Giant *Miscanthus* Rhizomes v. Plugs

Giant *Miscanthus* Planting Options

Giant *Miscanthus* (*Miscanthus* x *giganteus*) is one of the most promising biomass crop candidates for the Midwest, but as a sterile hybrid perennial grass, it must be vegetatively propagated.

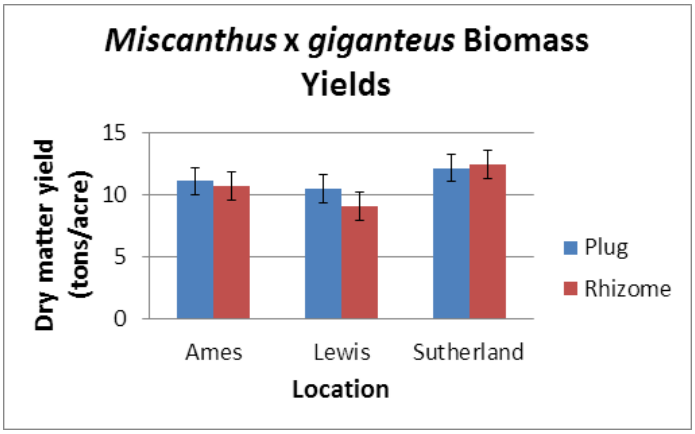
Research at Iowa State University indicates there is no significant yield difference between rhizome and plug propagation by the second growing season.

Yield Results Comparison

In 2009, the biomass yields for Giant *Miscanthus* varied, according to both propagule type and field locations. Such differences diminished in 2010 as the plants moved out of their establishment and into the growth phase.

During 2010, dry matter yields ranged between 9.1 and 12.4 tons of dry matter per acre. The small differences seen in dry matter yields between rhizomes and plugs across research sites are not statistically significant. Thus, different propagules are functioning with similar success across Iowa. Biomass yields from this study are comparable with yields in Illinois.

As expected, biomass yields for 2010 show a marked increase. The anticipated peak biomass yields for Giant *Miscanthus* come in the third and fourth years which will be 2011 and 2012 for the plots in this study.



Dry biomass yield results from 2010 comparing rhizome and plug propogated plots.

Comparing Rhizomes and Plugs

To evaluate Giant *Miscanthus* rhizome and plug performance across a range of Iowa growing conditions, field research was established at research sites in northwest, southwest and central Iowa (Sutherland, Lewis and Ames, respectively) in 2009.

Plug plots were watered regularly for two weeks after planting, or until new shoots emerged.

Weeds within plots were controlled by mechanical and chemical methods.

In late October, plots were harvested so biomass yield could be evaluated.

Differences in Planting Methods

Propagule production:

While rhizome segments have been the traditional Giant *Miscanthus* propagation method, their production is difficult, labor intensive and dependent upon excavation of existing 'Mother' stands, which are not numerous in North America. On an industrial scale, stem plug propagated Giant *Miscanthus* may prove a more affordable option. Plug propagation offers a far superior rate of multiplication, is less labor intensive and less environmentally invasive.

Given these factors, plug propagules may be a more affordable option for those currently establishing Giant *Miscanthus* biomass plantations, though future rhizome production innovations may impact the relative affordability of each system.

Plant cultivation:

Differences in cultivation requirements also exist between rhizome and plug propagules. After planting, plugs require at least two weeks of irrigation, unlike rhizome segments which are self-sufficient under normal soil conditions in Iowa.

With regard to weed control, plug propagules have the advantage. The uniform and immediately apparent plug plantings mean producers can utilize mechanical weed control methods. Rhizomes segments send up shoots more unevenly, limiting producers to the use of herbicide application. Thus, it may be necessary for producers to make some practical trade-offs.

Best Options

This study concludes that, in Iowa, there is no significant difference in the establishment and yields of rhizome and plug propagated Giant *Miscanthus* plants during the second growing season.

In light of this, producers may choose to establish Giant *Miscanthus* plantations from the cheaper, more readily available plug propagules, without experiencing decreased establishment success or biomass yield, as long as soil moisture is not limiting.

In dry or especially adverse conditions, rhizomes will likely establish better.

Authors/Contacts:

Nic Boersma, research associate
Department of Agronomy
nboersma@iastate.edu | 515 294-2417

Emily Heaton, assistant professor
Department of Agronomy
heaton@iastate.edu | 515 294-1310