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Giant Miscanthus for Biomass Production

Miscanthus has received widespread attention as a biomass crop in Europe where it is used primarily for combustion in power plants. It is desirable for this use because of its low water and ash contents and high energy output to input ratio. In the U.S., *Miscanthus* is being investigated as a biomass crop for bioenergy and biofuel. Research into *Miscanthus* production and use has been conducted for more than 30 years in Europe, but is in its early stages in the U.S.

Origin and Distribution

The *Miscanthus* genotype with the greatest biomass potential to date is Giant *Miscanthus* (*Miscanthus* x *giganteus*), a sterile hybrid of *M. sacchariflorus* and *M. sinensis* parentage. The material being studied for biomass production is completely unimproved.

Giant *Miscanthus* is unable to produce seed so is less likely to be invasive. *M. sacchariflorus* and *M. sinensis* have escaped cultivation and can be invasive.

Lifecycle and Growth Habitat

Giant *Miscanthus* is a perennial crop; it does not need to be reseeded each spring. Giant *Miscanthus* grows from a rhizome and will spread slowly. It has erect stems which are 8- to 12-feet tall.

Giant *Miscanthus* is a warm-season grass but can grow even at relatively low temperatures (as low as 43°F). Autumn frost stops annual growth. Maximum dry matter yield is reached in late-summer but harvest is typically delayed until winter or early spring after dry down. This allows nitrogen to move into the rhizome for use by the plant the following season. Regrowth in Iowa begins in late April.

Yield

European research has shown dry matter yields from 5 to 11 tons per acre with an average of 8 tons per acre (non-irrigated, fully-established crop). The highest yields are reported in southern Europe, generally south of 40° N latitude.

US Research has shown dry matter yields from 10 to 15 tons per acre (Illinois), an increase of 30% to 50% over Europe. Yields decrease at more northerly latitudes. Yield trials are currently underway in Iowa.

Dry matter yield of Giant *Miscanthus* in the establishment year is typically insufficient to merit harvest. Yield increases each year reaching maximum potential by year three or four.

(continued on reverse)



Photo courtesy University of Illinois at Urbana-Champaign.

Giant Miscanthus Quick Facts

- Potential Benefits:
 - High yielding biofuel feedstock
 - Soil stabilization/improvement
 - Water filtration
 - Wildlife cover
 - Carbon sequestration
 - Low inputs after establishment
- Challenges:
 - Difficult propagation
 - Expensive establishment
 - Transportation of harvested material

Miscanthus species are native to Eastern Asia. They are now grown in various temperate and tropical areas.

In the U.S., many varieties have been bred and used ornamentally for over 100 years. In Japan, *Miscanthus* varieties have been successfully cultivated and managed in a prairie-like setting for use as a forage and building material for thousands of years.

A stand of Giant *Miscanthus* has a lifespan of 15 to 30 years.