



# Documenting Soybean Genomics Research

David Grant & Rich Wilson



**SOYBEAN GENOMICS RESEARCH**

**A STRATEGIC PLAN**

**FOR 2008 – 2012**

**This Report Documents a 5-Year Strategic Plan for Soybean Genomics Research.  
The Plan was Co-Authored by a Representative Group of 45+ Scientists Who  
Attended a 30-31 May 2007 Planning Meeting Held in St. Louis, Missouri.  
(a list of all meeting participants can be found in the appendix)**

**[http://soybase.org/resources/  
soygec.php](http://soybase.org/resources/soygec.php)**

**Soybean  
Genomics  
Research**

**Strategic  
Plan**

**2008-2012**

# Nature 463:178-183 (2010)

## Genome sequence of the palaeopolyploid soybean

Jeremy Schmutz<sup>1,2</sup>, Steven B. Cannon<sup>3</sup>, Jessica Schlueter<sup>4,5</sup>, Jianxin Ma<sup>5</sup>, Therese Mitros<sup>6</sup>, William Nelson<sup>7</sup>, David L. Hyten<sup>8</sup>, Qijian Song<sup>8,9</sup>, Jay J. Thelen<sup>10</sup>, Jianlin Cheng<sup>11</sup>, Dong Xu<sup>11</sup>, Uffe Hellsten<sup>2</sup>, Gregory D. May<sup>12</sup>, Yeisoo Yu<sup>13</sup>, Tetsuya Sakurai<sup>14</sup>, Taishi Umezawa<sup>14</sup>, Madan K. Bhattacharyya<sup>15</sup>, Devinder Sandhu<sup>16</sup>, Babu Valliyodan<sup>17</sup>, Erika Lindquist<sup>2</sup>, Myron Peto<sup>3</sup>, David Grant<sup>3</sup>, Shengqiang Shu<sup>2</sup>, David Goodstein<sup>2</sup>, Kerrie Barry<sup>2</sup>, Montona Futrell-Griggs<sup>5</sup>, Brian Abernathy<sup>5</sup>, Jianchang Du<sup>5</sup>, Zhixi Tian<sup>5</sup>, Liucun Zhu<sup>5</sup>, Navdeep Gill<sup>5</sup>, Trupti Joshi<sup>11</sup>, Marc Libault<sup>17</sup>, Anand Sethuraman<sup>1</sup>, Xue-Cheng Zhang<sup>17</sup>, Kazuo Shinozaki<sup>14</sup>, Henry T. Nguyen<sup>17</sup>, Rod A. Wing<sup>13</sup>, Perry Cregan<sup>8</sup>, James Specht<sup>18</sup>, Jane Grimwood<sup>1,2</sup>, Dan Rokhsar<sup>2</sup>, Gary Stacey<sup>10,17</sup>, Randy C. Shoemaker<sup>3</sup> & Scott A. Jackson<sup>5</sup>

Soybean (*Glycine max*) is one of the most important crop plants for seed protein and oil content, and for its capacity to fix atmospheric nitrogen through symbioses with soil-borne microorganisms. We sequenced the 1.1-gigabase genome by a whole-genome shotgun approach and integrated it with physical and high-density genetic maps to create a chromosome-scale draft sequence assembly. We predict 46,430 protein-coding genes, 70% more than *Arabidopsis* and similar to the poplar genome which, like soybean, is an ancient polyploid (palaeopolyploid). About 78% of the predicted genes occur in chromosome ends, which comprise less than one-half of the genome but account for nearly all of the genetic recombination. Genome duplications occurred at approximately 59 and 13 million years ago, resulting in a highly duplicated genome with nearly 75% of the genes present in multiple copies. The two duplication events were followed by gene diversification and loss, and numerous chromosome rearrangements. An accurate soybean genome sequence will facilitate the identification of the genetic basis of many soybean traits, and accelerate the creation of improved soybean varieties.

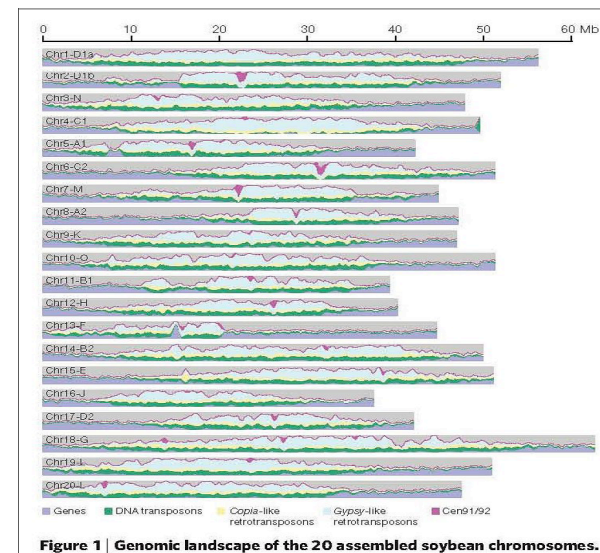
# Research Accountability

## Soybean Genomics Research Accomplishment Report

### National Soybean Genomics Research Initiative Accomplishments

Meeting Strategic Milestones for  
2008 to 2012 in a Timely Manner

v 1.0 March 2010



Schmutz, J., et al. 2010. Genome sequence of the palaeopolyploid soybean. *Nature* 463:178-183.

<http://www.soybase.org/survey/new/index.php>

## On-line Survey Outline Format

Research Area:

### 1. Glycine max Genome Structure & Analysis

Research Activity:

#### 1.1 Annotation (A1a, A2b)

Milestones: A collage of expected products from A1a & A2b in the Strategic Plan

Open Box: Insert relevant accomplishments

# For Each Accomplishment, Report:

- What was done?
- When, Who, Where was it done?
- What were the most significant results?
- Citations for all relevant publications

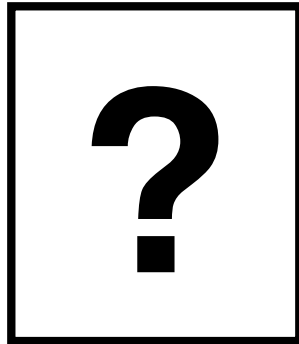
We appreciate your efforts to be:

Clear, Concise, Correct & Complete as possible

**National Soybean Genomics  
Research Initiative**

**Strategic Priorities & Milestones for  
2013 to 2018**

v 1.0



**Soybean  
Genomics  
Research**

**Strategic  
Plan**

**2013-2018**

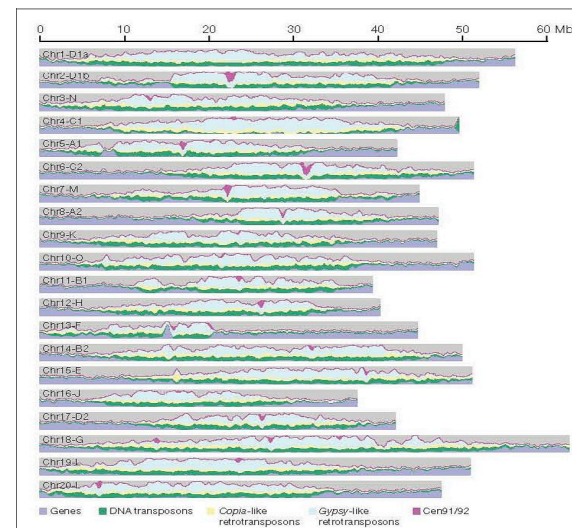
<http://soybase.org/resources/soygec.php>

Please submit  
Research  
Accomplishments  
On-line by  
31 March 2010

National Soybean Genomics Research  
Initiative Accomplishments

Meeting Strategic Milestones for  
2008 to 2012 in a Timely Manner

v 1.0 March 2010



**Figure 1 | Genomic landscape of the 20 assembled soybean chromosomes.**

Schmutz, J., et al. 2010. Genome sequence of the palaeopolyploid soybean. *Nature* 463:178-183.



# Putting the best case forward...

