



**Bayer BioScience**

# **Brassica Oilseeds Research**

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BCS Oilseed rape

# Bayer has sequenced the canola genome

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Milestone Will Result in Speeding up of Research and Breeding Programs

## **Bayer CropScience First to Sequence the Entire Genome of Rapeseed/Canola**

**Monheim.** Bayer CropScience (BCS) announced today that it has sequenced the entire genome of rapeseed/canola (*Brassica napus*) and its constituent genomes present in *Brassica rapa* and *Brassica oleracea*. This provides Bayer with a unique level of insight into the previously unknown genetic code of canola. Rapeseed/canola is the second largest oilseed crop after soybeans, accounting for approximately 15 percent of world production.



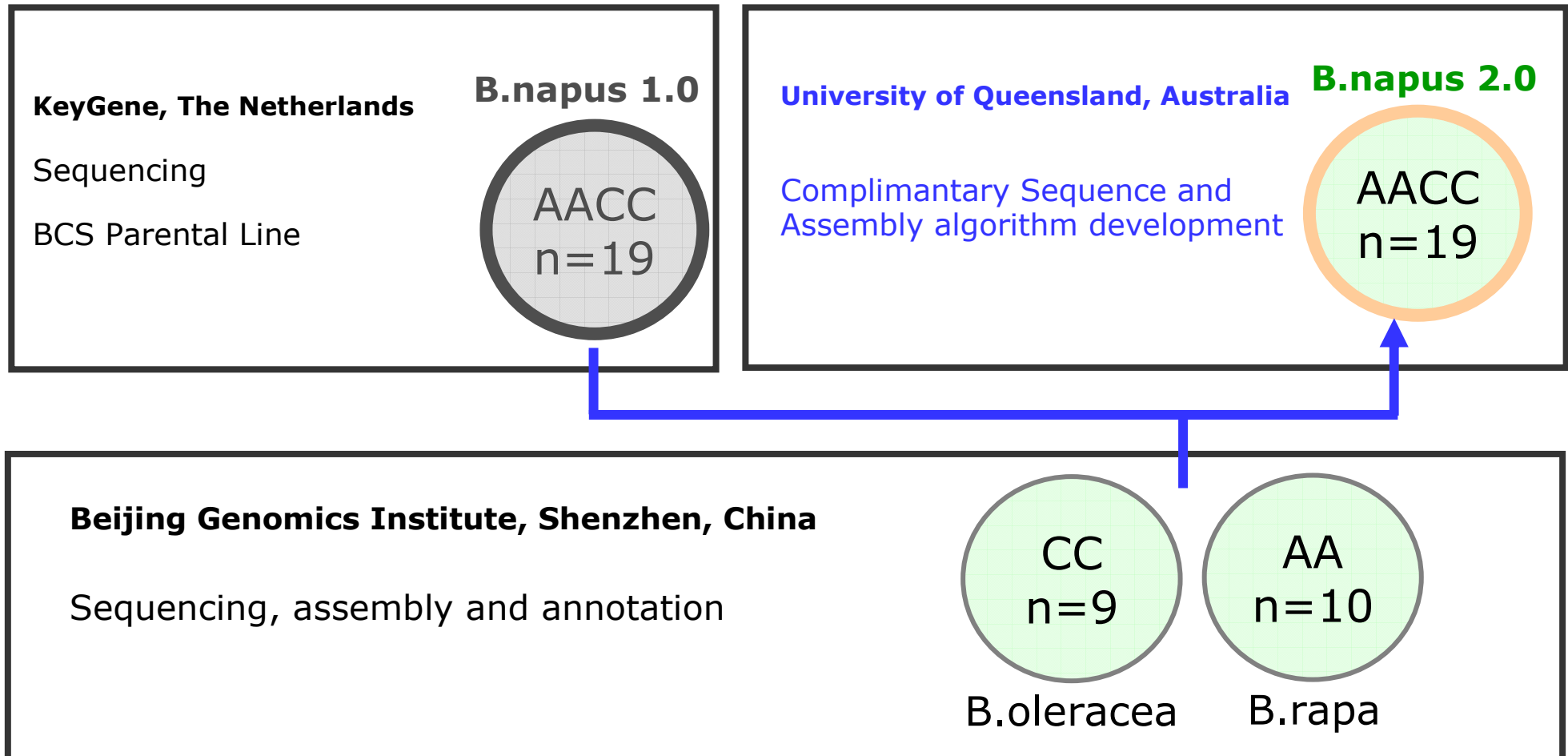
The BCS sequencing project was a collaboration with several parties. The Beijing Genomics Institute-Shenzhen (BGI-Shenzhen, China), provided Bayer with a high-density, fully assembled and annotated sequence of a *Brassica rapa* and a *Brassica oleracea* line. Both lines were made available by Bayer. Complementary genome sequence data sets of an elite proprietary Bayer CropScience *Brassica napus* parental line were provided by Keygene N.V. (The Netherlands), and the University of Queensland (Australia). These data were assembled and now form the basis of Bayer's functional sequenced rapeseed genome.

Siu/Yah Wu (left) and Jeremy Klassen at the Canola research facility of Bayer CropScience in Saskatoon/Canada.

BCS Oilseed rape research  
BCS Brassica genome sequencing



## 3 complementary collaborative projects



BCS Oilseed rape research

Exploitation and value extraction

Research Phase 1 : Technical proof-of-concept testing



Lead gene validation

Significant increase in efficiency and time gain

Significantly more at the same cost

Non-GM trait development:

- Sequences enable rapid “in-silico” cloning of target gene copies
- From 0.5 year to 1 week per trait gene lead
- **Main benefit is a significant shortening of non-GM R&D timelines**

GM trait development :

- Sequences enable fast “in silico” genome localization of Events
- From 4 months to 1 month per trait gene lead
- **Main benefit is a significantly more at the same cost**



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BCS Oilseed rape development  
Exploitation and value extraction



## Phases 2 and 3 : Trait Development

Monitoring and quality control of experimental plant material

Facilitates the development of DNA-based diagnostic assays

- Reliable diagnostic assays are needed for monitoring of trait introgression into different breeding lines and quality control
- Assays are based on targeting the gene-of-interest AND gene-flanking genomic sequences which are usually duplicated in the other genome of canola and hence, complicate assay development
- Now, a specific candidate assay can be pre-validated "in silico", resulting in a faster validation and increased accuracy



BCS Oilseed Rape Breeding  
Exploitation and value extraction  
(Molecular) Breeding



Will enable a significant increase in breeding efficiency  
and understanding of (elite) germplasm diversity

- Phase 1: Re-sequencing of selected breeding lines and elite germplasm to study the diversity in elite breeding material and to identify genomic regions involved traits of interest
- Phase 2: Re-sequencing for discovery of SNPs to be used for high-resolution genotyping in routine molecular breeding applications



BCS Oilseed rape research  
Exploitation and value extraction



## Research Phase 0: Discovery

Technology integration

Asset to attract 3rd party collaborators

- Positive feedback and high interest from multiple 3rd parties
- Strategy is to provide genome sequence data on a selective basis to key collaborators
- Further refinement and focus on higher density mapping of regions of interest.



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Exploring Life



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Science For A Better Life



Six billion people already live on our planet, and the number is growing by 220,000 every day. How can we provide food for more and more people without damaging the environment?

How can we improve everyone's health and prevent diseases? How can we develop new materials to help us conserve resources?

Bayer has repositioned itself to provide better answers to these questions. The New Bayer consists of three subgroups: HealthCare, CropScience and MaterialScience. Fields in which Bayer is already a global leader – and whose importance to the future of humankind grows by the day. [www.bayer.com](http://www.bayer.com)

HealthCare

CropScience

MaterialScience

The New Bayer