

Introduction:

Willow short rotation coppice (SRC) is an energy crop grown as a biomass fuel source. It produces high yields of small diameter stems which can be cut and stored as rods, billets or chips. Once established, it can be harvested every 2-3 years.

Willow is a multipurpose biomass crop which can also provide a number of environmental benefits such as remediation of polluted land and can be used to protect watercourses when grown as a riparian buffer.

The biomass produced can be used for biomass heating systems and for electricity generation. Harvested biomass has a calorific value of 18.4 MJ/ kg on a dry matter basis, equivalent to 5.1 MWh/ oven dry ton.



Site suitability

- Willow SRC grows best on heavier soils with a high clay content. But varieties can be matched to a wider range of soil types.
- pH range 5.5-8.0.
- Annual rainfall of between 600-1000mm.
- Suited to relatively flat sites with a slope of no more than 7%.

Establishment

'Coppice beds' are grown from willow rods or cuttings planted in spring and cut-back to ~10cm during the first winter to encourage multiple side-shoots from each stump or 'stool'.

Large scale commercial planting, for mechanised harvesting, is done at a stocking density of ~15,000 per hectare (~6,070 per Acre). Planting typically 0.6m apart in twin rows with 0.75m between rows and a 1.5m alley between each twin-row. At this stocking density yields are approx.:

- 25-30 dry t/ha in the first year, with rods reaching up to 4m in height.
- 30-35 dry t/ha every 2-3 years, with rods reaching up to 7-8m.

Smaller-scale planting for harvesting manually is also feasible. Stocking densities of ~6,600 stems per hectare (2,671/acre) will provide yields of ~13-15 odt/ha after 2-3 years. Planting single rows at 0.5m spacing, leaving 3m between rows is recommended to allow for better access.

Smaller-scale planting can afford greater flexibility. Staggered planting and harvesting can be performed to provide continuous self-supply or be adapted to suit farmland available to fit around the core farm business and provide other benefits, such as:

- Shelterbelts, buffer strips and sight screens.
- Cover for poultry and game.
- Flood mitigation, wastewater management.

Management, pests and diseases

Young growth is attractive to deer, hare and rabbits so fencing may be required in areas where these animals are prevalent. Other major pests include the Willow Beetle (*Chrysomelidae*) and perennial weeds, both of which may require chemical control, especially during establishment.

However, the use of geotextile membranes can remove/reduce the need for herbicides. No other inputs are required once established.

Planting several varieties within a single plantation can be beneficial in protecting against pests and diseases.

Willow is a very thirsty crop and droughts can seriously affect establishment; an even annual rainfall of between 600-1000mm is required for the crop to perform well.

Harvesting

After cut-back, willow can be harvested in late winter every 2-3 years and will remain productive for up to 15-20 years. Yields vary according to site, soil type, water availability, pests and weeds. Upper and lower yield estimates are 8-15 odt/ha/yr.

When established on a commercial scale modified forage harvesters are used to cut and chip straight to a trailer. Availability of specialised harvesters and contractors varies by region with greater availability in the North of England. If not removed straight from the farm, large areas can be required for the storage of chip.



Smaller-scale harvesting can be performed using a chainsaw or brush cutter. Biomass can be stored and seasoned as whole rods in stacks/bundles or cut down to billets (15-30cm logs) and stored for on-farm or domestic use.

If intended for small-scale self-supply, 3-5 Ha, with manual harvesting can be the most flexible and cost-effective option.

Harvest time, storage conditions and moisture content of wood chip needs careful consideration. Higher moisture content can lead to increased fungal growth (composting) in chip stacks and under some conditions can also present a fire risk which needs to be accounted for in the management of the chip.

Further information

www.biomassconnect.org