Forest Research

Emerging Species:

Species choice for future forestry - what we are doing…

Chris Reynolds - Forest Research

Forestry and Timber Knowledge Exchange, Bangor

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What is an emerging species?

- **Principal tree species** - currently widely used in British forestry. E.g. Sitka spruce; pedunculate oak; Scots pine; Douglas-fir; grand fir

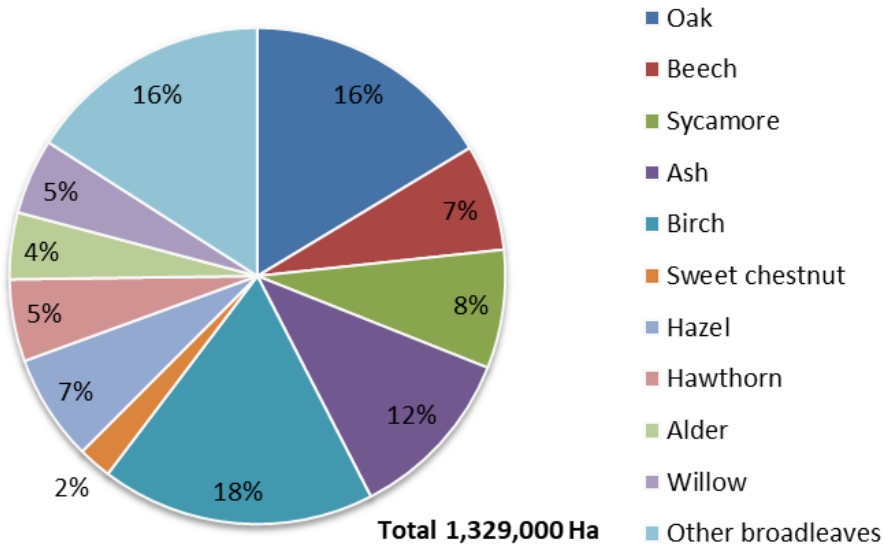
- **Secondary tree species** – used on a limited scale. E.g. European silver fir; Norway maple; red oak; coast redwood; Serbian spruce

- **Plot-stage species** - demonstrated positive characteristics in trials. E.g. tulip tree; Atlantic cedar; dawn redwood; Macedonian pine; European silver fir

- **Specimen-stage species** - promising trees from arboreta. E.g. Hickory species; Pine species; Abies species; Oak species – a long list

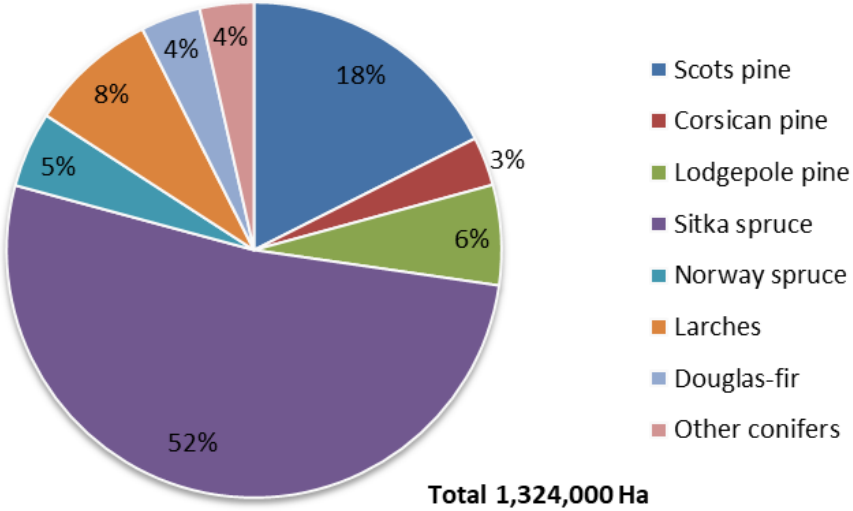
Why the urgency?

British Broadleaf Forests



Total 1,329,000 Ha

British Conifer Forests



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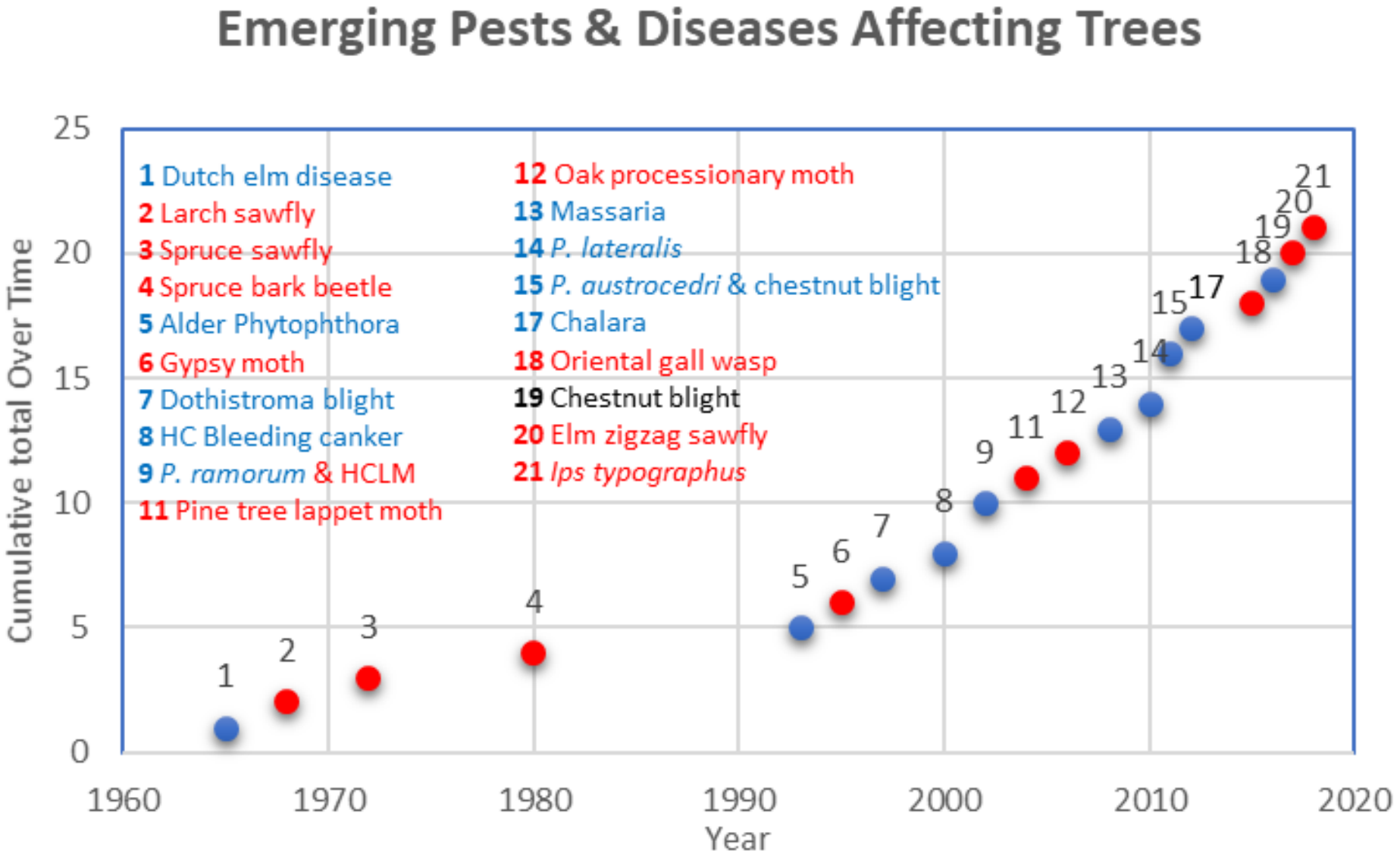
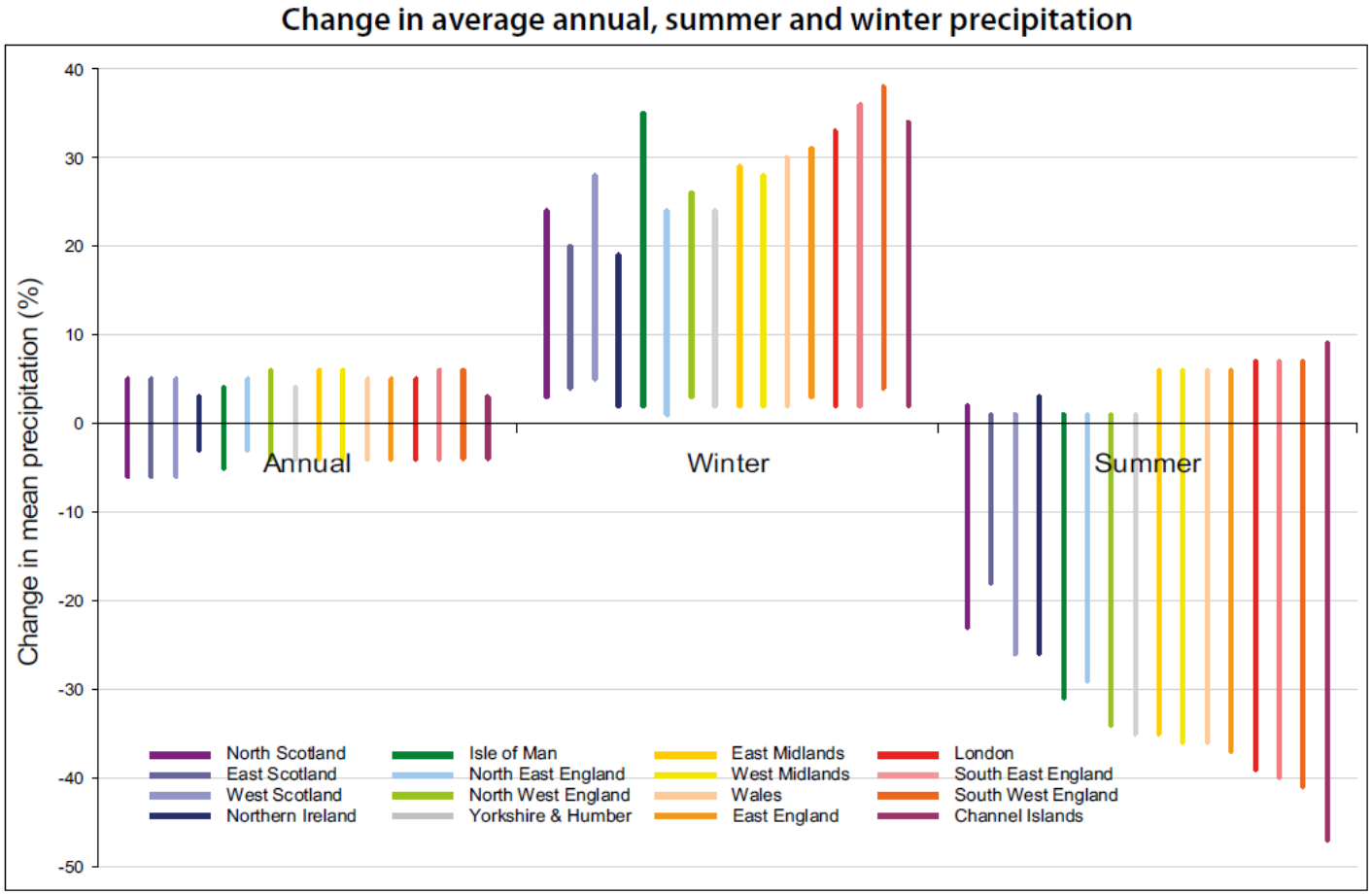
Why the urgency?



Why the urgency?

The change in climate is reality: it's not just a projection



Notes: Projections for the period 2040-2069 relative to 1961-1990

Source: 2009 UK Climate Projections, under a medium emissions scenario

What we are doing?

- Revisiting old species trial sites – long term experiments
- Operational species trials
- Short Rotation forestry trials
- Partnering European provenance trails – REINFFORCE
- New Generation of FR Species Trials
- Reviewing Emerging Species planted on the PFE England
- Using our network of Arboreta as a first stage assessment for new species

Revisiting and Reviewing old Trials – 44 Species Trials

Summarising old FR Seed Origin Trials – ongoing – Western Hemlock

By W.L. Mason, F. MacDonald, M. Perrott and J.P. McLean

What alternative tree species can we grow in western Britain? 85 years of evidence from the Kilmun Forest Garden

Summary

Nearly 300 tree species have been planted at Kilmun Forest Garden in Argyll since 1930, mostly in small plots allowing the collective performance of an individual species to be evaluated. Results from the mid-1990s showed that about 40 species had formed productive closed canopy stands, with a number of conifers all showing health and potential productivity equivalent to that of Sitka spruce, the major species grown in the forests of western Britain. Since 2000, there has been increased interest in the collection at Kilmun, partly because it allows the comparison of long-term growth of a wide range of species at a time when species diversification is being encouraged as a means of adapting forests to climate change. Accordingly, existing plots have been remeasured, some have been sampled for their timber properties and a number of new plots have been established. There are now around 200 different species in the collection, of which 145 are in good health. Growth measurements show the continuing good performance of about 18 conifer and broadleaved species at between 45 and 86 years of age: these species would be prime candidates for use in diversifying spruce dominated planted forests in western Britain.

Introduction

Recent years have seen increasing awareness of the potential impacts of both projected climate change and a range of pests and diseases upon the long-term sustainability of British forests (Read *et al*, 2009). One concern is the low numbers of species in our forests, for example in 2005 around 55% of UK forests were single species stands (Forest Europe, 2011). In addition, the British timber industry is dependent on very few species with Sitka and Norway spruce accounting for over 55% of softwood timber production in 2012, a figure projected to increase to nearly 70% by 2030 (Forestry Commission, 2014). Single species stands can be vulnerable to the impact of biotic and abiotic hazards, a recent example in Britain being the extensive mortality of Japanese larch (*Larix kaempferi*) and other larch species caused by the pathogen *Phytophthora ramorum* (Webber *et al*, 2010).

Awareness of a lack of species diversity has resulted in renewed interest in other tree species that could be used to diversify British forests, either as

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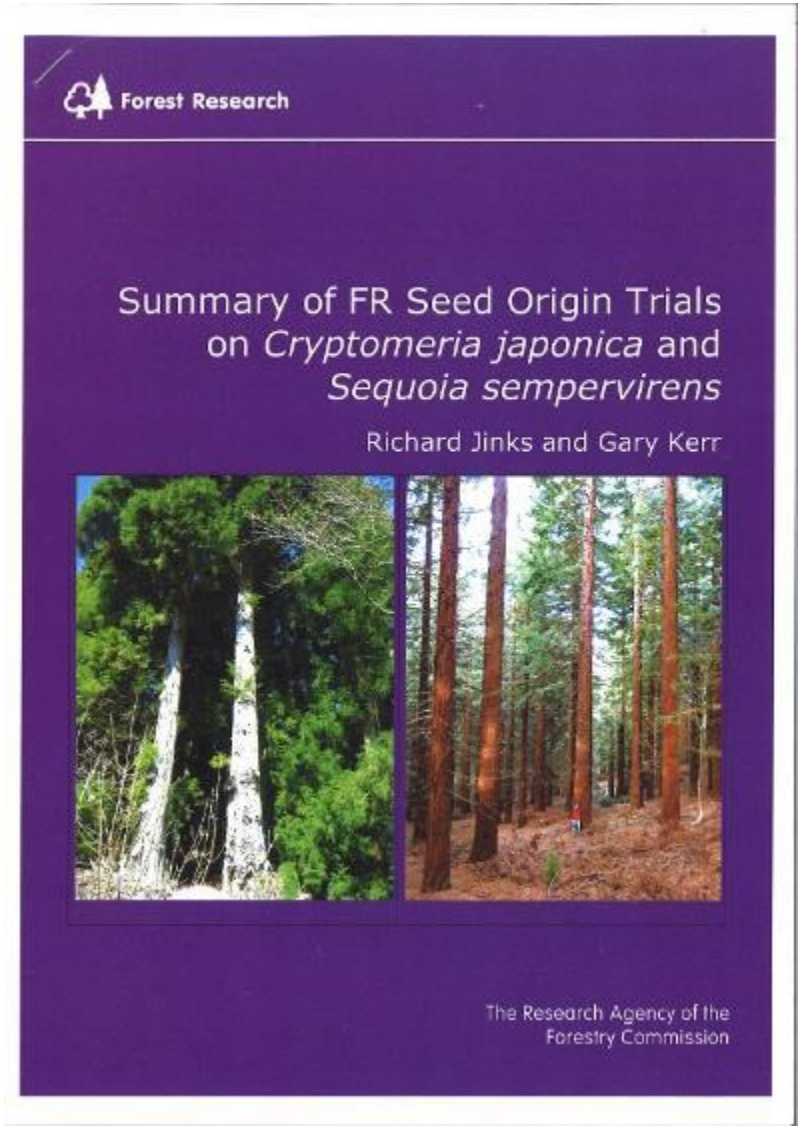


Locations of active species trials

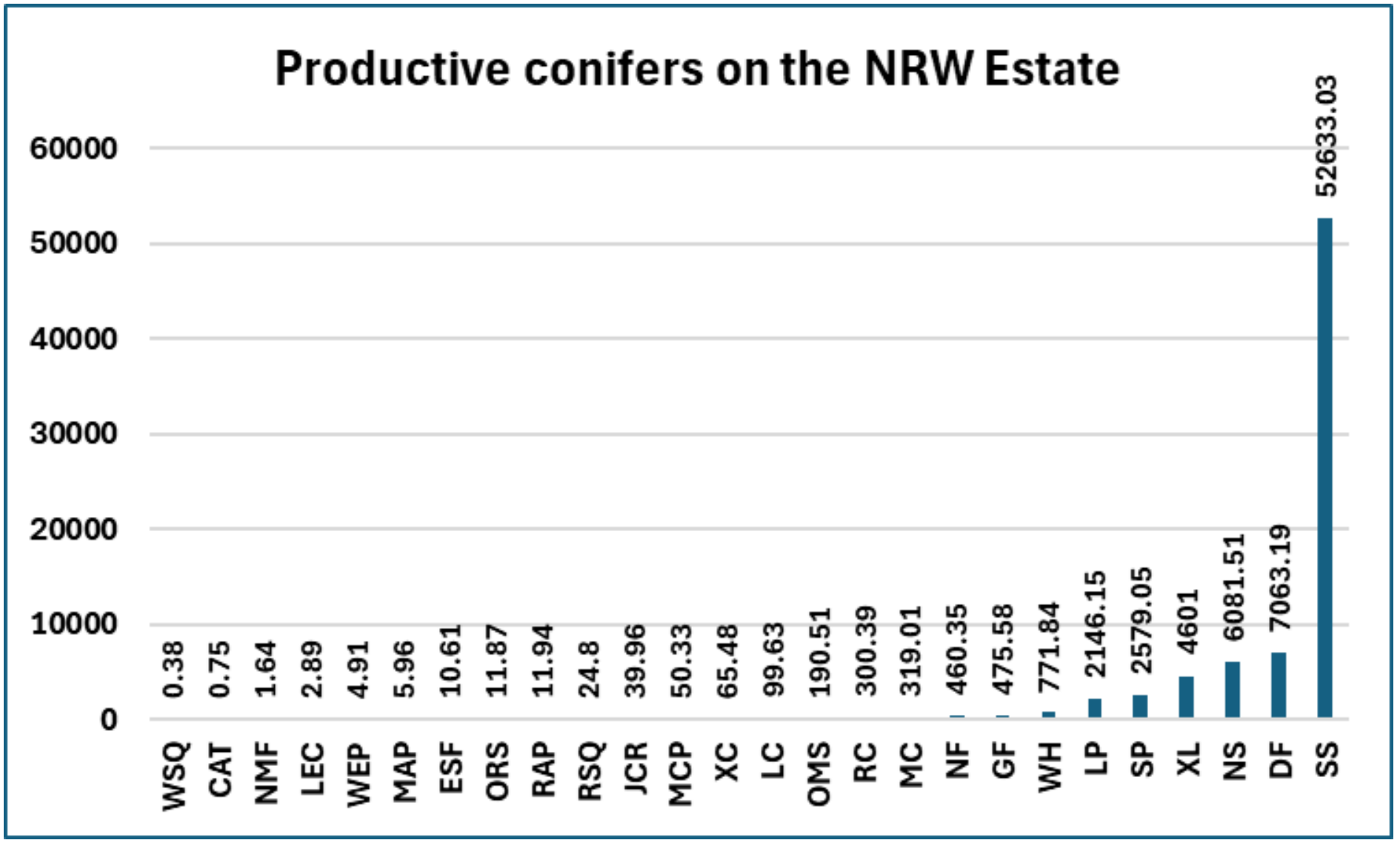
Operational Species trials

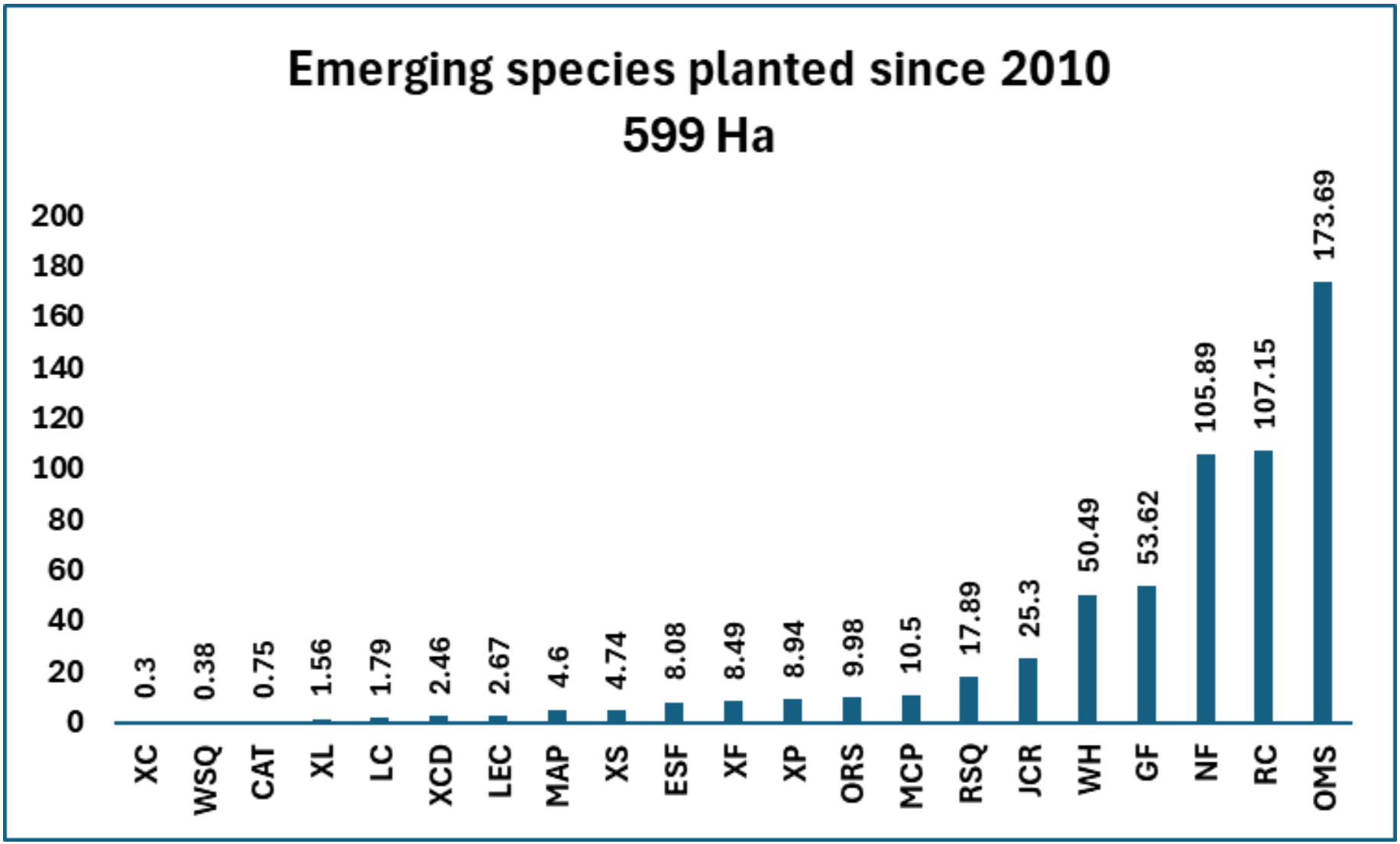
Short Rotation Forestry – Totnes 1

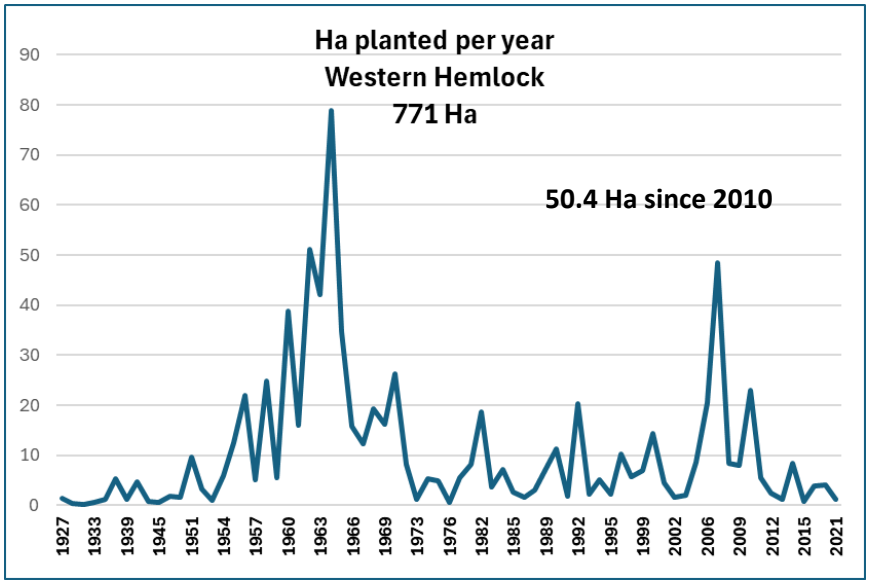
REINFFORCE: A Europe-wide collaboration

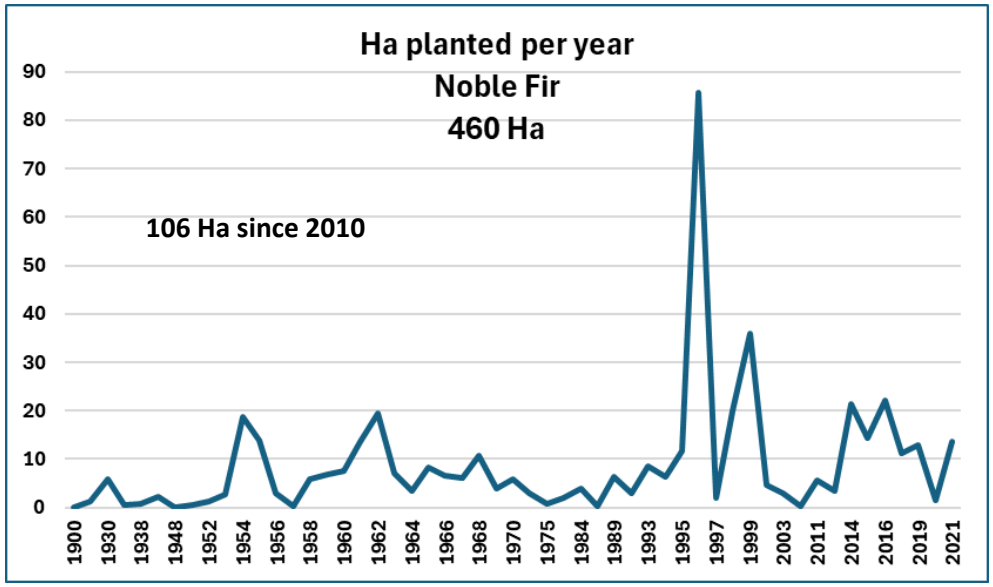
Forest Research Species Trials

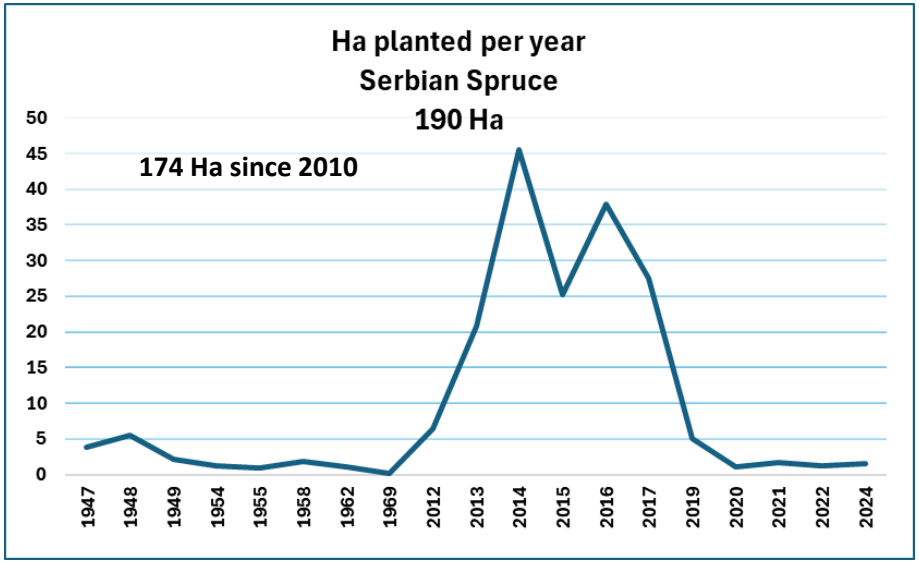
So what's happening in Wales?

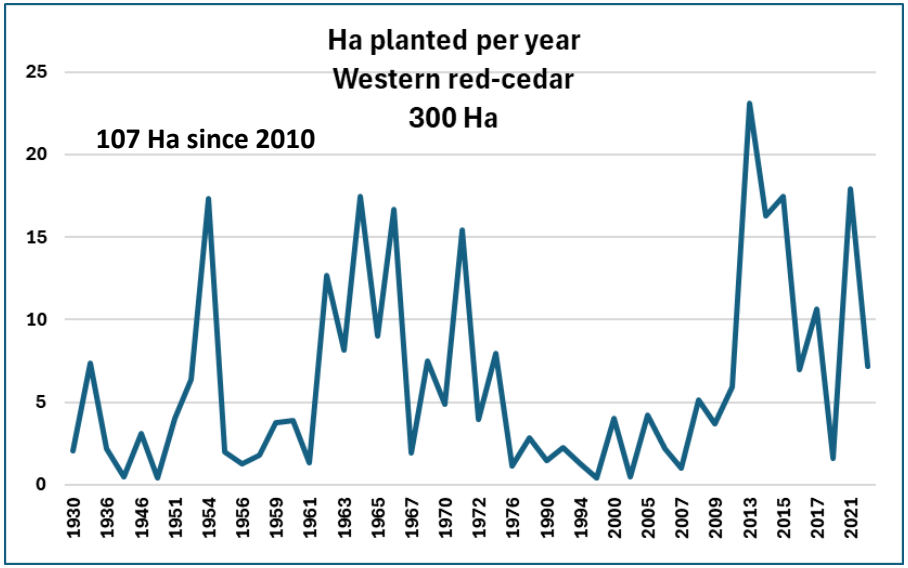






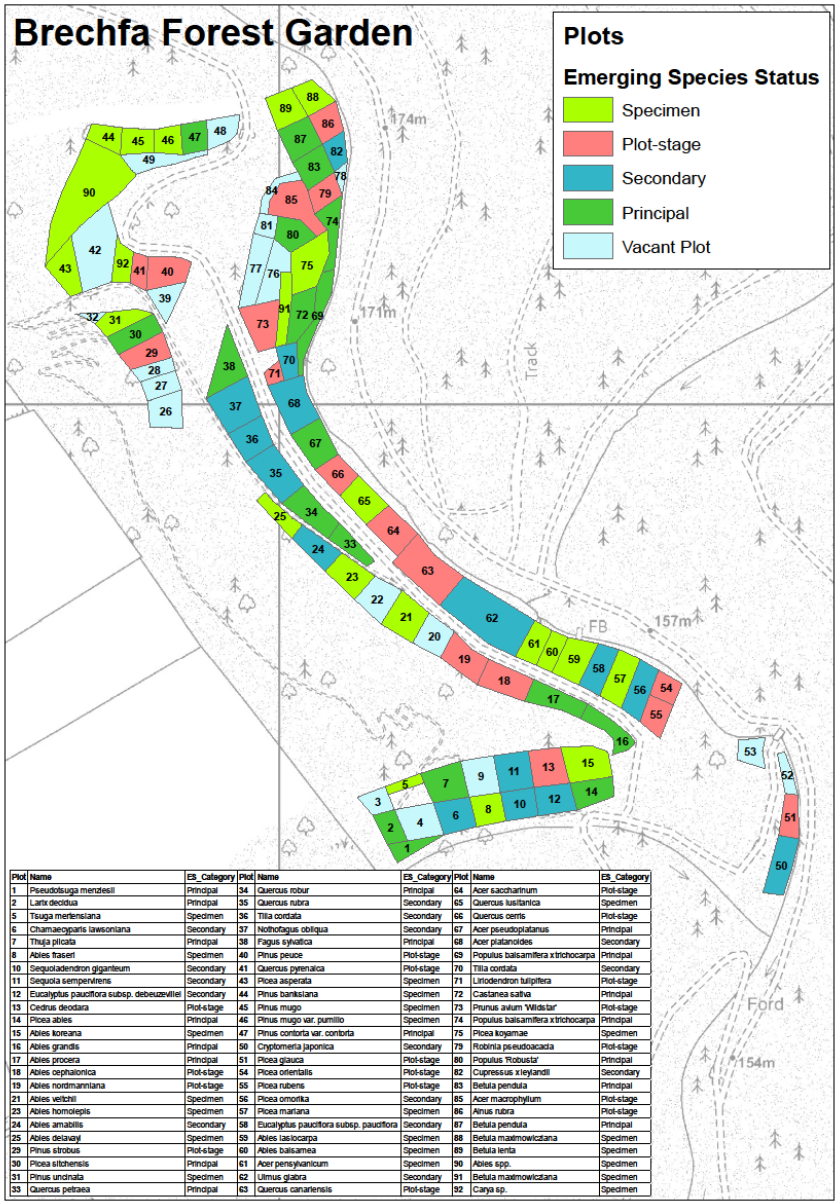






Llandovery FR and REINFFORCE species trials

Brechfa 15 – Forest Garden



Plot	Name	ES_Category	Plot	Name	ES_Category	Plot	Name	ES_Category
1	Pseudotsuga menziesii	Principal	34	Quercus robur	Principal	64	Acer saccharinum	Plot-stage
2	Larix decidua	Principal	35	Quercus rubra	Secondary	65	Quercus lusitanica	Specimen
5	Tsuga mertensiana	Specimen	36	Tilia cordata	Secondary	66	Quercus cerris	Plot-stage
6	Chamaecyparis lawsoniana	Secondary	37	Nothofagus obliqua	Secondary	67	Acer pseudoplatanus	Principal
7	Thuja plicata	Principal	38	Fagus sylvatica	Principal	68	Acer platanoides	Secondary
8	Abies fraseri	Specimen	40	Pinus peuce	Plot-stage	69	Populus balsamifera x trichocarpa	Principal
10	Sequoiadendron giganteum	Secondary	41	Quercus pyrenaica	Plot-stage	70	Tilia cordata	Secondary
11	Sequoia sempervirens	Secondary	43	Picea asperata	Specimen	71	Liriodendron tulipifera	Plot-stage
12	Eucalyptus pauciflora subsp. debeuzevillei	Secondary	44	Pinus banksiana	Specimen	72	Castanea sativa	Principal
13	Cedrus deodara	Plot-stage	45	Pinus mugo	Specimen	73	Prunus avium 'Wildstar'	Plot-stage
14	Picea abies	Principal	46	Pinus mugo var. pumilio	Specimen	74	Populus balsamifera x trichocarpa	Principal
15	Abies koreana	Specimen	47	Pinus contorta var. contorta	Principal	75	Picea koyamae	Specimen
16	Abies grandis	Principal	50	Cryptomeria japonica	Secondary	79	Robinia pseudoacacia	Plot-stage
17	Abies procera	Principal	51	Picea glauca	Plot-stage	80	Populus 'Robusta'	Principal
18	Abies cephalonica	Plot-stage	54	Picea orientalis	Plot-stage	82	Cupressus x leylandii	Secondary
19	Abies nordmanniana	Plot-stage	55	Picea rubens	Plot-stage	83	Betula pendula	Principal
21	Abies veitchii	Specimen	56	Picea omorika	Secondary	85	Acer macrophyllum	Plot-stage
23	Abies homolepis	Specimen	57	Picea mariana	Specimen	86	Alnus rubra	Plot-stage
24	Abies amabilis	Secondary	58	Eucalyptus pauciflora subsp. pauciflora	Secondary	87	Betula pendula	Principal
25	Abies delavayi	Specimen	59	Abies lasiocarpa	Specimen	88	Betula maximowiczlana	Specimen
29	Pinus strobus	Plot-stage	60	Abies balsamea	Specimen	89	Betula lenta	Specimen
30	Picea sitchensis	Principal	61	Acer pensylvanicum	Specimen	90	Abies spp.	Specimen
31	Pinus uncinata	Specimen	62	Ulmus glabra	Secondary	91	Betula maximowiczlana	Specimen
33	Quercus petraea	Principal	63	Quercus canariensis	Plot-stage	92	Carya sp.	Specimen

What species are we considering for the future?

Using our network of Arboreta as a first stage assessment for new species

What else are we – could we be doing?

- Establishing new species and provenance trials
- Expansion of the Operational Species trials
- Suitable ES mixtures for restocking and underplanting
- Silvicultural practices for establishing ES
- A review of alternatives to SS completed now need to consider potential species for new trials
- Identify ES for the hot dry South and East of the country and establish new trials
- Make more use of our tree collections
- BROADLEAVES – a bit of a black hole!

Our role is to:

Provide foresters and land managers with the silvicultural tools to experiment with new species and enable confidence in their choices to achieve their desired end results

Right Tree; Right Place; Right Reason

THE REASON; THE PLACE; THE TREE