



Benefits of Rice Genome Sequencing

Rice Genomics Program

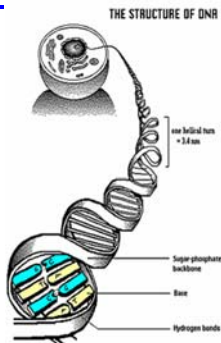
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The Rice Genome

- Genes carry instructions on how organisms grow, develop, and function

- 40,000+ genes in rice



Genes are made of DNA
800 million bits of DNA information in rice genome

Genes are aligned on chromosomes
24 chromosomes in rice



BUT

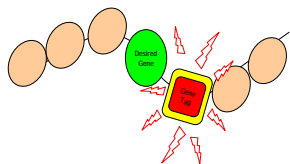
Which of these 800 million bits of DNA are important to look at ?

- too costly to look at them all

Must identify high priority genes

- control economically valuable traits
- can map chromosomal location

OUR GOAL



Develop DNA markers for valuable traits

- Markers are DNA sequence tags readily monitored by lab analysis
- Located near gene controlling trait

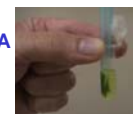
Marker Assisted Selection

- Markers indicate presence of valuable genes
- Increases efficiency of selection
- Does not replace traditional breeding methods
- Helps breeders combine valuable traits into new rice cultivars

DNA Marker technology



Collect tissue



Isolate DNA



Amplify DNA markers



Analyze markers

Presence of DNA marker is associated with presence of important trait



1 2 3 4 5 6 7
..... Rice breeding lines
... 26

← DNA marker for disease resistance

Traits tagged with DNA markers



Disease resistance

- Blast disease: 5 genes
- Sheath blight: 2 genes

Cooking Quality

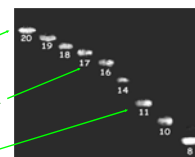
- Amylose content

Waxy gene DNA marker

Long Grain - Nonsticky

Medium Grain - Sticky

High Amylose
- specialty use



- Pasting strength

- Cooking energy

- Grain aroma

- Grain elongation

Agronomic traits

- Cultivar identity/purity:
genetic fingerprinting
- Heading date
- Seedling vigor

