

# 2020 VEGETABLE CHEMICAL USE SURVEY

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California Enterprise

<b>VERSION</b> <b>01</b>	<b>POID</b> _____	<b>SUBTRACT</b> _____
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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 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**. We encourage you to refer to your records during the interview.

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.

**BEGINNING TIME [MILITARY].** ..... \_\_\_\_\_

004  
\_\_\_\_\_

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

During the screening phase of the Vegetable Chemical Use Survey conducted in June and July, your operation was found to be growing or intending to grow vegetables this year. I now need to verify some of the information collected during the screening survey.

Verify operation name and operator on label and/or screener.

- If no changes, go to Section A, page 5.
- If changed, continue to "Change in Operating Status".

## CHANGE IN OPERATING STATUS

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[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.]

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

**CODE**

023

Operation Name \_\_\_\_\_

Operator Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Phone (\_\_\_\_\_) \_\_\_\_\_

[ENUMERATOR NOTE: If the operation on the face page was in business part of the 2020 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.]

# SCREENING

1. Did this operation have any of the target crops during the 2020 crop year?

**YES** - [Continue.]

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

**Notes:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

one individual? [Go to California Screening, page 4.]

a hired manager? [Go to California Screening, page 4.]

partners? [Continue with questions 3 and 4.]

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 **California Screening**, page 4.  
(Partners jointly operate land and share in decision making. **Do not include** landlords and tenants as partners.).....

NUMBER

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4. Please identify the other person(s) in this partnership, then go to **California Screening**, page 4.

[Verify partners' names and make necessary corrections if names have already been entered.]

<b>PARTNERS</b> <b>POID</b> _____	<b>PARTNERS</b> <b>POID</b> _____
PARTNER NAME	PARTNER NAME
ADDRESS	ADDRESS
CITY                      STATE      ZIP	CITY                      STATE      ZIP
PHONE NUMBER <input type="checkbox"/> Check if cell phone	PHONE NUMBER <input type="checkbox"/> Check if cell phone
<b>PARTNERS</b> <b>POID</b> _____	<b>PARTNERS</b> <b>POID</b> _____
PARTNER NAME	PARTNER NAME
ADDRESS	ADDRESS
CITY                      STATE      ZIP	CITY                      STATE      ZIP
PHONE NUMBER <input type="checkbox"/> Check if cell phone	PHONE NUMBER <input type="checkbox"/> Check if cell phone

# CALIFORNIA SCREENING

1. What ID (*pesticide permit number*) does this operation use for reporting pesticide applications on the target acres to the County Agricultural Commissioners? .....

**COUNTY**

--	--

**NUMBER**

--	--	--	--

2. Is this ID used to report pesticide applications for any other operations?

**YES** - [Continue.]                       **NO** - [Go to item 3.]

a. What other operation(s) is this ID used to report for?

Name _____ Address _____ Phone (    ) _____ <input type="checkbox"/> Check if cell phone	Name _____ Address _____ Phone (    ) _____ <input type="checkbox"/> Check if cell phone
--	--

3. Does this operation use any **OTHER** ID's to report pesticide applications on the target acres to the County Agricultural Commissioners?

**YES** - [Continue.]                       **NO** - [Go to Section A.]

a. What are these other ID numbers? .....

**COUNTY**


**NUMBER**


b. Do you use any of these ID's to report pesticide applications for any other operation(s)?

**YES** - [Continue.]                       **NO** - [Go to Section A.]

(i) What other operation(s) use this ID for reporting? [*Identify operation and ID.*]

Name _____ Reporting ID _____ Address _____ Phone (    ) _____ <input type="checkbox"/> Check if cell phone	Name _____ Reporting ID _____ Address _____ Phone (    ) _____ <input type="checkbox"/> Check if cell phone
--	--

ACRES OPERATED

[Enumerator Action: If acreage on the insert is verified as correct, enter code 1 in box 801, then skip to Section B. If acreage has changed, ask ALL questions.]

801

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 vegetables? (Include both target and non-target vegetables planted on the operation.) ..... 803

1. What **target VEGETABLE crops** were on these [Section A, item 2] acres during the 2020 crop year? (*Exclude new plantings of vegetables not intended for harvest in 2020.*)

[Enumerator Note: *If no target acreage is present, write notes and skip to "Conclusion" on back page*

OFFICE USE LINES IN TABLE	TABLE 001	199
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LINE	1	2	3	4	5	6	7
	CROP	CROP CODE	How many acres of [crop] did this operation have? ACRES	Were any commercial fertilizers applied to this crop? [YES = 1]	Were any herbicides, insecticides, fungicides, etc. applied to this crop? [YES = 1]	On what date did you complete harvest of your 2017 crop year on these [crop] acres? MM DD YY	On what date did you complete harvest of your 2020 crop year [crop]? MM DD YY
01			11	12	13	14	15
02			11	12	13	14	15
03			11	12	13	14	15
04			11	12	13	14	15
05			11	12	13	14	15
06			11	12	13	14	15
07			11	12	13	14	15
08			11	12	13	14	15
09			11	12	13	14	15
10			11	12	13	14	15
11			11	12	13	14	15
12			11	12	13	14	15
13			11	12	13	14	15
14			11	12	13	14	15
15			11	12	13	14	15

CALIFORNIA – CROP CODES

701 ASPARAGUS	714 CAULIFLOWER	LETTUCE	759 SPINACH
613 BEANS, SNAP	715 CELERY	725 HEAD	742 SQUASH
705 BROCCOLI	766 CORN, SWEET	728 OTHER	748 STRAWBERRIES
808 CABBAGE	798 CUCUMBERS	824 ONIONS	770 TOMATOES
709 CANTALOUPE	723 GARLIC	736 PEPPERS, BELL	752 WATERMELONS
632 CARROTS	730 HONEYDEW	738 PUMPKINS	

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L I N E	CAL – EPA SITE LOCATION NUMBER <i>(If Required)</i>						
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							

**INCLUDES AND EXCLUDES**

<p><b>INCLUDE:</b></p> <p>TARGET CROPS ONLY</p> <p>All acreage equal to or greater than one tenth of an acre.</p> <p>All acreage for processing or fresh market.</p> <p>All acreage for roadside stands, farmer’s markets or U-pick sales.</p> <p>Acreage not harvested due to weather, economic or other reasons.</p> <p>Crops planted in the fall of 2017 if they were part of the 2020 crop.</p> <p>Double Cropping.</p>	<p><b>EXCLUDE:</b></p> <p>ALL CROPS GROWN IN ANOTHER STATE.</p> <p>All crops grown in greenhouses and hothouses.</p> <p>All vegetables grown for commercial transplanting.</p> <p>HOME GARDEN vegetable acreage.</p> <p>All mushrooms, potatoes, sweetpotatoes, dry beans.</p> <p>All vegetable acres grown by institutional, experimental, research and university farms.</p> <p>Non-target vegetables.</p>
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Now I have some questions about pest management practices you may have used on any of the **total vegetable acres** on this operation. (*Include both target and non-target vegetable 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	600 _____
2. Were any biological pesticides such as Bt ( <i>Bacillus thuringiensis</i> ), insect growth regulators ( <i>Courier, intrepid, etc.</i> ), 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 2020, how were your vegetable acres primarily scouted for insects, weeds, diseases and/or beneficial organisms? .....		608 _____
<div style="display: flex; justify-content: space-between;"> <div style="width: 65%;"> <p>1 By deliberately going to the vegetable acres specifically for scouting activities. (Enter code 1 and go to item 5.)</p> <p>2 By conducting general observations while performing routine tasks. (Enter code 2 and go to item 7.)</p> <p>3 The vegetable acres were not scouted. (Enter code 3 and go to item 10.)</p> </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p>.....</p> </div> </div>		
5. Was an established scouting process used ( <i>systemic sampling, recording counts, insect traps, etc.</i> ) on any vegetable acres? .....	YES = 1	609 _____
6. Was scouting for pests done on these vegetable acres due to---		
a. a pest advisory warning? .....	YES = 1	610 _____
b. a pest development model? .....	YES = 1	611 _____

1		2 [If column 1 is YES, ask---] <b>Who did the majority of the scouting for [column 1]—</b>
7. Were your vegetable acres scouted for ---	YES = 1	CODE
a. weeds? .....	612	614
b. insects and mites? .....	615	617



**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	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 decisions? .....	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 plowed down or removed to manage pests? .....	YES = 1	627
13. Were crops rotated during the past three years for the purpose of managing pests? .....	YES = 1	628
14. Were ground covers, mulches, or other physical barriers maintained to manage pest problems? .....	YES = 1	629
15. Was a crop variety chosen because it had resistance to a specific pest? .....	YES = 1	630
16. Was no-till or minimum till used to manage pests? .....	YES = 1	631
17. Were planting locations planned to avoid infestation of pests? .....	YES = 1	632
18. Were planting or harvesting dates adjusted to manage pests? .....	YES = 1	633
19. Were row spacing or plant density adjusted to manage pests? .....	YES = 1	634
20. Was a trap crop grown to help manage insects? .....	YES = 1	635
21. Were any beneficial organisms ( <i>insects, nematodes, fungi</i> ) applied or released to manage pests? .....	YES = 1	636
22. Were floral lures, attractants, repellants, pheromone traps or other biological pest controls used on any vegetable acres? .....	YES = 1	637
23. Were any vegetable acres cultivated for weed control during the growing season? .....	YES = 1	640
24. Were field edges, lanes, ditches, roadways or fence lines chopped, mowed, plowed, or burned to manage pests on any vegetable acres? .....	YES = 1	642
25. Were equipment and implements cleaned after completing field work to reduce the spread of pests? .....	YES = 1	643
26. Were any vegetable acres irrigated for the 2020 crops? .....	YES = 1	644
a. <i>[If item 26 = YES, ask---]</i> Were water management practices (excluding chemigation) such as irrigation scheduling, controlled drainage, or treatment of retention water used to manage pests? .....	YES = 1	645

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

COMPLETION CODE for PEST MANAGEMENT PRACTICES	
1 Incomp/R	500

**E-1**

**PEST MANAGEMENT PRACTICES**

**E-1**

**Enumerator Note:** For the remaining questions, primary target crop is defined as the largest target crop by acres planted for harvest in 2020, as reported in Section B, Question 1.

The primary target crop on this operation is: \_\_\_\_\_ crop / \_\_\_\_\_ crop code.

1. Were any of the following pesticide spraying practices or activities used on this operation for [insert primary target crop] in 2020? Pesticides include insecticides, fungicides, herbicides, bactericides, nematocides, and plant growth regulators (PGR).

Pesticide Spraying Practice or Activity	1  Was this used in 2020?  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., altering spray pressure, ground speed, and/or boom height)	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, variable-rate 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: _____

2. Which of the following spraying practices resulted in a sprayer re-calibration for [insert primary target crop] in 2020? 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

3. Excluding application of herbicides, which of the following methods of spraying did this operation use to apply insecticide/fungicide/bactericides/nematicides/plant growth regulator for [insert primary target crop] in 2020? Check all that apply.

- 5405  Ground boom sprayer(s)
- 5406  Aerial application(s)
- 5407  Spot treatments (e.g., backpack sprayers)
- 5410  Chemigation (such as through drip irrigation or micro-sprinklers)
- Air blast / Air-assisted sprayer(s)
- xxxx \_\_\_\_\_
- 5413 Other, specify: 5400 \_\_\_\_\_
- 
- 
- 

4. Pre-emergence pesticide applications are pesticides that are applied both prior to planting and/or before the emergence of the vegetables for early-season pest management. Pesticides include insecticides, fungicides, herbicides, bactericides, nematicides, and plant growth regulators (PGR). Did this operation make any pre-emergence pesticide applications using air blast sprayer and/or ground boom sprayers for [insert primary target crop] in 2020?

- 0000  Yes, made pre-emergence pesticide applications using air blast / air-assisted sprayer(s) - Complete Column 1
- 0000  Yes, made pre-emergence pesticide applications using ground boom sprayers - Complete Column 2
- 0000  No, did not make pre-emergence pesticide applications - Go to item 5

	1	2
	For Air blast / Air-assisted sprayer(s) systems	For Ground Boom systems
a. What pesticide type(s) were used in this [insert systems type] pre-emergence in 2020? Check all that apply.	5420 <input type="checkbox"/> Insecticides 5421 <input type="checkbox"/> Fungicides 5422 <input type="checkbox"/> Herbicides 5423 <input type="checkbox"/> Bactericides xxxx <input type="checkbox"/> Nematicides 5424 <input type="checkbox"/> Plant Growth Regulators (PGRs)	5427 <input type="checkbox"/> Insecticides 5428 <input type="checkbox"/> Fungicides 5429 <input type="checkbox"/> Herbicides 5430 <input type="checkbox"/> Bactericides Xxxx <input type="checkbox"/> Nematicides 5431 <input type="checkbox"/> Plant Growth Regulators (PGRs) 5432 <input type="checkbox"/> Other: specify: 5433 _____
b. What is the typical spray volume, in Gallons per Acre (GPA), for pesticide applications pre-emergence in 2020? Select one item only.	5425 Other: specify: 5426 _____ 5434 1 <input type="checkbox"/> Less than 25 GPA 2 <input type="checkbox"/> 25 to <50 GPA 3 <input type="checkbox"/> 50 to <75 GPA 4 <input type="checkbox"/> 75 to <100 GPA 5 <input type="checkbox"/> 100 to <200 GPA 6 <input type="checkbox"/> 200 or greater GPA 99 <input type="checkbox"/> Don't Know	5435 1 <input type="checkbox"/> Less than 5 GPA 2 <input type="checkbox"/> 5 to <7.5 GPA 3 <input type="checkbox"/> 7.5 to <10 GPA 4 <input type="checkbox"/> 10 to <15 GPA 5 <input type="checkbox"/> 15 to <20 GPA 6 <input type="checkbox"/> 20 to <25 GPA 7 <input type="checkbox"/> 25 or greater GPA 99 <input type="checkbox"/> Don't Know
c. What is the typical operating pressure, in PSI, for pesticide applications pre-emergence in 2020? Select one item only.	5436 1 <input type="checkbox"/> Less than 50 PSI 2 <input type="checkbox"/> 50 to <75 PSI 3 <input type="checkbox"/> 75 to <100 PSI 4 <input type="checkbox"/> 100 to <150 PSI 5 <input type="checkbox"/> 150 to <200 PSI 6 <input type="checkbox"/> 200 or greater PSI 99 <input type="checkbox"/> Don't Know	5437 1 <input type="checkbox"/> Less than 10 PSI 2 <input type="checkbox"/> 10 to <20 PSI 3 <input type="checkbox"/> 20 to <30 PSI 4 <input type="checkbox"/> 30 to <40 PSI 5 <input type="checkbox"/> 40 to <50 PSI 6 <input type="checkbox"/> 50 to <60 PSI 7 <input type="checkbox"/> 60 to <70 PSI 8 <input type="checkbox"/> 70 to <80 PSI 9 <input type="checkbox"/> 80 to <90 PSI 10 <input type="checkbox"/> 90 PSI or greater 99 <input type="checkbox"/> Don't know
d. What is the typical nozzle used when spraying pesticide applications pre-emergence in 2020? Select one item only.	1 <input type="checkbox"/> Hollow Cone 2 <input type="checkbox"/> Full Cone 3 <input type="checkbox"/> Disc/Core Nozzle 4 <input type="checkbox"/> Flat fan 5 <input type="checkbox"/> Air-inclusion (AI) Air-induction 6 <input type="checkbox"/> Other, specify: xxxx _____ 99 <input type="checkbox"/> Don't Know	5438 1 <input type="checkbox"/> Hollow Cone 2 <input type="checkbox"/> Full Cone 3 <input type="checkbox"/> Disc/Core Nozzle 4 <input type="checkbox"/> Flat fan 5 <input type="checkbox"/> Air-inclusion (AI)/Air-induction/Venturi 6 <input type="checkbox"/> Other, specify: 5439 _____ 99 <input type="checkbox"/> Don't Know
e. What is the typical ground speed when spraying pesticide applications pre-emergence in 2020? Select one item only.	5440 1 <input type="checkbox"/> Less than 1 mph 2 <input type="checkbox"/> 1 to <2 mph 3 <input type="checkbox"/> 2 to <3 mph 4 <input type="checkbox"/> 3 to <4 mph 5 <input type="checkbox"/> 4 to <5 mph 6 <input type="checkbox"/> 5 mph or greater 99 <input type="checkbox"/> Don't Know	5441 1 <input type="checkbox"/> Less than 1 mph 2 <input type="checkbox"/> 1 to <2 mph 3 <input type="checkbox"/> 2 to <3 mph 4 <input type="checkbox"/> 3 to <4 mph 5 <input type="checkbox"/> 4 to <5 mph 6 <input type="checkbox"/> 5 to <6 mph 7 <input type="checkbox"/> 6 to <7 mph 8 <input type="checkbox"/> 7 mph or greater 99 <input type="checkbox"/> Don't know
f. What is the typical boom height above the ground when spraying pesticide applications pre-emergence in 2020? Select one item only.	1 <input type="checkbox"/> <24 inches 2 <input type="checkbox"/> 24 to <36 inches 3 <input type="checkbox"/> 36 inches or greater 4 <input type="checkbox"/> Don't know	5442 1 <input type="checkbox"/> <24 inches 2 <input type="checkbox"/> 24 to <36 inches 3 <input type="checkbox"/> 36 inches or greater 99 <input type="checkbox"/> Don't know

	For Air blast / Air-as <sup>1</sup> isted sprayer(s) systems	<input checked="" type="checkbox"/> <sup>2</sup> For Ground Boom systems
g. What is the typical target droplet size spectrum for pesticide applications pre-emergence in 2020? Select one item only.	5443 1 <input type="checkbox"/> Less than 106 microns (Extremely Fine or Very Fine) 2 <input type="checkbox"/> 106-235 microns (Fine) 3 <input type="checkbox"/> 236-340 microns (Medium) 4 <input type="checkbox"/> 341-403 microns (Coarse) 5 <input type="checkbox"/> 404-502 microns (Very Coarse) 6 <input type="checkbox"/> 503-665 microns (Extremely Coarse) 7 <input type="checkbox"/> Greater than 665 microns (Ultra Coarse) 99 <input type="checkbox"/> Don't Know	5444 1 <input type="checkbox"/> Less than 106 microns (Extremely Fine or Very Fine) 2 <input type="checkbox"/> 106-235 microns (Fine) 3 <input type="checkbox"/> 236-340 microns (Medium) 4 <input type="checkbox"/> 341-403 microns (Coarse) 5 <input type="checkbox"/> 404-502 microns (Very Coarse) 6 <input type="checkbox"/> 503-665 microns (Extremely Coarse) 7 <input type="checkbox"/> Greater than 665 microns (Ultra Coarse) 99 <input type="checkbox"/> Don't Know
h. For which of the following reasons did this operation change the airspeed (in revolutions per minute, or RPM) pre-emergence in 2020? Check all that apply.	5445 <input type="checkbox"/> Crop stage 5446 <input type="checkbox"/> Change of product(s) 5447 <input type="checkbox"/> Use of specialty Plant Growth Regulator (PGR) applications (e.g., for thinning or fruit finish) 5448 <input type="checkbox"/> Moving between blocks 5449 <input type="checkbox"/> Wind speed or wind direction 5450 <input type="checkbox"/> Other, specify: <sup>5451</sup>	
i. Which of the following practices were used pre-emergence in 2020? Check all that apply.	5452 <input type="checkbox"/> Never 5453 <input type="checkbox"/> Drift reducing adjuvant(s) 5454 <input checked="" type="checkbox"/> Drift reducing nozzle(s) 5454 <input checked="" type="checkbox"/> Shielded sprayers Xxxx <input checked="" type="checkbox"/> Don't know - - - -	5453 <input type="checkbox"/> Drift reducing adjuvant(s) 5454 <input type="checkbox"/> Drift reducing nozzle(s) 5455 <input type="checkbox"/> Shielded sprayers 0000 <input type="checkbox"/> Don't know

5. Post-emergence pesticide applications are made to control pests that occur after emergence of the vegetables.

Pesticides include insecticides, fungicides, herbicides, bactericides, nematocides, and plant growth regulators (PGR). Did this operation make any post-emergence pesticide applications using air blast sprayers and/or ground boom sprayers for [insert primary target crop] in 2020?

- 5241  Yes, made post-emergence pesticide applications using air-assisted sprayer(s) - Complete Column 1
- 5240  Yes, made post-emergence pesticide applications using ground boom sprayers - Complete Column 2
- 5242  No, did not make post-emergence pesticide applications - Go to item 6



	1 For Air blast / systems Air-assisted sprayer(s)	2 For Ground Boom systems
<p>A. What pesticide type(s) were used in this [insert systems type] post-emergence in 2020? Check all that apply.</p>	<p>5420 <input type="checkbox"/> Insecticides  5421 <input type="checkbox"/> Fungicides  5422 <input type="checkbox"/> Herbicides  xxxx <input type="checkbox"/> Bactericides  5423 <input type="checkbox"/> Nematicides  5424 <input type="checkbox"/> Plant Growth Regulators (PGRs) Other:  specify: 5426 _____</p>	<p>5427 <input type="checkbox"/> Insecticides  5428 <input type="checkbox"/> Fungicides  5429 <input checked="" type="checkbox"/> &lt;24 inches  5430 <input checked="" type="checkbox"/> 24 to &lt;36 inches  5431 <input type="checkbox"/> 36 inches or greater  xx <input type="checkbox"/> Don't know  5432 <input type="checkbox"/> PGRs) Other: _____</p>
<p>B. What is the typical spray volume, in Gallons per Acre (GPA), for pesticide applications post-emergence in 2020? Select one item only.</p>	<p>5425 <input type="checkbox"/> Less than 25 GPA  5434 <input type="checkbox"/> 25 to &lt;50 GPA  1 <input type="checkbox"/> 50 to &lt;75 GPA  2 <input type="checkbox"/> 75 to &lt;100 GPA  3 <input type="checkbox"/> 100 to &lt;200 GPA  4 <input type="checkbox"/> 200 or greater GPA  5 <input type="checkbox"/> Don't Know  6 <input type="checkbox"/></p>	<p>5432 specify: 5433 _____  5435 <input type="checkbox"/> Less than 5 GPA  1 <input type="checkbox"/> 5 to &lt;7.5 GPA  2 <input type="checkbox"/> 7.5 to &lt;10 GPA  3 <input type="checkbox"/> 10 to &lt;15 GPA  4 <input type="checkbox"/> 15 to &lt;20 GPA  5 <input type="checkbox"/> 20 to &lt;25 GPA  6 <input type="checkbox"/> 25 or greater GPA  7 <input type="checkbox"/> Don't Know  99 <input type="checkbox"/></p>
<p>C. What is the typical operating pressure, in PSI, for pesticide applications post-emergence in 2020? Select one item only.</p>	<p>5436 <input type="checkbox"/> Less than 50 PSI  1 <input type="checkbox"/> 50 to &lt;75 PSI  2 <input type="checkbox"/> 75 to &lt;100 PSI  3 <input type="checkbox"/> 100 to &lt;150 PSI  4 <input type="checkbox"/> 150 to &lt;200 PSI  5 <input type="checkbox"/> 200 or greater PSI  6 <input type="checkbox"/> Don't Know  99 <input type="checkbox"/></p>	<p>5437 <input type="checkbox"/> Less than 10 PSI  1 <input type="checkbox"/> 10 to &lt;20 PSI  2 <input type="checkbox"/> 20 to &lt;30 PSI  3 <input type="checkbox"/> 30 to &lt;40 PSI  4 <input type="checkbox"/> 40 to &lt;50 PSI  5 <input type="checkbox"/> 50 to &lt;60 PSI  6 <input type="checkbox"/> 60 to &lt;70 PSI  7 <input type="checkbox"/> 70 to &lt;80 PSI  8 <input type="checkbox"/> 80 to &lt;90 PSI  9 <input type="checkbox"/> 90 PSI or greater  10 <input type="checkbox"/> Don't know  99 <input type="checkbox"/></p>
<p>D. What is the typical nozzle used when spraying herbicide applications post-emergence in 2020? Select one item only.</p>	<p>1 <input checked="" type="checkbox"/> Hollow Cone  2 <input type="checkbox"/> Full Cone  3 <input type="checkbox"/> Disc/Core Nozzle  4 <input type="checkbox"/> Flat fan  5 <input type="checkbox"/> Air-inclusion (AI)/Air-induction/Venture  6 <input type="checkbox"/> Other, specify: xxxx _____  99 <input type="checkbox"/> Don't Know</p>	<p>5438 <input type="checkbox"/> Hollow Cone  1 <input type="checkbox"/> Full Cone  2 <input type="checkbox"/> Disc/Core Nozzle  3 <input type="checkbox"/> Flat fan  4 <input type="checkbox"/> Air-inclusion  5 <input type="checkbox"/> (AI)/Air-induction/Venturi Other,  6 <input type="checkbox"/> specify: 5439 _____  99 <input type="checkbox"/> Don't Know</p>
<p>E. What is the typical ground speed when spraying pesticide applications post emergence in 2020? Select one item only.</p>	<p>5440 <input type="checkbox"/> Less than 1 mph  1 <input type="checkbox"/> 1 to &lt;2 mph  2 <input type="checkbox"/> 2 to &lt;3 mph  3 <input type="checkbox"/> 3 to &lt;4 mph  4 <input type="checkbox"/> 4 to &lt;5 mph  5 <input type="checkbox"/> 5 mph or greater  6 <input type="checkbox"/> Don't Know  99 <input type="checkbox"/></p>	<p>5441 <input type="checkbox"/> Less than 1 mph  1 <input type="checkbox"/> 1 to &lt;2 mph  2 <input type="checkbox"/> 2 to &lt;3 mph  3 <input type="checkbox"/> 3 to &lt;4 mph  4 <input type="checkbox"/> 4 to &lt;5 mph  5 <input type="checkbox"/> 5 to &lt;6 mph  6 <input type="checkbox"/> 6 to &lt;7 mph  7 <input type="checkbox"/> 7 mph or greater  8 <input type="checkbox"/> Don't know  99 <input type="checkbox"/></p>
<p>F. What is the typical boom height above the ground or plant canopy when spraying herbicide applications post-emergence in 2020? Select one item only.</p>	<p>1 <input type="checkbox"/>  2 <input type="checkbox"/>  3 <input checked="" type="checkbox"/>  4 <input checked="" type="checkbox"/></p>	<p>5442 <input type="checkbox"/> &lt;24 inches  1 <input type="checkbox"/> 24 to &lt;36 inches  2 <input type="checkbox"/> 36 inches or greater  3 <input type="checkbox"/> Don't know  99 <input type="checkbox"/></p>

	For Air Blast / Air-as <sup>1</sup> isted sprayer(s) systems	2 For Ground Boom systems
G. What is the typical target droplet size spectrum for pesticide applications post-emergence in 2020? Select one item only.	5443 1 <input type="checkbox"/> Less than 106 microns (Extremely Fine or Very Fine) 2 <input type="checkbox"/> 106-235 microns (Fine) 3 <input type="checkbox"/> 236-340 microns (Medium) 4 <input type="checkbox"/> 341-403 microns (Coarse) 5 <input type="checkbox"/> 404-502 microns (Very Coarse) 6 <input type="checkbox"/> 503-665 microns (Extremely Coarse) 7 <input type="checkbox"/> Greater than 665 microns (Ultra Coarse) 99 <input type="checkbox"/> Don't Know	5444 1 <input type="checkbox"/> Less than 106 microns (Extremely Fine or Very Fine) 2 <input type="checkbox"/> 106-235 microns (Fine) 3 <input type="checkbox"/> 236-340 microns (Medium) 4 <input type="checkbox"/> 341-403 microns (Coarse) 5 <input type="checkbox"/> 404-502 microns (Very Coarse) 6 <input type="checkbox"/> 503-665 microns (Extremely Coarse) 7 <input type="checkbox"/> Greater than 665 microns (Ultra Coarse) 99 <input type="checkbox"/> Don't Know
H. For which of the following reasons did this operation change the airspeed (in revolutions per minute, or RPM) post-emergence in 2020? Check all that apply.	5445 <input type="checkbox"/> Crop stage 5446 <input type="checkbox"/> Change of product(s) 5447 <input type="checkbox"/> Use of specialty Plant Growth Regulator (PGR) applications (e.g., for thinning or fruit finish) Moving between blocks Wind speed or wind direction Other, specify: 5451 _____ 5448 <input type="checkbox"/> Never 5449 <input type="checkbox"/> _____ 5450 <input type="checkbox"/> _____ 5452 <input checked="" type="checkbox"/> _____	
j. Which of the following practices were used post-emergence in 2020? Check all that apply.	5453 <input checked="" type="checkbox"/> Drift reducing adjuvant(s) 5454 <input checked="" type="checkbox"/> Drift reducing nozzle(s) 5455 <input checked="" type="checkbox"/> Shielded sprayers xxxx <input checked="" type="checkbox"/> Don't Know	5453 <input type="checkbox"/> Drift reducing adjuvant(s) 5454 <input type="checkbox"/> Drift reducing nozzle(s) 5455 <input type="checkbox"/> Shielded sprayers 0000 <input type="checkbox"/> Don't know
	- - - - -	



6. Now we are going to ask a few questions about spray equipment maintenance in 2020.

	1	2
	For Air Blast / Air-assisted systems	For Ground Boom systems
<p>a. How often did this operation clean the system(s) in 2020? Check all that apply.</p> <p>[If the never box is checked for Item 5464 in Column 1 or 5276 in Column 2, then skip item 25b and go to 25c; otherwise go to 24b.]</p>	<p>5457 <input type="checkbox"/> Before the season</p> <p>5458 <input type="checkbox"/> After the season</p> <p>5459 <input type="checkbox"/> Depended on the product(s)</p> <p>5460 <input type="checkbox"/> When switching from USDA certified organic to conventional blocks</p> <p>5461 <input type="checkbox"/> Regularly scheduled cleaning</p> <p>5432 <input type="checkbox"/> Other: specify: _____</p> <p>5463 _____</p> <p>5464 <input type="checkbox"/> Never</p>	<p>5271 <input type="checkbox"/> Before the season</p> <p>5272 <input type="checkbox"/> After the season</p> <p>5273 <input type="checkbox"/> Depended on the product(s)</p> <p>5278 <input type="checkbox"/> When switching from USDA certified organic to conventional blocks</p> <p>5274 <input type="checkbox"/> Regularly scheduled cleaning</p> <p>5275 <input type="checkbox"/> Other: specify: _____</p> <p>5277 _____</p> <p>5276 <input type="checkbox"/> Never</p>
<p>b. For each time that the system(s) was cleaned, how often was a tank cleaner used?</p>	<p>5473</p> <p>1 <input type="checkbox"/> Always (100%)</p> <p>2 <input type="checkbox"/> Often (51% or more)</p> <p>3 <input type="checkbox"/> Sometimes (50% or less)</p> <p>4 <input type="checkbox"/> Never (0%)</p> <p>99 <input type="checkbox"/> Don't know</p>	<p>5279</p> <p>1 <input type="checkbox"/> Always (100%)</p> <p>2 <input type="checkbox"/> Often (51% or more)</p> <p>3 <input type="checkbox"/> Sometimes (50% or less)</p> <p>4 <input type="checkbox"/> Never (0%)</p> <p>99 <input type="checkbox"/> Don't know</p>
<p>c. Did this operation use separate spray rigs for herbicides</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Don't Know</p>	<p><input type="checkbox"/></p>
<p>d. What were the most common reasons for replacing the nozzles on the sprayers in 2020? Check all that apply.</p>	<p>5481 <input type="checkbox"/> Regularly scheduled calendar based replacement (i.e., annually, twice annually, monthly, etc.)</p> <p>5482 <input type="checkbox"/> Regularly scheduled replacement based on operating time (i.e., sprayer operating hours)</p> <p>5483 <input type="checkbox"/> Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles)</p> <p>5484 <input type="checkbox"/> Calibration problems (i.e., too high or too low a flow rate)</p> <p>5485 <input type="checkbox"/> Observed nozzle damage (e.g., change in spray pattern or leaks)</p> <p>5486 <input type="checkbox"/> Availability of new nozzle technologies</p> <p>5487 <input type="checkbox"/> Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.)</p> <p>5488 <input type="checkbox"/> Other, please specify: _____</p> <p>5480 _____</p> <p>5489 <input type="checkbox"/></p> <p><input type="checkbox"/> None of the above</p>	<p>5491 <input type="checkbox"/> Regularly scheduled calendar based replacement (i.e., annually, twice annually, monthly, etc.)</p> <p>5492 <input type="checkbox"/> Regularly scheduled replacement based on operating time (i.e., sprayer operating hours)</p> <p>5493 <input type="checkbox"/> Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles)</p> <p>5494 <input type="checkbox"/> Calibration problems (i.e., too high or too low a flow rate)</p> <p>5495 <input type="checkbox"/> Observed nozzle damage (e.g., change in spray pattern or leaks)</p> <p>5496 <input type="checkbox"/> Availability of new nozzle technologies</p> <p>5497 <input type="checkbox"/> Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.)</p> <p>5498 <input type="checkbox"/> Other, please specify: _____</p> <p>5490 _____</p> <p>5499 <input type="checkbox"/></p> <p><input type="checkbox"/> None of the above</p>

7. On what proportion of fields did this operation wind-breaking structures, such as hedge rows, that are at least one and a half times the height of the crop canopy in 2020?

5300 1  0%

2  1% to 25%

3  26% to 50%

4  51% to 75%

5  76% to 100%

99  Don't know

8. How often were the following sources of information used to inform pest management decisions in 2020?

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
a. Pesticide product labels.....	5301
b. University and/or Agricultural Cooperative Extension resources/recommendations.....	5303
c. Non-university literature, such as trade magazines, catalogues, newspapers, etc.....	5305
d. Commodity/trade groups.....	5307
e. Pesticide sales representatives and/or farm supply distributors.....	5309
f. Independent crop consultants paid for by the operation.....	5311
g. Crop consultants employed by pesticide companies or other distributors.....	xxxx
h. Other grower(s).....	5..3.1..3..
i. Commercial or other non-university decision tools.....	5315
j. Weather forecasting tools.....	5317
k. Other, Specify: <sup>5319</sup> .....	5320

9. [If 8b, 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 2020?

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)....	5..322
b. Field days/demonstration workshops.....	5..323
c. Farm visits and/or one-on-one consultation.....	5..324
d. Email lists.....	5..325
e. Newsletters and blogs.....	5-3- 26
f. Crop and/or Pest Protection Handbook.....	5-3-27
g. Other publications (e.g., fact sheets).....	5-3- 28
h. Decision tools.....	5-3- 29
i. Other, Specify: <sup>5330</sup> .....	5331

10. How often were the following practices used during the season to manage herbicide, fungicide and insecticide resistance in 2020?

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 material, cleaning transplant trays, sanitizing process or wash water)		5336	
iii. For insect control (e.g., removing or incorporating unharvested vegetables 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
h. Rotating crops	0000	0000	0000

11. 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 2020? 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.

10. How often were the following practices used during the season to manage herbicide, fungicide and insecticide

<sup>5356</sup>

Other communication tool(s), Specify: <sup>5358</sup>\_\_\_\_\_

<sup>5357</sup>

Other, Specify: <sup>5359</sup>\_\_\_\_\_

12. How often were the following Best Management Practice (BMPs) used during the season in 2020?

Best Management Practices	<p style="text-align: center;">1</p> <p style="text-align: center;">How often was this practice used?</p> <p>1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99 Don't know</p>	<p style="text-align: center;">2</p> <p style="text-align: center;">[Only answer if column 1 = 1, 2, or 3] Was this practice specifically used to prevent exposure to bees?</p> <p>1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99 Don't know</p>
a. Avoid crop 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: <sup>5536</sup> .....	5537	5538

13. Which of the following auditing systems, if any, did this operation participate in during 2020? Check all that apply.

- <sup>5361</sup> GLOBAL G.A.P.
- <sup>5362</sup> State Quality Food (SQF) Program
- <sup>5363</sup> Other, Specify: <sup>5365</sup>.....
- <sup>5364</sup> The operation did not participate in an auditing system
- <sup>5369</sup> Don't know

# CONCLUSION

## SURVEY RESULTS

- To receive the complete results of this survey on the release date, go to [http://www.nass.usda.gov/Surveys/Guide\\_to\\_NASS\\_Surveys/](http://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/)

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

1095
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	<b>CODE</b>	9990
Would you rather have a brief summary mailed to you at a later date? . . . . .	<b>YES = 1</b>	

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

ENDING TIME [MILITARY]. . . . .		005
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<b>OFFICE USE TIME IN HOURS</b>
006

## RECORD USE

Did respondent use operation records to report pesticide data? . . . . .	<b>YES = 1</b>	064
--	----------------	-----

<b>CODE</b>
064

## SUPPLEMENT USE

Record the total number of supplements used to complete this interview.		<b>NUMBER</b>
Fertilizer Supplements. . . . .		067

067
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Operation Email: (if different from above)	Operation Phone	
9937	9936	Check if cell phone <input type="checkbox"/>

Reported by: _____	9910 M M D D Y Y	9911 Telephone: _____
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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	Respdnent	Mode		Enum.	POID					
1-Comp	9901	1-Op/Mgr	9902	2-PATI (tel)	9903	9998	9989			
2-R		2-Sp		3-PAPI (Face-to-						
3-Inac		3-Acct/Bkpr		Face)						
4-Office Hold		4-Partner								
		9-Other								
								Eval.	Change	
								9900	9985	

