Alley Coppice: Combining Willow SRC with Poplar and Cherry trees

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Introduction

Forest & woodland have a significant role in ecosystem services delivery in Ireland, yet tree cover (7-10%) is the lowest in Europe despite suitability for tree growth.

Innovative Agroforestry (**AF**) systems were developed to encourage tree planting on farms during the 1980/90s. They have proven to be economically feasible, socially acceptable and environmentally sound.

Short Rotation Coppice (**SRC**) also provides significant benefits, including reduced net greenhouse gas emissions, C sequestration, soil amelioration, bio-remediation, increased land use diversity, and may rejuvenate rural economies.

Both of these systems when combined are known as an Alley Coppice (**AC**) system.

Aims

- To determine the interactions in **AC** systems for biomass, timber production and ecosystem services.
- Develop best practices for establishment and management of **AC** systems.
- To promote knowledge transfer of the system.

Experimental Sites

In May 2013 three field experimental sites were established, two in the North of Ireland at the Agri-Food and Bioscience Institutes Research Station in Loughgall, Co. Armagh and one at Gurteen College Roscrea, Co. Tipperary, Ireland.

Experiment 1 (AFBI)

Cherry-Willow varieties interaction in an **AC** system.

- Split-plot design – 3 reps.
- Measure cherry & willow growth, soil water, light, leaf nutrients and soil organic carbon.

Experiment 1 – Cherry - Willow trial at the Agri-Food and Biosciences Institute (AFBI) research station, Loughgall, Co. Armagh, N. Ireland.

Experiment 2 (AFBI)

Poplar-Willow varieties interaction in an **AC** system.

- Randomised strip-split plot design – 4 reps.
- Measure willow growth, soil water, light, leaf nutrients and soil organic carbon.

Experiment 2 – Poplar – willow trial at AFBI, Loughgall, Co. Armagh, N. Ireland.

Experiment 3 – Cherry Clonal trial at Gurteen, Roscrea, Co. Tipperary, Ireland.

Experiment 3 (Gurteen)

Clonal Cherry Comparison.

- Randomised single tree linear plots.
- Measure cherry growth, soil water, light and leaf nutrients.

Preliminary Results (ANOVA)

- Experiment 1 - differences in Willow Mean weights after the first growing season.

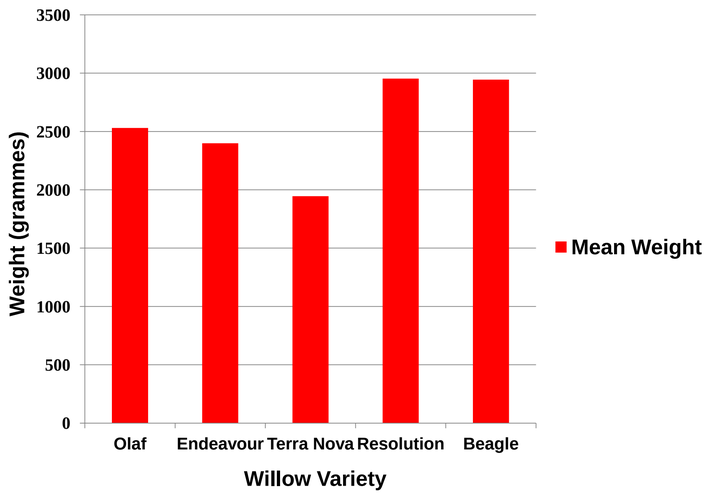

Fig. 1: Mean Weights for willow varieties Experiment 1

- Height growth differences between willow varieties.
- A high tree mortality rate was recognised in the control Cherry trees in experiment 1 and 3. The control trees were replaced with alternatively sourced cherry planting material.
- Survival for the German Cherry clonal material on Experiment 1 & 3 was high.
- High survival rates in the willow in Experiment 1 & 2 at the end of the first growing season.

Potential benefits of Alley Coppice systems

Economic

- Diversification of income & land-use.
- Tolerate market fluctuations or crop failures.
- Greater efficiency and use of resources.
- Polyculture system as opposed to monoculture.

Environmental

- Soil amelioration.
- Improved landscape aesthetics.
- Carbon sequestration.
- Nutrient cycling.
- Biodiversity enhancement.
- Continuous cover forestry.

Conclusions

Preliminary data shows that further research is required over the 2014 growing season and 2015 in order to validate initial findings.

Project Outcomes

Exploiting multiple outputs for both **AF** and **SRC** systems.

- **Short-term income** from willow (**SRC**) for bioenergy production.
- **Long-term income** in the form of high quality hardwood timber (**AF**).
- Research will contribute to a wider European project titled '**Agrocop**'. The Agrocop team consists of partners from 5 countries. These are Germany, France, Italy, Ireland & the U.K.

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