

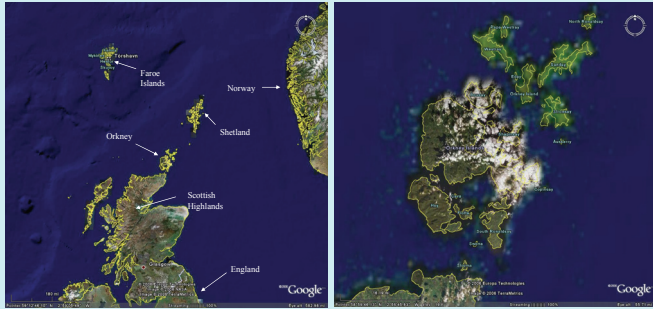
SHORT ROTATION COPPICE: A POTENTIAL BIOMASS CROP FOR THE HIGHLANDS AND ISLANDS OF SCOTLAND

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Orkney's Location in Europe

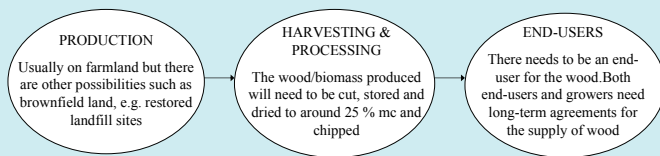
The Orkney islands are located just off the north coast of Scotland and include the largest island, known as the "Mainland", and 15 other inhabited islands. At 59° North, the islands are at the same latitude as the south of Norway.



Introduction

- The Highlands and Islands are very dependent on fossil fuels, especially oil, for heating and power. With the negative environmental impacts and rapidly increasing costs that this brings, it is vital that the Highland and Islands diversifies and utilises the region's considerable renewables potential, including developing biomass resources.
- Within the region, wood from forestry residues and wastes is starting to be used as a heating fuel.
- Orkney Housing Association has installed a wood-fuelled heating system for a 40-dwelling development.
- Orkney has negligible forest resources, but considerable agricultural land, so Short Rotation Coppice (SRC) was considered a more appropriate option upon which to build a sustainable wood chip supply chain.
- Developing SRC would also assist agricultural diversification and rural employment.
- Research on SRC is well-documented for much of the U.K. However, there is little information on growing SRC in challenging environments like Orkney's.
- Since 2002, the Agronomy Institute has investigated the viability of growing SRC on Orkney. However, if SRC is to succeed, a reliable supply chain also has to be established in which growers can be sure of a market and end-users can rely on a continuity of supply.

The supply chain involved when Short Rotation Coppice (SRC) is used to produce biorenewable energy



The Challenge of Growing SRC on Orkney

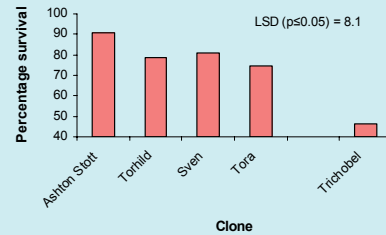
- Soil waterlogging in winter.
- Strong winds, often carrying salt spray which can be injurious to plants.
- Equipment for planting and harvesting has to be imported from further a field.
- A northern maritime climate with relatively mild winters but short, cool growing seasons.

Experimental Objectives and Methodology

- In 2002 a trial to investigate the growth and biomass production of willow and poplar was commenced.
- Four willow clones included: Ashton Stott, Sven, Tora and Torhild.
- One poplar clone: Trichobel.
- Randomised complete block design consisting of five replicates.
- Plants were cut back in March 2003.
- Biomass production was determined by harvesting two-year-old willow and poplar stems in 2005.

Percentage Survival After Cut Back in March 2003

- Percentage survival of Ashton Stott was significantly greater than the other willow clones.
- Percentage survival of the poplar clone, Trichobel was significantly lower than the willow clones.



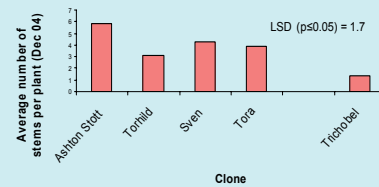
Wind Damage

- By 2005, some socketing, due to the wind, was observed in all clones.
- In the third year of growth, height increase was small in all clones as a result of wind damage.



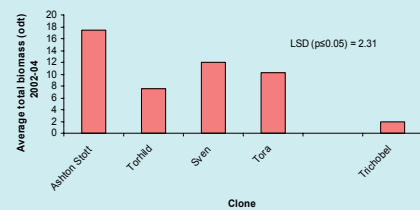
Number of Stems per Plant

- Ashton Stott produced significantly more stems than Torhild and Tora.
- Trichobel produced significantly fewer stems than the willow clones.



Biomass Production

- Stem biomass production was significantly greater in Ashton Stott than in the other willow clones.
- Amongst the willow clones, Torhild had the lowest biomass yield but this was still significantly greater than that of the poplar clone Trichobel.



Conclusions

- Willow could be a viable crop for the Highlands and Islands, offering a useful diversification of land use, provided the whole supply chain can be set up, including a range of end-users.
- Ashton Stott produced the best biomass yields.
- These results suggest that poplar is not a suitable biomass crop on Orkney.
- All clones suffered some wind damage, especially in the third year, which suggests that a 2-year cutting cycle may be more suitable than the usual 3-5 year cutting cycle.
- As a result of encouraging results from the trial, the first commercial growers planted willow in Orkney in 2006.
- New, larger scale research trials were planted in 2006 to investigate growth and biomass production by a larger number of clones (13) to identify a wider range suited to the Orkney environment. Trials into different lengths of harvesting cycle have also commenced.