**Appendix G: Response to review**

*We thank the three reviewers for their time and insightful comments.  We have responded to them below.  There are several useful suggestions that we have incorporated.  Our specific responses are set off from the other text in italics to separate them from reviewer comments.  We have also updated our proposal.  In particular we have updated the methods and measurement of progress and results.  We have clarified where and how we will release germplasm.  We have also updated our use of checks.*

Appendix G: Peer Review (Submitted)

Status: Complete

Project ID/Title: NE\_TEMP2210: Improving Forage and Bioenergy Crops for Better Adaptation,

Resilience, and Nutritive Value

Rate the technical merit of the project:

1. Sound Scientific approach:

Approve/continue project

2. Achievable goals/objectives:

Excellent

3. Appropriate scope of activity to accomplish objectives:

Excellent

4. Potential for significant outputs(products) and outcomes and/or impacts:

Excellent

5. Overall technical merit:

Excellent

Comments

Team has a history of collaboration and productivity in the form of new varieties and climate-based

plant responses on a wide geographic scale. This proposal would broaden the scope of the project

to a legume (birdsfoot trefoil). Project is thorough and involves a number of different scientific

disciplines. Project will result in manuscripts on GxE interactions that will be relevant for multiple

efforts across the US and other countries.

Your Recommendation:

Approve/continue project

*Thank you for the positive comments.*

Appendix G: Peer Review (Submitted)

Status: Complete

Project ID/Title: NE\_TEMP2210: Improving Forage and Bioenergy Crops for Better Adaptation,

Resilience, and Nutritive Value

Rate the technical merit of the project:

1. Sound Scientific approach:

Approve/continue project with revision

2. Achievable goals/objectives:

Excellent

3. Appropriate scope of activity to accomplish objectives:

Excellent

4. Potential for significant outputs(products) and outcomes and/or impacts:

Excellent

5. Overall technical merit:

Excellent

Comments

This multistate project has proven successful under NE-1710 with the networking across Northeast

US and Eastern Canada regions and disciplines. The project aligns with four of the NIFA’s Priority

Science Areas. The improvement of forage and bioenergy crops will positively impact the livestock

and biofuel industries in the US. The project highlights a reduction of negative environmental

impact in this agricultural system. The group addresses pre-breeding activities in Alfalfa as an

essential part of the breeding efforts. The importance of multistate trials is emphasized. The forage

and bioenergy are facing a shortage of breeders and extension workers. It is a national problem

across different crops in the US.

Milestones are clear. Maybe need to add more milestones. The release of new species and their

respective cultivars should be considered milestones.

I didn’t see any release in the Literature Cited (Journal of Plant of Registrations).

*Response:*

*We have added the release of cultivars and submissions to Journal of Plant of Registrations (JOPR) to our milestones.  Several participants mentioned that their recent releases are currently in extended approval queues at State Agricultural Experiment Stations due to COVID delays.*

How do the new species compare with the check cultivars?

*Response: It is unclear which forage or bioenergy crop the reviewer is focused on with the question.  Given the scope of the project, different crops will have different answers.  We have however clarified that our experiments will include appropriate checks.  The methods are now updated.*

List the most threatening diseases and pests to the crops in the project and assess yield reduction

and economic impact.

*Response: We have listed significant diseases and pests where space allows.  We have emphazied them in switchgrass where they are our specific focus. We have not added as much about alfalfa, as different regions face different stresses.*

Better agronomic practices and integrated pest management should be considered.

*Response: Yes, this is a good suggestion.  In this renewal we have expended the second aim, Genotype\*Environment\*Management interaction to include a greater focus on three way interactions between genotypes, environment, and agronomic practices.  Due to the scope of funding involved however, we do not have the capacity to include significant IPM in the work, except where individual participants have other funding focused on this very important issue.*

Any plans to conduct some feed studies on animals? The nutritional values of both legumes and

grasses should be considered in the proposal.

*Response: Many participants would love to move in this direction.  However, due to funding limitations this is outside the scope of this proposal per se.  Several participants have aligned funding to look at this.  In birdsfoot trefoil this is particularly important, due to the focus on condensed tannins.*

Is the group considering the use of genomic tools and databases? Many major quantitative trait

loci (QTL) related to agronomic traits have been identified in alfalfa. This might benefit the group in

taking decisions of what kind of germplasm to use. The genes responsible for key agronomic and

disease traits will be discovered with novel diversity panels, genomic tools and databases, and

innovative analysis methods. It will accelerate the process of cultivar development.

*Response: Yes, we are very interested as a group in genomic tools and databases.  The nature of multi-state Hatch support means that this project lacks the funding to specifically develop tools.  However, several participants have genomic research programs.  Academic Advisor von Wettberg has a program on comparative legume domestication.  The Cornell Breeding Insight team is developing tools for alfalfa, in the wake of the shift in focus at the Noble Foundation.  Participant Rios in Florida is developing a genomic selection program for alfalfa.  Switchgrass has seen a rapid development of genomic tools.  However, we have not included these in this proposal, due to the absence of dedicated funding to support these activities, with the exception of places where participant Rios in Florida is funded to do such work.*

Your Recommendation:

Approve/continue project with revision

Appendix G: Peer Review (Submitted)

Status: Complete

Project ID/Title: NE\_TEMP2210: Improving Forage and Bioenergy Crops for Better Adaptation,

Resilience, and Nutritive Value

Rate the technical merit of the project:

1. Sound Scientific approach:

Approve/continue project

2. Achievable goals/objectives:

Excellent

3. Appropriate scope of activity to accomplish objectives:

Excellent

4. Potential for significant outputs(products) and outcomes and/or impacts:

Excellent

5. Overall technical merit:

Excellent

Comments

This proposal was a pleasure to read. The need for the work is strongly justified. I appreciated the

focus on understudied forage species that are widely grown (e.g. orchardgrass and trefoil). With a

collaborative approach, the team seems primed to accomplish the proposed objectives.

The focus on aggregation and analysis of existing breeding program data is an efficient way to use

small funding sources, and will likely yield greater benefits than attempting trendy methods like

genomic selection. The organizational structure matches the lean style of the proposal, with lead

scientists vested in the research coordinating each objective.

The GxE objectives and specific methods described in 1.2 and 1.4 seem highly related to the

continent-wide forage adaptation and resilience research coordinated by Valentin Picasso. What

can be learned from that work to make a similar study for these different forage species more

Successful?

*Response: We appreciate this suggestion.  Although academic advisor von Wettberg has a new Kerza project (NSF Biology Integration Institute* New Roots For Restoration) *with the Danforth Center and the Land Institute, and others in the project have interest in intermediate wheatgrass, Prof. Picasso has not yet joined this multistate Hatch, as IWG breeding has occurred in other projects in the past.  We have reached out to Prof. Picasso, and expect to have a big tent, open door approach to learn from each other as much as possible.*

The proposal states that all improved material will be released through the GRIN system.

However, the outputs and outreach plan discuss releasing new cultivars with seed companies.

Does the release of improved material as germplasm accessions work for those companies?

*Response: As our project encompasses several crops, the answer varies by activity, crop and by the company.  For alfalfa, where we specified release, we are developing pre-breeding populations.  These will be released to GRIN.  Participant Professor Rios at the University of Florida publicly released a re-selection from Florida 99 in 2021. For work with native bioenergy grasses, they will be exclusively licensed through Roundstone Native Seed Company.  Heat tolerant ryegrass and heat tolerant orchardgrass will be licensed to Ampac Seed.*

Your Recommendation:

Approve/continue project

*Thank you for the positive comments.*