



BioDiagnostics Inc.

Molecular Breeding Services



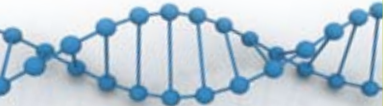
Accelerating speed-to-market of your new genetics

Increasing the efficiency of your plant-breeding program

Today's sophisticated technology allows plant breeders to know their seed more thoroughly than ever before. In fact, using molecular markers and genomics to select desirable traits makes plant breeding a more precise science, and ultimately a cost-effective one when compared to more traditional plant breeding methods.

Being competitive in the seed industry requires releasing new varieties quickly and efficiently. That's why our approach is to customize specific programs to meet a plant breeder's evolving needs.

BioDiagnostics, Inc. (BDI) is committed to the success of our customers. We bring together a team of highly skilled professionals to design the most effective programs while using cutting-edge technology to produce the most informative data.



Consulting Services

The key to success is a well-designed plan

BDI's professionals offer:

- A deep understanding of genomics and plant-breeding principles
- Comprehensive and practical experience in the seed industry

Our goal is to enhance the success of your breeding program by:

- Determining which tests are most appropriate for your program
- Assisting in data interpretation
- Getting the most out of your genetics in a cost-effective way

Our Molecular Breeding Services

Marker-Assisted Selection

Certain plant traits can be difficult to score phenotypically. Traditional phenotypic markers can have significant limitations, since they are often affected by environment and development stage. In contrast, molecular markers are easy to score, abundant in number and are not affected by the variables that limit phenotypic markers. Molecular-marker technology enables plant breeders to accurately and successfully select a wide range of traits. A well-designed molecular-marker testing program can significantly reduce both your time-to-market and breeding program costs.

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Trait Introgression Using Marker-Assisted Backcrossing

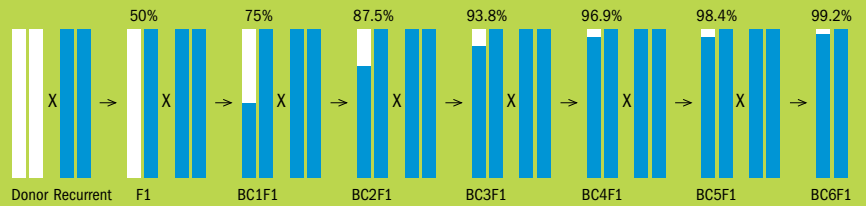
A cost-effective testing program using SNP-based VeraCode™ technology makes rapid trait conversions a reality. It's possible to attain 95% of the recurrent parent genetic make-up within two backcross generations. This is achieved with the aid of polymorphic markers distributed throughout the genome, while capturing desired traits of interest. BDI has developed proprietary sets of SNP markers for many crop species.



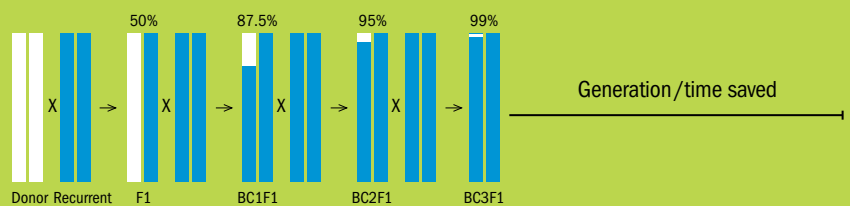
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Conventional approach



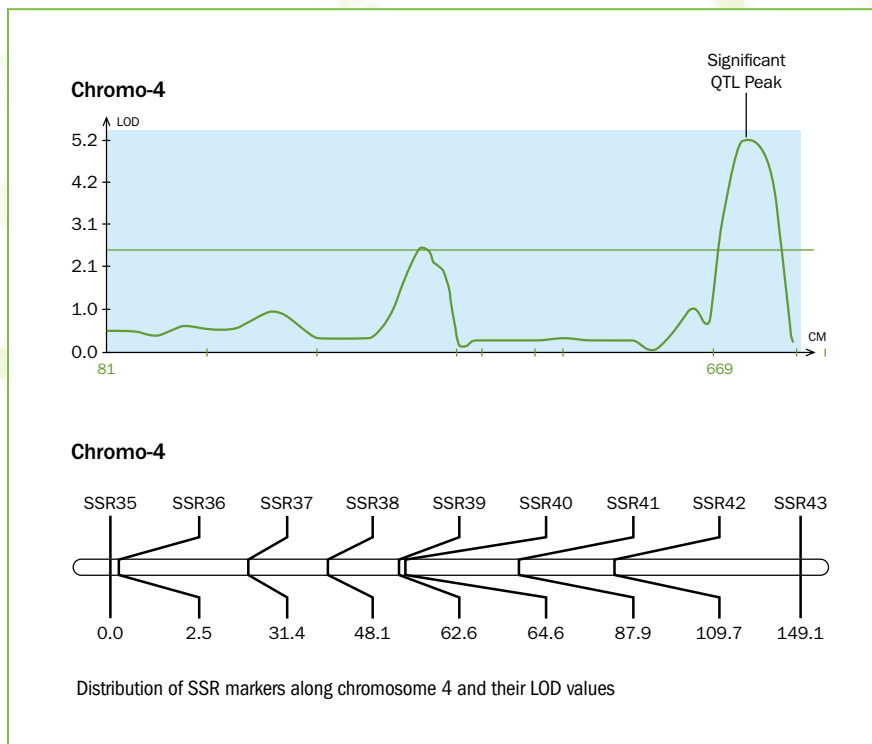
Marker-assisted backcrossing



QTL Mapping and Trait Identification

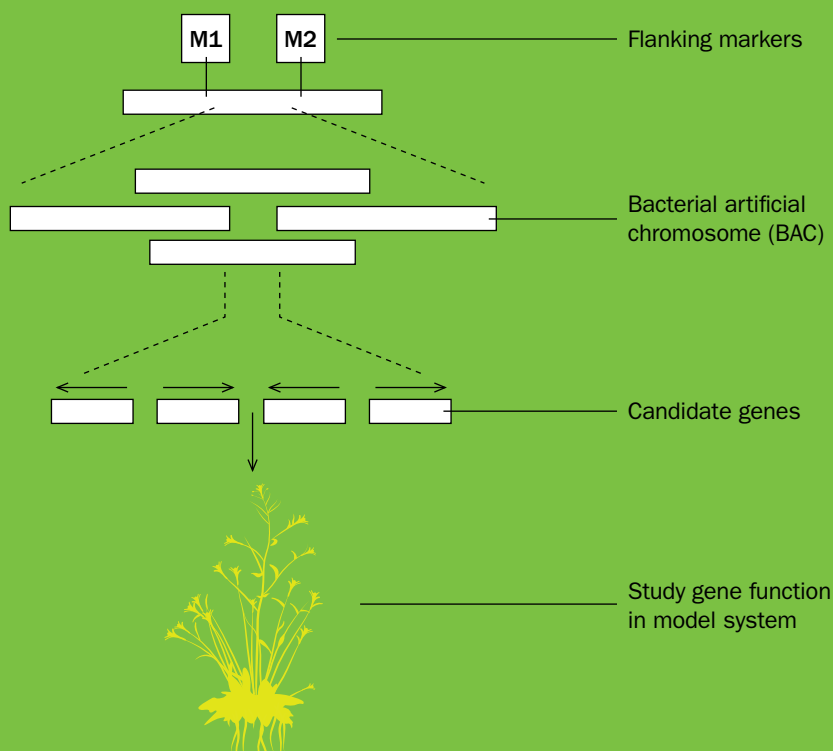
Traits that are regulated by multiple genes are known as quantitative traits (e.g., intrinsic yield, drought tolerance and disease resistance). The genomic locations in which genes such as these reside are known as quantitative trait loci (QTL). Molecular markers can be used to map QTL regions and identify the genomic basis of a specific phenotype.

BDI offers a comprehensive range of marker-based genotyping services as well as data analysis support for identification of markers tightly linked to QTL regions. These markers can be a powerful selection tool in a breeding program.



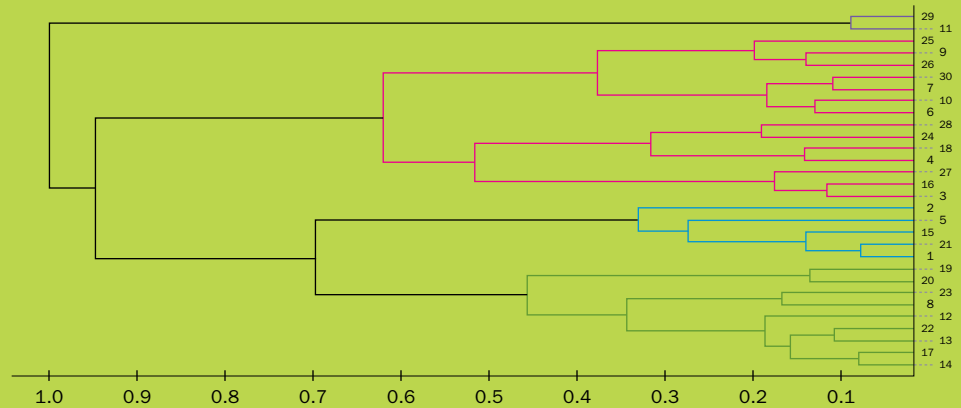
Positional Gene Cloning

BDI offers high-resolution mapping to identify candidate genes for traits of interest. We employ a wide range of tools, including reverse genetics, genetic transformation, gene expression and literature mining, for functional characterization of these genes.



DNA Fingerprinting

DNA fingerprinting helps you protect your valuable intellectual property (IP). We fingerprint proprietary crops, fruits, flowers and vegetables using a variety of molecular markers. That same DNA fingerprinting data can be used to create dendrograms to understand kinship relations in breeding material.



Dendrogram representing relationships between breeding lines

Genetic Purity

The success of hybrid seed production is largely dependent on the genetic purity of parental lines. Out-crossing and the inadvertent mixing of seeds may compromise your seed quality. BDI provides molecular markers support to confirm the genetic identity of your seed material.

	SNP1	SNP2	SNP3	SNP4	SNP5	SNP6	SNP7	SNP8	
Parent 1	A/A	GG	T/T	T/T	A/A	G/G	A/A	G/G	
Parent 2	C/C	A/A	G/G	C/C	T/T	C/C	C/C	T/T	
Individual 1	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual 2	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual 3	A/C	G/A	T/G	T/C	A/T	G/A	A/C	G/A	← Outcrossing
Individual 4	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual 5	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual 6	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual 7	A/A	G/G	G/G	T/T	A/A	G/G	A/A	G/G	
Individual 8	A/A	G/G	G/G	T/T	A/A	G/G	C/C	G/G	→ Selfing
Individual 9	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual 10	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual ...	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual ...	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual ...	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	
Individual N	A/C	G/A	T/G	T/C	A/T	G/C	A/C	G/T	

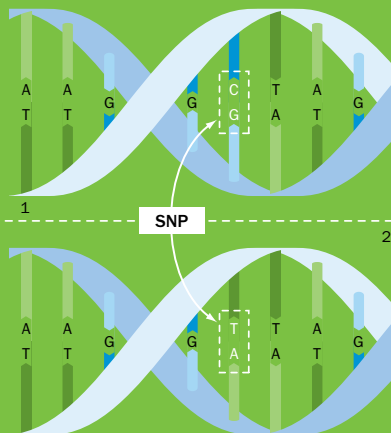
Genetic purity analysis using SNP markers



Marker Discovery and Development

BDI offers the following marker discovery and development services:

- Finding SNP or SSR markers in crops
- Converting SSR to SNP markers for cost-effective, high-throughput genotyping
- Reviewing public domain literature
- Searching plant genome databases
- Implementing sequencing strategies for SNP marker development



SNP SSR



Quality Results That Help You Grow Your Business

BioDiagnostics, Inc. stands behind its promise to offer you robust, quick and cost-effective molecular testing. We consult with you so your business receives the full benefits of our services and achieves maximum results.

We've provided confidential, trusted results to plant breeders for more than a decade. We know the seed industry and what it takes for you to be successful.

Contact us today

for further information or to set up a consultation.



Additional Services

Services for Line Purification and Trait Integration

BDI offers a suite of integrated plant-breeding services that enhance the genetic purity of high-value inbred lines. These cost-effective services guarantee the highest quality, increase your speed to market and may be combined to reduce the number of seeds required for testing.

Breeders' Seed Purification – Stabilize your breeding lines by using isozyme electrophoresis to identify contamination or segregation in each selfed plant. Eliminating segregation prior to bulking seed allows you to create purified foundation inbreds.

Trait Confirmation – Confirm that a trait of interest is present, that the maternal plant was homozygous and/or that the protein expression for that trait is adequate for its agronomic function using ELISA testing. Evaluate homozygosity for herbicide tolerance using a breeder's bioassay on up to 50 kernels from a single ear.

Event Identity, Zygosity and Adventitious Presence – Verify that the appropriate event is present and homozygous and that there are no unintended events using validated PCR methods.

BDI offers services to meet all requirements of your quality assurance program. For more information, please visit our Web site at www.BioDiagnostics.net or contact us at Info@BioDiagnostics.net.

