

# Morphological Evaluation of *Miscanthus sacchariflorus* and *Phragmites australis* as Potential Bio-energy Crops

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## Abstract

*Miscanthus sacchariflorus* and *Phragmites australis* are species of perennial C4 plants indigenous to East Asia including the Korean peninsula. They are commonly used in botanical gardens and private residences for ornamental purposes.

Most of the biomass in *M. sacchariflorus* and *P. australis* is in the internodes, especially the basal 1–10 phytomers, with much less biomass in leaves and inflorescence. Among plant parts, internodes also contain the highest cellulose concentration, a critical component for bio-energy production. Cultivation techniques for *M. sacchariflorus* and *P. australis* in paddy should be developed for sustainable biomass yield. Research to determine efficiency of vegetative versus seed propagation must also be considered.

## Media summary

Introduce the good candidate species, *Miscanthus sacchariflorus* and *Phragmites australis* for cellulosic biomass source to bio-ethanol

## KeyWords

Bio-ethanol, cellulosic biomass, *Miscanthus sacchariflorus*, *Phragmites australis*, morphological evaluation

## Introduction

*M. sacchariflorus* and *P. australis* are being widely researched for their use as bio-energy crops. Major reasons for choosing these species are high growth rate, environmental benefits, and wide geographic adaptability. Those two species origin are East Asia, it need to be collected and evaluated for their growth and production. Especially *M. sacchariflorus* and *P. australis*

may be promising for cultivation in paddy fields, those two species adaptability for paddy fields have to be checked to be cultivated instead of rice.

## Methods

To study the growth characteristics and biomass quality of these species, 25-year-old swards of *M. sacchariflorus* and natural stands of *P. australis* were sampled every 2 weeks from post-anthesis to after a hard frost at three different environments near Brookings, South Dakota USA during autumn 2007.

## Results

Most of the biomass in *M. sacchariflorus* and *P. australis* is in the internodes, especially the basal 1-10 phytomers, with much less biomass in leaves and inflorescence. Among plant parts, internodes also contain the highest cellulose concentration, a critical component for bio-energy production. Cultivation techniques for *M. sacchariflorus* and *P. australis* in paddy should be developed for sustainable biomass yield. Research to determine efficiency of vegetative versus seed propagation must also be considered.

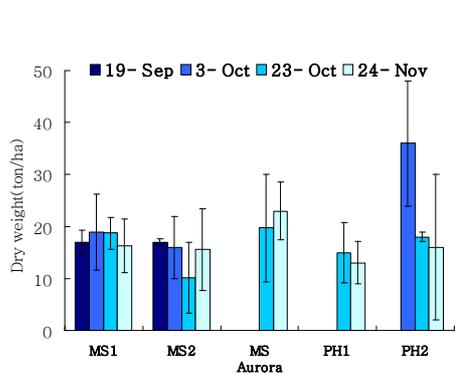


Fig. 1. Dry matter changes of *M. sacchariflorus* and *P. australis* according to the date.

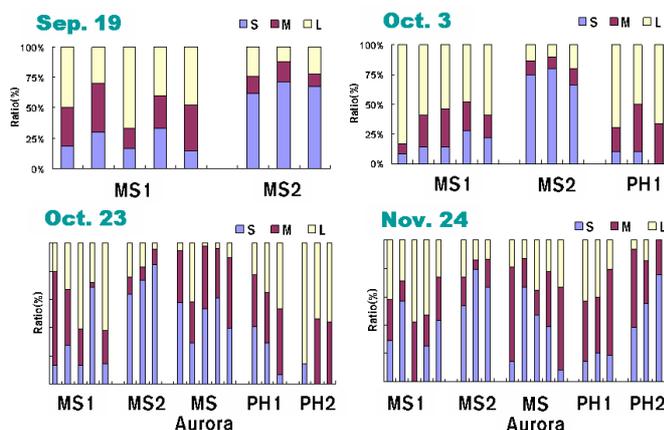


Fig. 2. Distribution of plant size of *M. sacchariflorus* and *P. australis* according to the date.

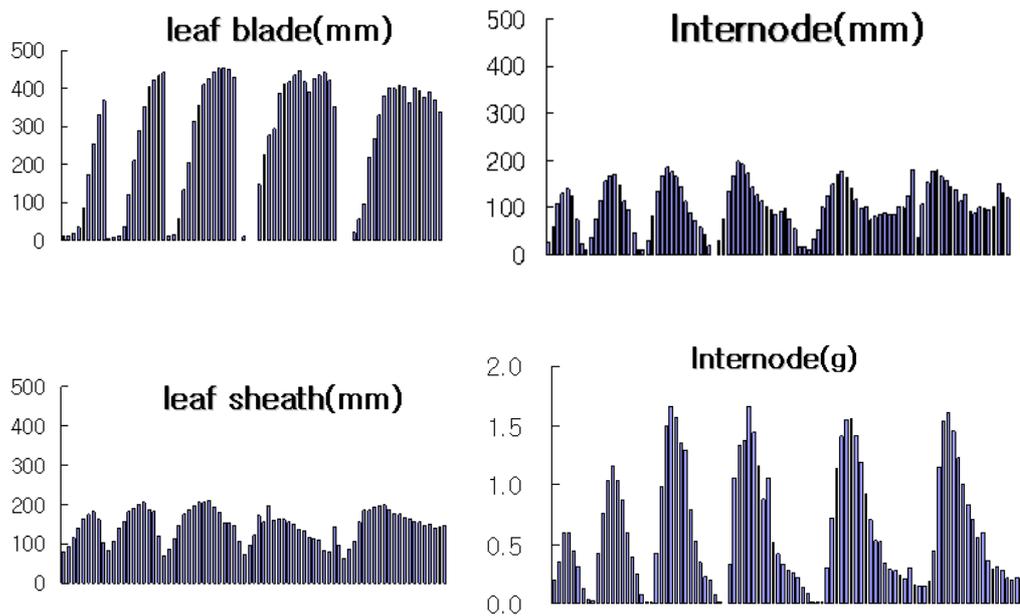


Fig. 3. Characteristics of *Phragmites australis* leaf blade, leaf sheath Internode.

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