REQUEST FOR PROPOSALS - PROGRAMMATIC INITIATIVES

Department:

Plant Sciences

Title of Proposal:

The Genomic Basis of Local Adaptation in Maize

Amount Requested:

$4880

Matching Funds (source and amount):

We are in the process of applying for funding from the National Science Foundations' Catalyzing New International Collaborations (CNIC) program (URL: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12815) in order to generate funds for both continued development of the partnerships established via the meeting proposed here and for generation of preliminary data for an eventual NSF Plant Genome grant. Our current budget for the CNIC grant is ~$50,000.

Proposal Narrative (3 page maximum):

Project Overview

Maize (*Zea mays* ssp. *mays*) was domesticated in southwest Mexico from teosinte (*Zea mays* ssp. *parviglumis*), a wild grass species with a narrow ecological distribution. Despite the limited environments inhabited by its progenitor, maize has spread globally and is currently cultivated across a wide range of latitudes (from the tip of South America to Canada), altitudes, precipitation gradients, and soil types. Reciprocal transplants of maize landraces have experimentally demonstrated their adaptation to local conditions. Our previous work has suggested these adaptations have been obtained both through gene flow from uniquely adapted wild relatives and through new mutations arising during the spread of maize. Recently developed sequencing resources present the opportunity to assess the genomic architecture of these local adaptations in great detail. While such studies will provide much information regarding the basic evolutionary history of maize, they will also generate valuable data for continued improvement of maize in the face of growing human populations and climate change, particularly in high elevation regions of the developing world where the maize yield gap is the greatest.

The meeting we are proposing through Programmatic Initiatives would bring together researchers from the United States and Mexico who are well qualified to

address the issue of local adaptation in maize. We have already developed initial connections between our institutions through an NSF-funded student exchange program and informal talks. We hope the meeting we describe here will fully establish a fruitful, long-term collaboration that will generate substantial extramural funding. The individuals we are proposing to include have the theoretical, computational, and field-based expertise necessary to effectively address this topic and have all agreed to attend should we receive funding. In addition to developing this collaboration, we also hope to expose the broader UC Davis community to the research of our collaborators through participation in existing campus seminar series.

Aim 1: Development of Collaboration

Our primary goal in organizing this meeting will be to establish a broad collaboration that can effectively address the genomic basis of local adaptation in maize from a number of perspectives. This collaboration will span multiple colleges at UC Davis and include three institutions within the United States as well as an international partner. Participants will be:

1) Jeffrey Ross-Ibarra, Project PI, Associate Professor, UC Davis, College of Agricultural and Environmental Sciences
2) Graham Coop, Associate Professor, UC Davis, College of Biological Sciences
3) Matthew Hufford, Postdoctoral Scholar, UC Davis (current); Assistant Professor, Iowa State University (Fall, 2013)
4) Sherry Flint-Garcia, USDA-ARS Research Geneticist and Adjunct Assistant Professor, University of Missouri
5) Angelica Cibrian Jaramillo, Assistant Professor, National Laboratory of Genomics for Biodiversity (Langebio), Mexico
6) Ruairidh Sawers, Assistant Professor, National Laboratory of Genomics for Biodiversity (Langebio), Mexico

The meeting will take place over three days at UC Davis. During this meeting we will determine the scope of our collaborative effort to characterize local adaptation in maize. The first day of our meeting will consist of presentations by each collaborator introducing the resources available from their respective institutions and their personal goals for the project. During the second day of our meeting, we will narrow the objectives of the project, develop an outline for both our NSF-CNIC and our NSF-Plant Genome grants, and establish responsibilities for both grant writing and the proposed research. Finally, on the third day we will schedule meetings with faculty and staff at UC Davis (*e.g.,* personnel at the Genome Center and at BGI@UC Davis) to more fully consider the resources available to us at UCD and to seek feedback regarding logistics of the proposed project.

Aim 2: Outreach to the Broader UC Davis Community

The proposed meeting would bring international experts on plant breeding,

quantitative trait mapping, statistical genetics, phylogenomics, and agricultural biodiversity to the UC Davis campus. We will take advantage of this opportunity to expose the campus to their research by working with organizers of existing seminar series. In particular, we believe our collaborators' research will be of interest to the audiences of the Plant Sciences and Ecology & Evolution departmental seminar series as well as the seminar series of the Genetics, Population Biology, and Plant Biology graduate groups. We will contact organizers of these seminar series immediately should our proposed meeting be funded.

Budget Justification:

Rates for airfare and hotel are based on results from an online travel aggregator.

Item	**Quantity**	**Unit Price**	**Cost**	**Comments**
Airfare: Leon, Mexico-Sacramento	2	$700	$1,400	round trip
Airfare: Columbia, MO-Sacramento	1	$600	$600	round trip
Hotel	12 days	$120	$1,440	4 nights x 3 people
Meals	72 meals	$20	$1,440	3 meals x 4 days x 6 people
		Total	$4,880	

Contact Person:

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