



## SUMMARY FACTSHEET – MISCANTHUS



*Miscanthus x giganteus* is a perennial C4 Poacea with high biomass production potential. Variety used is a sterile hybrid obtained from two natural species.



*Miscanthus x giganteus* rhizome

Original area of cultivation : Asia  
Primary end use : Combustion (main use), cattle fodder, second-generation biofuels  
Prefered kind of soils : Large array of soils except for water-logged soils and stony soils. Preferentially deep soils with high water retention capacity  
Crop establishment : March-April, on a dried parcel with soil temperature around 8°C to 10°C.  
Plantation density : 15.000 to 20.000 rhizome/ha (20 to 50% loss)  
Production : after 2-3 years of establishment , minimum 10 tDM/ha  
Harvest : preferentially end of winter (dry product), autumn(silaging)  
Optimal cutting height : 15 to 20 cm

### Crop assets and constraints :

Assets	Constraints
High biomass production potential	Expensive establishment costs (rhizomes and workforce requiring a specific material)
Harvesting once biomass is dry (end of winter), directly usable for combustion	Sensitive to self-propagating plant competition on the first 2 years
Perennial crop (> 15 years)	Production after 2-3 years of establishment
Moderate fertilizer input (nitrogen, phosphorus, potassium)	Production highly dependent from the soil and climate conditions
Low phytosanitary inputs and in most cases only for the first 2 years of crop establishment	High sensitivity to water stress
Efficient carbon storage in rhizome	Need for soils with an high load-bearing capacity
A few number of interventions on the crop	Loose product with low fluid density
Ensures winter soil coverage	Parcel destruction and rehabilitation to be planned at the end of the crop cultivation

### Focus on :

#### Crop Establishment

Plantation is realised from March to April, once the parcel is dried enough and frost risks are reduced. Soil temperature should range from **8 to 10°C**.

Crop density should approximate 10 to 15.000 stalks/ha. Considering the rhizome recovery rate (50 to 80%), recommended rhizome density at plantation is around **15 to 20.000/ha**.

Duration of the operation highly depends from the available material : specific material enables to lower the operation duration to **1hour/ha** while 6 to 7 hours/ha are required for a generic material.

#### Self proragating plant management and fertilising strategy

A key success for miscanthus optimal establishment is a parcel cleaned from self propagating plants. Mechanical or chemical weeding control are required during the first 2 years of crop establishment.

No fertilizer is required until the miscanthus has entered full production capacity (minimum 2 to 3 years).

Nitrogen, phosphorus and potassium inputs are moderate once miscanthus is harvested end of winter. Fertilising must be thought out in order to compensate N,P and K biomass exportation.



### Harvest

Preferred way of harvesting is realised **end of winter once the biomass is dry**, enabling a direct use in combustion.

No specific material is required: silage harvester or mower combined with a press can be used to densify the end product.

Harvest can be realised sooner in Autumn but will be processed as silage. This practising could although reduce the crop lifetime.

### Destruction and parcel rehabilitation

Destruction is realised from June to August. First step consists in harvesting or grinding the aerial biomass.

The objective is to empty rhizome's reserves considering they are at their lower stage at this time. Once rhizomes start over their growth, a mechanical intervention is recommended (rotovator) to destroy the new growth and subdivide the rhizome. A second intervention with the rotavator can be observed in order to eliminate crop remainings and flatten the soil.

## Potential biomass production according to location/soil nature

Biomass Production (in tDM/ha)		Location		
		Northern Europe	Southern Europe	Central Europe
Kind of soils	Superficial soils	8/10	6/8	8/10
	Intermediate soils	10/12	8/10	10/15
	Deep soils	15	12/15	12/15

### Production Costs

80-120 €/tDM

High cost for planting

Lack of income first two years

Need to include destruction costs

### Environmental

At the field edge

Gross Energy production :

200 000 à 225 000 MJ/ha

Total prime energy consumption :

5000 MJ/ha

GHG Emissions : 500 – 1000 kg CO<sub>2</sub>/ha

## Valorisation

- Nowadays use :
  - Mulch for garden;
  - Animal bedding,
  - Combustion: pellets, bulk

- Developing use:
  - Biobased material: building block, composite
  - Second generation biofuel