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New Hampshire
Department of Agriculture,
Markets & Food

Shawn N. Jasper, Commissioner

January 11, 2024

His Excellency, Governor Christopher T. Sununu
and the Honorable Council
State House
Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the New Hampshire Department of Agriculture, Markets and Food, Division of Agricultural Development (DAMF) to enter into Cooperative Project Agreement (CPA) with the University of New Hampshire in the amount of \$73,713.00 to advance the evaluation and release of locally bred strawberry varieties for New England production, effective upon Governor and Council approval through September 29, 2025. **100% Federal Funds** – Specialty Crop Block Grant.

Funding is available in account, Specialty Crop Block Grant, as follows:

02-18-18-180010-23290000 Specialty Crop Grant - Farm Bill, 21SCBGPNH1101-00

<u>ACCOUNT</u>	<u>FY2024</u>
072-500577 Grants to Schools – Federal	\$73,713.00

EXPLANATION

The New Hampshire Department of Agriculture, Markets & Food (DAMF) received Specialty Crop Block Grant (SCBG) money from the United States Department of Agriculture to fund projects that increase the competitiveness of specialty crops in New Hampshire. The projects for 21SCBGPNH1101-00 were solicited through the RFP process and submitted for review by USDA, Agricultural Marketing Service as part of our state application. The proposal submitted by the University of New Hampshire was one of the projects accepted by USDA for funding as enumerated in the CPA.

Strawberries are a regionally important fruit with nearly 1,400 New Hampshire farms reporting growing strawberries in the most recently reported USDA Census of Agriculture (2017). Although strawberries are a regionally important fruit, there is an unmet need for varieties bred under local environmental conditions. The goal of this project is to advance the breeding and release of new, locally bred strawberry varieties adapted to New Hampshire conditions for crop production and ornamental floriculture.

In the event that these Federal funds become no longer available, General Funds will not be requested to support this program.

Respectfully submitted,



Shawn N. Jasper
Commissioner

COOPERATIVE PROJECT AGREEMENT

between the

STATE OF NEW HAMPSHIRE, **Department of Agriculture, Markets, and Food**

and the

University of New Hampshire of the UNIVERSITY SYSTEM OF NEW HAMPSHIRE

- A. This Cooperative Project Agreement (hereinafter "Project Agreement") is entered into by the State of New Hampshire, **Department of Agriculture, Markets, and Food**, (hereinafter "State"), and the University System of New Hampshire, acting through **University of New Hampshire**, (hereinafter "Campus"), for the purpose of undertaking a project of mutual interest. This Cooperative Project shall be carried out under the terms and conditions of the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002, except as may be modified herein.
- B. This Project Agreement and all obligations of the parties hereunder shall become effective on the date the Governor and Executive Council of the State of New Hampshire approve this Project Agreement ("Effective date") and shall end on **9/29/25**. If the provision of services by Campus precedes the Effective date, all services performed by Campus shall be performed at the sole risk of Campus and in the event that this Project Agreement does not become effective, State shall be under no obligation to pay Campus for costs incurred or services performed; however, if this Project Agreement becomes effective, all costs incurred prior to the Effective date that would otherwise be allowable shall be paid under the terms of this Project Agreement.
- C. The work to be performed under the terms of this Project Agreement is described in the proposal identified below and attached to this document as Exhibit A, the content of which is incorporated herein as a part of this Project Agreement.

Project Title: Advancing the Evaluation and Release of Locally Bred Strawberry Varieties for New England Production

- D. The Following Individuals are designated as Project Administrators. These Project Administrators shall be responsible for the business aspects of this Project Agreement and all invoices, payments, project amendments and related correspondence shall be directed to the individuals so designated.

State Project Administrator

Name: Joshua Marshall
Address: NH Dept Agriculture, Markets & Food
P.O. Box 2042
Concord, NH 03302-2042
Phone: 603-271-3688

Campus Project Administrator

Name: Svetlana Wanzer
Address: University of New Hampshire
Sponsored Programs Administration
51 College Road
Durham, NH 03824
Phone: 603-862-2037

- E. The Following Individuals are designated as Project Directors. These Project Directors shall be responsible for the technical leadership and conduct of the project. All progress reports, completion reports and related correspondence shall be directed to the individuals so designated.

State Project Director

Name: Joshua Marshall
Address: NH Dept Agriculture, Markets & Food
P.O. Box 2042
Concord, NH 03302-2042
Phone: 603-271-3688

Campus Project Director

Name: Lise L. Mahoney
Address: UNH Agriculture, Nutrition &
Food Systems
Kendall Hall Rm. 217
Durham, NH 03824
Phone: 603-496-7879

F. Total State funds in the amount of \$73,713.00 have been allotted and are available for payment of allowable costs incurred under this Project Agreement. State will not reimburse Campus for costs exceeding the amount specified in this paragraph.

Check if applicable

Campus will cost-share _____ % of total costs during the term of this Project Agreement.

Federal funds paid to Campus under this Project Agreement are from Grant/Contract/Cooperative Agreement No. **AM21SCBPNH1101** from **AMS/USDA** under CFDA# **10.170**. Federal regulations required to be passed through to Campus as part of this Project Agreement, and in accordance with the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002, are attached to this document as Exhibit B, the content of which is incorporated herein as a part of this Project Agreement.

G. Check if applicable

Article(s) _____ of the Master Agreement for Cooperative Projects between the State of New Hampshire and the University System of New Hampshire dated November 13, 2002 is/are hereby amended to read:

H. State has chosen **not to take** possession of equipment purchased under this Project Agreement.

State has chosen **to take** possession of equipment purchased under this Project Agreement and will issue instructions for the disposition of such equipment within 90 days of the Project Agreement's end-date. Any expenses incurred by Campus in carrying out State's requested disposition will be fully reimbursed by State.

This Project Agreement and the Master Agreement constitute the entire agreement between State and Campus regarding this Cooperative Project, and supersede and replace any previously existing arrangements, oral or written; all changes herein must be made by written amendment and executed for the parties by their authorized officials.

IN WITNESS WHEREOF, the University System of New Hampshire, acting through the **University of New Hampshire** and the State of New Hampshire, **Dept of Agriculture, Markets & Food** have executed this Project Agreement.

By An Authorized Official of:

University of New Hampshire

Name: Karen M. Jensen

Title: Director, Pre-Award

Signature and Date:

Karen Jensen

Digitally signed by Karen Jensen
Date: 2024.01.17 10:10:24 -0500

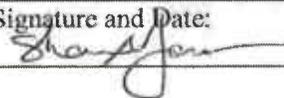
By An Authorized Official of:

NH Dept of Agriculture, Markets & Food

Name: Shawn N. Jasper

Title: Commissioner

Signature and Date:

 1/17/24

By An Authorized Official of: the New Hampshire Office of the Attorney General

Name:

Title:

Signature and Date:

Sheri Phillips

Digitally signed by Sheri Phillips
Date: 2024.01.16 11:21:19 -0500

By An Authorized Official of: the New Hampshire Governor & Executive Council

Name:

Title:

Signature and Date:

EXHIBIT A

A. Project Title: Advancing the Evaluation and Release of Locally Bred Strawberry Varieties for New England Production

B. Project Period: April 1, 2023 - September 29, 2025

C. Objectives:

Objective 1: Increase stocks of F1 seeds and clonally propagated hybrid plants during Year 1 in preparation for field evaluations of fruiting and ornamental selections in Year 2.

At the UNH NHAES Macfarlane greenhouses: For evaluation of seed-propagated varieties, crosses between six pairs of previously selected inbred parents will be performed to increase stocks of six varieties of F1 seed as needed for varietal evaluation. The resultant seed (the botanical “achenes” of strawberry) will be harvested, dried, cleaned, and stored in labeled seed packets in a dedicated seed refrigerator. For evaluation of clonally propagated varieties, mother plants of selected advanced hybrids will be environmentally stimulated to develop runners and produce new crowns to increase the stock of clonal hybrid plants up to 100 plants of each of ten fruiting varieties and 50 plants of each of ten ornamental varieties. The runners and crown divisions will be harvested and rooted in plug trays containing PRO-Mix HP-CC or PRO-MIX MP Organik under lights and mist in the greenhouse in preparation for setting out at the Woodman Farm.

For evaluation of seeds, late in Year 1, 200 F1 seeds from each of the six families will be sown in potting media (PRO-Mix HP-CC or PRO-MIX MP Organik), vernalized for a minimum of one week consisting of refrigeration at 35-40oF, and then grown under controlled 16-hour light cycle at 75oF with 85% relative humidity and 8 hours of dark cycle at 65oF and 95% relative humidity in a growth chamber. Once the seedlings have germinated and have developed true leaves, they will also be transplanted to plug trays, and grown for setting in at the Woodman Horticultural Farm at the beginning of Year 2.

During year 1, at the Woodman Farm, the field will be improved with cover crop and UNH compost to increase organic matter and build soil structure.

Objective 2: Evaluate F1 seed and clonal hybrid fruiting and ornamental selections in field replicated plots during Years 2 and 3.

Early in Year 2, at the Woodman Farm, rows will be prepared with drip irrigation and plastic row covers. The F1 seed varieties and clonal fruiting and ornamental varieties will be subjected to randomized replicated plot evaluations, where plots of a minimum of twelve plants will serve as experimental units, and will include plots of familiar, existing cultivars to serve as comparators. The ornamental varieties will also serve as border plants and randomization will be confined within the borders of the field. The individual plants will be set in the double rows on a 16” equidistant spacing for subsequent phenotypic evaluation. Minimal intervention will be utilized for insect and pest management as the intention is to develop varieties well-suited for sustainable production in the Northern New England region.

During Years 2 and 3 growing seasons, the individual plants will be phenotyped for the traits of interest, including vigor, flowering attributes, fruit quality and yield, and pest and disease resistance using standardized strawberry phenotyping methods (Mathey et al., 2013). The plant vigor will be assessed by plant diameter (inches) and number of runners on a scale of 0 to 9 (none to greater than 20 runners). The flowering cycles will be determined by documenting on a weekly basis the number of flower trusses. The flowers will be photographed with a ruler scale (cm/inches) to record the size

of the flower and calyx, presence/absence of anthers (the male pollen producing structure), the number of petals and the color hue and the pattern of the flower petals and anthers. The fruit will be harvested once to three times per week as the production seasonality dictates. Good fruit (undamaged) and bad fruit (damaged) will be harvested separately, counted, and weighed (grams) using a bench-top scale. The fruit yield will consist of total plant yield (grams) for the productive season. The fruit quality will be assessed in terms of % pollination, fruit shape on a scale of 1 to 9 (very mis-shaped to very attractive), achene color and position, calyx reflexed or enclosing the fruit. Fruit flavor will be subjectively evaluated on a scale of 1 to 9 (horrible to delicious). Five fruits will be weighed, photographed with a ruler (cm and inches), frozen and later assayed for soluble solids and acidity using PAL Digital Hand-held "Pocket" Refractometer PAL-1 and PAL-Easy ACID4 Kit (ATAGO USA). Pest and disease resistance will be observed on the fruit and on the plants and scored on a scale of 1 (very symptomatic) to 9 (no symptoms). The health of the flower and anthers will include observations for presence of tarnish plant bugs, thrips and/or aphids. Fruit health will be scored for damage by insects and diseases. Plant health will be scored for crown rot and for leaf pest and diseases symptoms including spider mites, aphids, powdery mildew, leaf spot, leaf scorch, leaf hopper, angular leaf spot and leaf blight.

Objective 3: Attract grower interest and initiate grower evaluations of advanced selections. Growers and nursery operators will be invited to view the selections and provide input and feedback during the on-site evaluations. Candidate advanced selections will be compared using plot means subjected to ANOVA and methods used by other researchers and breeders (Kennedy et al., 2013; Lewers et al., 2017; Whitaker et al., 2015). Based on performance a final selection set will be chosen in cooperation with the growers for evaluation at grower sites and/or proposed to regional plant producers for immediate commercialization.

Project Beneficiaries This project will impact 50 growers. The project will also directly benefit socially disadvantaged farmers and beginning farmers as defined in the RFA.

Statement of Enhancing Specialty Crops: I confirm that this project enhances the competitiveness of specialty crops in accordance with and defined by the Farm Bill.

External Project Support: Our breeding program has been endorsed by various organizations including Driscoll's (commercial fruit breeder, Watsonville California), Fedco Seeds (seed company, Clinton Maine, High Mowing Seeds (organic seed producer, Wolcott, Vermont), and University of Maine Cooperative Extension.

Expected Measurable Outcomes: This project will address one of the listed Outcomes.

Outcome 4: Enhance the competitiveness of specialty crops through greater capacity of sustainable practices of specialty crop production resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources

Outcome Indicators:

Outcome 4, Indicator 1: Number of plant/seed releases (i.e., cultivars, drought-tolerant plants, organic, enhanced nutritional composition etc.): 6 cultivars

Data Collection to Report on Outcomes and Indicators: Field phenotypic data will be logged using Field Book (Rife and Poland, 2018) whose developers have committed to responding to the needs of the Rosaceae community. A Breeding Information Management System (BIMS) in the Genomic Database for Rosaceae (GDR) (<https://www.rosaceae.org>) (Jung et al., 2019) developed in collaboration with RosBREED, has been adopted to assist in planning crosses and in making

selections. The BIMS program is structured to securely enter field, lab, and genetic data and includes options for analyzing and visualizing data. Field Book and BIMS database structures are now compatible. The data will be analyzed using a combination of Microsoft excel and BIMS.

- D. Scope of Work:** Here at the University of New Hampshire (UNH), the site of our recently established strawberry breeding program, we have developed strawberry hybrids bearing delicious attractive fruit and ornamentals with a palette of flower petal colors ranging from light coral and lavender to dark pelargonidin red and scarlet. We will evaluate advanced selections of these fruit bearing and ornamental strawberry hybrids including seed-propagated and clonal hybrids in replicated field plots with respect to fruit flavor and size, total yield, hardiness and vigor, pest and disease resistance, flowering attributes, and flower color (ornamentals). Throughout the project, we will showcase UNH field plots employed for strawberry variety development by means of open houses, field days, and grower meetings for the purposes of public outreach and cultivar commercialization.

Project Purpose: Food security and climate change are major priorities globally, nationally, and regionally for New Hampshire. These priorities drive the need for local food production and for regional breeding of locally adapted crop varieties. Strawberries are a regionally important fruit. Although data for NH alone is not readily available, based on a nine-pound per capita consumption nationwide (ERS-USDA, 2012), the demand for strawberries in New England may be over 133 million pounds based on a population of 14.8 million, and in New Hampshire the demand maybe 12 million pounds based on a population of 1.36 million. Although strawberry is a regionally important fruit, there is an unmet need for varieties bred under local environmental conditions.

The primary focus of the proposed project is advancing the development of new, locally bred varieties with emphasis on fruit-producing varieties for sustainable low input agriculture, including but not limited to organic production. The proposed project also includes an ornamental strawberry breeding component for edible landscaping to meet the needs and changing priorities of the Northern New England region. The New Hampshire Agricultural Experiment Station (NHAES) facilities, specifically the Macfarlane greenhouses and the Woodman Horticultural Farm provide excellent settings to conduct this work. The goal of this proposal is to advance the breeding and release of new, locally bred strawberry varieties for crop production and for ornamental floriculture value for the New England region.

This project builds upon our previous accomplishments, which have been supported by Hatch funding from the NHAES and from a USDA-OREI award during the period of (September 2017 – December 2022). Specifically, we have developed strawberry hybrids bearing delicious attractive fruit and ornamentals with a palette of flower petal colors ranging from light coral and lavender to dark pelargonidin red and scarlet. We have established a multi-faceted strawberry breeding program, which has advanced to the point that superior selections are now ready for pre-commercial performance testing followed by commercial varietal release. The proposed project will support the release of new strawberry varieties suitable for sustainable agricultural practices in the region. The project aim is to evaluate short-day and day-neutral selections in field trials at the UNH Woodman Farm, as a final step toward varietal release of superior selections. The new, locally developed and adapted strawberry varieties are expected to increase the production of strawberries in New England, contributing to satisfying the demand for local strawberries and thus increasing access to local fresh fruit and improving food security.

E. Deliverables Schedule: 6 month and annual reports on project activity due in June and December of 2024 and 2025. Final printed and digital report due by December 10, 2025.

F. Budget and Invoicing Instructions: Campus will submit invoices to State on regular Campus invoice forms no more frequently than monthly and no less frequently than quarterly. Invoices will be based on actual project expenses incurred during the invoicing period, and shall show current and cumulative expenses by major cost categories as shown below. State will pay Campus within 30 days of receipt of each invoice. Campus will submit its final invoice not later than 60 days after the Project Period end date.

Budget Items	State Funding	Cost Sharing	Total
1. Salaries & Wages	\$ 62,741	0	\$ 62,741
2. Employee Fringe Benefits	\$ 4,852	0	\$ 4,852
3. Travel	\$ 730	0	\$ 730
4. Supplies & Services	\$ 5,390	0	\$ 5,390
5. Equipment	\$ 0	0	\$ 0
6. Facilities & Admin Costs	\$ 0	0	\$ 0
Subtotals	\$ 73,713	0	\$ 73,713
Total Project Costs:			\$ 73,713

EXHIBIT B

This Project Agreement is funded under a Grant/Contract/Cooperative Agreement to State from the Federal sponsor specified in Project Agreement article F. All applicable requirements, regulations, provisions, terms and conditions of this Federal Grant/Contract/Cooperative Agreement are hereby adopted in full force and effect to the relationship between State and Campus, except that wherever such requirements, regulations, provisions and terms and conditions differ for INSTITUTIONS OF HIGHER EDUCATION, the appropriate requirements should be substituted (e.g., OMB Circulars A-21 and A-110, rather than OMB Circulars A-87 and A-102). References to Contractor or Recipient in the Federal language will be taken to mean Campus; references to the Government or Federal Awarding Agency will be taken to mean Government/Federal Awarding Agency or State or both, as appropriate.

Special Federal provisions are listed here: None or **Uniform Guidance issued by the Office of Management and Budget (OMB) in lieu of Circulars listed in paragraph above. .**