

NSF-GRFP RESEARCH STATEMENT OUTLINE

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Project Background:

- greater *Zea* phylogeny is not well resolved
- *Zea luxurians* phylogeny is not well resolved *Instead of saying that the phylogenies are unresolved, I would focus on determining how the genus has been altered by the spread of the domesticate. We know the basic phylogeny of Zea, but certain regions of genomes may have been subject to gene flow with maize and, indirectly, with other Zea taxa using maize as a bridge for gene flow.*
- we are interested in admixture, explain how hybridization can lead to haplo-type transfer *between species and subspecies*
- maize is a good study system because it's agriculturally important and has great variety over a wide area *both subspecies and species of Zea demonstrate local adaptation and may have conferred these adaptations to maize during its spread across the Americas.*
- maize hybrid zones exist
- we have found interesting hybrid populations near proposed areas of maize domestication
- we have many questions about these populations *I would consider focusing on either dynamics across the entire Zea genus or on the parviglumis/mexicana hybrid zones, with a preference toward the latter since this is the work we have proposed to take place here at ISU in the NSF-DEB grant. Also, it would probably be a good idea to take some area of that proposal and extend it further to show how you plan to take ownership and expand on the goals of the project as part of your Ph.D.*

Project description:

Here I would be sure to break your project plan down into clear aims/objectives that very cohesively form the overall project. It would be ideal if the aims would flow into each other, but that's not essential

All Zea:

Zea Phylogeny: Treemix/Spacemix (grater phylogeny) (looking at landraces) (resolving luxerians)

Gene Flow: Treemix/Spacemix, STRUCTURE, Fst, heterozygosity

Hybrid populations:

Characteristics: common garden, Fst, heterozygosity

Taxonomy: Dstatistic, Treemix/Spacemix

Gene Flow: Treemix/Spacemix, STRUCTURE, Fst

Resources needed: **People:** me, Matt Hufford, Jeff Ross-Ibara, Mexico collaborators

money: my salary, common garden materials (low cost is a selling point)

Project impacts: *So we'll need a "Broader Impacts" section that is less about the impact of the project on **science** and more about the impact of the project on **society***

Maize Community: better greater phylogeny, better landrace phylogeny, resolved luxurians

Evolutionary Biologists: more info about the nature of hybridization and it's affect on evolution

Works Cited: