Project report submitted in Microsoft Word version. Do not provide a pdf version.

Project Leader (PI): Zhaohua **Peng**

Co-PI(s): Sam Chang

Collaborator(s): Stephen M. Boue

Objective(s):

1) Verify arsenic content of low and high arsenic rice germplasms in Starkville, Mississippi

2) Carry out crosses with low and high arsenic rice to establish mapping populations

3) Mapping, cloning, and developing molecular markers for genes controlling arsenic content using next generation DNA sequencing and bioinformatics technologies *(clearly stated in the proposal that this is a multiple year objective "We are aware that the research will extend multiple years. Given the importance of reducing arsenic in rice, it is worth to pursue the goal with multiple years of effort.")*

4) Developing cooking and processing procedures and device that can reduce arsenic content of cooked rice and rice products *(clearly stated in the proposal that this objective takes two years).*

Milestones for FY 2016-17:.

1. List your project title in a separate line,
   Mapping and Cloning the Genes Controlling Arsenic Content in Rice (*Oryza sativa*) for Generation of Low Arsenic Crops and Developing Novel Processing Methods for Removal of Arsenic in Rice Products

2. and describe if Milestones met or not, in terms of

   Fully met: **Objectives 1, 2, and 4**

   Partially met: N/A

   Substantially met: **Objective 2** (The flowering time of different rice cultivars are different. Although we managed to carry out crosses as proposed, some of them did not produce seeds).

   Or Not met: N/A

Progress Report:

We have identified the high and low arsenic rice germplasm by collaborating with Dr. Shannon Pinson (USDA). Excellent germplasm lines have been collected worldwide and grown in Starkville, Mississippi. Rice seeds have been harvested. The arsenic contents of selected key germplasm lines have been detected and verified. Crosses have been made for mapping population construction. Mapping required software and procedures have been established. A novel procedure to reduce rice arsenic content has been established. The method can substantially reduce arsenic and lead content in cooked rice but have very minor effect on other minerals. The exciting results suggest that continuing the research may substantially contribute to reducing human arsenic exposure from rice consumption.

Accomplishments

Rice germplasm with high and low arsenic content has been identified, collected, and verified.

A method that can substantially reduce arsenic content in cooked rice has been developed.

International Cooperation / Collaboration

Dr. Shihai Xing, a visiting scientist from China has been actively participated in this project.

Publications:

Shihai Xing [1, 2], Xiaoxi Meng[2], Lihui Zhou [1], Hana Mujahid [2], Chunfang Zhao [1], Yadong Zhang [1, 2], and Cailin Wang [1] , **Zhaohua Peng [2]** (2016) Proteome Profile of Starch Granules Purified from Rice (*Oryza sativa*) Endosperm. PLOS One 11(12): e0168467.