**Reply memo to reviewer comments 08/30/2018**

**Project/Activity Number: NE\_TEMP1839 - Development and Evaluation of Broccoli Adapted to the Eastern US**

**Reviewer 1**

Recommendation: Approve/continue project with revision

The purpose of the NE\_TEMP1839 Multistate project appears to be “to sustain the trial system beyond current SCRI funding so that it will continue to support the development and improvement of broccoli varieties and other research on this important crop”. However, statements such as “The goal of NE\_TEMP1839 is to support a year-round, reliable supply of quality eastern-grown broccoli …” and “NE\_TEMP1839 will support the development and commercialization of new, Eastern-adapted broccoli hybrids that will produce high quality broccoli crowns in the climatically variable and challenging eastern environments” make the purpose confusing.

*We understand the ambiguity of the objective/goal statements raised by the reviewer. We rewrote the statements to provide a single objective/goal in both parts of the proposal.*

In addition, the indication that it will support “other research” without describing the problems and the additional studies/activities doesn’t help to make a case for a multistate multi/interdisciplinary project. Recommend to be specific and expand on these other research activities.

*The integrated regional testing to identify wide adaptation is the main justification for the multistate project. Identifying that adaptation is not possible through other mechanisms.*

In addition, the purpose of this proposal suggest that the project will address the interest of a specific group of breeders participating in a SCRI broccoli project. A multistate project is supposed to address a regional problem and be open to all potential participants/disciplines with interest in addressing the problem. Recommend to invite pathologists with experience and interest in broccoli diseases and potential participants from other broccoli producing states in the mid-Atlantic region.

*Individual breeders have relationships with pathologists and are set up to do evaluation of disease resistance. The multistate trialing system is an inefficient way to screen for diseases; such work is expected to be done previously for anything entered in Yield trials. The proposed multistate project is open to all interested broccoli breeding programs: all three public broccoli breeders in the US have signed on, and the trial system welcomes entries from any commercial broccoli program. We believe that with 11 locations we can assess adaptation to the entire region. Nevertheless, we anticipate that testing in expanding production areas may be valuable. This project would provide a strong framework for bringing in participants from those states.*

Stakeholders needs. This section emphasizes the importance of the SCRI Eastern Broccoli Project and its variety trials towards improving crown quality. However, diseases are a problem in the region that could be addressed by breeding or at least address the susceptibility/resistance of the developing varieties/breeding lines. Recommend to include information about the specific disease problems and the need for resistance.

*Multistate trial results will let breeders find out whether material they’ve developed to incorporate traits of interest (such as resistance to a particular disease) also has the adaptation necessary to produce high quality crowns and profitable yields in eastern environments. Disease-resistance breeding is being done through more appropriate means by individual breeders*. *We maintain the best pest control we can in our trials, so they are not effective ways to identify variation in resistance. The occasional diseases are noted and reported to the breeder entering material.*

Similarly, include more information about other abiotic problems. Maintaining or improving tolerance/resistance to biotic and abiotic stresses is critical to improve productivity and sustainability.

*The project was designed to test hybrids for wide adaptation to the eastern US with multiple planting dates. The breeders focus on improving tolerance and resistance to the abiotic stress, thus we feel that this topic has been addressed in the proposal.*

Related, current and previous work. Authors emphasize the work done by the SCRI Eastern Broccoli project, claiming the advances in developing of new varieties adapted to the region. More detail of their work and outcomes, and the work of others would strengthen the justification for this proposal. Similarly, expand on detail description of the sources and benefits of other traits (heat tolerance, resistance to diseases) mentioned in this section. Describe the efforts to include these in this breeding project. Diseases and heat disorders are problems in the region and there is a need for resistance and evaluation.

*The purpose of the proposed multistate project is to determine whether new hybrids developed by broccoli breeding programs (whether for improved flavor, disease resistance, drought stress, etc.) show good adaptation to eastern environments. The requested detail pertains to the breeding work done in individual breeding programs. While of critical importance to the proposed work, it is not among the proposed activities.*

Objectives. Including breeding and evaluation for heat and/or disease resistance/susceptibility will make a stronger case for this project.

*The breeding that provides hybrids for the trial system is done independently by public and private sector breeders and is funded by other sources far larger than the multistate project. The multistate project proposes to inform that breeding by enabling evaluation of wide adaptation, the part they cannot do otherwise.*

Activities and procedures. Unclear what and how each participating state/institution is contributing to the project and the procedures to use. For example, there is no specific information about the traits, sources, and procedures to support the statement “Broccoli germplasm with traits of interest to producers (e.g., disease resistance; exerted head for easy harvest) from public broccoli programs will be used to develop hybrids for eastern production environments” in the procedures of Obj. 1. Recommend to expand and explain in detail these traits and procedures.
The description of head quality traits appears to be appropriate though.

*We have included more details about the traits and procedures as recommended by the reviewer. In the Organization/Governance section, there is a description of the role of each participant.*

Measurement of progress and results. The release of new cultivars will be used as outputs. Recommend to describe outcomes in more detail (short, medium and long term) and how will influence sustainability. Missing milestones or expected accomplishments.

*We have added a milestones section and the outcomes section has also been reorganized into short, medium, and long-term outcomes.*

Outreach. Description of outreach activities seems appropriate, but recommend describing how to evaluate the outreach activities.

*We have included evaluation of the outreach activities.*

**Reviewer 2**

Recommendation: Approve/continue project

The proposed project is interesting and of great utility for the Eastern U.S. vegetable industry. The proposed objectives are ambitious but feasible given the established network of public institutions including breeders, horticulturists, and extension agents working along the East Coast of the U.S. and private seed companies. Higher outreach impact may be achieved further expanding the network to other States in the North East given their proximity to the large North East U.S. market.

Limited information are provided regarding post-harvest and nutritional quality evaluations, although partners that will work on these aspects have been identified. Timeline, specific milestones, and requested budget are not reported in the outline, therefore cannot be evaluated.

*Nutritional quality evaluation is an external service, conducted by long-time collaborator Carl Sams, that is available to participating breeding programs for an additional fee. We don’t expect all programs to be interested in this service, but it may be an attractive option for some.*

*We have added a milestones section.*

**Reviewer 3**

Recommendation: Approve/continue project with revision

The proposed activities are built upon previously supported SCRI project. The proposal can be enhanced by providing in-depth information on achievements that have been made and challenges that the team was facing in the past years in order to better justify the importance of continuity of the work.

*Space constraints limited our report of achievements, but we appreciate the prompt to expand on them. We annually file detailed REEports with this information.*

The proposal identifies warm nights as the major limitation for growing broccoli in the eastern state, and target improving heat tolerance as the major breeding goal. However, considering the wide geographic area covered in the project, other biotic and abiotic stresses should be considered in the breeding program.

*As mentioned for Reviewer 1, the breeders are working on a great number of traits. The heat tolerance is the one that is specific to the eastern US, and on which breeders had great trouble making progress. Those traits are very much being improved, but independently of this project.*

The proposal plans to conduct a large number of yield and quality trials across the different states, but how to organize the data and make meaningful conclusions from these trials are not clear in the proposal.

*An explanation has been added.*

The major output of the project is the number of entries that are ultimately commercialized. The single output would limit the impact of the project. The proposal may benefit from expanding outputs, such as including extension and peer-reviewed publications. In addition, milestones are missing in the proposal.

*The focused outcome has been a valuable part of our activity, helping avoid distractions that don’t deliver towards that goal. Of course, there are outputs along the way, including publications and extension activities. We typically reach hundreds of growers per year with the various field days and conferences.*

*We have added a milestones section.*

**Reviewer 4**

Recommendation: Approve/continue project

The continuation of this project from the original SCRI grant is important for growers throughout the east coast to build a viable broccoli industry. As a vegetable extension specialist in the Mid-Atlantic area I have been working with growers on trying to expand production into the spring season. Varieties from the EBP with heat tolerance will be essential to do so.

*Thanks!*