30 June 2016

**Evolution of genes involved in regulating flowering time in grasses**

The *VRN2* gene is a conserved repressor of flowering in grasses.

**The Science**

Studies of gene knockdown and overexpression experiments test whether the circuitry of the genes regulating the initiation of flowering is conserved across various grass species.

**The Impact**

Increasing biomass yield could improve the economics of biomass as an energy source. Furthering the molecular-level understanding of the flowering regulatory network in the model grass Brachypodium could allow for manipulation of flowering time, a trait affecting biomass yield.

**Summary**

The flowering of many plant species is coordinated with seasonal environmental cues such as temperature and photoperiod. In winter wheat and barley, three genes – *VRN1*, *VRN2*, and *FT* – form a regulatory loop that regulates the initiation of flowering. Here, we test whether the circuitry of this regulatory loop is conserved across Pooid grasses. Our studies reveal that some aspects of the regulatory loop, such as the cold repression of *VRN2*, are unique to wheat and barley. However, this study, as well some of our previous work, demonstrates that *VRN2* is a repressor of flowering that functions broadly in grasses from rice to Brachypodium, and thus *VRN2* is a target for fine tuning of flowering in grass biofuel crops.

**Contacts (BER PM)**

N. Kent Peters  
Program Manager, Office of Biological and Environmental Research  
[kent.peters@science.doe.gov](mailto:kent.peters@science.doe.gov), 301-903-5549

**(PI Contact)**

Richard M. Amasino  
University of Wisconsin - Madison  
amasino@biochem.wisc.edu

**Funding**This work was funded by the DOE Great Lakes Bioenergy Research Center (DOE BER Office of Science DE-FC02-07ER64494), USDA-HATCH, the National Science Foundation (IOS-1353056 and Grant IOS-1258126), a National Institutes of Health-sponsored pre-doctoral training fellowship to the University of Wisconsin Genetics Training Program, and the China Scholarship Council.

**Publications**

Woods, D.P. *et al.* “Evolution of *VRN2/Ghd7*-like genes in vernalization-mediated repression of grass flowering**.”** *Plant Physiology* **170**, 2124-2135 (2016) [DOI: 10.1104/pp.15.01279].

**Related Links**

<http://www.plantphysiol.org/content/170/4/2124.long>

**PM Recommendation for SC Web Publication**

[Yes or No]