

2014 Large-Scale Applied Research Project Competition Genomics and Feeding the Future

Summary of Review

Project Leader(s): Loren H. Rieseberg and John M. Burke

Project Title: Genomics of Abiotic Stress Resistance in Wild and Cultivated Sunflowers

A. RESEARCH PROPOSAL, INCLUDING RESEARCH ON (GE³LS)

Strengths

This proposal describes comprehensive well crafted study using sunflower to understand and manipulate the genetic components for four major stress conditions, namely drought, flooding, salt and low nutrient. The data to be generated will include phenotypic measurements as well as molecular data on genomes and transcriptomes. Much important and novel information should be obtained.

The GE³LS component of the proposal was focused on a very important topic, namely the international exchange of experimental/commercial material and the construction of Material Transfer Agreements.

Weaknesses

One concern was that the proposal was too comprehensive for the resources and proposed timeline. A second concern was whether or not the 288 line population contained sufficient variation and was large enough, with sufficient replicates, to have the resolving power to identify the determinants of these complex stress tolerances. Since there was already concern about the scope of the proposal any increase in the size of the population would exacerbate that concern. The sequencing of 2000 genotypes and associated soil characteristics is also ambitious but the expected outcomes of these studies are not clear.

The incorporation of the GE³LS information into the project should be clarified, as should the methodology to be used. The scope of the GE³LS questions beyond the MTA issue could also be extended.

Summary Statement

The proposal brings together a group of experts in the field of sunflower genomics and genetics to integrate research from phenotyping to genomics in order to improve the ability of the crop to grow in problem (stress) environments. It is extremely ambitious and unlikely to complete all the tasks but important data and new germplasm should result. The issue of international treaties for the sharing and distribution of germplasm is addressed. The social and economic benefits relate to the improvement of the crop and its place in securing the food supply.

B. SOCIAL AND/OR ECONOMIC BENEFITS

Strengths

The major deliverables are the advanced lines, a useful breeding population and genes possibly responsible for stress resistance, which are important deliverables that will benefit the end users.

Weaknesses

The likely influence of the white paper on MTAs for germplasm was questionable.

Summary Statement

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