

FACT SHEET

Miscanthus





Description

Miscanthus is a perennial, rhizomatous grass, originating from Asia, which possesses the C4 photosynthetic pathway. The most common species is *Miscanthus giganteus* which is a sterile triploid hybrid of *M. sacchariflorus* and *M. sinensis*.

Markets

An end use for *Miscanthus* should be lined up before planting.

Miscanthus can be used as a fuel in special *Miscanthus* boilers which are especially made to handle and burn it efficiently. It can also be burnt in Biomass-CHP units and for co-firing in power stations. The boiler manufacturer's warranty should cover *Miscanthus* as a fuel.

Planting

Site preparation is essential for good establishment. Rhizomes are planted in the spring at 20-30,000 per hectare using semi-automatic potato planters or bespoke planters. It is vital that sites should be cleared of perennial weeds before any planting takes place. It is particularly important that the rhizomes are planted in a fresh condition, are kept moist and below 4°C from lifting until re-planting.

Miscanthus plantations need 3–5 years to become fully established and to obtain maximum yield level.

Growing cycle

- Planting rhizomes in springtime: first harvest in years 3-5 (low yields in the first two years)
- Shoots emerge annually from the soil during March
- Crop reaches maximum height in the summer (robust stems)
- Crop drying in Autumn, nutrients move back into rhizome
- Leaves fall off and stems dry during winter (30-50% moisture content)
- Canes without leaves remain ready to be harvested mechanically in spring; moisture content has dropped significantly to ~20%

Harvesting

Canes with a height of up to 3-4 metres are harvested in early spring, generally between March and April, every year for about 15-20 years before new planting is required. Harvesting can be carried out using conventional farm machinery, producing either bales or chipped material. The soil must be suitable for heavy machinery.

Yield

Based on the results of yield trials in England and Northern Ireland and on experiences in the Republic of Ireland, the dry matter yields from *Miscanthus* can be expected to be similar to those for the North of England and in the range of 12-15 tonnes dry matter per hectare per year.

Key determinants of yield are planting density, soil type, sunshine, temperature and rainfall (recommended >550 mm). Highest yields are produced on soils with a good water holding capacity. *Miscanthus* has a very low nutrient requirement due to the return of plant nutrients through leaf litter decomposition.

Storage

Correct storage of *Miscanthus* is dependant on the moisture content of the bales, which is recommended to be ≤15°C to prevent occurrence of mould. *Miscanthus* has a low bulk density which should be considered for transport and storage.

Pests/disease

To date no reported insects or other pests in Europe have significantly affected *Miscanthus*.

Table of properties

Property	Description
Moisture content at harvest	20-50%
Bulk density (baled)	130-150 kg/m ³
Bulk density at harvest (chopped)	70-100 kg/m ³
Calorific value (Net)	~17 GJ/tonne (dry basis)
Ash content	Typically 2-3%
Ash fusion (melting)temperature	1090 °C
Temperature at which some sintering observed	600 °C

Contact:

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Abbreviations:

%	Percent	mc	Moisture content
>	Greater	GJ	Gigajoule
<	Less	mm	Millimetres
kg	Kilogram	°C	Degree Celsius
m ³	Cubic metres		

Grants

Planting energy crops, Department of Agriculture Fisheries and Food:

The objective of the scheme is to provide establishment grants to farmers to grow willow and *miscanthus* to produce biomass suitable for use as a renewable source of energy. For more information please visit:

<http://www.agriculture.gov.ie/ruralenvironment/climatechangebioenergybiodiversity/bioenergy/bioenergyscheme/>

Miscanthus Boiler installations, SEAI:

The *Miscanthus* Pilot Demonstration Programme, funded under the Renewable Energy RD&D Programme, provides assistance for the deployment of renewable heating systems fuelled by *Miscanthus* in industrial, commercial, public and community premises in Ireland. The programme is administered by the Sustainable Energy Authority of Ireland (SEAI). For more information please visit:

http://www.seai.ie/Grants/Renewable_Energy_RD_D/Miscanthus_pilot/

References and recommended Literature

Miscanthus:

1. *Planting and Growing Miscanthus - best practice guidelines* - Dept. of Agriculture, Fisheries and Food, 2009 <http://www.agriculture.gov.ie/media/migration/ruralenvironment/environment/bioenergyscheme/Best%20Practice%20Manual%20For%20Miscanthus%202010.pdf>
2. *Miscanthus as an energy crop and its potential for Northern Ireland*, Global Research Unit, AFBI, 2008 http://www.afbini.gov.uk/afb_i_miscanthus.pdf
3. *Miscanthus: A Review of European Experience with a Novel Energy Crop*, Oak Ridge National Laboratory, 1999 <http://www.p2pays.org/ref/17/16283.pdf>
4. *Harvesting of Miscanthus in Austria*, European Energy Crop Internetwork, BLT Wieselburg, 1999 http://www.bl.t.bmlf.gv.at/vero/veroeff/0349_Harvesting_of_miscanthus_e.pdf
5. Teagasc Fact sheet Tillage No.4, Teagasc, 2007
6. Teagasc Fact sheet Miscanthus Weed Control, Tillage Specialist 2008, Tillage fact sheet No 10, 2008 <http://www.teagasc.ie/publications/2009/MischantusFactsheet.pdf>
7. Anbautelegramm Chinaschilf, TLL, 2008
8. *Energie aus Biomasse-Grundlagen, Techniken, Verfahren*, 2nd edition, Kaltschmitt, Hartmann Hofbauer, Springer Verlag, 2009
9. *Miscanthus for energy and fibre*, Michael B Jones Mary Walsh, James and James, 2001
10. *Miscanthus Bioenergy: A Geospatial Analysis for Quantifying Potential Biomass Productivities across Europe* (Paperback), Paul Stampfl, VDM, 2008
11. *UK Case Study: The Greenhouse Gas and Energy benefits of a Miscanthus and a wood fuelled heating system*, ADAS Bio-Renewables Ltd, 2004 <http://www.ieabioenergy-task38.org/projects/task38casestudies/index1.htm>
12. DVD "*Miscanthus and Willow- From field to furnace*", Teagasc/SEAI/DAFF, 2008 (available free of charge from SEAI bookshop, www.seai.ie/bookshop)
13. SEAI REIO *Bioenergy News 2009*, SEAI Renewable Energy Information Office http://www.seai.ie/Renewables/REIO_Library/REIO_Publications/Bioenergy_News_Autumn_2009.pdf
14. SEAI REIO *Bioenergy Review 2010* – email renewables@reio.ie for a free copy.º

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Ireland's EU Structural Funds
Programmes 2007 - 2013
Co-funded by the Irish Government
and the European Union

*The Sustainable Energy Authority of Ireland is financed
by Ireland's EU Structural Funds Programme co-funded
by the Irish Government and the European Union*