preservatives well so is suitable for fencing and joinery.
- Norway spruce – currently used in construction alongside Sitka but has a much better added value potential in flooring and internal joinery.
- Larch – since Japanese larch has been taken off the list of grant aided species due to disease susceptibility, hybrid larch should be explored as an alternative. It has a wide range of external uses.

Irish foresters have experience in managing these species and we in Glennon Bros. have a track record in utilising them over the years. It will take time to build a viable timber industry around minor species. In the meantime, Glennon Brothers Timber will maximise the value of these species by processing them ourselves or by supporting smaller sawmills to explore niche markets.



Douglas fir is used by Glennon Brothers for post and rail fencing.



Dr. Dan Ridley-Ellis
Head of the Centre for Wood Science and Technology, Edinburgh Napier University.

Dan Ridley-Ellis is Associate Professor and head of the Centre Wood Science and Technology at Edinburgh Napier University. He is one of the UK's technical experts on guessing the strength of wood and can talk for hours on the topic - which he frequently does if nobody stops him. His main area of research is understanding the properties of wood, and how they are influenced by tree growth, forest management, and climate. He represents the UK at European Standards Committees for grading of construction timber, and the majority of structural sawn timber produced in the UK is now graded with settings he developed. He was named "woodland hero" for 2016 by Grown in Britain, and is also active in online learning, public engagement and science communication.

The Dun Laoghaire Rathdown County Council Operations centre in Ballyogan, Co. Dublin winner of the Wood Marketing Federation's Wood Awards Ireland 2014. European larch, Scots pine and Norway spruce were used extensively in this public building designed by Dun Laoghaire Rathdown County Council and Bucholz McEvoy.

Opposite: Western hemlock, Devil's Glen, Ashford.

Timber properties of minor conifer species in Britain and future marketing opportunities

This presentation will summarise what is known about the timber properties of current and potential conifer species in Britain and Ireland. It will cover structural grading potential for large and small mills, current and possible routes to market, and issues of concern to sawmills, both in relation to the wood and in relation to the normative framework of standards.

The softwood processing sector in Britain and Ireland has been built around a small number of timber-producing species, of which Sitka spruce is by far the biggest component. There are several reasons to increase diversification of species, including mitigation of the risk of pests and diseases, climate change, and changes in forestry practices. However, planting decisions should take due account of the timber potential of the future crop.

There is a pressing need for information about the impact of planting decisions on the future merchantability of timber. A proper understanding of wood properties of these species involves not only measurement of averages, but also the extent of variation, and the influential factors that would change timber potential, for better or for worse.



The natural comparison to draw is with Sitka spruce and one solution would be to find species that can be processed and sold as an equivalent mix. However, the use of new technology for grading and offsite manufacturing could also lead to new grades and new markets. This is particularly useful for lesser used species for which the ratios of strength, stiffness and density do not fit well into the standard strength classes, developed for the species with long-standing use: spruce, pine and fir.

The presentation will cover research so far on species including Sitka spruce, Norway spruce, larch, Douglas fir, noble fir, western hemlock and western red cedar. It will also outline research plans for work in the UK within the SIRT project, and in collaboration with Ireland in the WoodProps for Ireland project led by the National University of Ireland Galway.



Gordon Knaggs

Consultant, Gordon Knaggs and Associates, and Fellow of the Institute of Wood Science

Gordon Knaggs is a Fellow of the Institute of Wood Science. He was Senior Scientific Officer with Enterprise Ireland before he established his own successful consultancy, Gordon Knaggs & Associates. He has wide experience in research into the properties of Irish grown timber and has drafted monitoring standards relating to timber and timber products as well as providing advice on materials, equipment and processes used in the timber industries. He is co-editor of *Woodspec – A Guide to Designing, Detailing and Specifying Timber in Ireland* and has devised and provided courses on aspects of timber technology.

Opposite and left: The Samuel Beckett Civic Campus, Ballyogan Rd Dublin, winner of Wood Awards Ireland 2017, organised by the Wood Marketing Federation. Designed by Bucholz McEvoy Architects Ltd., the building featured hardwoods but the main species were sawn and engineered softwoods or conifers including Norway spruce, European larch, Scots pine and western red cedar.

Below: Douglas fir glulam roof, Artane Beaumont Recreation Centre, built 1985-86.



Minor conifers: past and future

Ireland is now predominately a producer of Sitka spruce, with a current total softwood harvest of approx. 4 million m³, of which 84% is Sitka spruce, 9% is lodgepole pine, and the remaining 7% mainly assorted softwood species (hardwood less than 1%). At present, much of these other species, in sawlog sizes, is used indiscriminately in mixture with spruce for structural, fencing and pallet applications. Many of these lesser-used softwood species have a considerable potential for use in more demanding and lucrative applications. The usage of such species in the past is outlined, and the potential for such species in the future is discussed.



In the distant past species planted were largely of European origin – larch, Scots pine and Norway spruce, plantings on private estates being promoted by RDS premia. European larch was widely used for boatbuilding, Scots pine for joinery and structural uses, and Norway spruce for structural use.

State forestry started in the early 1900s with experimental plots at Avondale, which showed the potential for exotic species, but only gained momentum from the 1950s onwards.

Our present forests are now largely based on North American species. In addition to Sitka we have lodgepole pine, western hemlock, western red cedar, Douglas fir, along with true firs and Monterey pine. In the relatively recent past, Irish-grown Scots pine and larch have been used in fencing and transmission poles, where their durability and ease of preservation is of value, and also in decorative flooring. Douglas fir has been used in a number of high-profile buildings with glulam beams.

There is considerable potential for increased use of these species in up-market applications and these are discussed, with existing and potential applications outlined. However, for many of these uses to be successful, pruning, thinning, and careful processing in the mill to produce high-quality lumber, will be necessary.

Information on Wood Marketing Federation and Society of Irish Foresters



Society of Irish Foresters

The Society of Irish Foresters

The Society of Irish Foresters is an all-island organisation which was founded in September 1942. Its main aims are to spread knowledge of forestry and to improve professional standards in the Irish forestry industry. To that end the Society publishes an annual scientific journal and a twice yearly newsletter, organises four field days, two public lectures, conferences and an international study tour each year.

The Society regularly makes submissions to government on policy initiatives which are likely to impact on the forestry industry and it is represented on several interdepartmental working parties. Our Continuous Professional Development (CDP) programme provides an opportunity for members to engage in the lifelong acquisition of knowledge and skills.

The Society currently has almost 700 members, most of whom are professional foresters who work across the whole spectrum of Ireland's forest industry. There are five categories of membership: Technical, Retired Technical, Associate, Student and Honorary.

Further information

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The Wood Marketing Federation

The Wood Marketing Federation (WMF) was founded in 1989 to promote wood and wood products providing they are sourced in sustainably managed forests. Membership and supporters include sawmills and other timber processors, State agencies and stakeholders involved in wood promotion and research. Our promotional programme covers wood processing, manufacture, design, preservation and usage from traditional applications to product development and innovation.

Our audience includes architects, engineers, designers, specifiers, timber processors and manufacturers, researchers, preservation companies, State agencies and educational bodies. The WMF's mission is *to promote wood as a renewable, sustainable and versatile natural material.*

Projects include:

- Wood Awards Ireland – aimed at architects, engineers, designers and timber conservationists.
- Publication of *Woodspec – A Guide to Designing, Detailing and Specifying Timber in Ireland.*
- All-Ireland Third Level Student Wood Awards for students of architecture, engineering and design.
- The establishment of the Irish Timber Information Centre hosted by NUI Galway.
- Organising conferences and symposiums.

Further information

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