FWF Notes Annual Meeting Friday 16th June

Morning Presentations

Response of tree species to climate change: Assessing the growth of important tree species over four decades in different soils and climatic regions of the island of Ireland.
Greg Forbes, Rodrigo Olave, Michelle Allen (AFBI), Niall Farrelly (Teasgasc).

The research aimed to identify key species in Irish forestry for future climate conditions and ensure resilient planting materials for new forests, crucial for the Irish government's climate action plan.

- Re-evaluate the performance of a range of seed origins from historic and current provenance test data
- Assess whether Irish and foreign improved seed origins for certain species are suitably adapted for future warmer climates
- Investigate the impact of climate parameters on the phenology and physiology of key species of importance to Irish forestry
- Evaluate the effect of temperature and temperature extremes on the timing of phenological events of key species
- To identify the suitability of new and marginal species under an altered climate regime employing bio- / geo-climatic modelling approaches
- Determine the effect of drought events on the performance of the key species

Predicting the effect of climate change and increased carbon dioxide concentrations on the silvoarable and silvopastoral experiments at Loughgall.
Paul J. Burgess 1, Michail L. Giannitsopoulos 1, Anil R. Graves 1, Rodrigo Olave 2, Jonathan Eden 3 1: Cranfield University, 2: AFBI, 3:Coventry University

Trees as a livestock feed: Case study of Willow (Salix spp) and the potential of this tannin-rich tree to reduce emissions and improve animal productivity. Katerina Theodoridou, QUB
Farm production systems face challenges in producing animal products with less environmental impact without affecting animal welfare. Currently, 12% of UK ammonia emissions come from agriculture, and 91% of those in 2015 came from agriculture. Condensed tannins (CT) can improve feed efficiency and decrease emissions by shifting nitrogen excretion from urine to feces. Willow (Salix sp.) is a tree fodder containing CT, which has great potential in animal nutrition. The proposed project aimed to evaluate the nutritive value of willow and assess its potential to reduce ammonia emissions and improve nitrogen use efficiency. The research involved in vitro assessment of condensed tannins in willow, optimization of the ensiling process, animal trials, and metagenomics and metabolomics analyses to reveal how rumen microbes influence metabolic pathways related to nitrogen use efficiency and milk quality using this

novel tanniniferous feed. Cattle grazing willow plantations showed a 27% reduction in methane emissions. The increased tannins in the diet showed no negative impact on liveweight gain.

The values and promotion of apple orchards as agroforestry. Andrew Ormerod, FWF

Innovation in tree protection from livestock Fred Farrelly

Fred Farrelly gave a presentation on his farm in Fermanagh, he has 8ha of grassland with sheep, including 45 ewes. They participated in an environmental scheme for 20 years, laying hedges, planting trees, and constructing fences. They also planted wild bird cover and built stone pillars, gates, and nest boxes. He then applied for EFS, but faced multiple off-putting inspections, including double ones. They then applied for funding for 125m hedge laying, 540m tree enhanced boundaries, 0.7ha winter feed, and 0.44ha agroforestry. Efforts to prevent sheep from rubbing, nibbling, or climbing trees were unsuccessful. Initially, 4 paddocks were split for grazing rotation. Ewe lamb trials were conducted to reduce damage, but they still reached 1.5m guards and ate the trees. Various guards and pegs were unsuccessful in protecting sheep from damaging trees on a 5x5m spec farm. Professor Jim McAdam suggested an innovative approach: grazing silvopasture with sheep, occasionally with cattle, and allowing mowing or silage production. Fred then researched getting a sheepdog but that was too expensive. He then decided to try electric fencing methods to protect trees without losing grazing ground.

In February 2022, Fred started an innovative farmer-led trial using trees provided by Trees on the Land, he marked out rows with alleys 11.5m apart, to allow most farm operations, including slurry spreading. They marked out and set up elected electric fence in 4 x 11.5m wide allays and trees were planted at 1.5m spacings. The trial aimed to promote biodiversity and protect the trees from hares. Grass growth shorted the electric fence, reducing power. To encourage the sheep to eat the grass under the wire but not the tree, Fred experimented with wire spacing, eventually settling on 4 rows on one side and 2 rows on the other, this was successful.

Fred's innovation ideas were well received by the attendees, some of whom- DEFRA and DAERA policy staff visited the farm the previous day to see the innovation first-hand. Fred also presented his innovation to the EURAF Farmer group.

Poster Presentations

- The effects of agroforestry on transmission of gastrointestinal nematodes of livestock

Anna Ciezarek QUB et al

- Lamb, Wool and Silvopasture

Maureen Kilgore, Irish Agroforestry Forum ; John Eversley, QUB. Jim McAdam, IAF & GrowIN; William Frazer, Helen Keys, Bronagh Tesch, GrowIN

- Farm Innovation. Tree Protection

Fred Farrelly

- Tree-related trials in a Livestock project about resilience and climate change -project outline.

Lindsay Whistance, Organic Research Centre

- Farming in the Shelter of Trees

Irish Agroforestry Forum Graphic.
Hazel Hurley/Irish Agroforestry Forum

- Ash dieback disease on the island of Ireland : comparison of treatments to reduce the spread of the pathogen Hymenoscyphus fraxineus on ash tree stands

Soldi, E, Tiley, A, Duggan C, Olave, R., O'Hanlon , R ., Hodkinson, T

- Factors controlling greenhouse gas emissions in agroforestry systems. Supporting a holistic methodological framework.

R. Olave., A. Gabourel., F. Castaño., L. Tonelli., A. Corzo., A. Mantino., B. Agudo., C. Tozzini., S. Schnabel F

Farm Walks

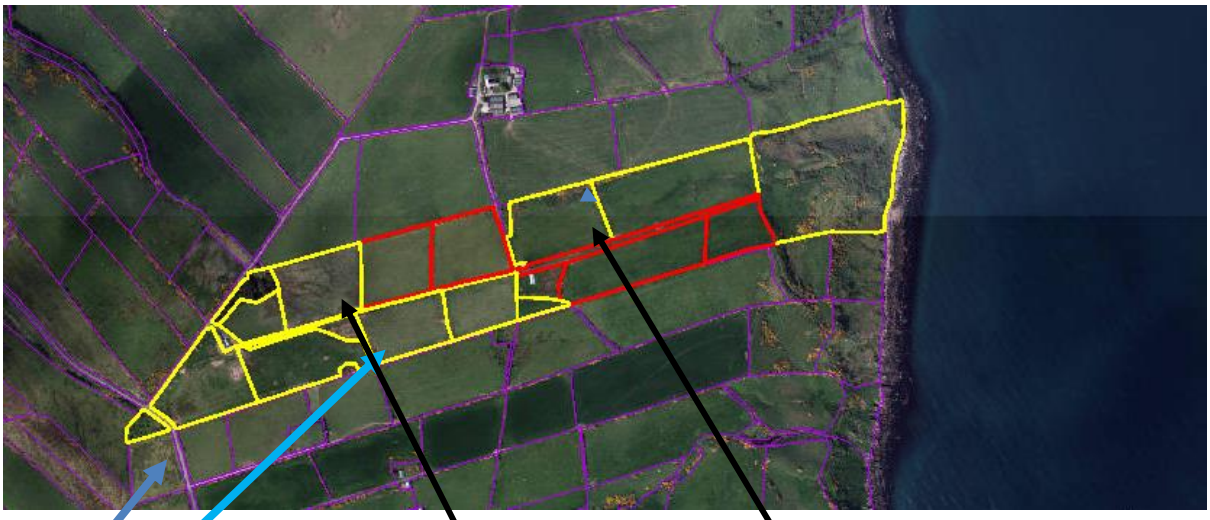
We had more farm visits on Friday afternoon, a lovely fine day for walking and seeing great agroforestry innovation. We visited Broughgammon Farm to see the whole farm environmental innovation which was undertaken with support from the Countryside Management Scheme. We had a lovely farm tour there accompanied by a playful collie pup and had a chat with a donkey, goats, sheep and pigs. Silvopasture, hedgerow restoration, wildflower meadows and many more abundant and plentiful habitats. There was a lot of interest in orchard planting in pastures with sheep, the trees were protected by lines of solar-powered electric fence.

We also visited the farm of Réamaí, Sinéad and Somairle Mathers in Cushendall. They farm on an exposed hillside overlooking the Scottish coast with son Somhairle and aim to make much use of trees on their farm. They use silvopasture and a shelterbelt system of hedgerows to protect their farm from severe northerly winds as well as to improve the welfare of their animals. Réamaí gave us an informative tour of their farm, the Pontbren hedges and silvopasture with Dexter cattle and sheep grazing. We have to thank Sinéad and Réamaí for their hospitality and the excellent demonstration that their son Somairle gave on Cactus guards. Sinéad served us some lovely homemade scones, strawberries and cream.

Farm Walk Further Details

Farm Walk, Réamaí & Sinéad Mathers, Layde, Cushendall

The Mathers have an 18 ha farm, it is on an exposed site with strong prevailing winds. One of the key reasons for growing trees and hedgerows on the farm was to create shelter both for livestock and pastures. Shelter for livestock would improve welfare and survival as well as allowing an extended grazing season. They have planted a shelterbelt system on the farm which involves placing one row of trees and then hedge planted on the inside of it. This provides ewes and lambs with low level shelter and as well as shelter for the pastures resulting in improved pasture growth rates and animals being able to graze outdoors for longer. The farm is moving towards a sustainable system, there is no artificial fertiliser used and they are implementing circular economy principles. Manure is sourced from a neighbouring poultry farm. Pastures have been reseeded with multispecies swards and herbal leys to help build fertility. There is a small flock of purebred Lleyn ewes and texel/suffolk ewes crossed to Lleyn tip and a herd of purebred Dexter (non-short) cattle and Black Galloway cattle chosen for ease of management and sustainability surviving on low inputs. Cattle are finished on farm from pasture only and beef boxes sold locally.



0.17 ha Native Woodland planted under ESA Scheme in 2003.
In 2017 0.25ha native woodland planted supported by Woodland Trust (range of species including oak, alder, birch, willow, aspen, hazel, beech, rowan, wild cherry)

1.18 ha 10mx 4m Agroforestry

Funded by Woodland trust

(Sainsbury's/PUR Project Funding)

1.28 ha Agroforestry

Funded by Woodland Trust

(Sainsbury's/PUR Project Funding)

Plots:

1. 1.18ha field of Agroforestry 10m x 4m: 187 Trees planted. Initially 69 wild Cherry trees planted in March 2021 using Cactus Guards (guards self-funded & planted with trees supplied by Woodland Trust). In March 2022 a further 118 Trees (Wild Cherry and 10 Alder) were planted by contractors and financed by Woodland Trust's PUR/Sainsbury's funding Scheme. Planted at 4m spacing between trees in each row and 10m spacing between each row.

2. 1.28 ha field of Agroforestry 10m x 10m: 72 trees planted in March 2021 by contractors and trees & Cactus guards supplied by Woodland Trust and financed via PUR/Sainsbury's funding Scheme. Tree species used entirely Sessile Oak.

Both plots have been grazed by cattle and ewes with lambs this year.

3. Pontbren Hedges: Planted throughout the farm to improve shelter, provide browse/vertical grazing and to improve important wildlife corridors. Recent hedges have included fruiting bushes to encourage foraging for potential future tourism opportunity. Funding provided by Woodland Trust-Sainsbury's PUR/ Funding.

4. Parkland Trees: Some parkland trees have been put in the braes at the lowest part of the farm. In this area it is planned that 1.1ha of steep slopes be planted in native woodland.

The Woodland Trust have been instrumental in providing trees on the farm and hedging to build connectivity for wildlife down through the farm connecting older established areas of woodland down to an area of trees on the braes which run down to the sea.

Farm Walk Broughgammon Farm

The 19.2 farm is situated three miles from the North Antrim coastline, on a semi-exposed plateau, approximately 371ft above sea level. The farm is roughly a third arable, a third improved grazing and a third rough hill ground. It has a stream running through it, a small pond, odd clusters of mature trees and well maintained hedgerows. The farm has a mixture of fertile mineral soils and more peaty organic soils. The predominant wind direction is from South-West, with the strongest winds being North West and South East. The farm participated in the Countryside Management Scheme (CMS) between 2006-2015.

Under the scheme They restored the majority of the farm's field boundaries with double fencing, re-established dry-stone walls, sheughs and ditches. They aimed to plant approximately 10% of the Farm with woodland or shelter belts. The hedgerow restoration has been designed in such a manner as to encourage Wildlife Corridors between tree plantings, allowing for abundant and plentiful habitat. They have also made a personal proposal to plant areas of wildflower and bird cover mixes to encourage wildlife. A third of the farm was designated as Species Rich Grassland under the CMS, and subject to restricted grazing and machinery operations to encourage Nesting Birds and Wildflowers. Another third is protected under unimproved grassland and the remaining as improved grassland. More recently there have been bigger pockets of woodland under the "Trees on the land" initiative, including some large pockets in 2018. Broughgammon Farm have developed an Agroecological plan for the farm. The **agroforestry** section is included here.

Excerpt from Broughammon Farm Agroecological Plan

The farm generally consists of quite small field parcels, and despite them being run down, on inheriting the farm, the Coles have been very good about re-establishing old field boundaries with hedges and trees. Where Agroforestry seems to be making waves is in big open country, and maybe these small field parcels already are an aspect of agroforestry. When re-planting the hedges on the farm the Cole's actively looked at using food producing species, so there are plenty of blackthorn, rosehip and apple trees built into these small field parcels.

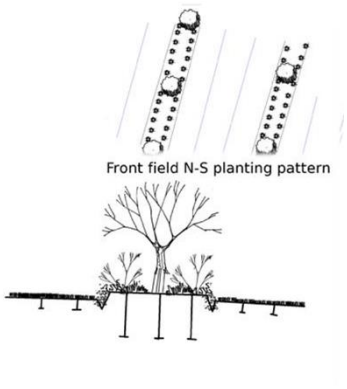
Having read further into agroforestry though, and now with the context of moving into some arable, the Cole's would like to explore the possibility of a silvo-arable project in the larger arable fields. The proposal here is to look within the confines of the existing fields. Whilst the family explored the possibility of working with Keyline Design, the conclusion was that water retention in this landscape was not overly important, however maximising solar gain would be, and so worked on this principle.

With that in mind there are three Proposals:

Silovoarable Fruit and Shrub tree Lanes.
This looks at tree planting on a North/South orientation. In order to maintain space for modern machinery (allowing up to 18m for a modern sprayer) these lines would be planted every 18m into a 3m buffer strip (to protect both the machinery and the trees).

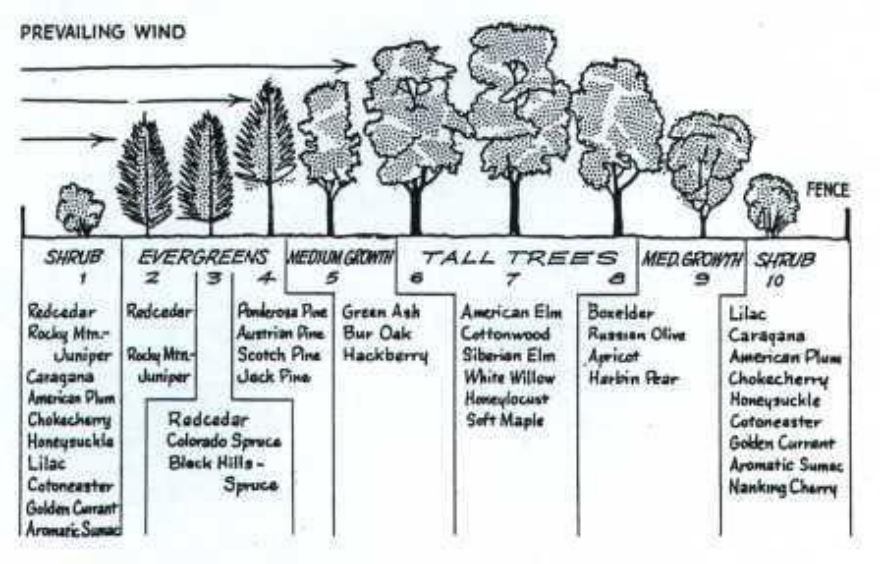
Establishment would see us shallow rotovating the 3m strips first. This would then be sown with a species rich pollinator seed mix to benefit the arable enterprise.

This would be planted into this with an 8m spacing to maximise solar collection, with shrub crops on either side, and these would be regularly mulched to aid in establishment. Annual management would see us subsoiling parallel to the tree rows in order to promote tree root growth in the vertical rather than horizontal plain and hopefully avoid root competition in neighbouring grass/cereal crops.



Example of Fruit trees in silvoarable line spacings. Plan to under plant this to fruiting shrubs, stacking to maximise productivity.

These North South running tree lines can be planted to be self-sheltering, planting up hardier species to face prevailing winds, whilst sheltering the more sensitive species.



This would lead to different species being in different tree lines, following the concentric rings of species 'hardiness':

Savanah Planting of Nut trees

This would see the planting of nut varieties to a maximum of 30% canopy cover over the field. Again these will have an 18m 'farming' spacing between the field boundaries and the N-S lines, as well as 3m buffer zone (21m spacing overall). However in these lines the tree spacing will be at 12m allowing for the savannah style effect as the trees grow.

The hedgerow to the west has been planted (2019) with a pontbren style hedge to provide shelter from what is currently the most exposed side.

Establishment of pontbren style hedge to NW hedgeline (hedge currently at 4') to provide shelter on most exposed side. Whilst the hedge is mixed the trees will be Birch Alder and Scots Pine.

Planting of field boundaries
The outer field boundaries would be planted up with larger edible tree species. This stacking effect will mimic a forest edge.

Proposed Tree Species:

Larger hedge line planting Varieties:
Sweet Chestnut (20-35m)(medium Shelter)

SIlvoarable Savanah Style Nut Field:
1 Heartnut (Japanese walnut) Hardy

2 Buartnuts (Hardiness of the heartnut but tastier)

3 English and Black Walnuts (35m) (sheltered)

The Silvoarable Fruit Tree lanes:
Apple (MM106 or M26 4-5m)

Pear (Pyrodwarf)

Plum (Brompton or St. Julien, Victoria[Grandma])

Gages (small Plums Yes-in Coleraine)

Damsons (Plums) (Good Windbreak) 3-4.5m very hardy (cramsies)

Bullaces (Plum)

Mirabelle (Plum)

Cherry (F.12.1 or Colt)

Cherry Plum (Good windbreak GISELLA 5 (5m)

Hazel (6m) (Maybe these are better for sheltering the fruit trees?)

- Cobnuts
- Filberts

Quince (not to be waterlogged) (june welsh)

Elder?

Medlar 8m winter fruiting (sunny/dry/acidic)

Sour Cherry (8m- hardier than sweet cherry)

Main Shrub Layers:

Blackcurrant

Redcurrant/White currant

Gooseberry

Japanese Quince (lemon replacement)

Blueberry (Likes acidic Soils 5.5- mulch with pine/coffee)

Cranberry (bottom of the hill/wet ground)

Lingonberry/cowberry (similar to cranberry)

Worcesterberry (Gooseberry/Blackcurrant Hybrid)

Aronia (Chokeberry)Wine/Jam (wet)

Jostaberry (Blackcurrant/Gooseberry Hybrid)

Sea Buckthorn (prickly/Jelly)

Potential Shrub Layers (but need more knowledge/convincing)

Hazkap/Honeyberry/Blue Honeysuckle (2m tall)

Mulberry (hybrid fruiting variety for jams) Charlotte Rousse variety.

Barberry/Berberis (Dried/Jam) Spiky….(hedge)

Beach Plum (prunus maritime) ????

Eleagnus (Autumn and winter) (autumn olive) 3m

Juneberry/Saskatoon Berry (5m max)

Oregon Grape (Mahonia) Jam/Wine

Ugni Molinae (Chilean Guava/strawberry myrtle)

Fuschia

Gojiberries

Need Supports/Maybe too high maintenance:

Loganberry (raspberry And blackberry Hybrid)

Raspberry

Tayberrys

Semi-Wild (good for woodland edges/hedges): bullaces, damsons, cherry plums, mirabelles, chestnuts, crabapples, elder, juneberry, sweet cherries, hazels and blackberries.

Woodland Creation

Despite having done a fair bit of woodland creation already (1ha), there are a few other further pockets that the Cole family hope to install (1.3ha), leaving their farm slightly more resilient for the future. The plan is to plant these with native Irish trees, and by using continuous cover forestry practices look at developing a mixed stand favouring long-term oak product. Some of this will hopefully be achieved through the Environmental Farming Scheme, and some with help from the Woodland Trust/Trees on the land campaign.