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New Hampshire
Department of Agriculture, Markets & Food

Shawn N. Jasper, Commissioner

March 22, 2021

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 & Food, Division of Pesticide Control to grant funds and enter into a Cooperative Project Agreement, in the amount of $69,834, with the University of New Hampshire Office of Sponsored Research, vendor #177867, for the advancement of agricultural research and to assist in the promotion of Integrated Pest Management practices in New Hampshire, for the period from Governor and Council approval through January 31, 2022. 100% Other Funds.

Funding is available in account, Integrated Pest Management, as follows:
02-18-18-183010-21820000 INTEGRATED PEST MANAGEMENT

OBJECT CLASS	ACCOUNT	FY 2021	Total
075-500590	Grants and Subsidies	$69,834	$69,834

EXPLANATION

The New Hampshire Department of Agriculture, Markets and Food (NHDAMF), Division of Pesticide Control in fulfilling its responsibilities under the Integrated Pest Management (IPM) Program, RSA 430:50; to promote the principles of IPM and assist New Hampshire citizens to advance the practice of such principles, has reviewed the project, "*2021 IPM Program for Fruit and Vegetable Crops On-Farm Monitoring*", and finds it exemplifies good practices associated with Integrated Pest Management. The research and educational aspects associated with this project and the efforts of the University of New Hampshire Cooperative Extension identify and establish the presence and treatment methods for pests common to sweet corn and vine crops. Experience and results of this project serve the benefit of all citizens of New Hampshire. The attachment includes a summary of the project and the dollar amount associated with each component.

Respectfully submitted,

Shawn N. Jasper
Commissioner

COOPERATIVE PROJECT AGREEMENT
between the
STATE OF NEW HAMPSHIRE, **Department of Agriculture, Markets & 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 & 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 **1/31/22**. 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: **2021 IPM Program for Fruit and Vegetable Crops On-Farm Monitoring**

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	**Campus Project Administrator**
Name: David J. Rouuseau	Name: Cheryl Moore
Address: State House Annex 25 Capitol Street P.O. Box 2042 Concord, NH 03301	Address: University of New Hampshire Sponsored Programs Administration 51 College Road Durham, NH 03824
Phone: 603 271-3640	Phone: 603 862-1992

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	**Campus Project Director**
Name: David J. Rousseau	Name: Jeremy DeLisle
Address: State House Annex 25 Capitol Street P.O. Box 2042 Concord, NH 03301	Address: UNH Cooperative Extension Merrimack County 315 Daniel Webster Highway Boscawen, NH 03033
Phone: 603 271-3640	Phone: 603 225-3556

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F. Total State funds in the amount of **$69,834** 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. from under CFDA# . 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, **Department of Agriculture, Markets & Food** have executed this Project Agreement.

By An Authorized Official of:
University of New Hampshire

Name: Karen M. Jensen

Title: Director, Sponsored Programs Administration, Pre-Award

Signature and Date:
Karen Jensen 3/17/21

By An Authorized Official of:
Department of Agriculture, Markets & Food

Name: Shawn N. Jasper

Title: Commissioner

Signature and Date:
Shawn N Jasper 3/23/21

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

Name: Stacie M. Moeser

Title: Assistant Attorney General

Signature and Date:
/s/ Stacie M. Moeser March 24, 2021

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

Name:

Title:

Signature and Date:

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Date 3/17/21

EXHIBIT A

A. **Project Title:** 2021 IPM Program for Fruit and Vegetable Crops On-Farm Monitoring

B. **Project Period:** April 1, 2021 through January 31, 2022

C. **Objectives:** The objectives of the University of New Hampshire are to assist the Department of Agriculture, Markets & Food in the promotion and advancement of Integrated Pest Management in New Hampshire

D. **Scope of Work:** A detailed scope of work is on file with the Department of Agriculture, Markets & Food and described in Attachment A of this agreement.

E. **Deliverables Schedule:** A detailed description with schedule for each project is on file with the Department of Agriculture, Markets & Food and described in Attachment A of this agreement.

Major Project Components:

On Farm Monitoring: April 2021 through October 2021
Insect/Crop: Corn Earworms/sweet corn
Fall Armyworm/sweet corn
European Corn Borer/sweet corn
Western Bean Cut Worm/sweet corn
Squash Vine Borer/vine crops, giant pumpkin
Brown Marmorated Stink Bug/fruit and vegetables
Spotted Wing Drosophila/fruit

Final Report: January 31, 2022

F. **Budget and Invoicing Instructions:** Campus will submit an invoice on regular Campus invoice form for $69,834 at the time of Governor and Council approval. State will pay Campus within 30 days of receipt of the invoice. Any unused funds must be returned to the State after the project end date.

Budget Items	State Funding	Cost Sharing (if required)	Total
1. Salaries & Wages	$35,415	0	$35,415
2. Employee Fringe Benefits	9,229	0	9,229
3. Travel	9,280	0	9,280
4. Supplies and Services	1,500	0	1,500
5. Equipment	0	0	0
6. Facilities & Admin. Costs	14,410	0	14,410
Subtotals		0	$69,834
In Kind Contribution		0	0
Total Project Costs			$69,834

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G. Other

A representative of the Department of Agriculture, Markets & Foods reserves the right to attend seminars and audit any work performed by the grant recipient.

Attachment A: Project Proposal - "2021 IPM Program for Fruits and Vegetable Crops On-Farm Monitoring"

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
Personnel	
Jeremy DeLisle, Extension Field Specialist	$17,815
Additional Labor	
100 days @ 8 hours/day@ $22.00/hr.	$17,600
Benefits	$9,229
Mileage: 100 miles/day @ 160 days @ $0.58/mile	$9,280
Supplies	$1,500
Subtotal:	$55,424
Indirect Costs at 26%	$14,410
Total	$69,834

Personnel: $35,415

Jeremy DeLisle, UNH CE - Extension Field Specialist, (0.25 FTE, 3 months) is the primary person conducting the project and will be managing the finances of the grant. All recommendations that are given to the farmers will be approved through the primary person conducting the project and may be delivered through the IPM scout hired for the project. The primary person conducting the project will make follow-up farm visits when problems occur with the IPM scouting during the growing season.

Additional Labor:

IPM Scout for Insect Monitoring and Scouting

One IPM Scout will be hired for insect monitoring and scouting from April through November for various vegetable insect pests; 100 days for the IPM scout. The IPM scout, with participating growers/farmers/orchardists, will set-up traps, check the traps and monitor the crop weekly to record and collect data throughout the growing season. The scout will collect the traps at the end of the season, clean and inventory the good traps and dispose of the traps that are no longer usable. The scout will collect the end of season grower/farmer/orchardist surveys.

Benefits Rate(s): $9,229

The University's fringe benefit rates are charged according to our federally negotiated rate agreement. The current applicable rates are 43.8% for full fringe benefits, and 8.1% for partial fringe benefits. The "partial fringe" rate applies to non-student hourly wages, faculty summer salaries and other exceptions to contract pay, and FICA-eligible graduate student pay (i.e. summer stipends). The "full

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fringe" rate applies to all other benefits-eligible wages. (College work study wages and graduate student academic year stipends are not benefits-eligible.)

Travel: $9,280 .

Over the previous two years, the IPM scouts averaged approximately 100 miles per day conducting the weekly farm visits for checking traps and monitoring crops. The total mileage is based on the 100 days additional labor (IPM Scout) and 60 days for Jeremy DeLisle, UNH CE Extension Field Specialist.

Mileage and per diem expenses will be reimbursed at the current federal rates. Travel expenses will include instate travel to farms participating in the IPM program and attending planning sessions and events/meetings/workshops dealing with this IPM program.

Supplies & Services: $1,500

This application is requesting $1,500 for the purchase of project supplies/services directly related to the support of this project. Funds will be used for purchasing traps (projected at $750), trap supplies (i.e. cups, tops, wires, fasteners, etc.), attractants/lures (projected at $500) and paper, ink, ink cartridges, and printing for forms used by the IPM scout and the PI (projected at $250).

Facilities and Administrative Costs Rate: $14,410

Facilities and Administrative (indirect) costs are calculated according to UNH's current negotiated rate agreement. The applicable Off-Campus rate, as shown on our Federal agreement is 26%. The U. S. Department of Health and Human Services is UNH's cognizant federal agency.

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

Selecte insect pests of fruits and vegetables will be trapped and monitored on a minimum of fifteen (15) farms weekly through the summer of 2021 plus work with five (5) additional farms to provide traps and lures and check weekly via email or text message on trap catch numbers and recommendations.

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

Sweet corn

- Monitoring European corn borer (ECB), corn earworm (CEW), fall armyworm (FAW) and western bean cutworm (WBCB) with pheromone traps to determine need, frequency, and timing for insecticide control applications.

- Reduce damage caused to sweet corn by the European corn borer, corn earworm, fall armyworm and western bean cutworm by application of properly timed insecticide applications.

Vine crops

- Determine when squash vine borer is active on vegetable farms in New Hampshire.

- Work with vegetable farms on monitoring squash vine borer using Heliothis traps with the Squash Vine Borer lure to determine need, frequency, and timing for insecticide applications.

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• Reduce damage caused to cucurbit crops by the squash vine borer thru application of properly timed insecticide applications.

Brown Marmorated Stink Bug (BMSB)

- Sentinel trapping/monitoring will be conducted for BMSB on a minimum of five (5) vegetable, small fruit and/or tree fruit farms weekly through the summer of 2021.

- Monitor for BMSB using 4-foot tall pyramid trap with an attractant lure and/or sticky trap with an attractant lure on fruit and vegetable farms.

- Determine if BMSB is feeding on fruits and vegetables in New Hampshire.

- BMSB population data will yield information on seasonal activity and relative abundance of the insect, which is necessary for development of an IPM strategy.

Spotted Wing Drosophila (SWD)
- Sentinel trapping/monitoring will be conducted for SWD on a minimum of five (5) small fruit farms/orchards through the summer of 2021.

- The data will yield information on seasonal activity and relative abundance of Spotted Wing Drosophila, which is needed to determine an IPM control strategy if Spotted Wing Drosophila numbers are over the action threshold of one male fly and becomes a threat to New Hampshire small fruit and tree fruit farms.

IV. Economic and Environmental Impact

Sweet Corn

In 2019, 23 growers participated in the sweet corn insect pest IPM program. The IPM trapping program proved that catches vary greatly by site. Twenty-three farmers had 26 sets of European corn borer (ECB) traps, including one trap for each of the two strains of ECB. Twenty farmers had 26 corn earworm (CEW) traps. Twenty-one farmers had 27 fall armyworm (FAW) traps. Seventeen farmers had 18 western bean cutworm (WBCW) traps.

The participating growers in the IPM program planted 569 acres of sweet corn and harvested 516.75 acres (90.8% of the planted acreage). Comparing the acreage planted and harvested to the 2019 USDA NASS statistics data, the participating farms in the IPM program had 43% of the sweet corn acreage planted and harvested in the state of New Hampshire.

Growers using the IPM program sprayed 2.04 fewer sprays than they did prior to the current IPM program. This saving was a value of $20,916 for pesticides and $29,050 for labor and equipment costs. The reduction in sweet corn cull rate (throwing away insect-damaged ears) due to the IPM program as reported by the participating growers resulted in an increase of $175,695. Growers stated that, by using the IPM practices and insect trapping, they had a 2.07% cull rate for insect damage (sweet corn that could not be sold). Prior to the IPM program, the average cull rate was 14.60%. This means that the growers had a net increase of 12.53% in sweet corn available for retail sales. Total sweet corn financial impact: $225,661.

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We anticipate there could be positive impacts from our sweet corn work on chrysanthemum and pepper crops. European corn borer also hits these crops and our monitoring and reporting alerts these growers as well. To avoid fatiquing clientele with questionnaires, we have not measured this impact, but several growers have reported their crops have avioded significant injury because of our notifications.

In 2018, 24 growers participated in the sweet corn insect pest IPM program. The IPM trapping program proved that catches vary greatly by site. Growers using the IPM program sprayed 2.00 fewer sprays than they did prior to the current IPM program. This savings was a value of $18,270 for pesticides and $25,375 for labor and equipment costs. The reduction in sweet corn cull rate (throwing away insect-damaged ears) due to the IPM program as reported by the participating growers resulted in an increase of $172,221. Growers stated that, by using the IPM practices and insect trapping, they had a 2.11% cull rate for insect damage (sweet corn that could not be sold). Prior to the IPM program, the average cull rate was 11.23% in sweet corn available for retail sales. Total sweet corn financial impact: $215,866.

In 2017, 35 sweet corn growers using the IPM program sprayed 2.77 fewer sprays than they did prior to the current IPM program. This savings was a value of $24,678 in pesticide and $34,276 in labor and equipment costs, along with an increase of $211,507 in retail crop sales due to the reduction in sweet corn cull rate from insect damage following the IPM program recommendations. Growers stated that, by using the IPM practices and insect trapping, they had a 0.68% cull rate for insect damage (sweet corn that could not be sold). Prior to the IPM program, the average cull rate was 11.83%. This means that the growers had a net increase of 11.15% in sweet corn available for retail sales. Total sweet corn financial impact: $270,461.

In 2016, 35 sweet corn growers using the IPM program sprayed 2.77 fewer sprays than they did prior to the current IPM program. This savings was a value of $25,842 for pesticides and $35,892 for labor and equipment costs. The reduction in sweet corn cull rate (throwing away insect-damaged ears) due to the IPM program as reported by the participating growers resulted in an increase of $174,361. In retail crop sales based on a difference of 14.62% more sweet corn produce compared to prior to using current IPM practices (farmers stated actual cullage percentage of 3.63% this year versus 14.62% prior to using IPM practices). Total sweet corn impact: $236,096.

In 2015, 35 sweet corn growers using the IPM program sprayed 2.05 fewer sprays than before involvement in the current IPM program. This savings is valued at $16,347 in pesticide and $19,616 in labor and equipment costs. The reduction in sweet corn cull rate (9.73%) from insect damage due to the IPM program, as reported by the participating growers resulted in increase of $212,241 in retail crop sales. Total annual impact of sweet corn IPM program: $248,204.

In 2014 sweet corn growers using the IPM program sprayed 3.10 fewer sprays than before involvement in the current IPM program. This savings is valued at $19,082 in pesticide and $22,898 in labor and equipment costs. The reduction in sweet corn cull rate from insect damage due to the IPM program, as reported by the participating growers resulted in increase of $82,168 in retail crop sales. Total annual impact of sweet corn IPM program: $124,148.

Vine Crops

In past years, participating growers reported the vine crop IPM work saved $5,000 on insecticides to control the squash vine borer. Neither our clientele nor we have been able to measure reduction in

crop losses from the squash vine borer work, but observation indicates it is effective, especially on bush-type crops of Cucurbita pepo or Cucurbita maxima.

In 2019, squash vine borer numbers started flying earlier that we normally expect. The growers participating in the squash vine borer IPM program reported they sprayed less than they usually did prior to the IPM program. An average of 1.0 sprays on 319.76 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Fewer insecticide applications means lower exposure risk to the applicators and farm workers. Growers noted no plant loss due to squash vine borer. This savings equaled over 80.01 gallons of pesticides that were not applied saving $4,800.45 in pesticide expense and $8,000.75 for labor and equipment costs.

In 2018, squash vine borer numbers started flying earlier that we normally expect. The growers participating in the squash vine borer IPM program reported they sprayed less than they usually did prior to the IPM program. An average of 1.09 sprays on 281.50 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Growers noted no plant loss due to squash vine borer. This savings equaled over 76.85 gallons of pesticides that were not applied saving $4,610.70 in pesticide expense and $7,684.50 for labor and equipment costs.

In 2017, again squash vine borer numbers started flying earlier that we normally expect. The growers participating in the squash vine borer IPM program reported they sprayed less than they usually did prior to the IPM program. An average of 2.36 sprays on 278.50 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Growers noted no plant loss due to squash vine borer. This savings equaled over 69.63 gallons of pesticides that were not applied saving $9,852.90 in pesticide expense and $16,421.50 for labor and equipment consts.

In 2016, squash vine borer numbers were high, and they started flying earlier that we normally expect. The growers participating in the squash vine borer IPM program, reported they sprayed less than they usually did, prior to the IPM program. An average of 2.02 sprays on 275.13 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Growers noted no plant loss due to squash vine borer. This savings equaled over 68.78 gallons of pesticides that were not applied saving $9,998 in pesticide expense, and $13,886.75 for labor and equipment costs.

In 2015, the 31 growers participating in the squash vine borer IPM program, reported they sprayed less than they usually did prior to the IPM program. An average of 1.85 sprays on 306 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Growers noted no plant loss due to squash vine borer. This savings equaled over 83.3 gallons of pesticides not applied, saving $6,348 in materials and $15,115 in labor and equipment costs.

In 2014, the 14 growers participating in the squash vine borer IPM program, reported they sprayed less than they usually did prior to the IPM program. An average of 1.90 sprays on 270 acres of summer squash, winter squash and pumpkins were not applied based on the IPM program. Growers noted no plant loss due to squash vine borer. This savings equaled over 67.4 gallons of pesticides not applied, saving $5,372 in materials and $12,790 in labor and equipment costs.

In addition to dollar savings, reduced insecticide application protects populations of beneficial insects including predators, parasitoids, and pollinators. Fewer spray applications also reduces farm worker exposure to pesticides, in particular those involved with pesticide mixing and loading. Reduced spraying also reduces the opportunity for drift and the risk of environmental contamination. It contributes to farm profitability, which ensures a supply of locally produced food to meet the rising demand for these products. Finally, while on weekly farm visits, our scouts provide valuable early

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warning information to farmers about other pests. As an example, over the past three years, IPM scouts were the first individuals in NH to notice the pest problems and consequently warnings were made to the agricultural community.

Brown Marmorated Stinkbug (BMSB)

The brown marmorated stink bug (BMSB), Halyomorpha halys, is an invasive stinkbug native to Japan, Korea, China, and Taiwan, which is now well established throughout the mid-Atlantic region of the United States.

BMSB is a polyphagus species, meaning it can feed on a wide range of hosts; therefore BMSB is a pest of many crops where it is established. Host crops include tree fruit, vegetables, shade trees, and leguminous crops. In 2010, populations of this invasive species increased dramatically, causing widespread injury to many crops throughout the mid-Atlantic region. Tree fruit, in particular, was hit hard with some growers losing entire crops of stone fruit. Among apple growers, losses were totaled in excess of $37 million in the region. In several Mid-Atlantic States, BMSB is now the most costly pest for peach and apple growers to manage.

Within the United States, native stink bugs generally have been classified as secondary pests of tree fruit and have been successfully managed with broad-spectrum insecticide applications typically directed at other key pests. When BMSB populations increased dramatically, this led to deavastating levels of fruit injury and BMSB quickly replaced pests such as codling moth and oriental fruit moth as the key pest driving management decisions in the mid-Atlantic region of the United States. Because BMSB is a newly established invasive species, management programs for this pest are still being developed.

From 2014 through 2020, damage was documented on fruit and vegetable farms in New York, Massachusetts and/or Connecticut. BMSB is not known to have caused any damage on fruit and vegetable farms in New Hampshire until the end of the 2018 growing season. Only in one situation, on a commercial orchard, a pesticide application was recommended for late maturing apple varieties to reduce the potential for fruit damage. In 2019 and 2020, from August through September, BMSB trap capture exploded in numbers. Damage from stink bugs was detected on apple fruit in September. Due to this increase, a more rigorous BMSB monitor protocol will be in place for the 2021 growing season.

Maintaining a network of pherome-baited traps is the most efficient means of monitoring this insect, which spends a lot of time in the canopy of forest and shade trees. The traps also tell us where BMSB population buildup is occuring, before agricultural damage begins. We anticipate more damage will take place in New Hampshire in 2021.

BMSB damage on tree fruit does not become visible until 2 to 4 weeks after feeding occurred, so monitoring by only visual checking for injury could result in our detecting it too late to prevent economic losses to apples or peaches.

By monitoring for it now, UNH CE will be able to inform farmers when it begins to arrive in their regions, and hopefully help them prepare to manage the pest using the least amount of pesticide. Work is currently being done by researchers at Mid-Atlantic States and New York to help farmers learn which pesticides are most effective, along with determining if there are any cultural or biological options effective for controlling this pest.

Spotted Wing Drosophila (SWD)

The Spotted Wing Drosophila situation is brand new to not only New Hampshire (2011) but also the United States (2008). Results of grower surveys conducted from 2012-2015 showed losses were greatest in later-maturing crops and/or varieties and no damage to earlier maturing crops and/or varieties.

Based on grower reports of crop losses combined with crop price and acreage production data from the National Agricultural Statistics Service, our team calculated the total 2012 NH crop loss due to SWD was $1,516,000. In 2013 the calculated losses decreased to $529,000 and in 2014 the losses dropped to $214,000. The late appearance and slower buildup of SWD may have contributed to the drop in 2014. However, as SWD trapping began in 2012, we believe trapping has provided growers with a tool they have been able to use to help minimize crop losses.

Without trapping, growers may choose to spray according to the calendar in order to prevent infestation and crop losses like they saw in 2012. This could lead to higher pesticide use than necessary. We aim to continue to prevent infestation and reduce the Spotted Wing Drosophila losses compared to the 2012 high without excessive use of pesticides by using trapping data to help growers decide if and when to spray to control the insect.

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. It can help keep farms in business growing locally produced food to meet the rising demand for fresh, local products.

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

- One IPM scout will be hired with NHDAM&F – IPM Grant funds to conduct on-farm monitoring and scouting.

- We will work with up to fifteen growers/farmers in New Hampshire on weekly monitoring of insect pests, check traps to determine need, frequency and timing for insecticide control applications. Also, we will work with five (5) additional farms to provide traps and lures and check weekly via email or text message on trap catch numbers and recommendations.

Sweet Corn

o European Corn Borer - two Heliothis traps with Scentry E-strain or 'New York' type pheromone lures and the Scentry Z- strain or 'Iowa' type pheromone lures changed every four to six weeks from May through October.

o Corn Earworm - Heliothis trap with Hercon pheromone luretapes and the luretapes changed every two weeks from July through October.

o Fall Armyworm - bucket or canister trap with Scentry FAW four component pheromone lures and the lures changed every four to six weeks from July through October.

o Western Bean Cut Worm - bucket or canister trap with Trece pheromone lures changed every four to six weeks from May through October.

Vine Crops

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o Squash Vine Borer - Heliothis trap with the SVB pheromone lures changed every four to five weeks from June through September.

Brown Marmorated Stink Bug

- Brown Marmorated Stink Bug - 4-foot tall pyramid trap with an attractant lure and/or sticky trap with an attractant lure will be used. The lures are changed according to recommendations (10-week lure) from the manufacturer.

Spotted Wing Drosophila

- Spotted Wing Drosophila - cup traps will be where the baiting and trapping protocol is evolving and will be updated based on 2020 results priot to the 2021 growing season.

• We will check traps throughout the 2021 growing season. Some insects are blown into NH on wind currents, so growers/farmers do not know when the insects arrive until damage appears or the growers/farmers apply unnecessary sprays for prevention.

• Work with UNH CE IPM Coordinator and Extension Entomology Specialist, to determine if any special news releases need to be made on the status of any insect outbreaks.

• A regular report will be published through the growing season and made available through UNH Extension marketing channels. If there are major insect outbreaks, we will consider disseminating alerts through additional means, including Weekly Market Bulletin.

• At the end of the season, growers/farmers in the program will complete a survey in order to measure impact.

VI. Sampling Methods (if applicable):

• On-farm monitoring for insect pests will be conducted during the 2021 growing season on a minimum of fifteen operations in New Hampshire with UNH CE personnel assisting. Also, we will work with five (5) additional farms to provide traps and lures and check weekly via email or text message on trap catch numbers and recommendations.

• Weekly trap counts will be reported to the growers/farmers and we hope growers/farmers will participate in the monitoring.

• Any pheromone lures or baits used in the trap will be changed according manufacturer recommendations.

• Working with the growers/farmers, some traps will be moved according to crop conditions and maturity.

• Depending on how the traps are used in the field, material breakdown of the traps during growing season and storage of the traps; traps may have a life of two or more years and will need to be replaced.

VII. How will your data be evaluated?

• At the end of the season, growers/farmers in the program will complete a program evaluation survey to be reviewed by the UNH CE IPM Coordinator and/or other UNH CE personnel. Number of sprays

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per sweet corn field applied will be compared to trap counts and grower's concept of the amount of sweet corn ears damaged due to insect damage will be evaluated.

- Based on the monitoring counts collected during the season, UNH CE can decide if additional educational programming needs to be developed for vegetable growers/farmers in the state.

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.

- A weekly visit to each grower will be made to monitor trap counts where the grower will be provided the information on need, frequency and timing for insecticide control applications.

- Updates on insect pest situations will be given at scheduled grower twilight meetings throughout the growing season.

- Pending agreement by participating growers, trap catches will posted on UNHCE's website, for anyone to access whenever he/she wishes. This will support decision-making by growers beyond those directly involved, and by other agricultural workers.

- If there are any major insect outbreaks, we will consider disseminating alerts through additional means, including Weekly Market Bulletin.

- A presentation on the results of this project will be developed and presented to vegetable growers/farmers upon request.

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.

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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Campus Authorized Official KJ
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