RiceCAP Project and Program

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Coordinated Agricultural Project
RiceCAP

• Program Outline
• Management
• Project objectives
Program Outline (cont.)

• Morning (cont.) – RiceCAP Project Outline
  – Introduction of RiceCAP
  – U.S. rice breeding programs & RiceCAP project efforts (milling yield & sheath blight resistance)
  – U.S. molecular programs & RiceCAP project efforts
  – Connecting whole genome variation with phenotype
  – Science of milling yield & quality
  – Sheath blight importance & resistance breeding
  – Coordinated sheath blight screening effort

RiceCAP

The genome, or DNA genetic code, of rice is composed of approximately 50,000 “pieces” of DNA, called genes, which control all plant traits including yield and pest resistance. The sequencing information is now publicly available to rice researchers worldwide. For the rice industry to effectively utilize this valuable resource, rice researchers need to begin to understand the function of these genes and how they impact economically valuable attributes to commercial rice. A better understanding of these genes will enable researchers to develop a healthier and more productive rice crop.

Two attributes that have been difficult to improve through traditional plant breeding efforts are milling yield and disease resistance to sheath blight disease, one of the most pervasive and destructive diseases of rice worldwide. The RICECAP project aims to develop a set of biotechnology-based tools to improve these two attributes in U.S. rice varieties. The tools being developed will help rice researchers identify genes which control these important agronomic traits as well as determine their function in the rice plant. The biotechnology tools will allow traditional rice breeders to address problems which they have been unable to adequately address in the past.

The RICECAP project is a multi-institutional and multi-contract program with a strong research component as well as teaching and extension efforts to fully engage the rice community on the potential benefits of the overall effort. The project will advance the utility of the biotechnology information available for rice, train traditional rice breeders in the usefulness of biotechnology-based tools, and educate a broader audience on the merits of such an approach to improve rice cultivars.

The management of this project will receive significant input from scientific and stakeholder advisory boards, with the stakeholder advisory board composed of industry representatives from the rice community.
PROJECT COMPONENTS

• Science

• Education

• Extension/Outreach

PROJECT OBJECTIVES

• Objective 1
  – Identify candidate genes/markers for improved milling yield and sheath blight resistance

• Objective 2
  – Develop and utilize high-throughput tools to validate the function of candidate genes

• Objective 3
  – Workshops (MAS and VIGs)

• Objective 4
  – Extension and Outreach
PROJECT OBJECTIVES

• Objective 1
  – Identify candidate genes/markers for improved milling yield and sheath blight resistance (*breeding/molecular*)

• Objective 2
  – Develop and utilize high-throughput tools to validate the function of candidate genes

• Objective 3
  – Workshops (MAS and VIGs)

• Objective 4
  – Extension and Outreach

U.S. RICE
Breeding and Molecular Efforts

• Overview of rice breeding programs in the U.S. and the efforts focused on the RiceCAP
  – Dr. Anna McClung

• Overview of rice molecular programs in the U.S. and the efforts focused on the RiceCAP
  – Dr. Scot Hulbert

• Connecting whole-genome variation with phenotype
  – Dr. Jan Leach
MILLING YIELD and SHEATH BLIGHT RESISTANCE

- The science of milling yield and RFA
  - Dr. Terry Siebenmorgan

- Sheath blight importance and breeding for resistance
  - Dr. Fernando Correa

- Coordinated sheath blight screening effort
  - Dr. Yulin Jia
BROADER GOAL

Improved U.S. rice

Molecular toolbox

RiceCAP