2019 FRUIT CHEMICAL USE SURVEY

OMB No. 0535-0218
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NATIONAL AGRICULTURAL STATISTICS SERVICE

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ENTERPRISE

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

CONTACT RECORD

DATE	TIME	NOTES

INTRODUCTION:

[Introduced 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. Your responses will be kept confidential and any person who willfully discloses any identifiable information about you or your operation is subject to a jail term, a fine, or both. This survey is conducted in accordance with the Confidential Information Protection provisions of Title V, Subtitle A, Public Law 107-347 and other applicable Federal laws. For more information on how we protect your information please visit: https://www.nass.usda.gov/confidentiality. 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 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.

H H M M

BEGINNING TIME [MILITARY]..... 004 __ __ __ __

☐ 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? [See page 3 for target crops.]
   - ☐ Yes - Continue
   - ☐ No - Write notes explaining the 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 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___	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 OPERATOR STATUS

[Enumerator Note: Skip this section if there is no change in operation name or operator.]

	Code
1. Has there been a change in operation name or operator?..... Yes=1 No=3	023

[If item 1 = 1, complete name and address information below for new operator and continue.
If item 1 = 3, go to Enumerator Note below.]

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

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

a. Does this include the farmstead, all cropland, woodland, pastureland, 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? INCLUDE 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**

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.

	Table 001
Office Use Lines in Table	
Line 99	199

LINE	1 Crop	2 Crop Code	3 How many bearing acres of [crop] did this operation have? Acres	4 Were any commercial fertilizers applied to this crop? Yes = 1 No = 3	5 Were any herbicides, insecticides, fungicides, etc. applied to this crop? Yes = 1 No = 3
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 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 fruit.
- 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 9.

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 such as irrigation water, foliar applications, etc. Record amount of an 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
200

Office Use Lines in Table	Table 001	299

LINE	1 Crop	2 Crop Code	3 NITROGEN N	4 PHOSPHATE P_2O_5	5 POTASH K_2O	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	23	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_2O_5	5 POTASH K_2O	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	23	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 miticide 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

[Enumerator Action: If all items 1 - 4 are No, go to Section E, page 14, otherwise continue.]

D PESTICIDE APPLICATIONS D

[Enumerator Action: If pesticides were reported in Section B, column 5, continue. Otherwise, go to Section E.]

5. 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.
   INCLUDE the table for all chemical applications to the target fruit crops. Use supplemental tables if necessary.
   INCLUDE herbicides, insecticides, nematicides, miticide 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

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.]
	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:_____)

Office Use

300

LINE	6 OR 7 How much was applied per acre per application?	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 Percent	10 How many acres were treated with this product? [Include bearing acres only.] Bearing Acres	11 How many times was this product applied? Number
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 Reg. 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?	6 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 Percent	10 How many acres were treated with this product? [Include bearing acres only.] Bearing Acres	11 How many times was this product 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 Reg. 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 5 on page 6?]

☐ Yes - Continue ☐ No - Go to item 4

		Code
1. Was weather data used to assist in determining either the need or when to make pesticide applications?	Yes=1 No=3	600
2. Were any biological pesticides such at Bt (*Bacillus thuringiensis*), insect growth regulators, such as Courier, intrepid, etc., neem or other natural/biological based products sprayed or applied to manage pests?	Yes=1 No=3	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 No=3	602

4. In 2019, how were your fruit acres primarily scouted for insects, weeds, diseases and/or beneficial organisms?.....

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 7.

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

..... Code 608

		Code
5. Was an established scouting process used such as systemic sampling, recording counts, insect traps, etc., on any fruit acres?	Yes=1 No=3	609
6. Was scouting for pests done on these fruit acres due to--		
a. a pest advisory warning?	Yes=1 No=3	610
b. a pest development model?	Yes=1 No=3	611

7. Were your fruit acres scouted for --	Yes = 1 No = 3	[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
a. weeds?.....	612	614
b. insects or mites?.....	615	617
c. disease?.....	618	620

E PEST MANAGEMENT PRACTICES E

		Code
8. Were written or electronic records kept to track the activity or numbers of weeds, insects or diseases?	Yes=1 No=3	623
9. Was scouting data compared to published information on infestation thresholds to determine when to take measures to manage pests?	Yes=1 No=3	624
10. Was field mapping data used for making pest management decisions?	Yes=1 No=3	625
11. Were the services of a diagnostic laboratory used for pest identification or soil or plant tissue pest analysis?	Yes=1 No=3	626
12. Were crop residues, including drops, rotting fruit and/or debris, removed to manage pests?	Yes=1 No=3	627
13. Were ground covers, mulches, or other physical barriers maintained to manage pest problems?	Yes=1 No=3	629
14. Were any beneficial organisms such as insects, nematodes, or fungi applied or released to manage pests?	Yes=1 No=3	636
15. Were floral lures, attractant repellants, pheromone traps or other biological pest controls used on any fruit acres?	Yes=1 No=3	637
16. Were any fruit acres cultivated for weed control during the growing season?	Yes=1 No=3	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 No=3	642
18. Were equipment and implements cleaned after completing field work to reduce the spread of pests?	Yes=1 No=3	643
19. Were any fruit acres irrigated for the 2019 crop?	Yes=1 No=3	644

[If item 19 = Yes, ask--]

a. Were water management practices, excluding chemigation, such as irrigation scheduling, controlled drainage, or treatment of retention water used to manage pests?	Yes=1 No=3	645

COMPLETION CODE for PEST MANAGEMENT PRACTICES	
1 Incomp/R	500

E PEST MANAGEMENT PRACTICES E

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).

Pesticide Spraying Practice or Activity	1 Was this used in 2019? 1 Yes 3 No 99 Don't Know	2 Was it specifically used to keep pesticide application(s) on target (i.e., reduce pesticide drift)? 1 Yes 3 No 99 Don't Know	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? List 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 issue/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)	5170	5171	5172	5173 _____ 5174 Specify:_____
b. Calibrate sprayer before the season	5190	5191	5192	5193 _____ 5194 Specify:_____
c. Calibrate sprayer during the season	5195	5196	5197	5198 _____ 5199 Specify:_____
d. Manually altering sprayer settings to improve the spray precision (e.g., turning off upper nozzles for smaller trees)	5200	5201	5202	5203 _____ 5204 Specify:_____
e. Electronic eye/infra-red or other sensor-based technology (e.g., sonar)	5165	5166	5167	5168 _____ 5169 Specify:_____
f. Other technologies to improve the spray precision (e.g., on/off nozzle spray technology, GPS technology)	5205	5206	5207	5208_____ 5209 Specify:_____
g. Pulse Width Modulation (PWM) (e.g., Aim Command, Raven's Hawk Eye, John Deere's Exact Apply)	5215	5216	5217	5218_____ 5219 Specify:_____
h. Other - Specify: 5225 _____	5220	5221	5222	5223_____ 5224 Specify:_____

E PEST MANAGEMENT PRACTICES E

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

5261 ☐ Computer calibration alert system

5262 ☐ Change in product being applied

5263 ☐ Observed change in spray pattern (e.g., from worn nozzles)

5264 ☐ Scheduled calibration (e.g., daily, monthly, annually)

5265 ☐ When moving to a different block or crop

5266 ☐ Other, specify: 5268_____

5267 ☐ 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, excluding herbicides, in 2019? Check all that apply.

5401 ☐ Conventional air blast sprayer(s)

5402 ☐ Tower air blast sprayer(s)

5403 ☐ Rotary atomizer air-assisted sprayer(s) (e.g. Proptec, Micron, or Curtex)

5404 ☐ Over-the-row/tunnel sprayer(s), wrap-around sprayers, or other canopy directed sprayer(s)

5405 ☐ Ground boom sprayer(s)

5406 ☐ Aerial application(s)

5407 ☐ Spot treatments (e.g., backpack sprayers)

5408 ☐ Trunk drench or vine drench (i.e., under the canopy)

5409 ☐ Ultra-low volume (ULV) ground applications (i.e. non-air assisted high pressure)

5410 ☐ Chemigation (such as through drip irrigation or micro-sprinklers)

5411 ☐ Multi-row sprayer

5412 ☐ Vertical boom (i.e. non-air assisted high pressure)

5413 ☐ Other, specify: 5400_____

E PEST MANAGEMENT PRACTICES E

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
a. What pesticide type(s) were used in this [insert tanks/systems type] in 2019? Check all that apply.	5420 ☐ Insecticides 5421 ☐ Fungicides 5422 ☐ Herbicides 5423 ☐ Bactericides 5424 ☐ Plant Growth Regulators (PGRs) 5425 ☐ Other: specify: 5426_____	5427 ☐ Insecticides 5428 ☐ Fungicides 5429 ☐ Herbicides 5430 ☐ Bactericides 5431 ☐ Plant Growth Regulators (PGRs) 5432 ☐ Other: specify: 5433_____
b. What is the typical spray volume, in Gallons per Acre (GPA), for pesticide applications in 2019? Select one item only.	5434 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	5435 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
c. What is the typical operating pressure, in PSI, for pesticide applications in 2019? Select one item only.	5436 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	5437 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
d. What is the typical nozzle used when spraying herbicide applications in 2019? Select one item only.		5438 1 ☐ Hollow Cone 2 ☐ Full Cone 3 ☐ Disc/Core Nozzle 4 ☐ Flat fan 5 ☐ Air-inclusion (AI)/Air-induction/Venturi 6 ☐ Other, specify: 5439_____ 99 ☐ Don't Know
e. What is the typical ground speed when spraying pesticide applications in 2019? Select one item only.	5440 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	5441 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
f. What is the typical boom height above the ground or plant canopy when spraying herbicide applications in 2019? Select one item only.		5442 1 ☐ <24 inches 2 ☐ 24 to <36 inches 3 ☐ 36 inches or greater 99 ☐ Don't know

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	1 For Air Blast tanks/systems	2 For Ground Boom tanks/systems
g. What is the typical target droplet size spectrum for pesticide applications in 2019? Select one item only.	5443 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	5444 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
h. For which of the following reasons did this operation change the airspeed (in revolutions per minute, or RPM) in 2019? Check all that apply.	5445 ☐ Crop stage 5446 ☐ Change of product(s) 5447 ☐ Use of specialty Plant Growth Regulator (PGR) applications (e.g., for thinning or fruit finish) 5448 ☐ Moving between blocks 5449 ☐ Wind speed or wind direction 5450 ☐ Other, specify: 5451 _____ 5452 ☐ Never	
i. Which of the following practices were used in 2019? Check all that apply.		5453 ☐ Drift reducing adjuvant(s) 5454 ☐ Drift reducing nozzle(s) 5455 ☐ Shielded sprayers
j. Is the majority of spray material from this operation's air blast sprayer(s) directed: Select one item only.	5456 1 ☐ Upward? 2 ☐ Horizontally? 3 ☐ Downward? 4 ☐ Both horizontal and upward? 5 ☐ Both horizontal and downward? 99 ☐ Don't know	

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

	1 For Air Blast tanks/systems	2 For Ground Boom tanks/systems
a. How often did this operation clean the tanks/systems in 2019? Check all that apply. [If the never box is checked for Item 5464 in Column 1 or 5276 in Column 2, then skip item 24b and go to 24c; otherwise go to 24b.]	5457 ☐ Before the season 5458 ☐ After the season 5459 ☐ Depended on the product(s) 5460 ☐ When switching from USDA certified organic to conventional blocks 5461 ☐ Regularly scheduled cleaning 5432 ☐ Other: specify: 5463 _____ 5464 ☐ Never	5271 ☐ Before the season 5272 ☐ After the season 5273 ☐ Depended on the product(s) 5278 ☐ When switching from USDA certified organic to conventional blocks 5274 ☐ Regularly scheduled cleaning 5275 ☐ Other: specify: 5277 _____ 5276 ☐ Never
b. For each time that the tank/system was cleaned, how often was a tank cleaner used?	5473 1 ☐ Always (100%) 2 ☐ Often (51% or more) 3 ☐ Sometimes (50% or less) 4 ☐ Never (0%) 99 ☐ Don't know	5279 1 ☐ Always (100%) 2 ☐ Often (51% or more) 3 ☐ Sometimes (50% or less) 4 ☐ Never (0%) 99 ☐ Don't know
c. What were the most common reasons for replacing the nozzles on the sprayers in 2019? Check all that apply.	5481 ☐ Regularly scheduled calendar based replacement (i.e., annually, twice annually, monthly, etc.) 5482 ☐ Regularly scheduled replacement based on operating time (I.e., sprayer operating hours) 5483 ☐ Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles) 5484 ☐ Calibration problems (i.e., too high or too low a flow rate) 5485 ☐ Observed nozzle damage (e.g., change in spray pattern or leaks) 5486 ☐ Availability of new nozzle technologies 5487 ☐ Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.) 5488 ☐ Other, please specify: 5480 _____ 5489 ☐ None of the above	5491 ☐ Regularly scheduled calendar based replacement (i.e., annually, twice annually, monthly, etc.) 5492 ☐ Regularly scheduled replacement based on operating time (I.e., sprayer operating hours) 5493 ☐ Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles) 5494 ☐ Calibration problems (i.e., too high or too low a flow rate) 5495 ☐ Observed nozzle damage (e.g., change in spray pattern or leaks) 5496 ☐ Availability of new nozzle technologies 5497 ☐ Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.) 5498 ☐ Other, please specify: 5490 _____ 5499 ☐ None of the above

25. On what proportion of fields 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?

5300 1 ☐ 0% 2 ☐ 1% to 25% 3 ☐ 26% to 50%

4 ☐ 51% to 75% 5 ☐ 76% to 100% 99 ☐ Don't know

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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 Code	2 Which of these sources was this operation's primary source of pest management decisions? Select one. 1 Primary 2 Not primary Code
a. Pesticide product labels.....	5301	5302
b. University and/or Agricultural Cooperative Extension resources/recommendations.....	5303	5304
c. Non-university literature, such as magazines or newspapers..	5305	5306
d. Grower/trade groups.....	5307	5308
e. Pesticide sales representatives and/or farm supply distributors.....	5309	5310
f. Crop consultants paid for by the operation.....	5311	5312
g. Other grower(s).....	5313	5314
h. Non-university decision tools.....	5315	5316
i. Weather forecasting tools.....	5317	5318
j. Other, Specify:[5319] _____.....	5320	5321

27. [If 26b, column 1 equals 1, 2, 3, ask--] 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 Code
a. Formal presentations (e.g., annual meetings, educational trainings)...	5322
b. Field days/demonstration workshops.....	5323
c. Farm visits and/or one-on-one consultation.....	5324
d. Email lists.....	5325
e. Newsletters.....	5326
f. Crop and/or Pest Protection Handbook.....	5327
g. Other publications (e.g., fact sheets).....	5328
h. Decision tools.....	5329
i. Other, Specify:[5330] _____.....	5331

E PEST MANAGEMENT PRACTICES E

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

Practice 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 herbicide resistance? 1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99 Don't know	Only complete if operation uses fungicides How often was each practice used on this operation to manage fungicide resistance? 1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99 Don't know	Only complete if operation uses insecticides How often was each practice used on this operation to manage insecticide resistance? 1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99 Don't know
a. Scouting.....	5510	5511	5512
b. Field mapping weeds and/or keeping records of field history and pesticide use to assist pesticide decisions.....	5332	5333	5334
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).....	5335		
ii. For disease control (e.g., removing or incorporating unharvested fruit and/or other field litter).....		5336	
iii. For insect control (e.g., removing or incorporating unharvested fruit and/or other field litter).....			5337
d. Planting disease-resistant cultivars and/or rootstock.....		5338	
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).....		5342	5343
f. Pesticide Mode of Action (MOA) rotation.....	5344	5345	5346
g. Pesticide Mode of Action (MOA) combination (i.e., tank mix or pre-mix product).....	5347	5348	5349

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.

5351 ☐ Neighboring crop producers

5352 ☐ Nearby beekeepers

5353 ☐ A local expert, such as an Agricultural Cooperative Extension agent

5354 ☐ State managed pollinator protection plans, or MP3s (MP3s are state-developed efforts that intend to reduce pesticide exposure through timely communication and coordination among beekeeper growers, pesticide applicators, and landowners)

5355 ☐ Driftwatch - Driftwatch is a voluntary communication tool that enables crop producers, beekeeper and pesticide applicators to work together to protect crops and apiaries through the use of mapping programs.

5356 ☐ Other communication tool(s), Specify: 5358_____

5357 ☐ Other, Specify: 5359_____

E PEST MANAGEMENT PRACTICES E

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

Best Management Practices	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 column 1 = 1, 2, or 3] 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.....	5520	5521
b. Make applications when temperatures are below 50°F.....	5522	5523
c. Maintain buffer between known beehive locations.....	5524	5525
d. Select pesticides that have the lowest residual toxicity to bees.....	5526	5527
e. Use alternative application methods of an active ingredient to prevent bee exposure (e.g., non-foliar applications when bees are foraging).....	5528	5529
f. Avoid applications when dew is forecast.....	5530	5531
g. Manage blooming plants on the orchard floor before applying pesticides that are acutely toxic to bees (e.g., mowing).....	5532	5533
h. Make application(s) at nighttime or no more than two hours prior to sunset.....	5534	5535
i. Other, Specify:5536_____....	5537	5538

31. Which of the following auditing systems, if any, did this operation participate in during 2019? Check all that apply.

5361 ☐ GLOBAL G.A.P.

5362 ☐ State Quality Food (SQF) Program

5363 ☐ Other, Specify:5365_____

5364 ☐ The operation did not participate in an auditing system

5369 ☐ Don't know

CONCLUSION

1. To receive the complete results of this survey on the release date, go to https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/

To have a summary emailed to you at a later date, please enter your email address. 1095

[Thank the respondent, then review this questionnaire.]

Ending time [Military]..... H H M M 0005 ___ ___ ___ ___

Office Use Time in Hours 006 ._____

Record Use

Did respondent use operation records to report pesticide data? Code (Yes=1 No=3) 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-Spouse 3-Acct/Bkpr 4-Partner 9-Other	9902	2-PATI (tel) 3-PAPI (Face-to-Face)	9903	9998	9989	
							Eval.	Change
							9900	9985