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Relationships between Phenological and Agronomic Traits Revealed key Traits Determining Biomass Yield of *Miscanthus Sinensis*

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[Introduction]
This study was conducted to determine the genetic diversity of *Miscanthus sinensis* by evaluating its phenotypic traits during the first four years after transplanting, to investigate the relationship between phenotypic traits and biomass yield, and to identify key traits at an early year after planting that can be utilized to estimate biomass yield potential of mature stands.

[Materials and Methods]
Four-year field experiments were conducted to investigate phenotypic traits associated with the biomass yield of 173 *M. sinensis* accessions collected from Korea and neighboring East Asian countries. Thirteen phenological and agronomic traits associated with biomass yield were assessed to investigate their genetic diversity and relationships with biomass yield as well as the latitudes of the *M. sinensis* accessions collection sites.

[Results and Discussions]
Correlation analyses among phenological and agronomic traits, biomass yield, and collection site revealed that heading date, vegetative growth duration, leaf area and stem growth traits (stem height, stem diameter, and stem dry weight) were closely related to biomass yield. The latitude of collection site exhibited a significant negative correlation with heading date, and heading date showed a significant positive correlation with biomass yield, indicating high biomass potential of the accessions originating from lower latitude. Agronomic traits measured in the second year after planting also showed a high correlation with biomass yield measured in the fourth year after planting. In particular, vegetative growth duration, leaf area, stem diameter, and stem dry weight measured in the second year were significantly related with the fourth year biomass yield. Therefore, these findings suggest that agronomic traits measured in the second year can be used for screening *M. sinensis* genetic resources and breeding lines with high biomass yield potential.

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