

# AGRICULTURAL RESOURCE MANAGEMENT SURVEY

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 Phase II



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## WINTER WHEAT PRODUCTION PRACTICES REPORT FOR 2019

<b>VERSION</b>	<b>ID</b>	<b>TRACT</b>	<b>SUBTRACT</b>	<b>C-TYPE</b>
<b>71</b>	_____	<b>01</b>	_____	<b>125</b>

### CONTACT RECORD

DATE	TIME	NOTES

**INTRODUCTION:**

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

We are collecting information on practices used to produce winter wheat 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 to this survey is **voluntary**. We encourage you to refer to your farm 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 **50 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.

H H M M

**BEGINNING TIME**  
 [MILITARY]

0004
_____

SCREENING BOX

0006
------

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

<b>POID</b> _____	<b>POID</b> _____
PARTNER NAME	PARTNER NAME
ADDRESS	ADDRESS
CITY                      STATE      ZIP              PHONE NUMBER	CITY                      STATE      ZIP              PHONE NUMBER
<b>POID</b> _____	<b>POID</b> _____
PARTNER NAME	PARTNER NAME
ADDRESS	ADDRESS
CITY                      STATE      ZIP              PHONE NUMBER	CITY                      STATE      ZIP              PHONE NUMBER

A

# WINTER WHEAT FIELD SELECTION

A

TOTAL PLANTED  
ACRES

1. How many total acres of winter wheat did this operation plant for the 2019 crop year? .....

0050

[If no acres were planted, review Screening Survey Information Form, make notes, then go to Conclusion on back page.]

I will follow a simple procedure to make a random selection from the winter wheat fields planted for the 2019 crop.

TOTAL NUMBER OF  
FIELDS PLANTED

2. What is the TOTAL number of winter wheat fields that were planted on this operation? [If only one field, enter "1" and go to item 5.] .....

0020

3. Please list these fields according to identifying name/number or describe each field, then I will tell you which field has been selected. [If there are more than 18 fields, make sure item 2 is TOTAL fields planted, and list only the 18 fields closest to the operator's permanent residence. If respondent is unable to identify or describe the fields, use the Field Selection Grid Supplement.]

FIELD NAME, NUMBER OR DESCRIPTION

FIELD NAME, NUMBER OR DESCRIPTION

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_
- 8 \_\_\_\_\_
- 9 \_\_\_\_\_

- 10 \_\_\_\_\_
- 11 \_\_\_\_\_
- 12 \_\_\_\_\_
- 13 \_\_\_\_\_
- 14 \_\_\_\_\_
- 15 \_\_\_\_\_
- 16 \_\_\_\_\_
- 17 \_\_\_\_\_
- 18 \_\_\_\_\_

APPLY "RANDOM NUMBER" LABEL HERE

OFFICE USE  
OY Field Substituted

0022

SELECTED FIELD  
NUMBER

4. [ENUMERATOR ACTION: Circle the pair of numbers on the above label associated with the last numbered field in item 3. Select the field according to the number you circled on the label, and record the selected number. If only one field, enter 1.] .....

0021

5. The field selected is \_\_\_\_\_ (field name/number/description)  
During this interview, the winter wheat questions will be about this selected winter wheat field.  
[Be sure the operator can identify the selected field.]

ACRES

6. How many acres of winter wheat were planted in this field for the 2019 crop? .....

1301

**C NUTRIENT or FERTILIZER APPLICATIONS---SELECTED FIELD**

**C**

<p>1. <b>Were commercial nutrients or fertilizers applied to this field for the 2019 winter wheat crop?</b> (Include those from operators, landlords, and contractors.) . . . . .</p> <p>[If <i>COMMERCIAL</i> nutrient or fertilizer applied, continue; else go to Section D.]</p>	<p><b>YES = 1</b> <b>No = 3</b></p>	<p><b>CODE</b> 0202</p>	<p><b>EDIT TABLE</b> 0200</p>
---	---	-----------------------------	-----------------------------------

<p>2. <b>How many commercial nutrient or fertilizer applications were made to this field for the 2019 crop?</b> (Include applications made by airplanes and custom applicators.) . . . . .</p>	<p><b>NUMBER</b> 0203</p>
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3. **Now I need to record information for each application.**

<b>CHECKLIST</b>				<b>OFFICE USE</b>	<b>TABLE</b>	0299
<input checked="" type="checkbox"/> <b>INCLUDE</b>	<input checked="" type="checkbox"/> <b>EXCLUDE</b>			<b>LINES IN TABLE</b>	<b>001</b>	
<input type="checkbox"/> Custom applied nutrients or fertilizers  <input type="checkbox"/> Nutrients or fertilizers applied in the fall of 2019 and those applied earlier if this field was fallow in 2019  <input type="checkbox"/> Commercially prepared manure or compost	<input type="checkbox"/> Micronutrients  <input type="checkbox"/> Unprocessed manure  <input type="checkbox"/> Nutrients or fertilizers applied to previous crops in this field  <input type="checkbox"/> Lime and gypsum/landplaster					

<b>APPLICATION CODES for COLUMN 6</b>	
1 Broadcast, ground without incorporation	5 In irrigation water
2 Broadcast, ground with incorporation	6 Chisel/Injected or knifed in
3 Broadcast, by aircraft	7 Banded in or over row
4 In seed furrow	8 Foliar or directed spray

<b>L I N E</b>	<b>2 MATERIALS USED</b>				<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
	[Enter percentage analysis or actual pounds of plant nutrients applied per acre.]				What quantity was applied per acre?	[Enter material code.]	When was this applied?	How was this applied?	How many acres were treated in this application?
	N Nitrogen	P <sub>2</sub> O <sub>5</sub> Phosphate	K <sub>2</sub> O Potash	S Sulfur	[Leave this column blank if actual pounds of nutrients were reported.]	1 Pounds 12 Gallons 19 Pounds of actual nutrients	1 In the fall before seeding 2 In the spring before seeding 3 At seeding 4 After seeding	[Refer to code list above.]	<b>ACRES</b>
<b>01</b>	31	32	33	34	36	37	38	39	40
<b>02</b>	31	32	33	34	36	37	38	39	40
<b>03</b>	31	32	33	34	36	37	38	39	40
<b>04</b>	31	32	33	34	36	37	38	39	40
<b>05</b>	31	32	33	34	36	37	38	39	40
<b>06</b>	31	32	33	34	36	37	38	39	40
<b>07</b>	31	32	33	34	36	37	38	39	40
<b>08</b>	31	32	33	34	36	37	38	39	40

**D BIOCONTROL or PESTICIDE APPLICATIONS---SELECTED FIELD**

**D**

Now I have some questions about all the biocontrols or pesticides used on this field for the 2019 winter wheat crop, including both custom applications and applications made by this operation.

1. Were any herbicides, insecticides, fungicides or other biocontrols or pesticides used on this winter wheat field for the 2019

YES = 1  
NO = 3

CODE	EDIT TABLE
0302	0300

**If no biocontrols or pesticides applied, go to Section E.**

<p><b>Include</b> defoliants, fungicides, herbicides, insecticides, and other pesticides.</p> <p><b>Include</b> biological and botanical pesticides.</p>	<p><b>Exclude</b> nutrients or fertilizers reported earlier and seed treatments.</p>
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OFFICE USE LINES IN TABLE	TABLE 001	0399
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CHEMICAL PRODUCT NAME	L I N E	2	3	4	5	6	OR	7	8	
		What products were applied to the selected field?  [Show product codes from Respondent Booklet.]	Was this product bought in liquid or dry form?  [Enter L or D]	If this was part of a tank mix, enter line number of first product in mix?	When was this applied? 1 BEFORE planting 3 AT planting 4 AFTER planting 5 DEFOLIATION prior to harvest	How much was applied per acre per application?		What was the total amount applied per application in the selected field?	[Enter unit code.] 1 Pounds 12 Gallons 13 Quarts 14 Pints 15 Liquid Ounces 28 Dry Ounces 30 Grams	
	01	61		63	64	65	_____	73	_____	74
	02	61		63	64	65	_____	73	_____	74
	03	61		63	64	65	_____	73	_____	74
	04	61		63	64	65	_____	73	_____	74
	05	61		63	64	65	_____	73	_____	74
	06	61		63	64	65	_____	73	_____	74
	07	61		63	64	65	_____	73	_____	74
	08	61		63	64	65	_____	73	_____	74
	09	61		63	64	65	_____	73	_____	74
	10	61		63	64	65	_____	73	_____	74
	11	61		63	64	65	_____	73	_____	74
	12	61		63	64	65	_____	73	_____	74
	13	61		63	64	65	_____	73	_____	74
	14	61		63	64	65	_____	73	_____	74

2. [For biocontrols or pesticides not listed in Respondent Booklet, specify---]

LINE	Pesticide Type (Herbicide, Insecticide Fungicide, etc.)	EPA No. or Trade name and Formulation	Form Purchased (Liquid or Dry)	Where Purchased [Ask ONLY if EPA No. cannot be reported.]
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**APPLICATIONS CODES for column 9**

- |   |                                |
|---|--------------------------------|
| 1 Broadcast, ground without incorporation | 6 Chisel/injected or knifed in |
| 2 Broadcast, ground with incorporation    | 7 Banded in or over row        |
| 3 Broadcast, by aircraft                  | 8 Foliar or directed spray     |
| 4 In seed furrow                          | 9 Spot treatments              |
| 5 In irrigation water                     |                                |

L I N E	9	10	11	12
	How was this product applied? [Enter code from above.]	How many acres in the selected field were treated with this product? ACRES	How many times was it applied? NUMBER	Were these applications made by--- 1 Operator, partner or family member? 2 Custom applicator? 3 Employee/Other?
01	76	77 .__	79	80
02	76	77 .__	79	80
03	76	77 .__	79	80
04	76	77 .__	79	80
05	76	77 .__	79	80
06	76	77 .__	79	80
07	76	77 .__	79	80
08	76	77 .__	79	80
09	76	77 .__	79	80
10	76	77 .__	79	80
11	76	77 .__	79	80
12	76	77 .__	79	80
13	76	77 .__	79	80
14	76	77 .__	79	80

**PEST MANAGEMENT PRACTICES**

Now I have some questions about your pest management decisions and practices used on this field for the 2019 winter wheat crop. By pests, we mean WEEDS, INSECTS, and DISEASES.

ENUMERATOR ACTION: Were PESTICIDE applications reported in Section D?

- YES – [Continue]                       NO – [Go to item 4]

	YES = 1 NO = 3	CODE
1. Was weather data used to assist in determining either the need or when to make pesticide applications? .....		0800
2. Were any biological pesticides such as Bt ( <i>Bacillus thuringiensis</i> ), insect growth regulators, neem or other natural/biological based products sprayed or applied to manage pests in this selected? .....		0801
3. Were pesticides with different mechanisms of action rotated or tank mixed for the primary purpose of keeping pests from becoming resistant to pesticides? .....		0802
4. Were records kept for the selected field to track the activity or numbers of weeds, insects or diseases? .....		0823
5. Did you use published information on infestation thresholds to determine when to take measures to manage pests in the selected field? .....		0824

	CODE
6. In 2019, how was the selected field primarily scouted for insects, weeds, diseases, and/or beneficial organisms? .....	0808

1 By deliberately going to the field specifically for scouting activities [Enter code 1 and go to item 7.]

2 By conducting general observations while performing routine tasks [Enter code 2 and go to item 9.]

3 This field was not scouted. [Enter code 3 and go to item 11.]

	YES = 1 NO = 1	CODE
7. Was an established scouting process (systematic sampling, recording counts, etc.) used or were insect traps used in the selected field? .....		0809
8. Was scouting for pests done in the selected field due to---		CODE
a. a pest advisory warning? .....	YES = 1 NO = 1	0810
b. a pest development model? .....	YES = 1 NO = 1	0811

1	2	3	
	[If YES, ask---] What was the infestation level for [column 1] ?	[If column 1 is YES, ask---] Who did the majority of the scouting for [column 1] ?	
	1 Higher than normal 2 Normal 3 Less than normal	1 Operator, partner or family member 2 An employee 3 Farm supply or chemical dealer 4 Independent crop consultant or commercial scout	
9. Was the selected winter wheat field scouted for---	YES = 1 NO = 3	CODE	
a. weeds? .....	0812	0813	0814
b. insects or mites? .....	0815	0816	0817
c. diseases? .....	0818	0819	0820

10. Did you use field mapping of previous weed problems to assist you in making weed management decisions? .....	YES = 1 NO = 3	0825
11. Did you do any of the following other types of pest management practices for the specific purpose of managing or reducing the spread of pests in the selected field? [Enter code "1" for all that apply.]		CODE
a. Use the services of a diagnostic laboratory for pest identification or soil plant tissue pest analysis for this field? .....	YES = 1 NO = 3	0841
b. Plow down crop residue (using conventional tillage)? .....	YES = 1 NO = 3	0842
c. Remove/burn down crop residue? .....	YES = 1 NO = 3	0843
d. Rotate crops in the selected field during the past three years? .....	YES = 1 NO = 3	0844
e. Maintain ground covers, mulches, or other physical barriers? .....	YES = 1 NO = 3	0845
f. Choose crop variety because of specific resistance to a certain pest? .....	YES = 1 NO = 3	0846
g. Use no-till or minimum till? .....	YES = 1 NO = 3	0847
h. Plan planting locations to avoid cross infestation of pests? .....	YES = 1 NO = 3	0848
i. Adjust planting or harvesting dates? .....	YES = 1 NO = 3	0849
j. Chop, spray, mow, plow, or burn field edges, lanes, ditches, roadways, or fence lines? .....	YES = 1 NO = 3	0850
k. Clean equipment and field implements after completing field work to reduce the spread of pests? .....	YES = 1 NO = 3	0851
l. Adjust row spacing, plant density, or row directions? .....	YES = 1 NO = 3	0852
m. Have the seed treated for insect or disease control after you purchased the seed for the selected field? .....	YES = 1 NO = 3	0854
n. Maintain a beneficial insect or vertebrate habitat? .....	YES = 1 NO = 3	0855
o. Maintain buffer strips or border rows to isolate winter wheat from non-organic crops or land, or did you take a buffer harvest? .....	YES = 1 NO = 3	0856
p. Use a flamer to kill weeds? .....	YES = 1 NO = 3	0857
q. Plant earlier or later to avoid weeds? .....	YES = 1 NO = 3	0865
12. Were any beneficial organisms (insects, nematodes, fungi) applied or released in the selected field to manage pests? .....	YES = 1 NO = 3	0853
13. Were floral lures, attractants, repellents, pheromone traps or other biological pest controls used on the selected field? .....	YES = 1 NO = 3	0858
14. Was a trap crop (excluding fallow) grown to help manage insects in the selected field? ..	YES = 1 NO = 3	0863
15. Was the selected field left fallow in 2018 to help manage insects on the selected field? ..	YES = 1 NO = 3	0864
16. Were water management practices such as irrigation scheduling, controlled drainage, or treatment of retention water used on the selected field to manage pests or toxin-producing fungi and bacteria? .....	YES = 1 NO = 3	0861
17. For the selected field, were any of the following pesticide spraying practices or activities used in 2019? Pesticides include insecticides, fungicides, herbicides and plant growth regulators (PGR).		

	(1)	(2)	(3)	(4)
Pesticide Spraying Practice or Activity	Was this used in 2019?	Was it specifically used to keep pesticide application(s) on-target (i.e., reduce pesticide drift)?	Considering labor, training, capital expenditures, and other costs, how easy or difficult was it to implement this practice or activity?	<p>(Complete column for every YES in Column 1)</p> <p>(Complete column for every NO in Column 1)</p> <p>Why was this practice or activity NOT used?</p> <p>Check all that apply.</p>
	Yes = 1 No = 3 Don't Know = 2	Yes = 1 No = 3 Don't Know = 2	1 - Very Easy 2 - Somewhat Easy 3 - Somewhat Difficult 4 - Very Difficult	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)				
b. Drift reducing adjuvant(s)				
c. Drift reducing nozzle(s)				
d. Increased GPA spray solution				
e. Calibrate sprayer before the season				
f. Calibrate sprayer during the season				
g. Manually altering sprayer settings to improve the spray precision (e.g., altering spray pressure, ground speed, and/or boom height)				
h. Adopting the use of technologies to improve the spray precision (e.g., on/off nozzle spray technology, GPS boom section controls, automatic boom height stabilization, and/or infrared technology)				
i. Shielded sprayers				
j. Pulse Width Modulation (PWM) (e.g. Aim Command, Raven's Hawk Eye, John Deere's Exact Apply, etc.)				
k. Other - Specify: _____				



[Enumerator Notes: Question 18 pertains to pre-emergence pesticide applications, regardless of pesticide type. Questions 19 and 20 are specific to post-emergence applications, Question 19 addressing herbicide applications and Question 20 addressing insecticide/fungicide applications.]

18. **Pre-emergence** pesticide applications are pesticides that are applied BOTH prior to planting and/or before the emergence of the wheat for early-season pest management. For the selected field, did this operation make any **pre-emergence** pesticide applications using aerial sprayers and/or ground boom sprayers in 2019?

- Yes, made pre-emergence pesticide applications using aerial sprayers - Go to Item 19  
 Yes, made pre-emergence pesticide applications using ground boom sprayers – Complete table below  
 No, did not make pre-emergence pesticide applications - Go to Item 19

	Pre-emergence Pesticide Applications Using Ground Boom Sprayers		Code
a. What was the typical spray volume (gallons per acre-GPA) for pre-emergence pesticide applications?	1 <input type="checkbox"/> < 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 GPA or greater 99 <input type="checkbox"/> Don't know	
b. What is the typical operating pressure for pre-emergence pesticide applications (PSI)?	1 <input type="checkbox"/> < 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 to < 100 PSI 11 <input type="checkbox"/> 100 PSI or greater 99 <input type="checkbox"/> Don't know	
d. c. What nozzles were typically used most often for any pre-emergence pesticide applications?	1 <input type="checkbox"/> Hollow Cone 2 <input type="checkbox"/> Full Cone 3 <input type="checkbox"/> Disc/Core Nozzle 4 <input type="checkbox"/> Flat (e.g., flat fan)	5 <input type="checkbox"/> Air-inclusion (AI), Air-induction, Venturi 6 <input type="checkbox"/> Other, specify: _____ 99 <input type="checkbox"/> Don't Know	
e. d. At what ground speed was this ground boom sprayer(s) typically driven during pre-emergence pesticide applications?	1 <input type="checkbox"/> < 5 MPH 2 <input type="checkbox"/> 5 to < 10 MPH 3 <input type="checkbox"/> 10 to <15 MPH	4 <input type="checkbox"/> 15 to <20 MPH 5 <input type="checkbox"/> 20 MPH or greater 99 <input type="checkbox"/> Don't know	
f. e. At what boom height above ground or crop canopy did this operation typically spray during pre-emergence pesticide applications?	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	
g. f. What is the target droplet size spectrum for pre-emergence pesticide applications?	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	

19. **Post-emergence** herbicide applications are made to control weeds that occur after emergence of the wheat. For this selected field, did this operation make any **post-emergence** herbicide applications using aerial sprayers and/or ground boom sprayers in 2019?

- Yes, made post-emergence herbicide applications using aerial sprayers - Go to Item 20  
 Yes, made post-emergence herbicide applications using ground boom sprayers – Complete table below  
 No, did not make post-emergence herbicide applications - Go to Item 20

	Post-emergence Herbicide Applications Using Ground Broom Sprayers		Code
a. What was the typical spray volume (gallons per acre-GPA) for post-emergence herbicide applications?	1 <input type="checkbox"/> < 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 GPA or greater 99 <input type="checkbox"/> Don't know	
b. What is the typical operating pressure for post-emergence herbicide applications (PSI)?	1 <input type="checkbox"/> < 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 to < 100 PSI 11 <input type="checkbox"/> 100 PSI or greater 99 <input type="checkbox"/> Don't know	
d. c. What nozzles were typically used most often for any post-emergence herbicide applications?	1 <input type="checkbox"/> Hollow Cone 2 <input type="checkbox"/> Full Cone 3 <input type="checkbox"/> Disc/Core 4 <input type="checkbox"/> Flat (e.g., flat fan)	5 <input type="checkbox"/> Air-inclusion (AI), Air-induction, Venturi 6 <input type="checkbox"/> Other, specify: _____ 99 <input type="checkbox"/> Don't Know	
e. d. At what ground speed was this ground boom sprayer(s) typically driven during post-emergence herbicide applications?	1 <input type="checkbox"/> < 5 MPH 2 <input type="checkbox"/> 5 to < 10 MPH 3 <input type="checkbox"/> 10 to <15 MPH	4 <input type="checkbox"/> 15 to <20 MPH 5 <input type="checkbox"/> 20 MPH or greater 99 <input type="checkbox"/> Don't know	
f. e. At what boom height above ground or crop canopy did this operation typically spray during post-emergence herbicide applications?	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	
g. f. What is the target droplet size spectrum for post-emergence herbicide applications?	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	

20. **Post-emergence** insecticide and/or fungicide applications are made to control pests that occur after emergence of the wheat. For the selected field, did this operation make any **post-emergence** insecticide and/or fungicide applications using aerial sprayers and/or ground boom sprayers in 2019?

- Yes, made post-emergence insecticide/fungicide applications using aerial sprayers - Go to Item 21  
 Yes, made post-emergence insecticide/fungicide applications using ground boom sprayers – Complete table below  
 No, did not make pre-emergence pesticide applications - Go to Item 21

	Post-emergence Insecticide/Fungicide Applications Using Ground Boom Sprayers		Code
a. What was the typical spray volume (gallons per acre-GPA) for post-emergence insecticide/fungicide applications?	1 <input type="checkbox"/> < 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 GPA or greater 99 <input type="checkbox"/> Don't know	
b. What is the typical operating pressure for post-emergence insecticide/fungicide applications (PSI)?	1 <input type="checkbox"/> < 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 to < 100 PSI 11 <input type="checkbox"/> 100 PSI or greater 99 <input type="checkbox"/> Don't know	
d. c. What nozzles were typically used most often for any post-emergence insecticide/fungicide applications?	1 <input type="checkbox"/> Hollow Cone 2 <input type="checkbox"/> Full Cone 3 <input type="checkbox"/> Disc/Core Nozzle 4 <input type="checkbox"/> Flat (e.g., flat fan)	5 <input type="checkbox"/> Air-inclusion (AI), Air-induction, Venturi 6 <input type="checkbox"/> Other, specify: _____ 99 <input type="checkbox"/> Don't Know	
e. d. At what ground speed was this ground boom sprayer(s) typically driven during post-emergence insecticide/fungicide applications?	1 <input type="checkbox"/> < 5 MPH 2 <input type="checkbox"/> 5 to < 10 MPH 3 <input type="checkbox"/> 10 to <15 MPH	4 <input type="checkbox"/> 15 to <20 MPH 5 <input type="checkbox"/> 20 MPH or greater 99 <input type="checkbox"/> Don't know	
f. e. At what boom height above ground or crop canopy did this operation typically spray during post-emergence insecticide/fungicide applications?	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	
g. f. What is the target droplet size spectrum for post-emergence insecticide/fungicide applications?	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	

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 or Gallons per Acre (GPA) output (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. For the selected field, how often did this operation clean the ground boom sprayer tank system in 2019? Check all that apply.....

- 1 Before the season
- 2 After the season
- 3 Depended on the product(s)
- 4 Regularly scheduled cleaning
- 5 Other, specify: \_\_\_\_\_
- 6 Never

**[Enumerator Note: If Respondent answered code 1 - 5 for Item 22, answer Item 22a and 22b; else skip to Item 23]**

22a. For each time that the ground boom sprayer 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

22b. Did this operation use separate spray rigs for herbicide applications? .....

- 1 Yes
- 3 No
- 2 Don't Know

23. For the selected field, what material were a **majority** of the nozzles made of that were used across all pesticide applications made in 2019? Select one.

- a. Plastic, such as Polypropylene (i.e. Poly or PP) or other types
- b. Aluminum, brass, or other soft metal(s)
- c. Stainless steel (including hardened stainless steel)
- d. Porcelain or other ceramic materials
- e. Other, specify: \_\_\_\_\_

24. For the selected field, what were the most common reasons for replacing the nozzles on the sprayers in 2019? Check all that apply.

- a. Regularly scheduled calendar-based replacement (i.e., annually, twice annually, monthly, etc.)
- b. Regularly scheduled replacement based on operating time (i.e., sprayer operating hours)
- c. Sporadic replacement based on area covered or general intuition (i.e., it feels like the right time to change nozzles)
- d. Calibration problems (i.e., too high or too low a flow rate)
- e. Observed nozzle damage (e.g., change in spray pattern or leaks)
- f. Availability of new nozzle technologies
- g. Expert and/or consultant recommendations (e.g., Cooperative Extension, crop consultants, etc.)
- h. Other, please specify: \_\_\_\_\_
- i. None of the above

25. For the selected field, 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 <b>PRIMARY</b> source of pest management decisions? Select one. 1 = Primary 3 = 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		
Crop Consultants Paid for by the Operation		
a. Other Grower(s)		
b. Non-University Decision Tools		
c. Weather Forecasting Tools		
d. 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. For the selected field, 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	<b>(Only complete if operation uses herbicides)</b>  How often was each practice used on this field to manage <b>herbicide</b> resistance?  1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99. Don't Know	<b>(Only complete if operation uses fungicides)</b>  How often was each practice used on this field to manage <b>fungicide</b> resistance?  1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99. Don't Know	<b>(Only complete if operation uses insecticides)</b>  How often was each practice used on this field to manage <b>insecticide</b> resistance?  1 Always (100%) 2 Often (51% or more) 3 Sometimes (50% or less) 4 Never (0%) 99. Don't Know
a. Field mapping weeds and/or keeping records of field history and pesticide use to assist pesticide decisions			
b. Field Management/Sanitation Practices:			
i. For weed control (e.g., crop rotation, tillage, planting cover crops, managing field borders, preventing field-to-field and within field movement of weed seed)			
ii. For disease control (e.g., removing or incorporating field residue to reduce potential disease infestations, managing field borders)			
iii. For insect control (e.g., removing or incorporating field residue to reduce potential insect infestations, managing field borders)			
c. Planting insect-resistant and/or disease-resistant varieties of wheat			
d. Pre-harvest and/or post-harvest control of weeds and/or disease to reduce the return of weed seeds and/or seed-borne diseases			
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]			
e. Pesticide Mode of Action (MOA) rotation			
f. 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. Are the spraying practices for *other fields* on this operation similar to the spraying practices for *this selected field*?

- a. Yes
- b. No – Please explain the difference: \_\_\_\_\_
- c. Don't Know

43. 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 Pest Management Data	
1 Incomplete/Refusal	500

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## NOTES:

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## CONCLUSION

5. 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

Would you like to receive a copy of the results of this survey in the mail? . . . . . **YES = 1** CODE  
9990

[Thank the respondent, then review this questionnaire.]

**H H M M**

0005

6. **ENDING TIME** [MILITARY]. . . . .

**RECORDS USED**

7. [Did respondent use farm/ranch records to report--]

a. [fertilizer data?]. . . . . **YES = 1**

b. [pesticide data?]. . . . . **YES = 1**

**CODE**

0011

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0012

**SUPPLEMENTS USED**

8. [Record the total number of each type of supplement used to complete this interview]. . . . .

**FERTILIZER APPLICATIONS**

**PESTICIDE APPLICATIONS**

**NUMBER**

0041

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0042

Reported by: _____	9910 M M D D	<b>19</b>	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		Respondent		Mode		Enum.		POID	
1-Comp	9901	1-Op/Mgr	9902	2-PATI (tel)	9903	9998	9989		
2-R		2-Sp		3-PAPI (Face-to-Face)					
3-Inac		3-Acct/Bkpr							
4-Office Hold		4-Partner							
		9-Other							
								<b>Eval.</b>	<b>Change</b>
								9900	9985