

## The “What If Challenge of Plant Genomics” 2010

**W**elcome to the second 2010 issue of *The Plant Genome*. For this editorial, I am going to rejuvenate what I called the “What If Challenge of Plant Genomics” that ran in 2009. This is timely because over two years have passed since this challenge was initiated and as predicted remarkable advances in sequencing technology have been achieved that have accelerated all aspects of plant genomics. What I wrote in the 2009 issue still stands.

We all know that genomics is in an era of accelerating sequence data acquisition and analysis. Many of us remember when sequencing a single 2 or 3 kb of DNA was a major, costly undertaking including both the lab work and data analysis. The establishment of sequencing centers accompanying the paradigm shift brought about by the automated sequencers made single gene and small genome sequencing easily feasible resulting in the complete sequencing of the Arabidopsis and rice genomes in 2000 and 2005, respectively, and many other crops are following suit. More recently, we have experienced another jump in sequencing productivity from a new generation of sequencing technologies that dovetails nicely with standard sequencing closing in on the NIH sponsored target of the \$1000 genome. This revolution in sequencing represents a reduction from \$10.00 to a few cents per finished bp in less than 20 years (Service, 2006). While this is incredible progress, there are indications that a next generation of technologies promise to cheaply sequence multiple gigabase runs in just hours. Accompanied with the requisite data analysis advances, these technologies promise to again shift our genome

sequencing paradigm making it feasible to sequence the large genomes of most crop plants rapidly and at low cost. Without promoting any particular technical approach or company involved in these next generation sequencing technologies, these advances are beginning to be implemented. As I stated in my previous editorial on this topic, it is a wonderful time to be a plant genomics researcher but... are we ready for this next paradigm shift in sequencing?

The “What If Challenge of Plant Genomics”—because it now seems likely that sequencing a crop genome for under \$1000 will become a reality sooner than later, it is important that the plant genomics community is prepared to benefit. For our next issues of *The Plant Genome*, an open forum series of short “Vision” articles will be invited that address how ultra high throughput genome sequencing will impact plant breeding, functional genomics, systems biology, and related fields. To ensure that “The What if Challenge” reviews are not obsolesced due to further advances in sequencing technology before they are published, I am setting the costs of sequencing a typical crop genome at \$1, three orders of magnitude lower than the \$1000 target. For the purpose of the intellectual exercise that “Challenge” represents, this makes sequence capacity and acquisition unlimited. Authors will be “challenged” to forecast the impacts on crop improvement, biology, and how we will do research, all towards closing the gap in knowledge between the genotype and phenotype. For articles to be featured in the next issue, authors will be invited, but in the spirit of the open source world we are interested in a diversity of visions and opinions. If you are interested in submitting an article, please send your proposed topic to dsomers@crops.org.

Sincerely,

Dr. David A. Somers  
Editor, *The Plant Genome*

### Reference

Service, R.F. 2006. Gene sequencing: The race for the \$1000 genome. *Science* 17 Mar. 2006, 311:1544–1546.

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