2019 FRUIT CHEMICAL USE SURVEY

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NATIONAL AGRICULTURAL STATISTICS SERVICE

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ENTERPRISE

VERSION	POID	SUBTRACT
01	__ __ __ __ __ __ __ __ __ __	__ __

CONTACT RECORD		
DATE	TIME	NOTES

INTRODUCTION:
[*Introduce yourself, and ask for the operator. Rephrase in your own words*.]

We are collecting information on chemical use and pest management practices and need your help to make the information as accurate as possible. The information you provide will be used for statistical purposes only. In accordance with the Confidential Information Protection provisions of Title V, Subtitle A, Public Law 107-347 and other applicable Federal laws, your responses will be kept confidential and will not be disclosed in identifiable form to anyone other than employees or agents. By law, every employee and agent has taken an oath and is subject to a jail term, a fine, or both is he or she willfully discloses ANY identifiable information about you or your operation. Response is **voluntary**.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0535-0218. The time required to complete this information collection is estimated to average 60 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

We encourage you to refer to your farm records during the interview.

004 __ __ __ __

BEGINNING TIME [MILITARY]. . . . . .

0 ☐ [*Name, address and partners verified and updated if necessary*.]

1. During 2019, were any crops (***including*** *new plantings*), livestock or poultry on the total acres operated? (***Exclude*** *crops produced by a tenant if [target] operator is landlord only*.). . . . . ☐ **YES** – [*Go to item 1, page 2*.] ☐ **NO**-[*Continue*.]

2. During 2019, did this operation sell any agricultural products or receive government agricultural payments? (***Exclude*** *crops produced by a tenant if [target] operator is landlord only*.). . . . . ☐ **YES** - [*Go to item 1, page 2*.] ☐ **NO**-[*Continue*.]

3. During 2019, were any crops stored on the total acres operated? (***Exclude*** *crops produced by a tenant if [target] operator is landlord only*.). . . . . ☐ **YES** - [*Go to item 1, page 2*.] ☐ **NO**-[*Continue*.]

4. During 2019, did this operation have any fruit acres which were operated by a **management firm**?. . . . . ☐ **YES** - [*Go to item 1, page 2.*] ☐ **NO**-[*Go to page 4.*]

SCREENING

1. Did this operation have any of the target crops during the 2019 crop year?

   ☐ **YES** - [*Continue*.]

   ☐ **NO** - [*Write notes explaining situation then go to "Conclusion" on back page.*]

   _____

   _____

   _____

2. Are the day-to-day decisions for this operation (*name on label*) made by –
   [*Check one*.]

   ☐ one individual? [*Go to Section **A***.]

   ☐ a hired manager? [*Go to Section **A***.]

   ☐ partners? [*Continue.*]

3. How many individuals are involved in the day-to-day decisions of this operation?
   [*Enter the number of partners, including the partner named on the label.*
   *Identify the other persons in this partnership below, then go to Section **A***.]
   (*Partners jointly operate land and share in decision making.* ***Do not include*** *landlords and tenants as partners.*). . . . . **NUMBER** ☐

PARTNERS **POID**__ __ __ __ __ __ __ __ __ __				**PARTNERS** **POID**__ __ __ __ __ __ __ __ __ __			
PARTNER NAME				PARTNER NAME			
ADDRESS				ADDRESS			
CITY	STATE	ZIP	PHONE NUMBER	CITY	STATE	ZIP	PHONE NUMBER
PARTNERS **POID**__ __ __ __ __ __ __ __ __ __				**PARTNERS** **POID**__ __ __ __ __ __ __ __ __ __			
PARTNER NAME				PARTNER NAME			
ADDRESS				ADDRESS			
CITY	STATE	ZIP	PHONE NUMBER	CITY	STATE	ZIP	PHONE NUMBER

TARGET CROPS & CODES

FLORIDA

320	Grapefruit
335	Oranges, All
748	Strawberries
349	Tangerines / Tangelos

GEORGIA

309	Blueberries
340	Peaches

MICHIGAN

301	Apples
309	Blueberries
314	Cherries, Tart
340	Peaches

NEW JERSEY

309	Blueberries
340	Peaches

NEW YORK

301	Apples
314	Cherries, Tart

NORTH CAROLINA

309	Blueberries

OREGON

301	Apples
309	Blueberries
312	Cherries, Sweet
520	Pears

PENNSYLVANIA

301	Apples
340	Peaches

SOUTH CAROLINA

340	Peaches

TEXAS

320	Grapefruit

WASHINGTON

301	Apples
309	Blueberries
312	Cherries, Sweet
314	Cherries, Tart
322	Grapes, Juice
624	Grapes, Wine
520	Pears
345	Raspberries

CHANGE IN OPERATING STATUS

[**ENUMERATOR NOTE:** *Skip this section if there is no change in operation name or operator.*]

1. Has there been a change in operation name or operator?

☐ **NO** - [*Go to Enumerator Note below.*]

CODE

☐ **YES** - [*Enter code 1, complete name and address information below for new operator, and read Enumerator Note.*]. 023

_____ Operation Name _____

_____ Operator Name _____

_____ Address _____

_____ _____

_____ Phone (_____) _____

[**ENUMERATOR NOTE:** *If the operation on the face page was in business part of the 2019 crop year, complete this questionnaire for the part of the year during which the operation did business, unless the operation has been taken over by a new operator. If the operator has changed midyear, please conduct this interview start to finish with the new operator after reading "Valid Substitution" rules in section 4 of the Interviewer's Manual.*]

2. Has the operation printed on this questionnaire been combined or merged with any other farming operations?

☐ Yes - [Go to "Conclusion".]

☐ No - [Continue.]

A LAND OPERATED A

ACRES OPERATED

Now I would like to ask about the total acres operated under this land arrangement.

1. How many acres does this operation---

		ACRES
a.	Own? . . . . . +	901 . ___
b.	Rent or lease from others or use rent free? (***Exclude*** *land used on an animal unit month (AUM) basis.*) . . . . . +	902 . ___
c.	Rent to others? . . . . . -	905 . ___

2. [Calculate item 1a + 1b - 1c.] Then the total acres operated are: . . . . . = 900 .

   a. Does this include the farmstead, all cropland, woodland, pasture land, wasteland, and government program land?

   ☐ **YES** - [*Continue*.] ☐ **NO** - [*Make corrections, then continue*.]

The remaining questions in this survey refer to these [*item 2*] acres.

3. Of the total acres operated, how many acres are considered cropland, including land in hay, summer fallow, cropland idle, cropland used for pasture and cropland in government programs? . . . . . 802 .___

4. Of the total acres operated, how many acres are in fruit? (***Include*** *bearing and non-bearing acreage in trees, vineyards and bushes.*) . . . . . 803 . ___

B FRUIT ACREAGE B

	TABLE 001
OFFICE USE LINES IN TABLE	
LINE 99	199

1. What **target fruit crops** were on these [*Section **A**, item 4*] acres during the 2019 crop year? (***Exclude** new plantings and other plantings which are not yet bearing.*)

LINE	1 CROP	2 CROP CODE	3 How many BEARING acres of [*crop*] did this operation have?	4 Were any commercial fertilizers applied to this crop?	6 Were any herbicides, insecticides, fungicides, etc. applied to this crop?
			ACRES	[YES = 1]	[YES = 1]
01			11 . ___	12	13
02			11 . ___	12	13
03			11 . ___	12	13
04			11 . ___	12	13
05			11 . ___	12	13
06			11 . ___	12	13
07			11 . ___	12	13
08			11 . ___	12	13
09			11 . ___	12	13
10			11 . ___	12	13
11			11 . ___	12	13
12			11 . ___	12	13
13			11 . ___	12	13
14			11 . ___	12	13
15			11 . ___	12	13

INCLUDE

- ***TARGET CROPS ONLY.***
- *All commercial bearing acreage equal to or greater than one tenth of an acre.*
- *All bearing acreage of TARGET CROPS for processing or fresh market.*
- *All bearing acreage of TARGET CROPS for roadside stands, farmer's markets or U-pick sales.*
- *Bearing acreage not harvested due to weather, economic or other reasons.*
- *Crops planted in the fall of 2018 if they were part of the 2019 crop.*

EXCLUDE

- *All crops grown in another state.*
- *Non-commercial orchard and vineyard acreage (home garden).*
- *Non-target fruits.*
- *New plantings and other plantings which are not yet bearing.*
- ***ALL TARGET CROPS** grown by institutional, experimental, research and university farms (abnormal farms).*
- *Abandoned orchards and vineyards.*

NOTES: _____

_____

C FERTILIZER APPLICATIONS C

Enumerator Note---
*If column 4 of the table in Section **B** is YES for any crops, continue with item 1.*
*If column 4 of the table in Section **B** is NO for all crops, go to Section **D**, page 10.*

1. I need to record complete information on all commercial fertilizers applied to the bearing acres of target fruit grown during the 2019 crop year. Include all applications regardless of how they were applied (i*rrigation water, foliar applications, etc.*). [*Record amount of analysis of fertilizers applied or pounds of actual plant nutrients applied. Complete the table below* (*and any necessary supplemental fertilizer tables*). *Exclude micronutrients, lime, and gypsum.*]

OFFICE USE LINES IN TABLE	TABLE 001	299

LINE	1 CROP	2 CROP CODE	3 NITROGEN N	4 PHOSPHATE $P_2 0_5$	5 POTASH $K_2 0$	6 SULFUR S	7 How much was applied per acre per application? [*Leave this column blank if actual nutrients were reported.*]	8 UNIT CODES 1 Pounds, 12 Gallons, 13 Quarts, 15 Liquid Oz., 28 Dry Oz., 19 Actual Nutrients	9 How many acres was this applied to? [*Include bearing acres only*] ACRES	10 How many times was it applied? NUMBER
01			31	32	33	34	36 . ___	37	40 . ___	41
02			31	32	33	34	36 . ___	37	40 . ___	41
03			31	32	33	34	36 . ___	37	40 . ___	41
04			31	32	33	34	36 . ___	37	40 . ___	41
05			31	32	33	34	36 . ___	37	40 . ___	41
06			31	32	33	34	36 . ___	37	40 . ___	41
07			31	32	33	34	36 . ___	37	40 . ___	41
08			31	32	33	34	36 . ___	37	40 . ___	41
09			31	32	33	34	36 . ___	37	40 . ___	41
10			31	32	33	34	36 . ___	37	40 . ___	41
11			31	32	33	34	36 . ___	37	40 . ___	41
12			31	32	33	34	36 . ___	37	40 . ___	41
13			31	32	33	34	36 . ___	37	40 . ___	41
14			31	32	33	34	36 . ___	37	40 . ___	41
15			31	32	33	34	36 . ___	37	40 . ___	41
16			31	32	33	34	36 . ___	37	40 . ___	41
17			31	32	33	34	36 . ___	37	40 . ___	41

C FERTILIZER APPLICATIONS C

LINE	1 CROP	2 CROP CODE	3 NITROGEN N	4 PHOSPHATE $P_2 0_5$	5 POTASH $K_2 0$	6 SULFUR S	7 How much was applied per acre per application? [*Leave this column blank if actual nutrients were reported.*]	8 UNIT CODES 1 Pounds 12 Gallons 13 Quarts 15 Liquid Oz. 28 Dry Oz. 19 Actual Nutrients	9 How many acres was this applied to? [*Include bearing acres only*] ACRES	10 How many times was it applied? NUMBER
18			31	32	33	34	36 . ___	37	40 . ___	41
19			31	32	33	34	36 . ___	37	40 . ___	41
20			31	32	33	34	36 . ___	37	40 . ___	41
21			31	32	33	34	36 . ___	37	40 . ___	41
22			31	32	33	34	36 . ___	37	40 . ___	41
23			31	32	33	34	36 . ___	37	40 . ___	41
24			31	32	33	34	36 . ___	37	40 . ___	41
25			31	32	33	34	36 . ___	37	40 . ___	41
26			31	32	33	34	36 . ___	37	40 . ___	41
27			31	32	33	34	36 . ___	37	40 . ___	41
28			31	32	33	34	36 . ___	37	40 . ___	41
29			31	32	33	34	36 . ___	37	40 . ___	41
30			31	32	33	34	36 . ___	37	40 . ___	41
31			31	32	33	34	36 . ___	37	40 . ___	41
32			31	32	33	34	36 . ___	37	40 . ___	41
33			31	32	33	34	36 . ___	37	40 . ___	41
34			31	32	33	34	36 . ___	37	40 . ___	41
35			31	32	33	34	36 . ___	37	40 . ___	41
36			31	32	33	34	36 . ___	37	40 . ___	41
37			31	32	33	34	36 . ___	37	40 . ___	41
38			31	32	33	34	36 . ___	37	40 . ___	41
39			31	32	33	34	36 . ___	37	40 . ___	41
40			31	32	33	34	36 . ___	37	40 . ___	41

D PESTICIDE APPLICATIONS D

Now I have some questions about pesticide and chemical applications to your **bearing fruit acreage** before harvest. Please consider all applications made to trees, vineyards or bushes which occurred **after last season's harvest.**

1. Since last year's (2018) harvest, did you use **herbicides** on any of your bearing fruit acreage?. . . . . ☐ **YES** ☐ **NO**

2. Since last year's (2018) harvest, did you use **insecticides, nematicides or miticides** on any of your bearing fruit acreage?. . . . . ☐ **YES** ☐ **NO**

3. Since last year's (2018) harvest, did you use any **fungicides** on any of your bearing fruit acreage?. . . . . ☐ **YES** ☐ **NO**

4. Since last year's (2018) harvest, did you use any other chemicals such as chemical thinners, growth regulators, microbial agents, pheromones, rodenticides, , etc. on any of your bearing fruit acreage?. . . . . ☐ **YES** ☐ **NO**

5. [**ENUMERATION ACTION:** *If ALL items 1 – 4 are NO, go to Section **E**, page; else continue*.]

D PESTICIDE APPLICATIONS D

[**ENUMERATOR ACTION:** *If pesticides were reported in Section B, column 6, continue. Otherwise, skip to Section E.*]

6. Now I need to get complete information on all of the chemicals applied, including applications made by you and/or by custom applicators during the 2019 crop year to each of the **target FRUIT crops** you grew. **Let's start with the first application to your** [*crop*] **since the 2018 crop year harvest.**
[*Complete the table for all chemical applications to the target FRUIT crops. Use supplemental tables if necessary.*]
(***Include*** *herbicides, insecticides, nematicides, miticides, fungicides, chemical thinners, growth regulators, microbial agents, pheromones, rodenticides, and soil fumigants.* ***Exclude*** *seed treatments, foliar applications of nutrients, and applications made to FRUIT after harvest.*)

				OFFICE USE LINES IN TABLE	TABLE 001 399	
		1	2	3	4	5
CHEMICAL PRODUCT NAME	LINE	CROP	CROP CODE	What products were applied to the [*crop*]? [*Enter product code.*]	Was this product bought in liquid or dry form? [*Enter L or D.*]	Was this part of a tank mix? [*If tank mix, enter line number of first product in mix.*]
	01			61		63
	02			61		63
	03			61		63
	04			61		63
	05			61		63
	06			61		63
	07			61		63
	08			61		63
	09			61		63
	10			61		63
	11			61		63
	12			61		63
	13			61		63
	14			61		63
	15			61		63

[*For pesticides not listed in Respondent Booklet, specify---*]

Line No.	Pesticide Type (*Herbicide, Insecticide, Fungicide, etc.*)	Trade Name and Formulation	Form Purchased (*Liquid or Dry*)	EPA Reg. No.

D PESTICIDE APPLICATIONS D

CODES FOR COLUMN 8

1 POUNDS	30 GRAMS
12 GALLONS	40 KILOGRAMS
13 QUARTS	41 LITERS
14 PINTS	46 SPIRALS
15 OUNCES, LIQUID	47 PACKETS
28 OUNCES, DRY	50 OTHER (*Specify:* _____)

LINE	6 **How much was applied per acre per application?**	**OR** 7 **What was the total amount applied per application?**	8 [*Enter unit code from above.*] **CODE**	9 **What percent of the rows were covered with an airblast application?** 100 All Rows; 50 Every Other Row; --- Other	10 **How many acres were treated with this product?** [*Include bearing acres only.*] **BEARING ACRES**	11 **How many times was this product applied?**
01	65 . ___ ___	73 .	74	75	77 .	79
02	65 . ___ ___	73 .	74	75	77 .	79
03	65 . ___ ___	73 .	74	75	77 .	79
04	65 . ___ ___	73 .	74	75	77 .	79
05	65 . ___ ___	73 .	74	75	77 .	79
06	65 . ___ ___	73 .	74	75	77 .	79
07	65 . ___ ___	73 .	74	75	77 .	79
08	65 . ___ ___	73 .	74	75	77 .	79
09	65 . ___ ___	73 .	74	75	77 .	79
10	65 . ___ ___	73 .	74	75	77 .	79
11	65 . ___ ___	73 .	74	75	77 .	79
12	65 . ___ ___	73 .	74	75	77 .	79
13	65 . ___ ___	73 .	74	75	77 .	79
14	65 . ___ ___	73 .	74	75	77 .	79
15	65 . ___ ___	73 .	74	75	77 .	79

[*For pesticides not listed in Respondent Booklet, specify---*]

Line No.	**Pesticide Type** (*Herbicide, Insecticide, Fungicide, etc.*)	**Trade Name and Formulation**	**Form Purchased** (*Liquid or Dry*)	**EPA No.**
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

D PESTICIDE APPLICATIONS D

CHEMICAL PRODUCT NAME	LINE	1 CROP	2 CROP CODE	3 What products were applied to the [*crop*]? [*Enter product code.*]	4 Was this product bought in liquid or dry form? [*Enter L or D.*]	5 Was this part of a tank mix? [*If tank mix, enter line number of first product in mix.*]
	16			61		63
	17			61		63
	18			61		63
	19			61		63
	20			61		63
	21			61		63
	22			61		63
	23			61		63
	24			61		63
	25			61		63
	26			61		63
	27			61		63
	28			61		63
	29			61		63
	30			61		63
	31			61		63
	32			61		63
	33			61		63

[*For pesticides not listed in Respondent Booklet, specify---*]

Line No.	Pesticide Type (*Herbicide, Insecticide, Fungicide, etc.*)	Trade Name and Formulation	Form Purchased (*Liquid or Dry*)	EPA Reg. No.

D PESTICIDE APPLICATIONS D

CODES FOR COLUMN 8

1 POUNDS	30 GRAMS
12 GALLONS	40 KILOGRAMS
13 QUARTS	41 LITERS
14 PINTS	46 SPIRALS
15 OUNCES, LIQUID	47 PACKETS
28 OUNCES, DRY	50 OTHER (*Specify:* _____)

LINE	6 OR 7 How much was applied per acre per application? / What was the total amount applied per application?	8 [*Enter unit code from above.*] CODE	9 What percent of the rows were covered? 100 All Rows; 50 Every Other Row; --- Other [*Enter percent covered.*]	10 How many acres were treated with this product? [*Include bearing acres only.*] BEARING ACRES	11 How many times was it applied? NUMBER
16	65 . ___ ___ / 73 .	74	75	77 .	79
17	65 . ___ ___ / 73 .	74	75	77 .	79
18	65 . ___ ___ / 73 .	74	75	77 .	79
19	65 . ___ ___ / 73 .	74	75	77 .	79
20	65 . ___ ___ / 73 .	74	75	77 .	79
21	65 . ___ ___ / 73 .	74	75	77 .	79
22	65 . ___ ___ / 73 .	74	75	77 .	79
23	65 . ___ ___ / 73 .	74	75	77 .	79
24	65 . ___ ___ / 73 .	74	75	77 .	79
25	65 . ___ ___ / 73 .	74	75	77 .	79
26	65 . ___ ___ / 73 .	74	75	77 .	79
27	65 . ___ ___ / 73 .	74	75	77 .	79
28	65 . ___ ___ / 73 .	74	75	77 .	79
29	65 . ___ ___ / 73 .	74	75	77 .	79
30	65 . ___ ___ / 73 .	74	75	77 .	79
31	65 . ___ ___ / 73 .	74	75	77 .	79
32	65 . ___ ___ / 73 .	74	75	77 .	79
33	65 . ___ ___ / 73 .	74	75	77 .	79

[*For pesticides not listed in Respondent Booklet, specify---*]

Line No.	Pesticide Type (*Herbicide, Insecticide, Fungicide, etc.*)	Trade Name and Formulation	Form Purchased (*Liquid or Dry*)	EPA No.
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

E PEST MANAGEMENT PRACTICES E

Now I have some questions about pest management practices you may have used on any of the **total fruit acres** on this operation. (***Include*** *bearing and non-bearing acreage of both target and non-target fruit crops grown.*)
By pests, we mean insects, weeds, and diseases.

[Enumerator Action: *Were PESTICIDE APPLICATIONS reported in Section B, column 6 on page 6?*]
☐ **YES** - [*Continue*.] ☐ **No** - [*Go to item 7*.]

		CODE
1. Was weather data used to assist in determining either the need or when to make pesticide applications?	**YES = 1**	600
2. Were any biological pesticides such as Bt (*Bacillus thuringiensis*), insect growth regulators (*Courier, intrepid, etc*.), neem or other natural/biological based products sprayed or applied to manage pests?	**YES = 1**	601
3. Were pesticides with different mechanisms of action rotated or tank mixed for the primary purpose of keeping pests from becoming resistant to pesticides?	**YES = 1**	602

4. In 2018, how were your fruit acres primarily scouted for insects, weeds, diseases and/or beneficial organisms? 608

1 By deliberately going to the fruit acres specifically for scouting activities. (*Enter code 1 and go to item 5*.)

2 By conducting general observations while performing routine tasks. (*Enter code 2 and go to item 6*.)

3 The fruit acres were not scouted. (*Enter code 3 and go to item 10*.)

5. Was an established scouting process used (*systemic sampling, recording counts, insect traps, etc*.) on any fruit acres?	**YES = 1**	609
6. Was scouting for pests done on these fruit acres due to---		
a. a pest advisory warning?	**YES = 1**	610
b. a pest development model?	**YES = 1**	611

7. Were your fruit acres scouted for –---	YES = 1	[*If column 1 is* ***YES****, ask*---] **Who did the majority of the scouting for** [*column 1*]— 1 Operator, partner or family member 2 An employee 3 Farm supply or chemical dealer 4 Independent crop consultant or commercial scout **CODE**
a. weeds?	612	614
b. insects or mites?	615	617
c. disease?	618	620

		CODE
8. Were written or electronic records kept to track the activity or numbers of weeds, insects or diseases?	YES = 1	623
9. Was scouting data compared to published information on infestation thresholds to determine when to take measures to manage pests?	YES = 1	624
10. Was field mapping data used for making pest management	YES = 1	625
11. Were the services of a diagnostic laboratory used for pest identification or soil or plant tissue pest analysis?	YES = 1	626
12. Were crop residues (*including drops, rotting fruit and/or debris*) removed to manage pests?	YES = 1	627
13. Were ground covers, mulches, or other physical barriers maintained to manage pest problems?	YES = 1	629
14. Were any beneficial organisms (*insects, nematodes, fungi*) applied or released to manage pests?	YES = 1	636
15. Were floral lures, attractants, repellants, pheromone traps or other biological pest controls used on any fruit acres?	YES = 1	637
16. Were any fruit acres cultivated for weed control during the growing season?	YES = 1	640
17. Were field edges, lanes, ditches, roadways or fence lines chopped, mowed, plowed, or burned to manage pests on any fruit acres?	YES = 1	642
18. Were equipment and implements cleaned after completing field work to reduce the spread of pests?	YES = 1	643
19. Were any fruit acres irrigated for the 2019 crops?	YES = 1	644
a. [*If item 19 is YES, ask*---] Were water management practices (excluding chemigation) such as irrigation scheduling, controlled drainage, or treatment	YES = 1	645

20. Were any of the following pesticide spraying practices or activities used on this operation in 2019? Pesticides include insecticides, fungicides, herbicides, bactericides, and plant growth regulators (PGR).

ENUMERATOR NOTE: Column 4: Choose items 1 – 5 and/or 6 for write-in response.

Pesticide Spraying Practice or Activity	(1) Was this used in 2019? Yes – 1 No – 3 Don't Know – 2	(2) Was it specifically used to keep pesticide application(s) on-target (i.e., reduce pesticide drift)? Yes – 1 No – 3 Don't Know – 2	(3) **(Complete column for every YES in Column 1)** Considering labor, training, capital expenditures, and other costs, how easy or difficult was it to implement this practice or activity? 1 – Very Easy 2 – Somewhat Easy 3 – Somewhat Difficult 4 – Very Difficult	(4) **(Complete column for every NO in Column 1)** Why was this practice or activity NOT used? Check all that apply. 1 – Cost of labor/training 2 – Cost of associated equipment/products 3 – Incompatible with current production practices (e.g., topography, equipment limitations) 4 – General time management issues/too busy 5 – Unfamiliar with activity or practice 6 – Other, specify:
a. Altering spray time(s) depending on weather conditions (e.g., wind speed, wind direction)				☐ __ __ __ __ __ ☐ Specify_____
b. Calibrate sprayer before the season				☐ __ __ __ __ __ ☐
c. Calibrate sprayer during the season				☐ __ __ __ __ __ ☐ Specify
d. Manually altering sprayer settings to improve the spray precision (e.g., turning off upper nozzles for smaller trees)				☐ __ __ __ __ __ ☐ Specify_____ _
e. Electronic eye/infra-red or other sensor-based technology (e.g., sonar)				☐ __ __ __ __ __ ☐
f. Other technologies to improve the spray precision (e.g., on/off nozzle spray technology, GPS technology, electrostatic sprayers)				☐ __ __ __ __ __ ☐ Specify_____
g. Pulse Width Modulation (PWM) (e.g. Aim Command, Raven's Hawk Eye, John Deere's Exact Apply)				☐ __ __ __ __ __ ☐ Specify_____
i. Other - Specify: _____				☐ __ __ __ __ __ ☐Specify_____ _

21. Which of the following spraying practices resulted in a sprayer re-calibration in 2019? Check all that apply.

a. Computer calibration alert system
b. Change in product being applied
c. Observed change in spray pattern (e.g., from worn nozzles)
d. Scheduled calibration (e.g., daily, monthly, annually)
e. When moving to a different block or crop
f. Other, specify: _____
g. None of the above

22. Which of the following methods of spraying did this operation use to make **insecticide/fungicide/ bactericides/plant growth regulator** applications in 2019? Check all that apply.

a. Conventional air blast sprayer(s)
b. Tower air blast sprayer(s)
c. Rotary atomizer air-assisted sprayer(s) (such as multi-head fan systems)
d. Over-the-row/tunnel sprayer(s), wrap-around sprayers, or other canopy directed sprayer(s)
e. Ground boom sprayer(s)
f. Aerial sprayer(s)
g. Spot treatments (e.g., backpack sprayers)
h. Trunk drench or vine drench (i.e., under the canopy)
i. Ultra-low volume (ULV) ground applications
j. Chemigation (such as through drip irrigation or micro-sprinklers)
k. Multi-row sprayer
l. Vertical boom
m. Other, specify: _____

23. Next we will discuss the use of air blast and ground boom tanks/systems on this operation in 2019:

	(1) For **Air Blast** tanks/systems	(2) For **Ground Boom** tanks/ systems
23a. What pesticide type(s) were used in this [insert tank system type] in 2019? Check all that apply.	1 Insecticides 2 Fungicides 3 Herbicides 4 Bactericides 4 Plant Growth Regulators (PGRs) 5.Other, please specify: _____	1 Insecticides 2 Fungicides 3 Herbicides 4 Bactericides 4 Plant Growth Regulators (PGRs) 5 Other, please specify: _____
23b. What is the typical spray volume, in Gallons per Acre (GPA), for pesticide applications in 2019?	1 Less than 25 GPA 2 25 to <50 GPA 3 50 to <75 GPA 4 75 to <100 GPA 5 100 to <200 GPA 6 200 or greater GPA 99 Don't Know	1 Less than 5 GPA 2 5 to < 7.5 GPA 3 7.5 to < 10 GPA 4 10 to < 15 GPA 5 15 to < 20 GPA 6 20 to < 25 GPA 7 25 or greater GPA 99 Don't Know
23c. What is the typical operating pressure, in PSI, for pesticide applications in 2019?	1 Less than 50 PSI 2 50 to <75 PSI 3 75 to <100 PSI 4 100 to <150 PSI 5 150 to <200 PSI 6 200 or greater PSI 99 Don't Know	1 Less than 10 PSI 2 10 to <20 PSI 3 20 to <30 PSI 4 30 to <40 PSI 5 40 to <50 PSI 6 50 to <60 PSI 7 60 to <70 PSI 8 70 to <80 PSI 9 80 to <90 PSI 10 90 PSI or greater 99 Don't Know

23d. What is the typical nozzle used when spraying herbicide applications in 2019?		1 Hollow Cone 2 Full Cone 3 Disc/Core Nozzle 4 Flat fan 5 Air-inclusion (AI)/Air-induction/Venturi 6 Other, specify: _____ 99 Don't Know
23e. What is the typical ground speed when spraying pesticide applications in 2019?	1 Less than 1 mph 2 1 to <2 mph 3 2 to <3 mph 4 3 to <4 mph 5 4 to <5 mph 6 5 mph or greater 99 Don't Know	1 Less than 1 mph 2 1 to <2 mph 3 2 to <3 mph 4 3 to <4 mph 5 4 to <5 mph 6 5 to <6 mph 7 6 to <7 mph 8 7 mph or greater 99 Don't Know
23f. What is the typical boom height above the ground or plant canopy when spraying herbicide applications in 2019?		1 < 24 inches 2 24 to < 36 inches 3 36 inches or greater 99 Don't Know
23g. What is the typical target droplet size spectrum for pesticide applications in 2019?	1 Less than 106 microns (Extremely Fine or Very Fine) 2 106-235 microns (Fine) 3 236-340 microns (Medium) 4 341-403 microns (Coarse) 5 404-502 microns (Very Coarse) 6 503-665 microns (Extremely Coarse) 7 Greater than 665 microns (Ultra Coarse) 99 Don't Know	1 Less than 106 microns (Extremely Fine or Very Fine) 2 106-235 microns (Fine) 3 236-340 microns (Medium) 4 341-403 microns (Coarse) 5 404-502 microns (Very Coarse) 6 503-665 microns (Extremely Coarse) 7 Greater than 665 microns (Ultra Coarse) 99 Don't Know
23h. For which of the following reasons did this operation change the airspeed (in Revolutions per Minute, or RPM) in 2019?	1 Crop stage 3 Change of product(s) 4 Use of specialty Plant Growth Regulator (PGR) applications (e.g., for thinning or fruit finish) 4 Moving between blocks 5 Wind speed or wind direction 6 Other, specify: _____ 7 Never	
23i. Which of the following practices were used in 2019?		1 Drift reducing adjuvant(s) 2 Drift reducing nozzle(s) 3 Shielded sprayers
23j. Is the MAJORITY of spray material from this operation's **air blast sprayer(s)** directed (select one):	1. Upward? 2. Horizontally? 3. Downward? 4. Both horizontal and upward? 5. Both horizontal and downward? 6. Don't Know	

24. Now we are going to ask a few questions about spray equipment maintenance in 2019.

ENUMERATOR NOTE (Question 24c, Columns 1-2): Choose items 1 – 9 and/or 8 for write-in response.

	(1) For **air blast** tanks/systems	(2) For **ground boom**

		tanks/systems
24a. How often did this operation clean the tanks/systems in 2019? *[If 1-6 answered for Item 24a, answer question 24b; otherwise go to 24c.*]	1 Before the season 2 After the season 3 Depended on the product(s) 4 When switching from USDA certified organic to conventional blocks 5 Regularly scheduled cleaning 6 Other, specify: _____ 7 Never	1 Before the season 2 After the season 3 Depended on the product(s) 4 When switching from USDA certified organic to conventional blocks 5 Regularly scheduled cleaning 6 Other, specify: _____ 7 Never
24b. For each time that the tank/system was cleaned, how often was a tank cleaner used?	1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know	1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know
24c. What were the most common reasons for replacing the nozzles on the sprayers in 2019? Check all that apply.	1 Regularly scheduled calendar-based replacement (i.e., annually, twice annually, monthly, etc.) 2 Regularly scheduled replacement based on operating time (i.e., sprayer operating hours) 3 Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles) 4 Calibration problems (i.e., too high or too low a flow rate) 5 Observed nozzle damage (e.g., change in spray pattern or leaks) 6 Availability of new nozzle technologies 7 Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.) 8 Other, please specify: _____ 9 None of the above ---------- ☐ _ _ _ _ _ _ ☐ Specify_____	1 Regularly scheduled calendar-based replacement (i.e., annually, twice annually, monthly, etc.) 2 Regularly scheduled replacement based on operating time (i.e., sprayer operating hours) 3 Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles) 4 Calibration problems (i.e., too high or too low a flow rate) 5 Observed nozzle damage (e.g., change in spray pattern or leaks) 6 Availability of new nozzle technologies 7 Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.) 8 Other, please specify: _____ 9 None of the above ---------- ☐ _ _ _ _ _ _ ☐ Specify_____

25. On what proportion did this operation use hedge rows or other wind-breaking structures (that are at least one and a half times the height of the crop canopy) for drift reduction in 2019?

a. 0%
b. 1% to 25%
c. 26% to 50%
d. 51% to 75%
e. 76% to <100%
f. Don't know

26. How often were the following sources of information used to inform pest management decisions in 2019?

Sources of Information	(1) How often was this source of information used? 1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know	(2) Which of these sources was this operation's **PRIMARY** source of pest management decisions? Select one. 1. Primary 2. Not Primary
a. Pesticide Product Labels		
b. University and/or Agricultural Cooperative Extension Resources/Recommendations		
c. Non-University literature, such as magazines or newspapers		
d. Grower/Trade Groups		
e. Pesticide Sales Representatives and/or Farm Supply Distributors		
f. Crop Consultants Paid for by the Operation		
g. Other Grower(s)		
h. Non-University Decision Tools		
i. Weather Forecasting Tools		
j. Other, Specify: _____		

27. (If 26b, column 1 equals 1, 2, 3) Which of the following types of services offered by the University and/or Agricultural Cooperative Extension were most often used as sources of pest management decisions in 2019?

University and/or Agricultural Cooperative Extension Services	How often was this source of information used? 1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know
a. Formal presentations (e.g., annual meetings, educational trainings)	
b. Field days/ demonstration workshops	
c. Farm visits and/or one-on-one consultation	
d. Email lists	
e. Newsletters	
f. Crop and/or Pest Protection Handbook	
g. Other publications (e.g., fact sheets)	
h. Decision tools	
i. Other, Specify: _____	

28. How often were the following practices used during the season to manage herbicide, fungicide and insecticide resistance in 2019?

Practices to Manage Resistance for Herbicide, Fungicide and Insecticide	**(Only complete if operation uses herbicides)** How often was each practice used on this operation to manage	**(Only complete if operation uses fungicides)** How often was each practice used on this operation to manage	**(Only complete if operation uses insecticides)** How often was each practice used on this operation to manage

	herbicide resistance? 1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know	**fungicide** resistance? 1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know	**insecticide** resistance? 1. Always (100%) 2. Often (51% or more) 3. Sometimes (50% or less) 4. Never (0%) 99. Don't Know
a. Scouting			
b. Field mapping weeds and/or keeping records of field history and pesticide use to assist pesticide decisions			
c. Field Management/Sanitation Practices:			
i. For weed control (e.g., managing weeds in field borders, tillage, preventing field-to-field and within field movement of weed seed)			
ii. For disease control (e.g., removing or incorporating unharvested fruit and/or other field litter)			
iii. For insect control (e.g., removing or incorporating unharvested fruit and/or other field litter)			
d. Planting disease-resistant cultivars and/or rootstock			
e. Use of pest diagnostic tools [e.g., Integrated Pest Management (IPM) treatment thresholds; predictive weather models (e.g., degree day models); pest forecasting systems, and/or assistance from diagnostic networks]			
f. Pesticide Mode of Action (MOA) rotation			
g. Pesticide Mode of Action (MOA) combination (i.e., tank mix or pre-mix product)			

29. In an effort to reduce off-target impacts to plants, pollinators, and/or beneficial insects, did this operation communicate with or consult any of the following sources in 2019? Check all that apply.

    a. Neighboring crop producers
    b. Nearby beekeepers
    c. A local expert, such as an Agricultural Cooperative Extension agent
    d. State Managed Pollinator Protection Plans, or MP3s (MP3s are state-developed efforts that intend to reduce pesticide exposure through timely communication and coordination among beekeepers, growers, pesticide applicators, and landowners)
    e. Driftwatch (Driftwatch is a voluntary communication tool that enables crop producers, beekeepers, and pesticide applicators to work together to protect crops and apiaries through the use of mapping programs.)
    f. Other communication tool(s), specify: _____

g. Other, specify: _____

30. How often were the following Best Management Practice (BMPs) used during the season in 2019?

Best Management Practices (BMPs)	(1) How often was this practice used? 1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99. Don't Know	(2) **[Only answer if respondents 1, 2, or 3 to column 1]** Was this practice specifically used to prevent exposure to bees? 1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99. Don't Know
a. Avoid bloom time applications		
b. Make applications when temperatures are below 50°F		
c. Maintain buffer between known bee hive locations		
d. Select pesticides that that have the lowest residual toxicity to bees		
e. Use alternative application methods of an active ingredient to prevent bee exposure (e.g., non-foliar applications when bees are foraging)		
f. Avoid applications when dew is forecast		
g. Manage blooming plants on the orchard floor before applying pesticides that are acutely toxic to bees (e.g., mowing)		
h. Make application(s) at nighttime or no more than two hours prior to sunset		
i. Other, specify: _____		

31. Which of the following auditing systems, if any, did this operation participate in in 2019? Check all that apply.
   a. GLOBALG.A.P.
   b. Safe Quality Food (*SQF)* Program
   c. Other, specify: _____
   d. This operation did not participate in an auditing system
   e. Don't know

COMPLETION CODE for FERTILIZER APPLICATIONS	
1 Incomp/R 3 Valid Zero	200

COMPLETION CODE for PESTICIDE APPLICATIONS	
1 Incomp/R 3 Valid Zero	300

COMPLETION CODE for PEST MANAGEMENT PRACTICES	
1 Incomp/R	500

NOTES:

CONCLUSION

SURVEY RESULTS

1. To receive the complete results of this survey on the release date, go to www.nass.usda.gov/results/. Would you rather have a brief summary mailed to you at a later date? . . . . . **YES = 1**

CODE 9990

[***Thank the respondent, then review this questionnaire.***]

ENDING TIME [*MILITARY*]. . . . . 005 ____ __ __ __ __

OFFICE USE TIME IN HOURS

006 . ___

RECORD USE

Did respondent use operation records to report pesticide data?. . . . . **YES = 1**

CODE 064

SUPPLEMENT USE

Record the total number of supplements used to complete this interview.

NUMBER

Fertilizer Supplements. 067

Pesticide Supplements. 068

Reported by: _____	9910 __ __ __ __ __ __ M M D D Y Y	9911 Telephone: _____

OFFICE USE

R. Unit	Ptr 1 Str	Ptr 2 Str	Ptr 3 Str	Ptr 4 Str	OPS	SSO 1	ADJ	Optional Use	
9921	9922	9923	9927	9928	923	9907	922	9906	9916

Response		Respondent		Mode		Enum.	POID
1-Comp 2-R 3-Inac 4-Office Hold	9901	1-Op/Mgr 2-Sp 3-Acct/Bkpr 4-Partner 9-Other	9902	2-Tel 3-Face-to-Face	9903	9998	9989 __ __ __ __ __ __ __ __ __ __

Eval.	Change
9900	9985