



Growing Miscanthus

Introduction

Miscanthus giganteus, a sterile hybrid of *Miscanthus sinensis* and *Miscanthus sacchariflorus*, is a perennial C4 rhizomatous grass. Its lignified, bamboo-like stems grow up to 3.5 metres in a single season. It features wide, dark green, pendulous leaves with a white central vein. It is widely used as a biofuel feedstock due to its high productivity and its perennial nature.

It is known for its photosynthetic efficiency and ability to absorb large amounts of carbon dioxide, making it environmentally friendly. It has specific characteristics such as large root systems and dormancy, resulting in high stress resistance, high survival rates, fewer growth limitations and high dry matter (DM) yield. Depending on climatic conditions, DM yields (average 14% moisture) vary in Europe from 12 t/ha in northern regions to 24 t/ha in southern climates.

Establishing Miscanthus

Miscanthus is planted during spring. For optimum establishment, using a specially designed semi-automatic miscanthus planter is recommended. A typical planter is operated by four people and is calibrated for a row-to-row distance of 75 cm (c.29 in) and an in-row distance of 78 cm (c.31 in), enabling 3 to 5 hectares to be planted per day.

- **Soil preparation** - heavier clay soil needs to be ploughed and subsoiled well in autumn to achieve a fine tilth in the spring. Winter frost will further break-down the soil leading to finer soil for planting. If heavy or light land needs subsoiling, the operation will be far more successful if done during August or September, when the soil is dry.
- **Seedbed preparation** - a stale seedbed is needed with 4-5 inches of fine, level tilth.
- **Rhizome quality maintenance** - rhizomes must be in cold storage and kept moist.
- **Same day rolling and soil consolidation** – this maximises soil contact and lock in moisture.



Miscanthus rhizomes



Miscanthus planter

Miscanthus agronomy

Pre-emergence, a stale seed bed is required. **Post-emergence** during establishment the use of a non-selective herbicide to control weeds while the shoots are young is recommended. Post-establishment, the high canopy of the crop out-competes weeds, including blackgrass. Miscanthus has little or no need for applied **fertiliser**, as it is capable of recycling nutrients into the rhizomes at the end of the growing season, and this can be confirmed by a basic soil test.

Harvesting and terminating Miscanthus

Miscanthus is harvested in late winter and early spring. It's cut with a forage harvester, left in the swath to dry and baled once the crop is dry. Harvesting Miscanthus is generally a contractor job. If you decide to use the land for something else, power harrowing the field will bring up the Miscanthus rhizomes to the surface, where they'll dry out and die.

Miscanthus markets and economics

Miscanthus is central to the global bioeconomy, being a core feedstock into existing markets for large-scale heat and power generation. At present, long-term UK supply contracts are available from Terravesta, who assists with establishment and links production with end-user power stations [Snetterton and Brigg power stations](#). Other markets include animal bedding, to supply manufacturers or for own use.

Second-generation markets such as biorefining similarly value Miscanthus for advanced end-uses, including degradable bio-plastics, pharmaceuticals, bio-ethanol and biogas production. Other energy intensive industries that are actively transitioning towards low carbon similarly value Miscanthus as a substitute to traditional materials, due to its fibrous properties which are already being successfully used in construction, packaging and furniture making.

Overall, including establishment and crop care a net margin of over £800 per ha may be expected over a 15 + year period. The first harvest is in the second year, and profits achieved over the first few harvests are likely to improve further.



Carbon capture in Miscanthus

The first dedicated, independent study into Miscanthus life cycles shows that the above ground biomass grows annually and recycles all the carbon that's been produced through planting, harvesting and burning the crop for renewable electricity, and at the same time, the underground rhizome and decaying leaf litter fixes and stores net 0.64 tonnes of carbon (2.35 tonnes CO²e) per hectare, each year as it grows.

References

[Terravesta the Miscanthus biomass specialist](https://terravesta.com) <https://terravesta.com>

[A parsimonious model for calculating the greenhouse gas emissions of miscanthus cultivation using current commercial practice in the United Kingdom - Lask - 2021 - GCB Bioenergy - Wiley Online Library](#)