

New Hampshire
 Department of Agriculture,
 Markets & Food

Shawn N. Jasper, Commissioner

May 2, 2022

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

Dear Governor Sununu and Honorable Council,

REQUESTED ACTION

Authorize the New Hampshire Department of Agriculture, Markets & Food, Division of Pesticide to make a **retroactive** payment to the New Hampshire Fruit Growers Association VC #160056, Lebanon, NH, in the amount of \$4,975, for grafting as a potential permanent pest management tool for multiple pests. Effective upon Governor and Council approval. 100% Other Funds – Integrated Pest Management

Funds are available in account:

02-18-18-18300000-21820000-Integrated Pest Management

<u>ACCOUNT</u>	<u>FY 2022</u>	<u>TOTAL</u>
075-500590 Grants and Subsidies	\$4,975	\$4,975

EXPLANATION

Integrated Pest Management requires competence in three areas: prevention, monitoring and intervention. In the apple industry there is a myriad of insect pests that cause economic losses to growers if populations are left unmanaged. This project involves teaching the proper methods of grafting in commercial apple orchards throughout the state and provide guidance and evaluation of the success of the educational efforts to participating farms.

This item is retroactive because when this payment was made, the Department overlooked that there was a previous contract with this vendor that went to Governor and Council on March 23, 2022, item #67, for a Specialty Crop Block Grant in the amount of \$32,000, \$12,000 of which was for FY22.

Respectfully Submitted,



Shawn N. Jasper
 Commissioner

I

STATE OF NEW HAMPSHIRE

INTRA-DEPARTMENT COMMUNICATION

DATE:

April 6, 2022

FROM:

David J. Rousseau
Division of Pesticide Control

SUBJECT:

IPM Check – New Hampshire Fruit Growers Association

TO:

Brenda Courchaine

This is to request that a check in the amount of \$4,975, for the IPM project proposal, 2022 Apple Grafting IPM Project, be written against the following account:

Integrated Pest Management
21820000-075-500590 ✓

AGRFY22388

The check shall be made payable to:

NH Fruit Growers Association
c/o Steve Wood
98 Poverty Lane
Lebanon, NH 03766

PO 1085076
2182 500590
Ln 1

Existing Vendor Code – #160056

STATE TREASURER CHECK NO. _____

DATE ISSUED _____

A copy of the Grant Agreement is included with this memo.

Attachments: Grant Agreement

Subjective: Product Registration/IPM/NH Fruit Growers Association/Request for Check NH Fruit Growers 4 6 22

01800-BRC-2 248 484 - 11946802

Purchasing will not add this Remit to address

Matched 4/19/22

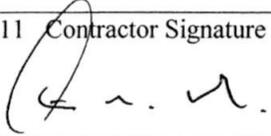
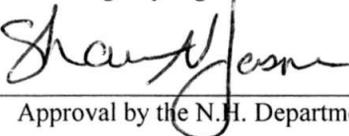
Notice: This agreement and all of its attachments shall become public upon submission to Governor and Executive Council for approval. Any information that is private, confidential or proprietary must be clearly identified to the agency and agreed to in writing prior to signing the contract.

AGREEMENT

The State of New Hampshire and the Contractor hereby mutually agree as follows:

GENERAL PROVISIONS

1. IDENTIFICATION.

1.1 State Agency Name Department of Agriculture, Markets & Food		1.2 State Agency Address 25 Capitol Street, PO Box 2042 Concord, NH 03302-2042	
1.3 Contractor Name New Hampshire Fruit Growers Association		1.4 Contractor Address 98 Poverty Lane Lebanon, NH 03766	
1.5 Contractor Phone Number 603-252-5696	1.6 Account Number 21820000	1.7 Completion Date June 31, 2022	1.8 Price Limitation \$4,975.00
1.9 Contracting Officer for State Agency David J. Rousseau		1.10 State Agency Telephone Number 603-271-3640	
1.11 Contractor Signature  Date: 3/04/22		1.12 Name and Title of Contractor Signatory Steve Wood, Research Chair	
1.13 State Agency Signature  Date: 4/5/22		1.14 Name and Title of State Agency Signatory Shawn N. Jasper, Commissioner	
1.15 Approval by the N.H. Department of Administration, Division of Personnel (if applicable) By: _____ Director, On: _____			
1.16 Approval by the Attorney General (Form, Substance and Execution) (if applicable) By: _____ On: _____			
1.17 Approval by the Governor and Executive Council (if applicable) G&C Item number: _____ G&C Meeting Date: _____			

2. SERVICES TO BE PERFORMED. The State of New Hampshire, acting through the agency identified in block 1.1 ("State"), engages contractor identified in block 1.3 ("Contractor") to perform, and the Contractor shall perform, the work or sale of goods, or both, identified and more particularly described in the attached EXHIBIT B which is incorporated herein by reference ("Services").

3. EFFECTIVE DATE/COMPLETION OF SERVICES.

3.1 Notwithstanding any provision of this Agreement to the contrary, and subject to the approval of the Governor and Executive Council of the State of New Hampshire, if applicable, this Agreement, and all obligations of the parties hereunder, shall become effective on the date the Governor and Executive Council approve this Agreement as indicated in block 1.17, unless no such approval is required, in which case the Agreement shall become effective on the date the Agreement is signed by the State Agency as shown in block 1.13 ("Effective Date").

3.2 If the Contractor commences the Services prior to the Effective Date, all Services performed by the Contractor prior to the Effective Date shall be performed at the sole risk of the Contractor, and in the event that this Agreement does not become effective, the State shall have no liability to the Contractor, including without limitation, any obligation to pay the Contractor for any costs incurred or Services performed. Contractor must complete all Services by the Completion Date specified in block 1.7.

4. CONDITIONAL NATURE OF AGREEMENT.

Notwithstanding any provision of this Agreement to the contrary, all obligations of the State hereunder, including, without limitation, the continuance of payments hereunder, are contingent upon the availability and continued appropriation of funds affected by any state or federal legislative or executive action that reduces, eliminates or otherwise modifies the appropriation or availability of funding for this Agreement and the Scope for Services provided in EXHIBIT B, in whole or in part. In no event shall the State be liable for any payments hereunder in excess of such available appropriated funds. In the event of a reduction or termination of appropriated funds, the State shall have the right to withhold payment until such funds become available, if ever, and shall have the right to reduce or terminate the Services under this Agreement immediately upon giving the Contractor notice of such reduction or termination. The State shall not be required to transfer funds from any other account or source to the Account identified in block 1.6 in the event funds in that Account are reduced or unavailable.

5. CONTRACT PRICE/PRICE LIMITATION/PAYMENT.

5.1 The contract price, method of payment, and terms of payment are identified and more particularly described in EXHIBIT C which is incorporated herein by reference.

5.2 The payment by the State of the contract price shall be the only and the complete reimbursement to the Contractor for all expenses, of whatever nature incurred by the Contractor in the performance hereof, and shall be the only and the complete

compensation to the Contractor for the Services. The State shall have no liability to the Contractor other than the contract price.

5.3 The State reserves the right to offset from any amounts otherwise payable to the Contractor under this Agreement those liquidated amounts required or permitted by N.H. RSA 80:7 through RSA 80:7-c or any other provision of law.

5.4 Notwithstanding any provision in this Agreement to the contrary, and notwithstanding unexpected circumstances, in no event shall the total of all payments authorized, or actually made hereunder, exceed the Price Limitation set forth in block 1.8.

6. COMPLIANCE BY CONTRACTOR WITH LAWS AND REGULATIONS/ EQUAL EMPLOYMENT OPPORTUNITY.

6.1 In connection with the performance of the Services, the Contractor shall comply with all applicable statutes, laws, regulations, and orders of federal, state, county or municipal authorities which impose any obligation or duty upon the Contractor, including, but not limited to, civil rights and equal employment opportunity laws. In addition, if this Agreement is funded in any part by monies of the United States, the Contractor shall comply with all federal executive orders, rules, regulations and statutes, and with any rules, regulations and guidelines as the State or the United States issue to implement these regulations. The Contractor shall also comply with all applicable intellectual property laws.

6.2 During the term of this Agreement, the Contractor shall not discriminate against employees or applicants for employment because of race, color, religion, creed, age, sex, handicap, sexual orientation, or national origin and will take affirmative action to prevent such discrimination.

6.3. The Contractor agrees to permit the State or United States access to any of the Contractor's books, records and accounts for the purpose of ascertaining compliance with all rules, regulations and orders, and the covenants, terms and conditions of this Agreement.

7. PERSONNEL.

7.1 The Contractor shall at its own expense provide all personnel necessary to perform the Services. The Contractor warrants that all personnel engaged in the Services shall be qualified to perform the Services, and shall be properly licensed and otherwise authorized to do so under all applicable laws.

7.2 Unless otherwise authorized in writing, during the term of this Agreement, and for a period of six (6) months after the Completion Date in block 1.7, the Contractor shall not hire, and shall not permit any subcontractor or other person, firm or corporation with which it is engaged in a combined effort to perform the Services to hire, any person who is a State employee or official, who is materially involved in the procurement, administration or performance of this Agreement. This provision shall survive termination of this Agreement.

7.3 The Contracting Officer specified in block 1.9, or his or her successor, shall be the State's representative. In the event of any dispute concerning the interpretation of this Agreement, the Contracting Officer's decision shall be final for the State.

8. EVENT OF DEFAULT/REMEDIES.

8.1 Any one or more of the following acts or omissions of the Contractor shall constitute an event of default hereunder ("Event of Default"):

8.1.1 failure to perform the Services satisfactorily or on schedule;

8.1.2 failure to submit any report required hereunder; and/or

8.1.3 failure to perform any other covenant, term or condition of this Agreement.

8.2 Upon the occurrence of any Event of Default, the State may take any one, or more, or all, of the following actions:

8.2.1 give the Contractor a written notice specifying the Event of Default and requiring it to be remedied within, in the absence of a greater or lesser specification of time, thirty (30) days from the date of the notice; and if the Event of Default is not timely cured, terminate this Agreement, effective two (2) days after giving the Contractor notice of termination;

8.2.2 give the Contractor a written notice specifying the Event of Default and suspending all payments to be made under this Agreement and ordering that the portion of the contract price which would otherwise accrue to the Contractor during the period from the date of such notice until such time as the State determines that the Contractor has cured the Event of Default shall never be paid to the Contractor;

8.2.3 give the Contractor a written notice specifying the Event of Default and set off against any other obligations the State may owe to the Contractor any damages the State suffers by reason of any Event of Default; and/or

8.2.4 give the Contractor a written notice specifying the Event of Default, treat the Agreement as breached, terminate the Agreement and pursue any of its remedies at law or in equity, or both.

8.3. No failure by the State to enforce any provisions hereof after any Event of Default shall be deemed a waiver of its rights with regard to that Event of Default, or any subsequent Event of Default. No express failure to enforce any Event of Default shall be deemed a waiver of the right of the State to enforce each and all of the provisions hereof upon any further or other Event of Default on the part of the Contractor.

9. TERMINATION.

9.1 Notwithstanding paragraph 8, the State may, at its sole discretion, terminate the Agreement for any reason, in whole or in part, by thirty (30) days written notice to the Contractor that the State is exercising its option to terminate the Agreement.

9.2 In the event of an early termination of this Agreement for any reason other than the completion of the Services, the Contractor shall, at the State's discretion, deliver to the Contracting Officer, not later than fifteen (15) days after the date of termination, a report ("Termination Report") describing in detail all Services performed, and the contract price earned, to and including the date of termination. The form, subject matter, content, and number of copies of the Termination Report shall be identical to those of any Final Report described in the attached EXHIBIT B. In addition, at the State's discretion, the Contractor shall, within 15 days of notice of early termination, develop and

submit to the State a Transition Plan for services under the Agreement.

10. DATA/ACCESS/CONFIDENTIALITY/PRESERVATION.

10.1 As used in this Agreement, the word "data" shall mean all information and things developed or obtained during the performance of, or acquired or developed by reason of, this Agreement, including, but not limited to, all studies, reports, files, formulae, surveys, maps, charts, sound recordings, video recordings, pictorial reproductions, drawings, analyses, graphic representations, computer programs, computer printouts, notes, letters, memoranda, papers, and documents, all whether finished or unfinished.

10.2 All data and any property which has been received from the State or purchased with funds provided for that purpose under this Agreement, shall be the property of the State, and shall be returned to the State upon demand or upon termination of this Agreement for any reason.

10.3 Confidentiality of data shall be governed by N.H. RSA chapter 91-A or other existing law. Disclosure of data requires prior written approval of the State.

11. CONTRACTOR'S RELATION TO THE STATE. In the performance of this Agreement the Contractor is in all respects an independent contractor, and is neither an agent nor an employee of the State. Neither the Contractor nor any of its officers, employees, agents or members shall have authority to bind the State or receive any benefits, workers' compensation or other emoluments provided by the State to its employees.

12. ASSIGNMENT/DELEGATION/SUBCONTRACTS.

12.1 The Contractor shall not assign, or otherwise transfer any interest in this Agreement without the prior written notice, which shall be provided to the State at least fifteen (15) days prior to the assignment, and a written consent of the State. For purposes of this paragraph, a Change of Control shall constitute assignment. "Change of Control" means (a) merger, consolidation, or a transaction or series of related transactions in which a third party, together with its affiliates, becomes the direct or indirect owner of fifty percent (50%) or more of the voting shares or similar equity interests, or combined voting power of the Contractor, or (b) the sale of all or substantially all of the assets of the Contractor.

12.2 None of the Services shall be subcontracted by the Contractor without prior written notice and consent of the State. The State is entitled to copies of all subcontracts and assignment agreements and shall not be bound by any provisions contained in a subcontract or an assignment agreement to which it is not a party.

13. INDEMNIFICATION. Unless otherwise exempted by law, the Contractor shall indemnify and hold harmless the State, its officers and employees, from and against any and all claims, liabilities and costs for any personal injury or property damages, patent or copyright infringement, or other claims asserted against the State, its officers or employees, which arise out of (or which may be claimed to arise out of) the acts or omission of the

Contractor, or subcontractors, including but not limited to the negligence, reckless or intentional conduct. The State shall not be liable for any costs incurred by the Contractor arising under this paragraph 13. Notwithstanding the foregoing, nothing herein contained shall be deemed to constitute a waiver of the sovereign immunity of the State, which immunity is hereby reserved to the State. This covenant in paragraph 13 shall survive the termination of this Agreement.

14. INSURANCE.

14.1 The Contractor shall, at its sole expense, obtain and continuously maintain in force, and shall require any subcontractor or assignee to obtain and maintain in force, the following insurance:

14.1.1 commercial general liability insurance against all claims of bodily injury, death or property damage, in amounts of not less than \$1,000,000 per occurrence and \$2,000,000 aggregate or excess; and

14.1.2 special cause of loss coverage form covering all property subject to subparagraph 10.2 herein, in an amount not less than 80% of the whole replacement value of the property.

14.2 The policies described in subparagraph 14.1 herein shall be on policy forms and endorsements approved for use in the State of New Hampshire by the N.H. Department of Insurance, and issued by insurers licensed in the State of New Hampshire.

14.3 The Contractor shall furnish to the Contracting Officer identified in block 1.9, or his or her successor, a certificate(s) of insurance for all insurance required under this Agreement. Contractor shall also furnish to the Contracting Officer identified in block 1.9, or his or her successor, certificate(s) of insurance for all renewal(s) of insurance required under this Agreement no later than ten (10) days prior to the expiration date of each insurance policy. The certificate(s) of insurance and any renewals thereof shall be attached and are incorporated herein by reference.

15. WORKERS' COMPENSATION.

15.1 By signing this agreement, the Contractor agrees, certifies and warrants that the Contractor is in compliance with or exempt from, the requirements of N.H. RSA chapter 281-A (*Workers' Compensation*).

15.2 To the extent the Contractor is subject to the requirements of N.H. RSA chapter 281-A, Contractor shall maintain, and require any subcontractor or assignee to secure and maintain, payment of Workers' Compensation in connection with activities which the person proposes to undertake pursuant to this Agreement. The Contractor shall furnish the Contracting Officer identified in block 1.9, or his or her successor, ~~proof of~~ Workers' Compensation in the manner described in N.H. RSA chapter 281-A and any applicable renewal(s) thereof, which shall be attached and are incorporated herein by reference. The State shall not be responsible for payment of any Workers' Compensation premiums or for any other claim or benefit for Contractor, or any subcontractor or employee of Contractor, which might arise under applicable State of New Hampshire Workers' Compensation laws in connection with the performance of the Services under this Agreement.

16. NOTICE. Any notice by a party hereto to the other party shall be deemed to have been duly delivered or given at the time of mailing by certified mail, postage prepaid, in a United States Post Office addressed to the parties at the addresses given in blocks 1.2 and 1.4, herein.

17. AMENDMENT. This Agreement may be amended, waived or discharged only by an instrument in writing signed by the parties hereto and only after approval of such amendment, waiver or discharge by the Governor and Executive Council of the State of New Hampshire unless no such approval is required under the circumstances pursuant to State law, rule or policy.

18. CHOICE OF LAW AND FORUM. This Agreement shall be governed, interpreted and construed in accordance with the laws of the State of New Hampshire, and is binding upon and inures to the benefit of the parties and their respective successors and assigns. The wording used in this Agreement is the wording chosen by the parties to express their mutual intent, and no rule of construction shall be applied against or in favor of any party. Any actions arising out of this Agreement shall be brought and maintained in New Hampshire Superior Court which shall have exclusive jurisdiction thereof.

19. CONFLICTING TERMS. In the event of a conflict between the terms of this P-37 form (as modified in EXHIBIT A) and/or attachments and amendment thereof, the terms of the P-37 (as modified in EXHIBIT A) shall control.

20. THIRD PARTIES. The parties hereto do not intend to benefit any third parties and this Agreement shall not be construed to confer any such benefit.

21. HEADINGS. The headings throughout the Agreement are for reference purposes only, and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Agreement.

22. SPECIAL PROVISIONS. Additional or modifying provisions set forth in the attached EXHIBIT A are incorporated herein by reference.

23. SEVERABILITY. In the event any of the provisions of this Agreement are held by a court of competent jurisdiction to be contrary to any state or federal law, the remaining provisions of this Agreement will remain in full force and ~~effect~~.

24. ENTIRE AGREEMENT. This Agreement, which may be executed in a number of counterparts, each of which shall be deemed an original, constitutes the entire agreement and understanding between the parties, and supersedes all prior agreements and understandings with respect to the subject matter hereof.

Welcome Michelle | Thibeault



User ID: Michelle22

Last Login: 04/28/2022 08:29 AM

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Business Details

Business Name:	THE NEW HAMPSHIRE FRUIT GROWERS ASSOCIATION	Business ID:	629399
Business Type:	Domestic Nonprofit Corporation	Business Status:	Good Standing
Business Creation Date:	04/19/2010	Name in State of Incorporation:	Not Available
Date of Formation in Jurisdiction:	04/19/2010		
Principal Office Address:	Kitt Plummer - Hazelton Orchard, 192 Pillsbury St, Londonderry, NH, 03053, USA	Mailing Address:	Kitt Plummer - Hazelton Orchard, 192 Pillsbury St, Londonderry, NH, 03053, USA
Citizenship / State of Incorporation:	Domestic/New Hampshire	Last Nonprofit Report Year:	2020
		Next Report Year:	2025
Duration:	Perpetual		
Business Email:	NONE	Phone #:	NONE
Notification Email:	NONE	Fiscal Year End Date:	NONE

Principal Purpose

S.No	NAICS Code	NAICS Subcode
1	OTHER / promotion of interests of fruit growers of NH	

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Principals Information

Name/Title	Business Address
Madison Hardy / Vice President	c/o Brookdale Farm, PO Box 389, Hollis, NH, 03049, USA
Paul Franklin / Treasurer	141 River Rd, Plainfield, NH, 03781, USA
Samantha Fay / Secretary	c/o Sunny Crest, 59 High Range Rd, Londonderry, NH, 03053, USA
Brett Mckenzie / Director	71 NE Pond Rd, Milton, NH, 03851, USA
Tim Bassett / Director	656 Gould Hill Rd, Hopkinton, NH, 03229, USA

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Registered Agent Information

Name:	Not Available
Registered Office Address:	Not Available
Registered Mailing Address:	Not Available

Trade Name Information

No Trade Name(s) associated to this business.

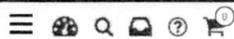
Trade Name Owned By

No Records to View.

Trademark Information

Trademark Number	Trademark Name	Business Address	Mailing Address
No records to view.			

Welcome Michelle I Thibeault!



User ID: Michelle22

Last Login: 04/28/2022 08:29 AM

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Certificate of Authority

I, Paul Franklin, Treasurer of the NH Fruit Growers Assoc. (NHFGA)
(name) (title) (business/organization)

do hereby certify that:

1. Steve Wood is the duly elected Research Chairman
(name) (title);
2. the NHFGA (business/organization) has agreed to accept funds and to enter into a contract with the State of New Hampshire, Department of Agriculture, Markets & Food;
3. the NHFGA (business/organization) further authorizes the Research Chairman (title) to execute any documents which may be necessary for this contract;
4. this authorization has not been revoked, annulled, or amended in any manner whatsoever, and remains in full force and effect as of the date hereof; and
5. the following person has been appointed to and now occupies the office indicated in (3) above:

Steve Wood
(name, title)

IN WITNESS WHEREOF, I have hereunto set my hand as the Treasurer of the
(Title)
NHFGA this 4 day of March, 2022
(Business/organization)

Paul Franklin
Printed Name: Paul Franklin

State of NH
County of Sullivan

On this 4 day of March, 2022, before me Michelle Marsh the undersigned officer, personally appeared Paul Franklin who acknowledged him/herself to be the Treasurer of the NH Fruit Growers Assoc. being authorized so to do, executed the forgoing instrument for the purpose therein contained.

In witness whereof, I have set my hand and official seal.

Michelle Marsh
Justice of the Peace/Notary Public



Commission Expiration Date: 8-2-2022

(Seal)

SW
3/04/22

New Hampshire Department of Agriculture, Markets and Food

IPM GRANT APPLICATION

The following is the official application for Integrated Pest Management Program grant funds. Proposals must be typed and submissions made on this form with additional attachments if necessary. Deliver four (4) copies to the Division of Pesticide Control. Provide a complete list of all persons involved in the proposed project; include the names, addresses and phone numbers of the individuals.

The New Hampshire IPM Grant Fund is limited. Rewards are considered to those whose proposals most represent the spirit of the IPM Program and whose applications are received the soonest. Applications should be submitted to the Division of Pesticide Control. Be advised that complete processing time may exceed 90 days. Proposals will be reviewed twice annually. Those persons whose projects are selected to receive grant money will be required to complete a grant agreement before any distribution of funds. The grant agreement must include a complete, detailed, and itemized budget.

Project Title: 2022 Apple Grafting IPM Project

Applicant's Organization: New Hampshire Fruit Growers Association (NHFGA)

Contact Person: Steve Wood, Research Chair

Signature:

Mailing Address: 98 Poverty Lane, NH 03766
City: Lebanon **State:** NH **Zip:** 03766
Telephone: day: 603-252-5696
Email: swood@farnumhillcidiers.com

Starting and Ending Dates: January 15, 2022 to June 31, 2022
Grafting Workshops (2-3): January 2022 through May 2022
Evaluation: June 2022 through August 2022
Final Report: October 2022

Grant Amount Requested: \$4975.00



I. **Itemized Budget**

Funding can only be used for items detailed in your budget. Requests for the purchase of non-consumable equipment that may serve a broader purpose than the IPM project will be rejected. Itemized budget must be specific.

Expense Account	TOTAL
Professional Commercial Grafting Experts – Teaching workshops	\$4200
Supplies	\$275
UNH Extension support, post-workshop	\$500
Total	\$4,975

Guest Educators: \$4200

A key component of this project involves grafting as a potential permanent pest management tool for multiple pests. Raul and Mary Godizez are highly skilled professional grafters servicing the commercial fruit industry along the east coast. They are also able educators, who regularly teach grafting to other growers and other potential grafters. Funds will be used to bring these expert commercial grafters to NH from Virginia as guest educators, to teach NH growers how to implement grafting techniques on their individual farms. The funds will be used for professional fees, travel, lodging, local transportation, and sustenance. (Projected at \$4200).

Support: \$500, to offer education, support, monitoring and/or documentation of project progress throughout the 2022 season.

Supplies: \$275, for the purchase of project supplies directly related to the implementation of this project, including educational grafting supplies such as grafting tools and materials, and other educational resources.

II. **Project Description** (3 lines or less, to be used for publicity purposes):

A team comprised of professional grafters, New Hampshire orchardists, UNH Extension field specialists, and the UMass Extension Entomologist will work with interested commercial apple orchards to teach proper methods of grafting in commercial apple orchards throughout the state. Research shows that the cultivars to be grafted are known to be highly attractive to two major insect pest of apples in New Hampshire, those being plum curculio (PC) and apple maggot fly (AMF). Up to three workshops teaching proper grafting techniques, supplemented by in-person site visits from grafting experts and Extension personnel will provide additional education, guidance and evaluation of the success of the educational efforts to participating farms.

III. **Project Objectives** (be sure to include how this project serves the concepts of IPM):

- Educate growers about the efficacy of grafting specific apple cultivars onto a prescribed number of existing perimeter-row trees as an effective component of their IPM programs. These selected cultivars serve as effective “trap cops” that can hold PC and AMF (two highly

damaging insect pests) on grafted trees for an extended time, where they can be killed prior to invading the rest of the orchard, rather than dispersing as normal throughout the entire orchard block. In his paper 2020 paper *Toward the Integration of an Attract-and-Kill Approach with Entomopathogenic Nematodes to Control Multiple Life Stages of Plum Curculio*, Dr. Jaime Piñero explains that approaches such as the one we are proposing allow growers to restrict post-petal fall treatments to a few perimeter-row trees, rather than threatening the entire perimeter row or the entire orchard, which can result in reductions of insecticide treatment by more than 90%.

- Teach apple growers how and when to graft for best results, as well as which varieties are most effective at attracting PC and AMF. This will be accomplished through up to three workshops, coordinated by NHFGA and UNH Extension, featuring expert grafters who will teach the most effective techniques for successfully grafting attractive cultivars onto existing trees in NH orchards.
- Partner with interested commercial orchards in New Hampshire to implement multi-cultivar grafting practices in at least one apple orchard block per farm in 2022. These orchard blocks will require two (2) years to begin producing fruit, and will serve as excellent monitoring sites for growers relative to the pest pressure from PC and AMF for years to come. Scion wood, being the actual grafting material from apple cultivars shown to be attractive to PC and AMF, will be sourced and provided to participating farms utilizing funding made available through this grant.

IV. Economic and Environmental Impact

Integrated Pest Management (IPM) requires competence in three areas: prevention, monitoring, and intervention. IPM includes a range of practical strategies that suit local conditions. In the apple agroecosystem, there is a myriad of insect pests that cause economic losses to growers if populations are left unmanaged. The most important pests associated with apple in eastern North America are plum curculio, apple maggot fly, and, depending on the year, internal Lepidoptera (moth species such as codling moth, Oriental fruit moth, and leafrollers that attack the fruit). The conventional approach to controlling pests such as plum curculio (PC) involves three full-block sprays of insecticide starting at petal fall.

PC is generally considered the single most destructive insect pest in orchards. The most recognizable type of wound caused by PC is the half-moon scar, produced by ovipositing females. Prior to depositing her egg, the female first uses her mouthparts to cut a small crescent-shaped flap in the fruit skin; then, she turns around to deposit an egg. When eggs hatch, larvae tunnel into fruitlets and begin to feed. Larvae complete four instars inside the fruit in about 16 days. PC-infested fruitlets generally drop to the ground prematurely. When an egg is not viable, or a female cuts into a fruit but does not deposit an egg, the scar remains and can be seen at harvest, often making the fruit unmarketable (Source: UMass Fact Sheet #AI-007a).

Based on annual apple crop evaluation data, UNH Extension reports that conventionally managed orchards typically see 0-2% injury due to PC scaring. Orchards with a more relaxed approach or those with particularly high pest pressure will see closer to 4-5% injury. Anything above 10% would be

considered a failed control. In a recent example, an orchardist looking to eliminate organophosphates from his spray program switched to a new material but did not use the appropriate rate. UNH Extension observed PC scars on more than 10% of the fruit in a heavily wooded block.

It is important to understand that the grafting component of this educational effort is one piece of the larger puzzle concerning how to effectively and more sustainably manage PC and AMF in New England apple orchards.

For PC, effective monitoring and management systems that make use of attractive lures have been developed. Extensive field-scale research that aimed at screening compounds for attractiveness to PC led to the identification of a synergistic two-component lure (Piñero et al. 2001, Piñero and Prokopy 2003, 2006). This dual lure, comprised of the plant volatile benzaldehyde (BEN) in association with grandisoic acid (GA), the synthetic PC aggregation pheromone, was used to develop an effective monitoring system for PC involving odor-baited trap trees (Prokopy et al. 2003, 2004, Piñero et al. 2011). This novel approach calls for baiting perimeter-row trap trees with GA plus BEN as a practical approach to determining need and timing of insecticide applications against overwintered PCs. Results from multi-state research (including New Hampshire) showed that the amount of insecticide used in trap tree plots using this monitoring system was reduced at least by 43% compared with plots managed with the conventional approach.

More recently, odor-baited trap trees were evaluated for direct PC control (Leskey et al. 2008, Piñero and Leskey 2019). This new approach calls for baiting the branches of several perimeter-row trees, which results in aggregations of adult PCs on those trap trees, and then confining insecticide applications to those trees only. Overall, the application of insecticides to trap trees only resulted in the same level of PC control achieved with perimeter-row sprays. The trap tree management strategy resulted in a reduction of 93% total trees being treated with insecticide compared with standard full-block sprays. While very effective, this approach can be expensive for growers to implement, and the supply of the lures is somewhat unstable, raising questions about the long-term sustainability of this approach.

Piñero and collaborators from NH and ME are currently evaluating the ability of selected perimeter-row apple trees grafted with multiple cultivars to attract plum curculio and other key pests to those grafted trees. Scion wood of five apple cultivars were selected based on grower input, indicating susceptibility of particular cultivars to PC and AMF injury under field conditions. Research proposed has strong grower support. Research results thus far indicate that grafted trees can serve as effective 'trap crops'. If growers could use grafted trees for improved monitoring and management of key pests then pesticide use could be reduced.

In the context of biological control, the UMass / UNH team developed a strategy involving soil applications of entomopathogenic nematodes as a way to reduce populations of PC larvae. Results from multi-year, multi-state research show that EPNs can reduce plum curculio emergence by 85%.

Plum trees are a natural host and very attractive to PC adults. Some growers in NH, MA and ME have already adopted the practice of planting one or two plum trees on either side of trap trees to increase attractiveness as much as possible.

A multi-pronged IPM approach is needed to provide growers with the tools that they need to manage the most damaging pest, PC. We propose the implementation of an Extension IPM project aimed at

increasing the adoption of IPM by apple growers in New Hampshire by providing them with the technical assistance and all the materials they would need to demonstrate that the IPM tools develop work. Grafting education is proposed as the first step in this project, as grower education must precede implementation. Grafting can commence in the spring of 2022; however, grafted scion wood will require two growing seasons before fruit production begins in earnest. Fruit from selected cultivars being the main attractant to PC in this system, the sooner growers get started grafting trees over, the sooner they will be able to take advantage of this system. Due to funding limitations, this project is not able to promote and demonstrate the multiple research-based IPM tools that have been developed for Pc and AMF. We hope to pursue to promote and demonstrate these additional approaches through a separate proposal.

Beyond dollar savings, reduced insecticide spraying can help protect populations of beneficial insects: predators, parasitoids, and pollinators. Fewer sprays also reduces farm worker exposure to pesticides, in particular those involved with spraying, pesticide mixing & loading. Reduced spraying also reduces the opportunity for drift and the risk of environmental contamination.

V. How will your goals be accomplished? (i.e., experimental design)

- Our team of Extension specialists, expert grafters and supporting growers will work with ten (10) of more growers/farmers in New Hampshire to teach grafting principles, the potential positive impacts of grafting for IPM strategies, and will consult with grower throughout the season in regards to the progress of the project. Up to three workshops focused on grafting techniques and benefits of grafting as part of an IPM program in apples will be offered. These will occur from February through May, 2022. Dr. Jaime Piñero is a partner on this project and will serve as a resource to educate growers on the research supporting these practices.
- Regular reports providing updates about the project will be published throughout the growing season and made available through UNH Extension marketing channels, and the Weekly Market Bulletin.
- At the end of the season, growers/farmers in the program will complete a survey in order to measure impact. Acres of orchard being entered into the program will be recorded. This data will allow our team to monitor project developments and collect economic and environmental impacts going forward under the larger plan.
- Press releases will be written highlighting the educational efforts accomplished in 2022, made possible through funding from the NHDAM&F IPM Fund, along with highlights of the partnerships between NH apple growers, NHDAM&F, UMass Extension and UNH Extension.

VI. Sampling Methods (if applicable):

- Our team of Extension specialists, expert grafters and supporting growers will work with interested growers/farmers in New Hampshire to teach grafting principles, the potential positive impacts of grafting for IPM strategies, and will consult with these growers throughout the season in regards to the progress of the project.

- Grafted trees will be monitored by partnering growers and project partners in order to evaluate the success of grafting conducted in spring of 2022.
- These grafted trees will serve as a monitoring location and attractant for PC. With these trees in place in NH orchards, orchardists will be free to adopt additional IPM practices such as the application of nematodes to further control PC populations in the vicinity of their orchard blocks. To be clear, we are not requesting funding to purchase nematodes in the proposal, however, we plan to do so in a separate proposal.

VII. How will your data be evaluated?

- At the end of the season, growers in the program will complete a program evaluation survey to be reviewed by the UNH Extension personnel. Number of trees grafted and representative acreage will be captured, as will grower expectations related to the benefits of the project going forward.
- Based on project results and grower feedback, UNH Extension, along with NHFGA representatives and UMass Extension, can determine if additional educational programming needs to be developed to expand adoption of the practices highlighted within this project.

VIII. Explain how the results of your project will be shared/publicized.

All published literature (papers, presentations, publications, advertisements, etc.) must contain a statement attributing funding to the New Hampshire Department of Agriculture, Markets and Food IPM Grant Program. Publications must be submitted with the final report.

- At least one visit to each grower will be made to provide education/demonstrations on proper grafting techniques, answer grower's questions about the grafting process and or long-term goals of the project.
- UNH Extension IPM Team personnel will document and share regular written, video and audio media highlighting the project and progress of NH growers in 2022. These resources will be shared through UNH media channels, and will be made available to share with NHDAM&F, as well as Extension colleagues throughout the northeast at a minimum. The potential is very real for this project and potential results to gain national recognition.
- A presentation on the results of this project will be developed and presented to fruit growers at educational meetings such as the NH Fruit Growers Association Annual Meeting, or one of four twilight meetings planned for 2022.

IX. Detail how other groups may adopt some of the information you learn or develop:

- The UNH CE Extension specialists will be available to present the information described above.
- From presentations during workshops to other growers we will collect data on (1) increases

in knowledge about the potential of multi-cultivar grafted trees to serve as trap crops for multiple pests, (2) intention to adopt this low-cost, grower-friendly IPM approach, and (3) potential barriers limiting adoption of grafting for pest management.

Provide a complete list of all persons involved in the proposed project; include the names, addresses and phone numbers of the individuals.

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