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Vegetable Chemical Use Survey

Interviewer's Manual

This manual was written for the paper questionnaire.

Contents

Chapter 1 - General

Background, Objectives and Purpose

The National Agricultural Statistics Service (NASS) can trace the beginning of its environmental data program to 1964 when enumerators collected fertilizer application data from fields selected for objective yield (OY) measurement. During the late 1980's, rising concern about pesticide and plant nutrient levels in well water spurred Congress to fund an initiative to enhance water quality, but data needed for assessing the scope of these issues was scarce. This Water Quality Initiative mandated the development of a comprehensive database describing the nature of agricultural chemical use in the United States.

The U. S. Department of Agriculture (USDA) was designated the lead agency for this endeavor and development became the responsibility of NASS and the Economic Research Service (ERS). The Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), and the National Oceanic and Atmospheric Administration (NOAA) were also given responsibilities under the Water Quality Initiative. As a result, NASS has been collecting data about fertilizer and pesticide use on major field crops and selected fruits, vegetables, melons and strawberries since 1990. The Agricultural Marketing Service (AMS), Human Nutrition Information Service (HNIS), the Office of Pest Management Policy (OPMP), and other USDA agencies, also collect and analyze agricultural chemical use and residue data. The aggregations of these data form the basis of the USDA Pesticide Data Program (PDP).

In 1996, the implementation of the Food Quality Protection Act (FQPA) required the EPA to conduct an accelerated review of tolerance levels for re-registration of pesticide products. An interdepartmental working group consisting of members from NASS, AMS, EPA, HNIS, and OPMP meets regularly to coordinate USDA pesticide data collection as required by the FQPA. The PDP continues to be used by these agencies to evaluate the safety of the nation's food supply, potential human exposure to pesticide residues, and water quality issues.

Generally, farmers benefit from NASS chemical use data indirectly. They see the information through contact with extension advisors, in reports issued by colleges and universities, and in farm magazines or newspapers. Most respondents probably do not realize the data comes from this survey. The most direct user of this data is the EPA.

Vegetable growers have a vested interest in the risk analyses because many pesticides they rely on are classified as "minor use." Growers often have no alternatives to these chemicals. If re-registration is not allowed for products used on specialty crops, such an action could have serious consequences for both farmers

and consumers.

The important benefits gained from responding to the survey are:

- Growers have a chance to tell how they use chemicals responsibly to maintain a safe and abundant food supply.
- The survey results are official USDA estimates and help to establish facts about chemical use. Accurate data can be used to lessen concern relating to marketing and exports to other countries.
- Accurate and timely information on actual usage can be used in the FQPA decision-making process for product registration, re-registration and product alternatives.

Release of VCUS Data

The NASS data will be released via the Quickstats system on the NASS website at http://www.nass.usda.gov/ July 15, 2025. The data will include acreage treated with herbicides, insecticides, fungicides, and other pesticides for each crop surveyed by the participating state. Each chemical product is classified by its active ingredient. The publication will include the percentage of farms using each pest management practice by region.

Questions and Answers

Below are some commonly asked questions and their answers that pertain to the USDA Pesticide Data Program. Enumerators should become familiar with the questions listed below and be prepared to answer questions farm operators may have about the survey.

1. Why do we need vegetable chemical use data?

When chemical usage data are not available, EPA and other organizations have to determine usage on their own. Usually they use maximum label rates and total acres of commodity. This could bias the risk assessment and thus overstate actual usage, ultimately causing cancellation of these important pesticides. The Agricultural industry needs to tell their story and here is a chance to give EPA actual usage statistics. Summarized data from the survey will be supplied to the EPA and to other organizations. The use of this information is determined by each organization. However, confidentiality of individual reports will be maintained.

2. Who uses the information produced from this program?

Recipients include growers, the public, news media, processors, foreign buyers of commodities, several USDA agencies, and

regulatory agencies such as the EPA and the Food and Drug Administration (FDA). Confidentiality of individual reports will be maintained.

3. What agricultural chemicals will be included in NASS' survey?

Included are all pesticides used in growing fruit, vegetables, melons, strawberries and other food crops. This year, vegetables will be surveyed. Fertilizer data is collected every other survey cycle. For the 2024 growing season, we will collect and publish pesticide data for vegetable crops.

4. What coordination has taken place between USDA, EPA, and FDA regarding this program?

Coordination has occurred at the highest levels within each of these agencies. Staff from all departments have met regularly to discuss FQPA's data needs and data collection priorities while trying to reduce respondent burden and avoid duplicating efforts. An interdepartmental working group, which consists of representatives from the following agencies: NASS, ERS, EPA, OPMP, and AMS, meets regularly to discuss the nation's pesticide issues. This working group helps set a coordinated USDA pesticide data collection policy.

5. Why are pesticides used on food crops and livestock?

They decrease losses in yield and/or quality by controlling insects, weeds, diseases, and other pests. Pesticides also protect livestock and poultry from insects and other pests. Harvest aids are used to regulate growth or cause fruit to ripen more uniformly.

6. How many pesticides are used on foods?

There are more than 21,000 pesticide products on the market. About 500 chemical compounds make up the active ingredients. EPA has approved 350 compounds for food uses; 200 of which account for 98 percent of the pesticides currently applied to agricultural products. The balance is used in non-food applications, such as disinfectants and termite and rodent control.

7. Why is there concern over the safety of pesticides?

The past four decades have seen a remarkable scientific revolution in agriculture with chemical technology playing a crucial role in this revolution. This chemical revolution has produced fundamental

changes in major components of the U.S. economy, including agriculture and food processing. It has brought significant benefits to the American consumer with an abundant, low-cost, and high quality food supply. Since the publication of Silent Spring (Carson, 1962), the public has been greatly concerned about the presence of chemicals in their environment and food supply.

Public concern over pesticides was evident in the 1989 survey of consumers conducted by Opinion Research Corporation for Food Marketing Institute (FMI): "Trends: Consumer Attitudes and the Supermarket." Three-quarters of those polled considered pesticides a serious hazard. The need exists to provide an ongoing statistically based monitoring program for on-farm chemical use, and how it affects vegetables in the marketplace. This chemical use survey helps regulators make good decisions from sound science concerning public health.

8. Are pesticides carcinogenic?

The relationship between cancer and exposure to pesticides is an issue with many unanswered questions. Nevertheless, grounds for concern remain because many pesticides have been found to cause cancer in laboratory animals. The EPA has banned or significantly reduced the tolerance level for pesticides suspected of being harmful to human health.

Today, we are able to detect chemical contaminants at levels many times lower than those we could detect 10 years ago. Determining a substance's safe level is guaranteed to open a controversy when the scientific community cannot agree on the data for low level or long term risks. Risk calculations are based on maximum tolerance concentration, not on actual exposure. A safety margin of at least a factor of 100 is built into the overall calculation. Some risk, however small, is posed by any commodity, regardless of how it is produced, marketed, or prepared.

9. How are pesticides regulated to safeguard consumers?

State and Federal governments regulate pesticides while looking to the scientific community for guidance on health and safety concerns. The Federal government takes the lead by approving pesticides and setting standards for their use. States have the option of regulating them in a stricter fashion.

Essentially, pesticides are regulated in three ways:

- Research is conducted on the safety of pesticides to determine how exposure to residues affect health. For individual pesticides, human health risk assessments are conducted to ensure that their use does not pose unreasonable risks to human health. Only after extensive review of scientific test data can pesticides be registered for use on food crops.
- Both domestic and imported food products are tested for pesticide residues that exceed the safe tolerance levels.
- Action is taken to remove from the market any food products with unsafe levels and to penalize the parties responsible.

Chapter 2 - Terms and Definitions

Enumerators working on the VCUS should be familiar with the definitions of the terms listed below. Appendix A of the NASDA Interviewer's Manual provides definitions for most of these terms. Some additional definitions follow on the next page.

actual nutrients
active ingredients (AI)
adjuvant
beneficial organism
Bt
Biopesticides
chemigation
Conservation Reserve Program (CRP)
conservation tillage
contour farming
cover crop
crop dusting
crop insurance
crop rotation
cropland
defoliant
fertilizer
fertilizer analysis
foliar pathogen
fungicide
fumigation
genetically enhanced
growth regulator
harvested acres
herbicide
highly erodible land
host free zone
idle land
insecticide
integrated pest management (IPM)
lime
low input sustainable agric. (LISA)
microbial control
micro-nutrient
miticide
mulching
N-P-K
nematicide
nematode
nitrogen (N)
noxious weed
no-till
organic matter
pathogen
pesticide
pheromone
phosphate (P_2O_5)
plant tissue test
potash (K_2O)
residue
scouting
selective herbicide
selective pesticide
soil fumigant
spot treatment
strip cropping
surfactant
sustainable agriculture
sustainable practices
tank mix
thinners
topically applied
trap crop
treated acres
treatment acres
wetting agent

Biopesticides: pesticides derived from natural materials such as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticidal applications and are considered biopesticides.

Foliar Pathogen: pathogen that occurs on above-ground plant parts

Infestation Threshold: the level of infestation at which it will pay to make a pesticide application; varies widely depending on costs of application and chemical selected, and on projected yields and market prices

Microbial Control: use of microorganisms or their by-products to control pests

Nematode: microscopic worm which is parasitic to plants

Pathogen: a living disease-causing microorganism, i.e., bacteria, fungi, virus, or mycoplasma (Mycoplasma is a living microorganism lacking a true cell wall; some species of which cause plant disease.)

Soilborne Pathogen: a disease-causing organism that is found in the soil or on roots of plants

Soilborne Pest: includes pathogens as described above and such pests as nematodes, insects or weeds

Spiral: type of applicator for pesticides normally applied at very low rates which contains a pre-measured amount of active ingredient

Sustainable Agriculture: a system of integrated farming practices designed to minimize the need for chemical additives to the soil and crops, and to conserve natural resources

Sustainable Practices: practices designed to work with the natural biological systems of the farm to permit farmers to substantially reduce or eliminate the use of chemical pesticides, fertilizers, and other farm inputs.

Threshold: The level of infestation at which it will pay to make a pesticide application. The threshold level varies widely depending on type of plant, costs of application, chemical selected and on projected yields and market prices.

Chapter 3 - Survey Procedures

General

The instructions in this chapter are guidelines for completing the questionnaire and turning in completed work. This manual should be studied carefully before beginning work and should be used as a reference during the survey. Review the NASDA Employee Handbook for other instructions on administrative items, agency goals, etc.

The Vegetable Chemical Use Survey (VCUS) does not focus on all vegetable crops grown. Information will be collected for 22 target vegetable crops in 18 States. Each State will collect chemical use information for only a pre-determined set of target crops. Pest management practices will be collected on all vegetable crops grown on the operation.

The Screening Phase I of data collection began in late May, 2024, and will end by late July, 2024. The Integrated Screening Survey (ISS) is used to collect information for both the VCUS and the Agricultural Resource Management Survey (ARMS). This phase screened a sample of vegetable producers for planted acreage of the target crops in the 2024 crop year. The VCUS sample is selected using information from the ISS.

The Vegetable Chemical Use Survey enumeration begins early in November, 2024 and ends in January, 2025. The data collection period will be dependent on the crop harvesting period and Regional Field Office (RFO) NASDA budget allocations. Enumerators should avoid contacting respondents until harvest has been completed or the last chemical applications have been applied to the 2024 crops. However, to keep survey costs reasonable, States are encouraged to complete enumeration as early in the survey period as possible, NASDA budget allowing. Arizona and California will use pesticide administrative data for their target vegetables. Arizona begins data collection in July because of their cropping practices.

Supplies and Materials

Each enumerator should have the following materials before beginning personal enumeration.

- State highway maps.
- County highway maps.
- Clipboard to hold questionnaires.
- Black lead pencils for recording information on questionnaires and a ball point pen for completing NAS-011.
- Calculator.
- NASDA Identification Card (NAS-005).
- *NASDA Interviewer's Manual.*
- Survey Materials.
  - Envelopes containing extra questionnaires for use as needed. Be sure the correct identification has been entered on any extra questionnaires used.
  - Vegetable Chemical Use Survey Interviewer's Manual.
  - Respondent Booklets.
  - Supplements.
  - Extra pre-survey letter & publicity materials

Interviewing

Before beginning enumeration, mark a state highway map with the locations of the samples assigned to you. The location of the operator's residence should be indicated by a small circle with the I.D. number written beside it. Use this map to plan your daily travel. This will make time and mileage use more efficient. Notify your Supervisor about all operations that cannot be located.

It is essential to interview the operator or the person designated by the operator who will be able to give the "best" information. If that person is not available, follow the callback procedures given later in this chapter.

The nature of this Survey dictates that the enumerator and respondent, at least initially, work together with the questionnaire and respondent booklet. If it's possible to get access to the operations spray records, it may be best to spend time recording information without the presence of the operator. However, any special situations that cannot be easily understood will need a follow up contact and detailed notes.

Enumeration

An operator or operation name, mailing address, and I.D. number will be provided to you, along with any related information that the RFO has. A label with the name and address of the operator will be printed on the front of the questionnaire. The mailing address will be the key to locating operators. **The spelling of the name and the entire address should be verified during the interview.**

Also included with the questionnaire will be a 2024 Vegetable Chemical Use Survey Acreage Insert. This acreage insert will include the operator or operation name, mailing address, and I.D. number along with relevant data collected during the screening phase such as Total Farm Acres Operated, Reporting Unit, Target Vegetable Crop(s) Grown, Target Vegetable Crop(s) Code, and Total Target Vegetable Crop(s) Acres Planted. Using the data from this acreage insert will help to reduce the length of interview time. Please use caution when using this data to ensure it remains confidential. A more complete description of the Acreage Insert can be found in Chapter 4 of this manual.

If the sampled unit operated a farm at any time during 2024, but does not operate a farm at the time of the interview, an interview should still be conducted. This year, limited substitution will be allowed. If the operation changed hands during the year, and the new owner did not merge the operation with any previously established operation, the interview may be completed with the new operator. More detailed substitution guidelines are available in section 4. If the operation went out of business but did not change hands, data for the time the operation was in business should be collected.

Recording Data

Use a black lead pencil.

Record data in the unit required and to the nearest whole number, unless greater precision is requested. When tenths or hundredths are required, the answer cell will contain a decimal point and blanks to indicate how many places to the right of the decimal must be recorded.

Follow skip instructions to avoid asking questions needlessly.

Cells requiring code entries are identified. Write notes in margins or blank spaces to describe unusual conditions. Good notes are a big benefit to the office and may help the office avoid contacting you or the respondent

Completing the Questionnaire

The heading on the first page of each section is CAPITALIZED. Items or questions

within sections are numeric or a combination of alpha/numeric; for example: 2e.

Enumerator instructions are italicized and enclosed within brackets, such as [**Enumerator Note:** *skip this section if there is no change in operation name or operator*]. Bracketed instructions should never be read to the respondent. Optional wording is enclosed in parentheses - i.e., "…decisions for this (name on label) operation". Additional details about questions, include and exclude instructions, and other points which may require clarification are italicized and enclosed in parentheses - i.e. (exclude new plantings of vegetables not intended for harvest in 2024. These should be read to the respondent when necessary. Space is provided in or near sections where it may be necessary to make calculations or notes.

Burden Statement

The Paperwork Reduction Act, as administered by the Office of Management and Budget (OMB), requires that all questionnaires used by federal government agencies include a burden statement with an estimate of the average response time. OMB has the duty of approving and overseeing government data collection efforts and requires that the average response time include refused interviews. For VCUS, the burden statement is printed in the questionnaire and Respondent Booklet. Any concerns or questions a respondent has about the questionnaire, the time required to complete it, the burden statement, or the Paperwork Reduction Act should be addressed in writing to OMB. The burden statement is located at the bottom of the last page.

Making an Appointment

Many times it is preferable to make an appointment over the phone for a convenient time to conduct the interview, rather than traveling to the location without any prior contact. This procedure is also economical. However, telephoning prior to the first visit is left to the discretion of the RFO.

Call Back Procedures

Attempt to contact the operator and complete the interview on the first visit. Occasionally, the first attempt is unsuccessful and it is necessary to call again. The following instructions should be used as a general guide.

First Visit:

Try to interview or set up a future appointment with the operator your first visit. If the operator is not present but is expected shortly, wait for an interview. If other contacts need to be made nearby, continue with those and return later.

Make every effort to schedule appointments at the operator's convenience and to keep all appointments.

If the operator will not be available until the data collection period is over, interview someone who knows about the farm operation such as a spouse, partner or employee.

Second Visit:

When a second visit is required, try to interview the operator. If the operator is not available, interview someone who knows about the farm operation such as a spouse, partner or employee.

Make every effort to secure the operator's telephone number and to determine where and when contact can be made. If the farm operator, spouse, partner or other employee cannot be contacted, notify your Supervisor.

Third and Final Visit:

On a third trip, try to interview the operator, spouse, partner or other employee. If a respondent is not available, explain in notes why an interview was not completed. Comments regarding whether the operation is an active farm or a non-farm and why the interview was not completed will be needed by your Supervisor and the RFO.

Supervision

Supervisors will schedule appointments to meet with each of their enumerators toward the beginning of the data collection period to review completed work. These visits will assist enumerators in getting off to a good start. Supervisors will instruct enumerators to hold their first completed questionnaires until they can be reviewed since a respondent may have to be re-contacted to address any problems.

Handling Completed Questionnaires

Completed questionnaires should be sent to your supervisor or the RFO according to your supervisor's instructions for this survey. If you are concerned that the last few questionnaires you complete might not reach the RFO before the final due date, call your supervisor or the survey statistician.

Keep a record of when you complete each questionnaire and when you sent it to your supervisor or the RFO. This will help the survey statistician to locate questionnaires or survey materials, if lost or delayed.

Questionnaire Versions

There are three questionnaire versions for this survey: Enterprise; Arizona Enterprise and California Enterprise.

The main sections in these versions are lettered A through E, but not every version contains every lettered section. There are additional Screening and Conclusion sections that are not lettered. Some Screening sections do not appear in all versions.

Chapter 4 - Questionnaire Completion: Face Page, Screening and the Acreage Insert

Introduction

Before you introduce yourself and this survey to an operator, get comfortable with the introduction you want to use. Be sure your introduction includes who you are, who you represent (USDA/NASS) and what you want. Remind the respondent that the data are confidential and are used only in analysis and to make State and Multi-state estimates. You should also mention that farm records are extremely helpful in answering the survey questions. Study the information in Chapter 1 of this manual so you can answer questions about the survey.

All of the operators you contact should have received a pre-survey letter from your RFO. Some of them may have heard or read about the survey through pre-survey radio, television spots or newspaper or magazine articles.

The Screening Phase for this survey conducted in May, June and July allowed us to sub-sample one operation when target operators had more than one qualified operation for the Vegetable Chemical Use Survey. We will only collect information for one of the operations associated with the target name.

If the operation on the label has changed since it was screened in the summer, this operation will need special handling. Rules for collection of data if a change in operator has occurred are explained below.

Substitution Rules

When it is discovered that the operation has changed hands, after recording the name and address of the new operator, enumerators will need to determine whether or not the new operator qualifies for an interview.

Substitution Allowed:

When a new operator is reported during the survey, a new operator should complete the questionnaire if the following conditions exist:

The new operator can report all chemical data for the entire calendar year of 2024.

AND

The new operator did not merge or combine the operation on the label with any other operation held previously.

Substitution Not Allowed:

When a new operator is reported during the survey, a new operator should not complete the questionnaire if the following conditions exist:

The new operator had existing vegetable acreage and it is being combined with the newly acquired acreage under one operation. We do not want this report.

Beginning Time

Record the Beginning Time (*in military time*) of the interview when you begin your introduction. We need correct beginning and ending times to accurately calculate the average interview time for this survey. One use of the average interview time is its inclusion in the burden statement. OMB requires that the average response time include refused interviews.

For interviews that require multiple contacts (personal or phone), you should write the date and time the interview began in a note on the face page near the Beginning Time question. Accumulate the hours and minutes of interview time and write the total on the back page near the Ending Time question. This will enable the office editor to record the total interview time in the 006 box on the back page.

Acreage Insert

Each Vegetable Chemical Use Survey sample will have an Acreage Insert that summarizes the information obtained during the Screening Phase of the survey for the selected operation. This sheet is highly confidential and should be returned to the RFO with the questionnaire. On the front page of the questionnaire, the paragraph below the beginning time introduces the Acreage Insert.

Specifically, the insert will show:

- the sampled unit's name, address, telephone number, ID information, and sequence number;
- the type of operation reported, and who reported the information;
- the total acres operated under the sampled unit's operating arrangement including the acres owned, acres rented from others, acres rented to others, total cropland acres, and total acres of all vegetable crops;
- each target crop reported during Screening Phase enumeration, and each target crop acreage;
- additional operation information when available.

Further discussion on using the Acreage Insert can be found in Chapter 5 under the explanations of Section A - Land Operated and Section B - Vegetable Acreage.

Verifying Operator

If the operator on the label is verified and there are no changes, we can go directly to the acreage insert to verify acreage. If there are operator changes, enumerators should proceed to page 2 for rescreening.

Change in Operating Status

Complete this section whenever there is an operator or operation name change.

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

A list of farm operations in each state was selected for the Vegetable Chemical Use Survey sample based on information about target vegetable crop acreage collected during the Screening Phase. The questions in this section were asked during screening and should be skipped unless there has been a change in operator or operation name.

If another operator is now operating on the land of the operator named on the label, the name, address and phone number of the new operator should be recorded here. This provides the information needed to update the List Frame when operators or operations have changed. For the 2024 VCUS survey, as explained above, limited substitution will be allowed. The enumerator note below will explain if what to do at this point. If it turns out there has been a change in operator we need to find out if this operation is operating independently of any operations the new operator may have had previously.

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

This question needs to be asked because we need to find out if the new operator already had a chance to be selected for this survey. If the operation has been combined or merged with another operation, we cannot collect the data and must conclude the interview. If the operation has not been combined, please continue to question 3 to ask if the operation ended up

having the target vegetable acreage reported during the screening phase. If the operation has just gone out of business, this question should be checked no, then proceed to question 3 on page 3.

Screening

Item 1 – Did this operation have acres of target crops during the 2024 crop year?

Enterprise Version:

Refer to the list of target crops and codes for your State. Make sure that you are familiar with the target vegetable crops for your State. If the operation had any of the target vegetable crops in 2024, check "YES" and continue the screening process. Even if the operator did not harvest the target crop(s) due to crop loss, weather, economic or other unforeseen conditions, answer this question yes and continue the interview.

If the operation did not have any target vegetable crops in 2024, check "NO" and write notes explaining the situation. Even though a screening survey was done on these operations, a producer may have changed production crops in between the screening survey and the VCUS.

California Version:

Refer to the list of target crops and codes at the bottom of Section B, page 6 in the questionnaire. If the operation had any of the target vegetable crops in 2024, check "YES" and continue the screening process. Even if the operator did not harvest the target crop(s) due to crop loss, weather, economic or other unforeseen conditions, answer this question yes and continue with the interview.

If the operation did not have any bearing or non-bearing acres of target vegetable crops in 2024, check "NO" and write notes explaining the situation. Even though a screening survey was done on these operations, a producer may have changed production crops in between the screening survey and the VCUS.

Item 2 – Who Makes Day-to-Day Decisions

This item screens to find out who makes the day-to-day decisions for the operation. These decisions may be made by an individual operator, by partners, or by a hired manager. Check the box with the appropriate decision maker for this operation. If the operation's day-to-day decisions are made by an individual operator or by a hired manager, continue to Section A on page 4. If the decisions for the operation are made by partners, go to item 5.

Item 3 – Number of Partners

If partners are recorded in item 4, then in item 5, record the number of partners associated with the day-to-day decisions of the operation. Record the number of partners, including the operator, in the box. Do not include landlords and tenants as partners.

If the operation now has partners, their names and addresses should be recorded here.

California Screening (California Version Only)

These additional screening questions are on page 4 of the California Enterprise version of the questionnaire.

Item 1 - CAL-EPA Reporting ID

The data collected for each operation in this survey will be matched with pesticide use reports which must be filed with the County Agricultural Commissioner and the California Environmental Protection Agency (CAL-EPA), Department of Pesticide Regulation (DPR). The CAL-EPA ID (pesticide permit number) is needed to make that match. Record the ID under which the operation makes pesticide use reports to the County Agricultural Commissioner for the TOTAL acres reported in Section A, Item 2. The ID may contain both letters and numbers. Be very careful when recording this ID.

Item 2 - Additional Operations Reported Under ID

Because a one-to-one match must be made between NASS records and CAL-EPA, DPR reports, we have to know whether the operation named on the face page is the ONLY operation which uses the permit number reported in Item 1 for making pesticide reports. Usually, only one operation is associated with a CAL-EPA ID. If other operations use this ID, check YES and continue. If NO, go to Item 3.

When the CAL-EPA ID is used to report for other operations, record CAL-EPA Site Location (Field Identification) Numbers (page 7) for all crops listed in column 1 of the Vegetable Acreage table (page 6). The CAL-

EPA Site Location is also required when reporting lettuce types since CAL-EPA does not break out head and other lettuce types.

Item 2a - Additional Operation Names

If this ID is used to report for other operations, record their identifying information in the space provided.

Item 3 - Screening for Additional ID's

This question screens for any other ID's that this operation may use to report pesticide applications to the County Agricultural Commissioners. If the operation uses more than one CAL-EPA reporting ID, check YES, and continue. If NO, go to Section A, Land Operated.

For operations which use multiple CAL-EPA ID's, you must record CAL-EPA Site Location (Field Identification) Numbers (page 7) for all crops listed in column 1 of the Vegetable Acreage table (page 6).

Item 3a - Additional ID's Used

If the operation uses more than one CAL-EPA reporting ID, record these additional ID's to associate the operation with all of its pesticide use during the 2024 crop year.

Item 3b - Additional Operations Using CAL-EPA ID

As with Item 2a, we need to know if any additional operations are using any of the pesticide permit numbers associated with the operation named on the facing page. If another operation is using one of the other numbers associated with the operation on the facing page, check YES and continue. If NO, proceed to Item 4.

ADA-ESD Screening - (Arizona Version Only)

This screening information is obtained on page 5 of the Arizona Enterprise Version.

Follow the directions in the **ENUMERATOR NOTE** at the top of the page. If **the box is marked, begin with Item 1**. If the box is not marked, skip this screening and go to Section B - Vegetable Acreage, on page 6.

Item 1 Pesticide Grower Permit Number

The data collected for each operation in this survey will be matched with

pesticide use reports which must be filed with the Arizona Department of Agriculture - Environmental Services Division (ADA-ESD). The ADA-ESD Grower Permit number is needed to make that match. Record the number under which the operation makes pesticide use reports to the ADA-ESD for the TOTAL acres reported in Section A, Item 2. If the respondent reports in Section A that all the data collected during the screening phase is correct, this question is referring to the total acres in the operation. Be very careful when recording these numbers.

Item 2 Other Operations Reported Under Grower Permit Number

Because a one-to-one match must be made between NASS records and ADA-ESD reports, we have to know whether the operation named on the face page is the ONLY operation which uses the Grower Permit number reported in Item 1 for making pesticide reports. Usually, only one operation is associated with an ADA-ESD number. If other operations use this number, check YES, enter code 1 in cell 012, and continue. If NO, go to Item 3.

Item 2a Additional Operation Names

If other operations do use this number, record their identifying information in the space provided.

Item 3 Screening for Other Pesticide Grower Permit Numbers

This question screens for any other numbers that this operation may use to report chemical applications. If the operation uses more than one ADA-ESD permit number, check YES, enter code 1 in cell 013, and continue. If NO, go to Section B.

Item 3a Other ID Numbers Used

If the operation uses more than one ADA-ESD Pesticide Grower Permit number, record these additional numbers here to associate the operation with all of its pesticide use during the 2024 crop year.

Item 3b Other Operations Using ADA-ESD Numbers

As with Item 2, if another operation is using one of the additional numbers associated with the operation on the facing page, check YES and continue. If another operation is using one of the additional numbers associated with the operation, on the facing page, indicate which additional ID(s) are involved and with which additional operation.

If NO, proceed to Section B.

Chapter 5 - Questionnaire Completion: Sections A – E-1 & Conclusion

Section A - Land Operated

The information in this section defines and describes the selected operation during the 2024 crop year. All land associated with the operation during the 2024 crop year should be reported. Western states must exclude Public, Industrial or Grazing Association (PIGA) land used on an Animal Unit Month (AUM) basis. At the time of the interview for this survey, some of the land operated during the 2024 crop year may no longer be in the operation, but count it anyway.

In this section, one tenth of an acre is the smallest acreage that can be reported.

The 2024 crop year will vary from State to State, or even from commodity to commodity within a State. In some areas the 2024 crop year is a twelve month period which crosses two calendar years. Crop seasons are used to define the crop year. Often the 2024 crop year will be Fall 2023 through Summer 2024. Let the respondent determine, for her/his operation, the period considered to be the 2024 crop year. Sometimes a crop year will be less than a twelve month period. We want to include all land from the end of harvest of the 2023 crop to the end of harvest of the 2024 crop.

If an operation grew target crops during any part of the 2024 crop year, data for the operation should be collected for the time during which it was in business.

If the selected respondent operates under several land operating arrangements, collect data only for the land operating arrangement (individual, partnership or managed) associated with the sampled name.

Enumerator Action Box: Using the Acreage Insert

This action box at the top of Section A needs to be coded to alert the RFO that you have verified all the acreage on the insert and there are no changes. If ALL of the acres are correct on the acreage insert, the box should be coded with a 1 indicating that Section A should be skipped, and the interview continued with Section B - Vegetable Acreage. If there are no changes from the screening survey data, no data should be entered into any cells in Section A.

Acreage on the insert was collected by mail or phone enumeration during May through July on the screening survey (ISS). Those figures may be incorrect for several reasons.

1. Someone other than the operator answered the screening survey.
2. The respondent may not have understood the questions when they completed a mail version of the screening survey.
3. Double cropping may not have been recorded on the total acres of all vegetables grown in the screening survey.

Remember that all data reported are confidential, so when using the acreage insert do not reveal an operation's data to anyone other than the operator or a person designated by the operator to answer questions. Operators may not be aware that another person answered the screening survey, so be careful how you use the acreage insert to verify anything reported during the screening phase. If the operation qualifies for substitution, do not show the acreage sheet to the new operator.

TOTAL ACRES IN THIS OPERATING ARRANGEMENT

INCLUDE:

- All acres owned and all acres rented from others.
- All cropland, woodland, wasteland, wetland, pasture, idle land, and government program land regardless of location, **if the operator made the day-to-day decisions for that land**. If an operator living in one State made the day-to-day decisions for land across State lines, that land should be included in this section.
- Land worked by sharecroppers. Sharecropper operations are considered part of the landlord's operation. A sharecropper is a worker who furnishes ONLY LABOR (his own and often that of his family) for a share of the crop. Sharecroppers generally furnish no machinery, seed, fertilizer, etc.
- All land (owned or rented) used by a son or daughter for 4-H or FFA projects, if the parent's equipment is used.

EXCLUDE:

- Pasture and rangeland that has never been tilled.
- Government program acres planted to trees. These are woodland acres.
- Woodland and wasteland.

Item 1a - Acres Owned

INCLUDE:

1. Land held by the operator and/or spouse and/or dependent children

under title, purchase contract, homestead law, or as an heir or trustee of a divided estate.
2. Cropland, woods, wasteland, wetland, pasture, idle land, government program land, orchards and vineyards.
3. Land which is not currently used for agricultural purposes.
4. All land owned and enrolled in government programs (acres in the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), and other diverted land.)

EXCLUDE:

1. All non-agricultural land separate from the operation that is permanently withdrawn from agricultural uses. This includes land in sub-divisions, commercial buildings, etc.

Item 1b - Acres Rented From Others

Farm/ranch operators often do not consider non-cropland acres such as woods, wasteland and wetland to be part of rented acreage even though the landlord considers the whole parcel rented. Rent is usually based on the number of acres of cropland or pasture land. However, if the renter was responsible for looking out for the owner's interest in the woodland, wasteland and/or wetland, these acres should be included as acres rented from others.

INCLUDE:

All land rented from private individuals, partnerships, corporations, federal, State or local governments, Indian Reservations, railroads, etc. if the operation:

1. paid cash rent on a per acre basis;
2. paid for use of the land with a share of the crops (either standing or harvested);
3. paid for use of the land with a share of livestock production;
4. had free use of the land.

EXCLUDE:

1. Any land used as pasture or for grazing livestock if payment was on a per head or Animal Unit Month (AUM) basis.
2. Land on which the respondent's livestock were fed under a contract (for example, commercial feedlots).

Item 1c - Acres Rented To Others

INCLUDE:

1. Land that this operation owned (or rented from someone else) which was rented (or subleased) to another operation during the 2024 crop

year. This land should also be included in either Item 1a or 1b.
2. Land rented to others for cash.
3. Land rented to others for a share of crop or livestock production.
4. Land that this operation allowed another operation to use free of charge.
5. Pasture or grazing land rented out on a per acre basis.

EXCLUDE:

1. Land which this operation has enrolled in government programs (acreage in Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), and other diverted land.
2. Land worked by sharecroppers on this operating unit.
3. Land used by a son or daughter for 4-H or FFA projects if the parent's equipment was used.
4. Land on which crops were grown under contract, if the land owner furnished machinery or controlled the seeding, growing and harvest of the crop.
5. Land used for pasturing someone else's livestock when payment was made on a per head or AUM basis.
6. Land on which the operator fed livestock under contract for someone else.

Item 2 - Total Acres in Operation

The operation's total farming or ranching operation acreage is the total of Items [1a + 1b - 1c].

Item 3 - Total Cropland Acres

Of the (Item 2) "total acres operated", enter the number of acres considered to be cropland in cell 802. Cropland is any tillable land currently in crop production or land that has previously been tilled and used for crops, and could be tilled again without additional improvements.

INCLUDE:

- Land in crop-pasture rotation and cropland used for pasture or grazing during the current year.
- Land in summer fallow.
- Idle cropland (no crops planted or harvested in current year).
- Cropland diverted for government programs (including CRP), unless the land is planted in trees.
- Fruit orchards, vineyards, nut trees, and citrus groves.

- Vegetables, melon crops, and other specialty foods.
- Nursery crops, turfgrass, sod, and Christmas trees.
- Land in hay crops.
- Pasture land tilled in the past if the land could be tilled again without first clearing brush, trees, undergrowth, etc.

EXCLUDE:

- Pasture and rangeland that has never been tilled.
- Government program acres planted to trees. These acres are woodland.
- Woodland and wasteland.

Item 4 - Total Vegetable Acres

Of the (Item 2) "total acres operated", enter the number of acres in vegetable production on the operation in cell 803. This question will include **ALL** vegetable acreage on the operation, including **both** target vegetable crops and non-target vegetable crops. This item must be less than or equal to item 2, total acres operated (cell 900).

INCLUDE:

- All **BEARING** and **NON-BEARING** vegetable acreage.
- All **TARGET** and **NON-TARGET** vegetable acreage.
- Acreage planted in strawberries.
- Double cropped acres.
- Crops planted in the Fall of 2023, if they were part of the 2024 crop year.

EXCLUDE:

- Acreage planted as a home garden.
- Vegetable acres grown in another State.
- Vegetable acres grown for seed only.
- Vegetables grown for commercial transplanting.
- Vegetables grown in greenhouses and hothouses.
- All mushrooms, potatoes, sweet potatoes, and dry beans.

Section B - Vegetable Acreage

The purpose of this section is to obtain the number of planted acres (total acres for California) of each of the target vegetable crops. Expansions of these acres will be used in coverage analysis for the vegetable chemical use.

Within this section and throughout much of the rest of the questionnaire, the terms "vegetables", "vegetable acreage" and "vegetable crops" will be used. Unless the questionnaire or specific manual instructions say otherwise, include only the target vegetable crop(s).

Do not collect acreage or chemical data for any vegetable acres which this operation grows outside of your State. This is because some States may receive special use permits for certain pesticides that are not allowed in other States.

INCLUDE:

1. Only target crops produced on the acres operated in your State.
2. All acreage of a target crop, includes fresh and processing combined.
3. All target acreage equal to or greater than one tenth of an acre.
4. All bearing acres of target crops for roadside stands, farmer's markets or pick-your-own sales.
5. Acreage not harvested due to weather, economic or other conditions.
6. **In California only**, new plantings and other plantings of asparagus and strawberries which are not yet bearing.
7. Crops planted in the Fall of 2023, if they were part of the 2024 crop.
8. Double cropped acres of target vegetables.

EXCLUDE:

1. All crops grown in another State.
2. **HOME GARDEN VEGETABLE ACREAGE**.
3. All crops grown in greenhouses and hothouses.
4. Crops planted but not intended for harvest in 2024.
5. All target crops grown by institutional, experimental, research or university farms.
6. All vegetable acreage grown for seed only.
7. All vegetables grown for commercial transplanting.
8. New plantings and other plantings of asparagus and strawberries which are not yet bearing (except in California).
9. Non-target vegetables.
10. All mushrooms, potatoes, sweet potatoes, and dry beans.

TARGET VEGETABLE CROPS BY STATE

Arizona
Lettuce, Head
Lettuce Other
Spinach
Watermelons

California
Beans, Snap
Broccoli
Cabbage
Cantaloupes
Carrots
Cauliflower
Celery
Corn, Sweet
Cucumbers
Garlic
Honeydew
Lettuce, Head
Lettuce Other
Onions
Peppers, Bell
Pumpkins
Spinach
Squash
Tomatoes
Watermelons

Florida
Beans, Snap
Cabbage
Corn, Sweet
Cucumbers
Peppers, Bell
Squash
Tomatoes
Watermelons

Georgia
Beans, Snap
Cabbage
Corn, Sweet
Cucumbers
Onions
Peppers, Bell
Squash
Watermelons

Indiana
Pumpkins
Watermelons

Illinois
Beans, Snap
Pumpkins

Michigan
Asparagus
Beans, Snap
Cucumbers
Squash

Minnesota
Corn Sweet
Peas, Green

New Jersey
Asparagus
Peppers, Bell
Squash

New York
Beans, Snap
Cabbage
Corn, Sweet
Onions
Pumpkins
Squash

North Carolina
Cucumbers
Peppers, Bell
Pumpkins
Squash
Watermelons

Ohio
Pumpkins

Oregon
Beans, Snap
Corn, Sweet
Onions
Peas, Green
Squash

Pennsylvania
Beans, Snap
Pumpkins

Texas
Cabbage
Cucumbers
Onions
Watermelons

Washington
Corn, Sweet
Onions
Peas, Green

Wisconsin
Beans, Snap
Cabbage
Corn, Sweet
Cucumbers
Peas, Green

Target Vegetable Crops Definitions

Asparagus: fresh and processing asparagus, all types.

Beans, Snap: fresh and processing snap beans, all types.

Broccoli: fresh and processing broccoli, all types.

Cabbage: fresh and processing cabbage, all types. Includes white, red, and savory cabbage; excludes napa, bok choy, and Chinese cabbage.

Cantaloupes: all types, excludes muskmelons.

Carrots: fresh and processing carrots, all types. Includes baby carrots.

Cauliflower: fresh and processing cauliflower, all types. Includes white and colored varieties.

Celery: fresh and processing celery, all types.

Corn, sweet: fresh and processing sweet corn, all types. Excludes seed and field corn.

Cucumbers: fresh and processing cucumbers and pickles, all types.

Garlic: fresh and processing garlic, all types.

Honeydews: honeydew melons, all types.

Lettuce, Head: head lettuce, all types.

Lettuce, Other: leaf, romaine, & non-head lettuce types (excludes spring mix).

Onions: dried onions includes dried, bulb, and/or dried bulb types.

Peas, Green: fresh and processing types, includes snow, sugar, and English peas. Excludes dried green peas.

Peppers, Bell: includes red, yellow, and green types.

Pumpkins: all types.

Spinach: fresh and processing, all types and varieties.

Squash: fresh and processing, all types.

Strawberries: fresh and processing, all types.

Tomatoes: fresh and processing, all types.

Watermelons: all types.

Target Vegetable Acreage

Columns 1 & 2 - Crop Name & Code

In these columns, record the name and corresponding code of each of the target vegetable crops grown by the operation. Use the list of target crops and codes for your State. The vegetable crop code is listed on page 5 of the Enterprise questionnaire version; at the bottom of the Vegetable Acreage, Section B, page 6 on the Arizona version; and for the California Enterprise questionnaire version, page 6 Section B. The data on this page will often be referred to in other sections of the questionnaire.

For 2024, there will not be separate codes for vegetable crop usage, ie fresh or processing.

Column 3 - Planted Acres (Except California Enterprise Version)

Record the number of acres planted for harvest in 2024 (to the tenth of an acre) for each of the target crops. For purposes of this survey, exclude new plantings not intended for harvest during the 2024 crop year. If the operator is reporting several plantings of a single target crop together, be sure to get the correct total acres. If several plantings of a single target crop are being recorded separately, be sure to record all plantings.

INCLUDE:

1. All acres planted and intended for harvest during the 2024 crop year, even if the acres were never actually harvested (due to weather damage, economic conditions, or other reasons).

2. All bearing age acres of crops planted in previous years for harvest in the 2024 crop year.
3. Acres of target crops planted in double, triple, and other multiple crop situations.

Example:
The operation has an 80 acre field in which two crops of head lettuce were planted. You can record this in one of two ways.
Coding:
Two lines may be used with 80 acres of head lettuce recorded on each line.
One line may be used with 160 acres of head lettuce recorded.

Column 3 - Total Acres - (California Enterprise Version Only)

Record **total acres** for California asparagus and strawberry growers, including bearing and non-bearing acreage (to the tenth of an acre). This is necessary because the CAL-DPR data does not distinguish between bearing and non-bearing acreage.

Column 4 - Pesticides Applied

At the individual target crop level, this item screens for herbicide, insecticide, fungicide, etc. applications. This column will help keep track of the crops for which pesticide application data must be collected in Section D.

If herbicides, insecticides, fungicides, growth regulators, fumigants, etc., were applied to an individual crop during the 2024 crop year, code the corresponding cell in column 5 with a "1." If no pesticides were applied, simply make a "dash" through the cell.

Column 5 - Harvest Date for 2023 Crop Year - (California Version Only)

Record the month, day, and year in which the 2023 crop year harvest was completed. This will identify the appropriate starting month for the 2024 crop year. If the respondent does not have the date recorded or is not reporting from his records, probe to determine the approximate timing. Try to get the month and then determine which third of the month the harvest was completed. If harvest was completed during the first ten days of the month, use 05 as the day. If it was sometime in the middle part of the month and the respondent is unsure of the exact date, use 15. If it was during the last part of the month and the respondent is unsure of the exact date,

use 25.

Record the date the respondent completed harvest of the 2023 crop in the "month-month-day-day-year-year format." For example, if the respondent knows that harvest was completed within the first ten days of November of 2023 but doesn't know the exact date, record 110523; 11 for November, 05 for the mid-point of the first ten days, and 23 for 2023.

If the crops were abandoned, the operator should be asked when they stopped applying chemicals for that year's crop.

Column 6 - Harvest Date for 2024 Crop Year - (California Version Only)

Record the month and year in which harvest of each 2024 target vegetable crop was completed. If harvest has not yet been completed for the 2024 crop, record the date, month, and year in which the respondent expects to complete harvest of the 2024 crop. If the respondent does not know the exact dates, use the same coding pattern as described in the instructions for Column 5 to approximate dates.

CAL-EPA Site Location Number - (California Enterprise Version Only)

CAL-EPA Site Location Numbers are required for all crops listed in column 1 **when a California Screening question was answered YES**. Refer back to items 2 and 3 on page 4.

If California Screening item 2 was answered YES, then the CAL-DPR permit ID is used to report for other operations and you must record Site Location Numbers.

If California Screening item 3 was answered YES, then the operation uses multiple CAL-DPR permit ID's and you must record Site Location Numbers.

Collecting the Site Location Numbers will allow matching the data from this survey to the CAL-DPR chemical application information. If more than 7 fields are needed for a crop line, use a blank table from a blank questionnaire or if possible, go to the next line on the table and change the line number on page 7 to the line number to which you are referring. On subsequent lines be sure to change the line number to the corresponding line in the crop table.

Vegetable Acreage Supplements

No unique Vegetable Acreage Supplement has been created. If the need arises for additional lines, pull out Section B from a blank questionnaire. Renumber the lines beginning with the next unused line number available for recording crops in the Section B table. A total of 98 lines may be used for this section. Copy the identifying numbers from the label on the face page of the questionnaire onto the top of any extra Vegetable Acreage pages used. Be sure these pages are returned with the questionnaire to the RFO. Keep track of the number of Vegetable Acreage pages used, and record this count in a blank area of Section B.

Using the Acreage Insert

The Acreage Insert can be used to help facilitate a smoother interview. The data on the insert was collected during the screening phase conducted from May through July. Caution should be taken because the report by mail or phone interview during the screening phase could have been made by someone other than the operator. If any of the acreages reported on the Vegetable Chemical Use Survey are different than those reported on the screening phase, note the reason for the change.

DO NOT use the Acreage Insert as a crop by crop guide to complete the Section B Vegetable Acreage table. Once you have completed the Section B table, check each reported crop against the insert.

There are many valid reasons why the Column 3 acreage may be significantly different from the Screening Phase recorded acreage. The screening acreage may represent intentions and not crops that had already been planted. Do not assume that something is wrong. If, however, the acres are significantly different, tell the operator that your notes from the screening survey conducted in May, June and July show the operation with "x" total acres planted of the target crop in question, while now "y" planted acres are being reported. Ask the respondent to help you explain the large difference in the acreage. Summarize the explanation on the insert, and make corrections as needed to the table.

When the respondent reports the same crops in the Screening Phase and the VCUS, things are easy. Be sure to check for crops that were reported on the Screening Phase, but are not being reported on the VCUS. Similarly, check for crops being reported on the VCUS that were not reported on the Screening Phase. Write notes of explanation on the insert to explain these types of situations.

Section D - Pesticide Applications - (Except California)

General

Table B earlier in the interview asked if pesticides had been applied and to which crop. If a 1 was recorded for any crop in table B, we will need to complete this section. Pesticides should include any herbicides, insecticides, nematicides, miticides, fungicides, chemical thinners, growth regulators, microbial agents, pheromones, rodenticides, and soil fumigants.

The crop year begins at the end of harvest for the 2023 crop. All applications made after harvest of the 2023 crop up through harvest of the 2024 crop should be included.

INCLUDE:

1. All pesticide materials applied to 2024 target vegetable crops.
2. Custom applied pesticides.
3. Defoliants or desiccants.
4. Biological and botanical pesticides, such as Bacillus thuringiensis (Bt).
5. Applications made by airplane.
6. Partial field and spot treatments

Spot treatments

Spot treatments occur when pesticide material is applied only to scattered spots in the field, such that the area treated is hard to define. Spot treatments will need to be included in the pesticide table this year as opposed to previous years when we omitted them. It will be difficult to determine the cumulative number of acres spot treated. Please get the operator to give their best estimate of acres spot treated and record the acreage in column 9.

EXCLUDE:

1. Fertilizers including those applied as foliar sprays.
2. Adjuvants, surfactants or crop oils (e.g., wetting agents, stickers, and spreaders).
3. Applications to fence rows, ditch banks, canals, and ponds.

Foliar fertilizers

Fertilizers applied as a foliar spray may be reported as a chemical treatment, especially if they were part of a tank mix which included other pesticides. Such fertilizer applications should be included on the fertilizer table if they consisted of N, P, K, or S and not on the pesticide table.

Adjuvants

Adjuvants are used to aid the operation or improve the effectiveness of pesticides. A spray adjuvant may contain one or more surfactants, solvents,

solubilizers, buffering agents, and stickers needed to formulate a specific type adjuvant. By using the proper adjuvant it is often possible to use certain chemical pesticides in a tank mix that otherwise would present compatibility problems. However, if you or the respondent are in doubt about whether a product should be included, record it anyway and write notes to explain the situation.

Applications to fence rows, ponds, canals and ditch banks

This land should not be considered part of the target vegetable acres. Often the chemicals used for killing weeds and other pests in these areas are not labeled for use on vegetable crops.

Item 1 - Pesticide Applications Table

This item is a lead-in to completing the pesticide applications table. All applications made after harvest of the 2023 crop through harvest of the 2024 crop should be included. **Do not include any applications made to the target vegetable crops after the 2024 crop year harvest.**

There are several ways a respondent may report within this section. The questionnaire is flexible enough to handle most of them. Depending on the way the records are kept or the way the respondent thinks about chemical and pesticide applications, it may be easier to report all applications to one crop before going on to the next crop, versus reporting applications to the target crops in chronological order.

If the operator prefers to report chemical applications to target vegetable crops one at a time, make sure that applications to **all** target crops are reported before you continue with the rest of the interview.

The respondent may report applications in the order in which products were applied, especially if application records are used. In this case, applications to a specific crop may be mixed in with applications to other target crops. Take care that only applications to target vegetable crops are reported in the chemical applications table. Chronological reporting is probably the most accurate form of reporting and the most likely form of reporting if whole farm records are used.

Use of Records

Because of record keeping requirements for restricted use pesticides, most operators will have records of chemical applications for each field. Encourage the respondent to use these records if they are available. If it is

possible to obtain a printout of the operations spray records, it may be best to record applications without the presence of the operator as to not unnecessarily burden them. However, if records were to get confusing, or in the event of an unexplainable situation, the operator would need to be re-contacted for clarification.

Use of the Respondent Booklet

Both you and the respondent should use the Respondent Booklet. Most of the pesticide products used on the target vegetable crops are listed in the Respondent Booklet. It is very important to obtain the chemical product name as well as the formulation from the operator to insure that the correct product code is recorded. In order to report the formulation and whether the product is liquid or dry, the respondent may have to look at the product label or detailed itemized receipts for the product.

Some respondents may be willing to use the booklet and to report the product code for each of the products they used. You should encourage this since it makes the job of enumeration easier as well as making reporting faster and more accurate.

The respondent booklet should also be used as an aid in making sure all crops the operator reported as having applied pesticides to in Section B are covered. If a crop is reported in Section B as having a pesticide applied to it and it does not show up in Section D, a re-contact with the operator will need to be made.

To aid in identification, the products in the Respondent Booklet are categorized as liquid (L) or dry (D) formulations. Ask the respondent if the product was in a liquid or dry state **when it was purchased not how it was applied**. This should help you and the respondent find and record the correct product codes.

The Respondent Booklet also lists the type or class of each product:

- Herbicide (H)
- Insecticide (I)
- Fungicide (F)
- Miscellaneous (M)
- Miscellaneous Growth Regulator (MG)
- Miscellaneous Rodenticide (MR)
- Miscellaneous Soil Fumigant (MS)

Some chemicals and pesticides have more than one use. Some products with more than one use may be listed twice if the second use is associated with a separate product code. For example,

Thiolux

L	I	10193	THIODAN 3E INSECTICIDE	11656-28
D	F	70117	THIOLUX DRY FLOWABLE MICRONIZED SULFUR	100-835

For products that are listed more than once, be sure to probe for what it was used for and record the product code associated with that use.

Note that each product code listed in the Respondent Booklet specifies the trade name and formulation. The numbers and letters after the product name identify the concentration and form. For example, Captan 80-WP: Captan is the trade name, and the 80-WP indicates the formulation. The 80 indicates the concentration as the percent of active ingredient in a pound of product, and the WP indicates that the form of the product is Wettable Powder. For Direx 4L: Direx is the trade name and the 4L indicates the formulation. The "4" indicates four pounds of active ingredient in a gallon of product and the "L" indicates a Liquid Concentrate.

Also note that for several products there is more than one formulation for a given trade name: Acrobat MZ and Acrobat 50WP; or Diazinon 4E, Diazinon 14G, Diazinon 50W and Diazinon AG500 (4E). Different formulations of a product have different concentrations of the active ingredient and inert materials.

It is extremely important that you get the correct product code because active ingredient concentrations for different products and different formulations vary greatly. Since we summarize by active ingredient in the product, recording a product or its formulation incorrectly will make a difference when the active ingredient application rate per acre is calculated.

Some chemical products may be known by more than one product name. In this case, both names are listed in the respondent booklet with the same product code. For example, the following products are listed in the respondent booklet:

FORM	CLASS	CODE	PRODUCT NAME
L	F	70689	Quadris Top

Note that after the product name is listed, the "aka" (also known as) is listed in parentheses.

If you cannot find a reported product in the Pesticide Code List in the Respondent Booklet, complete the line at the bottom of Section D which

requests data on the unknown product. If you run out of space to report unknown chemicals in this section, use a blank page in the questionnaire. The RFO will research the product and assign a new product code if necessary.

Chemical Product Name

Record the name of the chemical in the column on the left hand side of the table. This helps the office staff to correctly identify the product in column 3.

Columns 1 & 2 - Crop Name & Code

Record the crop name and code for each pesticide application. **Each pesticide product must be recorded on a separate line**, so you may have several lines for each crop receiving chemical applications.

Column 3 - Product Code

Record the product code from the respondent booklet of the herbicide, insecticide, fungicide, etc., reported. Be sure to write the product code clearly.

Information for Unlisted Pesticides

If you cannot find a product in the pesticide list in the Respondent Booklet, complete the table on the bottom of the page to provide the information needed to identify unlisted products. Record the line number(s) of the pesticide from the table, the pesticide type (herbicide, insecticide, fungicide, etc.), the EPA Registration number or the name and formulation of the product, the product form (liquid or dry) and finally, where the product was purchased.

The EPA Registration number is the best means of identifying a product. If the respondent does not know the EPA Registration number or the trade name and formulation, record as much information about the product as you can. A good, complete entry for an unlisted product is shown below.

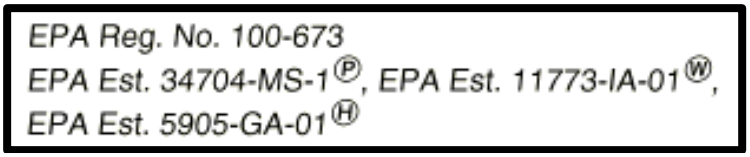
Unlisted Product Example:

[*For pest control products 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.
6	Insecticide	Danitol 2,4 EC	Liquid	39639-35

What is an EPA Registration Number?

All pesticide products, if properly registered, are identified by a unique EPA Registration Number (EPA Reg. No.) which is required to be printed on the product label. A label example is shown below. EPA Reg. Nos. are several digits long, such as 312-18713 or 2980-4. In the example, the **EPA Reg. No. is 100-673**. The EPA Reg. No. is not the same thing as an EPA Establishment (EPA Est.) number. EPA Est. numbers indicate which companies are licensed to market the product, but do not uniquely identify the product.



At a minimum, the EPA Reg. No. includes two components separated by a hyphen:

1 - **Firm Number**: identifies the company that is the primary registrant with the U.S. EPA; one to seven digits long.

2 - **Product Number**: identifies the product; generally assigned sequentially (i.e., with each new EPA product registration for a company, a new product number is assigned); one to five digits long.

Occasionally, an EPA Reg. No. will include additional components. For example, 31703-EUP-1673, where EUP means the registration is for an "Experimental Use Permit."

Remember that EPA Est. numbers do not identify products, therefore, **do not record numbers labeled "EPA Est." under "EPA Reg. No." in the notes at the bottom of the page.** These numbers identify companies that are registered under an existing agreement certified by the U.S. EPA to market a product owned by another company. For a product registered in California, this number represents the company that holds the license for pesticide registration within the state.

Common abbreviations for form include:

L (Liquid)	These products flow like water. Concentrations are usually expressed in pounds per gallon.
E (EC)	Emulsifiable concentrates. These are usually thicker than water and are mixed with water and applied as sprays. They contain one or more active ingredients, one or more solvents and an emulsifier. Their concentrations are generally indicated in pounds per gallon.

F (FL) (Flowable)	These products are in liquid form. They contain finely ground active ingredients suspended in the liquid. They are mixed with water for application. Their concentrations are indicated in pounds per gallon.
D (Dust)	Dusts contain a low percentage of active ingredients on a very fine dry inert carrier such as talc, chalk or clay. They are usually applied directly as purchased. Their concentrations are expressed as percentages.
WP (W), SP (S)	Wettable or Soluble Powders. These are dry products, much like flour, which will dissolve or disperse in water. Their concentrations are indicated as percentages.
G(Granular)	Granular products contain active ingredients coated or absorbed onto coarse particles like clay, ground walnut shells or ground corn cobs. The pellets are about the diameter of the lead in a pencil (or larger); during shipment the granules have a tendency to break down and create dust. These are used as purchased. Their concentrations are expressed as percentages.
DF (Dry Flowable), WSG(Water Soluble Granules)	Also known as water dispersible granules. These are small pellets formulated to reduce the dust problem created with granules. They are like wettable powders, except that the active ingredient is formulated on a granule instead of a powder. The product pours easily into spray tanks for mixing with water. Their concentrations are expressed as percentages.
Bait	Bait products contain active ingredients mixed with food or another attractive substance. Concentrations are expressed as percentages.

Column 4 - Liquid or Dry

Record an "L" or a "D" in this column to indicate in what form the product was purchased. Be sure the liquid or dry designation listed by the product code selected from the Respondent Booklet agrees with what you record here for the product.

Column 5 - Tank Mix Line Number

For products not applied as part of a tank mix, leave this column blank.

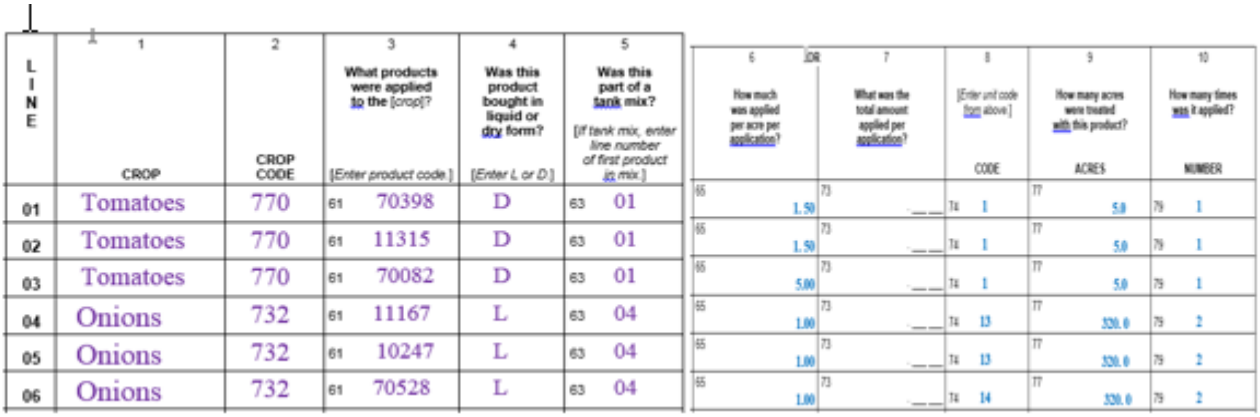
Products applied in a tank mix (two or more products mixed in the tank by the farmer/custom applicator and applied together) must be identified on the questionnaire. Since the table is designed for one product per line, each product in a tank mix must be recorded on a separate line. Identify the products in a tank mix by recording in column 5 the line number of the first product in the tank mix.

For example, consider a tank mix where you recorded the first product on line 11, the second product on line 12 and the last product on line 13. In Column 5 of line 11 you should record "11" which signals that this line is the beginning of the list of products in that tank mix. In column 5 of line 12, record "11" again to indicate this product as part of the same tank mix listed on line 11. Record "11" in column 5 of line 13 also. In a tank mix situation, column 2 (crop), column 5 (tank mix line), column 9 (acres treated), and column 10 (number of times applied) must all be the same for each product in the mix.

Tank Mix Examples:

A 5 acre field of tomatoes received a single application of a tank mix containing Elevate 50 WDG at 1.5 lbs./acre, Vendex 50 WP at 1.5 lbs./acre, and Captan 50 W at 5 lbs./acre.

A 320 acre field of onions received two applications of a tank mix containing Warrior with Zeon at 1 qt./ acre, Penncap-M at 1 qt./acre, and Bravo 6EC at 1 pt./acre.



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.]	6 OR 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 How many acres were treated with this product? ACRES	10 How many times was it applied? NUMBER
01	Tomatoes	770	61 70398	D	63 01	65 1.50	73 ___	74 1	77 5.0	79 1
02	Tomatoes	770	61 11315	D	63 01	65 1.50	73 ___	74 1	77 5.0	79 1
03	Tomatoes	770	61 70082	D	63 01	65 5.00	73 ___	74 1	77 5.0	79 1
04	Onions	732	61 11167	L	63 04	65 1.00	73 ___	74 13	77 320.0	79 2
05	Onions	732	61 10247	L	63 04	65 1.00	73 ___	74 13	77 320.0	79 2
06	Onions	732	61 70528	L	63 04	65 1.00	73 ___	74 14	77 320.0	79 2

Column 6 - Rate per Acre per Application

OR

Column 7 - Total Amount Applied per Application

The rate per acre per application or the total amount applied per application may be used for each product reported. **Record data for either column 6 or column 7, not both.** If the respondent is able to give either total quantity applied per application or rate per acre, select the option which the respondent feels will give the most accurate data.

Record application rates to one-hundredth of the respective unit, that is, to two decimal places. Be sure that if whole numbers are reported, two zeros

are entered after the decimal point.

For column 6, rate per acre is the amount used in one application to one acre. If the same amount of a chemical was applied several times to the same crop, more than one application may be recorded on a line by entering a number greater than 1 in column 10 (number of times applied, except WA).

In column 7, record the total quantity applied per application to all acres treated. If column 10 (number of times applied) is more than 1, be sure this figure is the total quantity for **one application only**, rather than a total for all applications.

See the example under the discussion about Column 10 below.

Alternative Methods of Reporting Rate or Quantity:

In some cases, respondents cannot report either the rate per acre per application of a product or the total amount of the product applied per application. In these cases, there is an additional way to possibly collect the data.

If the respondent knows:

1. the amount of the product mixed with every 100 gallons of water,
2. the number of gallons in each tank,
3. the number of tanks used to cover the acres,

make a note of these figures. The RFO will be able to calculate the amount of product used.

Other ways of reporting amount applied include parts per million (PPM), and rate per 100 gallons of water. In these cases, try to find out the amount of actual product used (before mixing with water), and **write** notes to give your RFO as much information as possible. An example of good notes for your RFO are shown below.

Alternative Method of Reporting Example:

An operation with 200 acres of green peas for processing applied Dimethoate 4 EC one time. Exactly 0.5 pint was applied per 100 gallons. To cover the 200 acres, 40 tanks were used and each tank holds 300 gallons.

LINE	1 CROP	2 CROP CODE	3 What product(s) was 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.]	6 How much was applied per acre per application?	OR 7 What was the total amount applied per application?	8 [Enter unit code from above.] CODE	9 How many acres were treated with this product? ACRES	10 How many times was it applied? NUMBER
01	Peas, Green	855	61 10292	L	63	65	73 ___.___	74	77 200.0	79 1

NOTE for LINE 16: 0.5 pint of Dimethoate 4 EC was applied per 100 gal. of water. Operator used 40 tanks with 300 gal. in each tank.

Column 8 - Unit Code

Unit codes relate to the rate per acre or the total quantity reported in Column 6 or 7. Note that there is a different code for dry and liquid ounces. Even though spirals and packets are not units of measure, the summary system knows how much active ingredient (AI) is in each packet or spiral and can calculate the AI for each. Please write notes if any unit is reported other than the ones listed in the questionnaire.

When the reported unit is quite small, you may need to make conversions. Some conversion factors you may need to use are:

Liquid Products		
1 Gallon	=	4 Quarts
1 Gallon	=	3.785 Liters
1 Gallon	=	8 Pints
1 Gallon	=	128 Fluid Ounces
1 Quart	=	2 Pints
1 Pint	=	16 Fluid Ounces
2 Cups	=	1 Pint
1 Cup	=	8 Fluid Ounces

Dry Products		
1 Pound	=	16 Dry Ounces
1 Pound	=	453.6 Grams
1 Pound	=	0.45 Kilograms
1 Kilogram	=	1,000 Grams
1 Kilogram	=	2.2046 Pounds
1 Dry Ounce	=	28.3 Grams
1 Dry Ounce	=	0.0625 Pounds
2 Tablespoons	=	1 Ounce

Column 9 - Acres Treated

Here a differentiation must be made between **treated acres** and **treatment acres**. **Treated acres** are the actual physical acres (land) of crop which were treated---it does not matter how many times the acres were treated. It matters that these acres are only counted once. **Treatment acres** are the total number of acres covered by applications of a product regardless of whether they are the same acres or different acres. If the same 40 acres are treated 4 times, the number of treated acres is 40 and treatment acres is 160 (4 x 40). In this example, 40 acres would be recorded in Column 9. **Never record treatment acres in this section.**

Acres and tenths of acres must be reported in Column 9. Zero must be recorded after the decimal point if whole acres are recorded. For example,

if the farmer treated exactly 25 acres, the entry in Column 9 must be 25.0. Otherwise, if "25" is entered in the cell, the summary will consider the entry to be 2.5, and a preventable error will be summarized.

Column 10 - How Many Times Applied

The minimum entry in this column is 1, since each acre that you will record in Column 9 must have been treated at least once. However, multiple treatments may be reported. In some cases it may be easier to use more than one line to record information than to find a previous entry of a specific product application on that crop and change the number of times applied. It should be noted that in order to have a number greater than 1 in Column 10, all application data must be the same, i.e., same crop (Columns 1 & 2), product (Col. 3), rate or total applied (Col 6 OR 7), unit (Col. 8), and acres treated (Col. 9).

Number of Times Applied Examples:

A 10 acre field of sweet corn for processing was treated with Atrazine 4L and Accent Herbicide. For the season, the producer used a total of 40 pints of Atrazine 4L in 2 applications, so that each application used 20 pints on the 10 acres. A total of 14 ounces of Accent Herbicide was used in 2 applications.

LINE	1 CROP	2 CROP CODE	3 What product(s) was 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.]	6 How much was applied per acre per application?	OR 7 What was the total amount applied per application?	8 [Enter unit code from above.] CODE	9 How many acres were treated with this product? ACRES	10 How many times was it applied? NUMBER
01	Corn, Sweet	766	61 10292	L	63	65 20.00	73 20.00	74 14	77 10.0	79 2
02	Corn, Sweet	766	61 11315	D	63 9	65	73 7.00	74 28	77 10.0	79 2

Pesticide Applications Supplements

More than one page of pesticide applications tables are printed in each questionnaire. If more than the 33 lines are needed, use a **Supplemental Pesticide Applications Table**. Copy the identifying numbers from the label on the face page of the questionnaire onto each supplement used. Supplemental tables should be numbered beginning with Table 002 (then 003, 004, etc). Every table used in completing the questionnaire must have a unique number. Be sure the supplement is returned to the RFO inside the questionnaire. When all Pesticide Supplements are complete, record the total number used in the **Pesticide Supplements cell 068** on the last page of the questionnaire.

Section E - Pest Management Practices

General

This section provides data about pest management practices the grower used on the **total vegetable acres** (target and non-target crops) on the operation in 2024.

Integrated Pest Management (IPM) is an approach to control pests in a more environmentally responsible and cost efficient manner than relying strictly on pesticides. IPM combines physical, biological, cultural, and chemical methods of pest control with the aim of decreasing the reliance on chemicals.

An integrated pest management approach can:

- Be an alternative or supplement to pesticide use;
- Reduce the number of pesticide applications needed;
- Reduce the toxicity of the pesticides used by producers;
- Improve the effectiveness of the pesticides applied.

The responses to these pest management questions allow researchers to determine grower adoption levels of non-chemical pest management practices, the reduction in chemical use of those using alternative pesticide treatment strategies, and the corresponding environmental, public health, and cost benefits derived from decreased pesticide usage.

Introduction and Definition of Pests

The introductory statement:

1) Explains to the operator that you will be asking about pest management practices used on the total vegetable acres on the operation in 2024;

2) Defines PESTS to include INSECTS, WEEDS AND DISEASES. Many operators tend to focus on one kind of pest depending on the crop, but we are interested in control practices for all types of pests.

[Enumerator Action:]

Were pesticide applications reported in Section B, column 5 (or Section D)?
If any pesticides were reported in section B (or D), continue with item 2. If no pesticide applications were made, begin with item 5.

Item 1 - Weather Data to Assist Determining Pesticide Applications

Weather data used by operators to determine either the need or when to make pesticide applications is another form of pest management. By using monitoring weather data, the timing of spraying fields may increase effectiveness, allow for a lower application rate, reduce drift, or decrease the total number of applications needed. Temperature and precipitation data can be used to determine whether a chemical application is likely needed. Fungi development is more likely to occur in damp conditions with low temperatures. If conditions have been dry and hot, a fungicide treatment may not be needed. If this practice was used during the 2024 crop year, enter 1 for YES.

Item 2 - Biological Pesticides Applied

Determine if any biological pesticides were used for the 2024 crop year. A biological pesticide is a product such as an insect growth regulator, neem, or an active bacteria.

Neem is extracted from the seeds and leaves of the neem tree. The primary mode of action of neem is to cover the plant with this natural pesticide. The insect pests refuse to eat any plant covered with neem, eventually starving to death. Another effect is that it acts as a repellent and will not permit an insect to reproduce.

The active bacteria, **Bacillus thuringiensis (*Bt*)**, is a natural insecticide found in the soil and acts as a biological pesticide when it is applied to a crop.

There are numerous biological insecticides on the market.

Item 3 - Pesticides Rotated or Tank Mixed to Prevent Pest Resistance

A common pest management practice is to rotate (from one year to another) or tank mix chemicals with different mechanisms of action. By "different mechanisms of action" we are talking about HOW the chemical kills the pest (attacks the nervous system, digestive system, etc). If the operator rotated or tank mixed chemicals for the primary purpose of slowing the development of pest resistance in 2024, enter 1 for YES.

Item 4 - Method of Pest Scouting

This question serves as a screening question to determine the intensity level of pest scouting. Scouting involves some means of monitoring fields for the presence of pests. Scouting is an activity,

and there are differences in the ways producers scout for pests. Scouting may be done once in a while when an operator is doing fieldwork, or scouting may be done every so many days during the growing season or even daily when weather conditions favor rapid development of specific pests. Enter the code that represents the primary approach the respondent used to scout for pests on the operation's vegetable acres. Continue with item 6 if code '1, with item 8 if code '2, or with item 11 if code '3.

Code 1 - By deliberately going to the field specifically for scouting activities

The operator has an established scouting strategy (based on time and/or method) and goes to the field deliberately for the purpose of checking for pests. The field may be scouted based on a schedule such as every four days. The operator may have some predetermined approach to how the scouting will be done (check every x number of rows and every x number of plants per row, etc.). Insect traps may be used for monitoring infestation levels. These are more deliberate, thorough, and scientific approaches to scouting than conducting "general observations" or scouting only if there is field work to be done in or adjacent to the field.

Code 2 - By conducting general observations while performing routine tasks

The operator does not have a structured scouting strategy where deliberate scouting trips are made to the fields at determined intervals or when weather conditions favor rapid development of specific pests. Rather, the operator periodically checks for the presence of pests as field tasks are performed. The scouting approach is somewhat casual where the operator may not even get off the tractor to look more closely for pest presence. The part of the field in which the operator looks for pests is random, and counts of pests are not taken.

Code 3 - The field was not scouted

The vegetable acres were not scouted for pests.

Item 5 - Established Scouting Process Used

If the operator's method of deliberately scouting the vegetable acres includes using a recommended system of checking every x number of rows and every x number of trees or bushes per row, or another mathematically sound approach for accurately determining pest levels, or if pest counts are taken while randomly checking in the field or if pest traps are used to monitor insect levels, enter 1 for YES.

Item 6 - Reason for Scouting

7. a. - A pest advisory warning?

Under certain climatic conditions, the potential for pest infestation is higher than normal. The County, Cooperative or University Extension advisor, crop consultant or other advisory source will often issue a pest advisory warning - a recommendation that growers scout their fields for particular pests. If scouting was done based on a pest advisory warning, enter 1 for YES.

7. b. - A pest development model?

Pest monitoring consists primarily of "in field" scouting surveys. However, there are also area-wide programs that monitor pest development, population levels, migration and seasonal emergence of overwintering insects. These predictive models are used to forecast the time and development stage of pest infestations. Often, a trapping network is used in conjunction with a predictive degree-day model to forecast insect larval growth and development and predict when growers need to scout for particular pests. If scouting was based on information from a pest development model, enter 1 for YES.

Item 7 - Pest Scouting

Column 1: Were Vegetable Acres Scouted for Pests?

Determine if any vegetable acres were scouted for weeds, insects or diseases. For each type of pest (weeds, insects, or diseases) scouted for, enter 1 for YES, and then ask column 2: "Who did the majority of the scouting for (weeds-insects and mites-diseases?)."

Column 2: Who did the Scouting?

Ask the respondent who did the majority of the scouting for weeds, insects, and diseases. If two or more people did equal amounts and there is no clear-cut "scouter", enter the lowest code. If the operator, a partner, or a family member did the most scouting, enter code 1. If most was done by an employee (other than the operator, a partner, or a family member), enter code 2. If most of the scouting was done by an employee of a farm supply or chemical company, enter code 3. If a hired crop consultant or a commercial scouting service was used, enter code 4. This year, processor was made available as an option for who did the majority of the scouting. Enter code 5 for processor. If none of these codes fit, please use code 6 for other.

Item 8 - Records Kept to Track Pests

Only organized, formal records, must be considered, not just notes jotted

down on scraps of paper. It doesn't matter who kept the records; it can be the operator, an employee, scouting service or someone else. Determine if some type of formal written, electronic, or map records were kept for this field on pest activities, counts, etc.

Important Note: If scouting was performed by someone outside of the farm operation (codes 3, 4, or 5 above), some type of formal scouting records were most likely kept. If not, please make a note as to why no records were kept. Enter 1 for YES, if records were kept on scouting.

Item 9 - Scouting Data Compared to Published Thresholds

This question asks if the operator compared scouting data against published infestation threshold information to determine whether or not to make a chemical application to control the pest(s). The "threshold" generally relates to an economic "breakeven point". If the pest count from scouting is below the threshold number, it would likely cost more to apply the chemical than the economic loss the pest is likely to cause through reduced crop yield or quality. If this practice was used, enter 1 for YES.

Item 10 - Field Mapping Used

Ask if this operation used field mapping of previous years' pest problems to assist in making pest management decisions this year. The level of insect, weed and disease infestation is not always uniform throughout a field. Previous years' mapping data can help an operator determine if it would be more cost efficient to treat portions of a field rather than the whole field. Operators sometimes use a topographic map from the National Resource Conservation Service (NRCS) for this purpose. There are also software programs available for field mapping. By identifying trouble spots, the map can help in making future pest management decisions. If this practice was used, enter 1 for YES.

Item 11 - Diagnostic Laboratory Used

Diagnostic laboratories can assist producers in identifying pests found on their operations. Soil samples can be analyzed for the presence of soil borne pests and plant tissues can be analyzed to identify diseases and pathogens. Determine if the operator had such a biological analysis performed by a diagnostic laboratory for any vegetable acres in 2024. If this practice was used, enter 1 for YES.

Item 12 - Plowed Down or Removed Crop Residues

By removing crop residue after a crop is harvested, a vital habitat for pests is removed. Methods of removal could include baling, burning, and/or removing debris from the field. If the operator used this practice to control pests, enter 1 for YES.

Item 13 - Rotated Crops to Control Pests

Find out if crops were rotated in the past 3 years **for the purpose of controlling pests**. Pest control is only one of several reasons crops could have been rotated. Be sure to probe to ensure that the control of pests was a reason for rotating vegetable crops. If the control of pests was a reason crops were rotated, then enter 1 for YES.

Item 14 - Maintained Ground Covers

Determine if any ground covers, mulches, or physical barriers were maintained in or around the vegetable acres to reduce pest problems. If this practice was used, enter 1 for YES.

Item 15 - Considered Pest Resistance When Selecting Seed Variety

Find out if the operator considered pest resistance offered by different seed varieties in selecting the varieties planted in 2024. This means seed which has been bred to be resistant to a pest and should not be confused with herbicide resistant seed. Enter 1 for YES.

Item 16 - No-till or Minimum-till for Pest Control

Determine whether no-till or minimum-till was practiced for weed control. If this practice was used, enter 1 for YES.

Item 17 - Planting Locations

Another pest management practice is to determine where to plant a particular crop. Crop location can have a negative or positive impact on pest populations. As an example, a wind break could create a pocket for a certain pest infestation such as flies or weeds. A prominent shaded area can harbor mold or a rot that could also have a negative impact. If this practice was used, enter 1 for YES.

Item 18 - Adjusted Planting or Harvesting Dates

Find out if vegetable planting or harvest dates were adjusted for the purpose of controlling pests. If this practice was used, enter 1 for YES.

Item 19 - Adjusted Row Spacing or Plant Density

Find out if row spacing (width) or plant density (number of seeds planted per acre) were adjusted for the purpose of controlling pests. If this practice was used, enter 1 for YES.

Item 20 - Trap Crop

If a trap crop was planted to manage insects, enter 1 for YES.

Item 21 - Beneficial Organisms

Beneficial organisms are predators and parasites and other natural enemies of crop pests. Some kinds can be purchased by operators and used on their fields.

Find out if the operator purchased and released any beneficial species of insects.

Item 22 - Biological Pest Controls

Determine whether any floral lures, attractants, repellants, pheromone traps or other biological pest controls were used on any vegetable acres.

Item 23 - Cultivation for Weed Control

Determine whether any vegetable acres were cultivated for weed control during the growing season.

Item 24 - Tilling, Chopping, Mowing, or Burning

Eliminating habitat where pests can breed and grow is an important pest management strategy. Producers often mow or otherwise maintain areas immediately adjacent to fields to minimize the habitat where insects live.

Find out if practices such as mowing, burning, plowing, or chopping of field edges, lanes or roadways, were used to slow or control the spreading of pests into vegetable fields.

Item 25 - Equipment Cleaned

Cleaning equipment after use in fields prevents carrying pests (such as weeds and disease) from one to another. Find out if the operator cleaned the harvesting and/or tillage equipment to reduce or prevent the spread of pests.

Item 26 - Irrigation

If any vegetable acres were irrigated for the 2024 crop year, then answer YES and ask the water management question.

26. a - Water Management Practices

Water management practices which can be used to manage pests include irrigation scheduling, using irrigation methods which minimize plant tissue dryness, drainage control, and treatment of retention water. Find out if water management practices were used to control pests on any vegetable acres.

Section E-1 – Pest Management Practices

Misc Notes:

Applies to primary target crop acres only, not total vegetable acres for the operation. If there is a tie (in acreage) between two or more primary target crops, please choose the crop with the most pesticide usage overall.

If pesticide applications, section B, column 4 is answered Yes=1, then answer all items in section E-1, 1-13. If section B, column 4 is answered No=3, then skip items 1-6 and 8.

Item 1: Pesticide Spraying Activities

It is common for growers to only consider insecticides as pesticides. Here, we are interested not only in insecticides but in all pesticide applications that have a potential to move off-target, which is also known as pesticide-drift. Pesticides includes insecticides or miticides, fungicides, herbicides, nematicides, bactericides, and plant growth regulators (PGRs). Pesticide applications for vertebrates, such as rodents and birds, are only of interest if they are applied using a formulation that is capable of drifting; *this is not at all common.*

Item 1: Left Columns: Pesticide Spraying Practice or Activity

a. Altering spray time(s) depending on weather conditions (e.g. wind speed, wind direction.
b. Calibrate sprayer before season.
c. Calibrate sprayer during the season.
d. Manually altering spraying settings to improve the spray precision (e.g. turning off the upper nozzles for smaller trees.
e. Electronic eye/infrared or other sensor-based technology (e.g. sonar).

   Electronic eye, infrared, and other sensor systems typically are used to detect to the canopy for determining when to turn a sprayer on and/or off using solenoids.

f. Other technologies to improve the spray precision (e.g., on/off nozzle spray technology, GPS technology.

   Only technologies that are not considered electronic eye/infrared (**Item 1e**) or Pulse Width Modulation (**Item 1g**) should be accounted for here. Practices that are not considered technological in nature and that are not supplied as an option elsewhere in **Item 1** should be recorded under **Item 1i**, 'Other – Specify.'
g. Pulse Width Modulation (PWM); e.g. Aim Command, Raven's Hawk Eye, John Deere's Exact Apply.

Pulse-width modulation (PWM) sprayers allow for variable rate control of flow through electronically actuated solenoid valves.

Example of a PWM Sprayer Nozzle with solenoid valves

h. Other – Specify. Write in other item.

Coding Guidance: Section E-1, Question 1, including Enterprise, AZ-Enterprise, and CA-Enterprise questionnaires. If column 1 is coded as a "1", then complete columns 2 and 3 and do not code column 4. If column 1 is coded as a "3" (row b), code column 4 and do not code columns 2 and 3. Code column 4 for items (1-6) which practice or activity was not used, do not use commas between items. The specify line must be completed with write in text, when item 6 is coded in column 4. If no spraying used, complete specify line with "**Did not Spray**", no quotations.

If column 1 is coded as a "99", do not code columns 2-4. See example below for coding guidance. Reminder that "I don't know" is always an acceptable answer and respondents should not be pushed to guess or to respond with an answer they think USDA wants to hear.

The PRISM edit will fill in blank items in column 1 to a "-1", however the OPMP prefers if this item is coded at a "99" if the response is unknown by the respondent.

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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 1	5171 1,3, or 99	5172 1,2,3, or 4	5173 5174 Specify: N/A
b. Calibrate sprayer before the season	5190 3	5191 N/A	5192 N/A	5193 123456 5194 Specify: Did not Spray
c. Calibrate sprayer during the season	5195 99	5196 N/A	5197 N/A	5198 5199 Specify: N/A
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:

Item 1, Column 1: Was this used in 2024?

Record if this practice was used in 2024. 1=Yes, 3=No, or 99= don't know. If column 1 is coded 1=Yes, answer column 2 and 3 questions. If column 1 is coded 3=No, then skip to column 4. If column 1 is coded 99=Don't Know, answer column 2 question and go to the next question in this table.

Item 1, Column 2: Keeping Pesticide Applications On-Target

For the purposes of this question, the following terms are synonyms with 'keeping pesticide application(s) on-target':

- Reducing pesticide drift
- Reducing off-target drift
- Reducing off-target movement
- Reducing off-field drift

- Reducing off-field movement

In general, pesticide drift refers to the movement of a pesticide through air, during or after application, to a site other than the intended site of application. In this case, we are interested only in the movement of the spray droplets away from the target site.

Record 1=Yes, 3=No or 99= Don't know. Answer only 1 item.

Item 1, Column 3: How easy or difficult was it to implement practice?

For the purposes of this question answer the following question for the Pesticide Spraying Practice or Activity. Considering labor, training, capital expenditures, and other costs, how easy or difficult was it to implement this practice or activity. Answer 1=Very Easy, 2= Somewhat Easy, 3= Somewhat Difficult, or 4 Very difficult. Answer only 1 item.

Item 1, Column 4: Why was this Practice or Activity NOT used?

The purpose of this question is to understand why an operator is NOT using a pesticide spraying practice or activity. Document, in sequential order (e.g., 2, 3, 4), the reasons why a respondent is NOT using this practice or activity. If the respondent selects other, specify (6), please indicate the reason in the response field provided in the table.

Pesticide Spraying Practice or Activity (a-h).
Item a. Altering spray time(s) depending on weather conditions (e.g. wind speed, wind direction). Column 4, item 5173, put in items 1-6, no commas between numbers. For example if (1) Cost of labor/training, (2) Cost of associated equipment/products, and (3) Incompatible with current production practices (e.g. topography, equipment limitations, code item 5173. Include 6 for other, specify. If item 6 is included, write in Other, specify in item 5174.

Item b. Calibrate sprayer before the season. Code item #5193, for all items in column 4 which apply, as is done in the example above. If item 6 is included, write in Other, specify in item 5194.

Items c-g. Code the items in column 4, as done above.

[Enumerator Note: Column 4: Choose items 1 - 5 and/or 6 for write-in response.]

Pesticide Spraying Practice or Activity	1 Was this used in 2019? 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:_____

Item h. Code the items in column 4, as done above. For item 5225, type item on the **Other - Specify** line. Column 4, item 5223, code as done for items a-g, If item 6 is included for item 5223, write in text on the Specify line for item 5224.

h. Other - Specify: 5225 _____	5220	5221	5222	5223 _____ 5224 Specify:_____

Item 2: Spraying Practices which Require Re-calibration

Check all answers which apply. If box 5195 (Question 1c, column 1) is listed as 'no' then 5267 'none of the above' should be checked for Item 2. If item 5266 is checked, add text to item code 5268, Other, specify line.

Item 3: Spraying Methods

Check all boxes which apply. If item 5413 is checked, add text to item code 5400 line, Other, specify line.

Use this list to identify Air Blast/Air-assisted and conventional Ground Boom sprayers for follow-on questions 4-6.

Item 4: Pre-emergent pesticide applications to vegetable fields.

Item 4a: Pesticide Types

Check all that apply. List pesticide types used for Air Blast/Air Assisted and Ground Boom

Systems. If items 5625 and 5632 are selected, write in item to the other, specify line.

	1 For Air Blast/Air-assisted Sprayer(s) Systems	2 For Ground Boom tanks/systems
a. What pesticide type(s) were used in this [insert systems type] pre-emergence in 2020? Check all that apply.	5620 ☐ Insecticides 5621 ☐ Fungicides 5622 ☐ Herbicides 5623 ☐ Bactericides 5665 ☐ Nematicides 5624 ☐ Plant Growth Regulators (PGRs) 5625 ☐ Other: specify: 5626 _____	5627 ☐ Insecticides 5628 ☐ Fungicides 5629 ☐ Herbicides 5630 ☐ Bactericides 5666 ☐ Nematicides 5631 ☐ Plant Growth Regulators (PGRs) 5632 ☐ Other: specify: 5633 _____

Item 4b: Spray Volume

Check only 1 item for column 1, Air Blast/Air-assisted systems check response boxes 1-6 or 99. For column 2 (Ground Boom systems) check response code 1-7 or 99. List typical Gallons per Acre (GPA) spray volume

	5634	5635
b. What is the typical spray volume, in Gallons per Acre (GPA), for pesticide applications pre-emergence in 2020? Select one item only.	1 ☐ Less than 25 GPA 2 ☐ 25 to <50 GPA 3 ☐ 50 to <75 GPA 4 ☐ 75 to <100 GPA 5 ☐ 100 to <200 GPA 6 ☐ 200 or greater GPA 99 ☐ Don't Know	1 ☐ Less than 5 GPA 2 ☐ 5 to <7.5 GPA 3 ☐ 7.5 to <10 GPA 4 ☐ 10 to <15 GPA 5 ☐ 15 to <20 GPA 6 ☐ 20 to <25 GPA 7 ☐ 25 or greater GPA 99 ☐ Don't Know

Item 4c: Operating Pressure

Check only 1 check-off box for columns 1 & 2, Air Blast/Air-assisted systems (item 5636) and Ground Boom tanks/systems (item 5637) items. Check box code 99 if answer is not known. List typical pressure in PSI (pounds per square inch) for Air Blast/Air-assisted systems (column 1) and Ground boom systems (column 2).

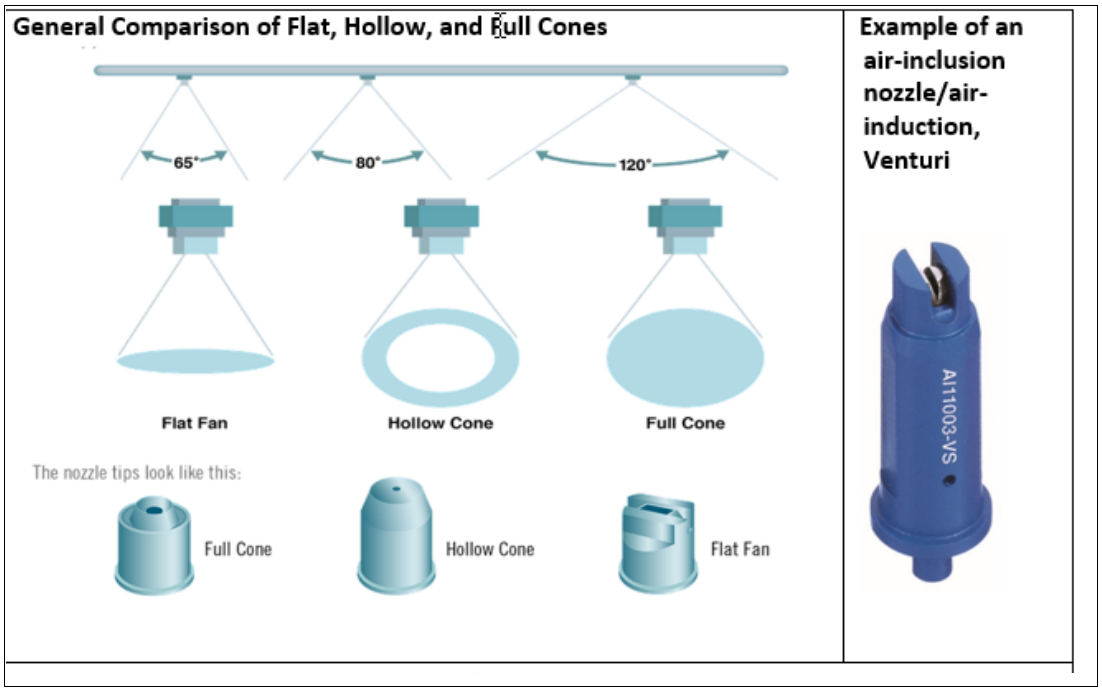
	5636	5637
c. What is the typical operating pressure, in PSI, for pesticide applications pre-emergence in 2020? Select one item only.	1 ☐ Less than 50 PSI 2 ☐ 50 to <75 PSI 3 ☐ 75 to <100 PSI 4 ☐ 100 to <150 PSI 5 ☐ 150 to <200 PSI 6 ☐ 200 or greater PSI 99 ☐ Don't Know	1 ☐ Less than 10 PSI 2 ☐ 10 to <20 PSI 3 ☐ 20 to <30 PSI 4 ☐ 30 to <40 PSI 5 ☐ 40 to <50 PSI 6 ☐ 50 to <60 PSI 7 ☐ 60 to <70 PSI 8 ☐ 70 to <80 PSI 9 ☐ 80 to <90 PSI 10 ☐ 90 PSI or greater 99 ☐ Don't know

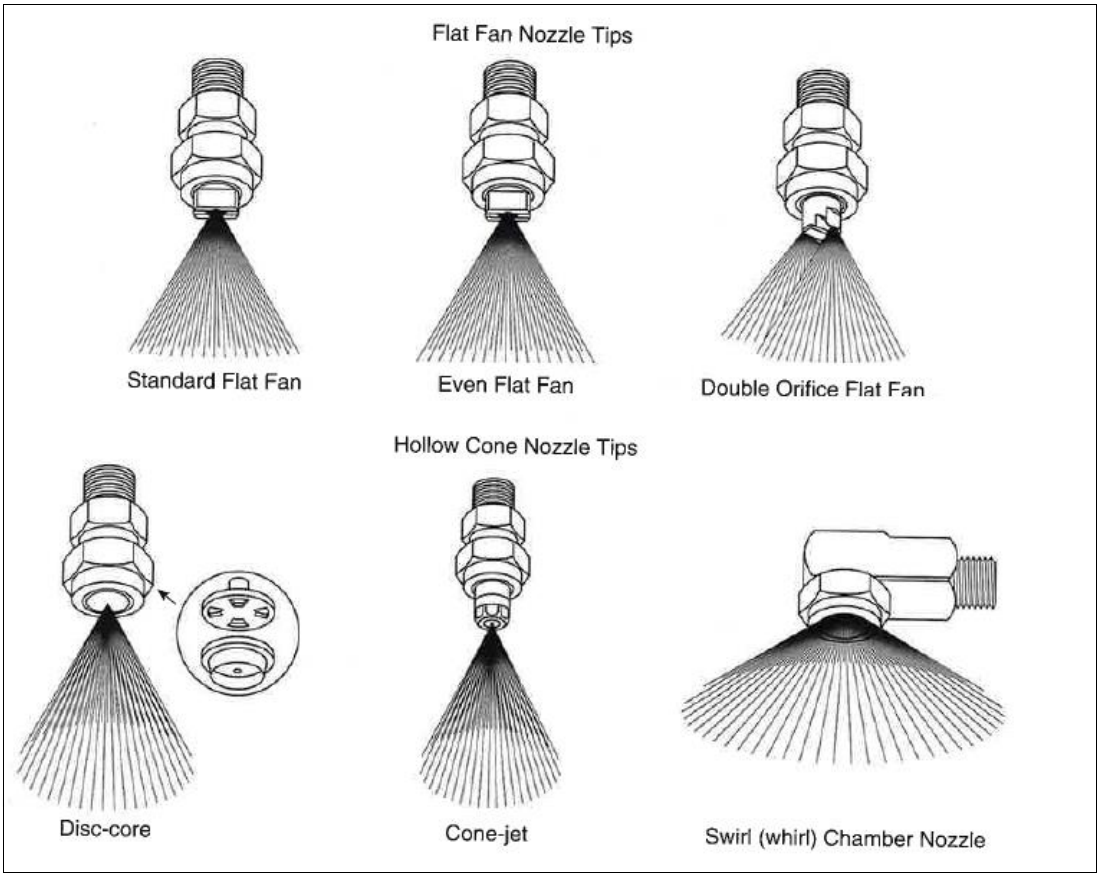
Item 4d: Nozzle Selection

Check only 1 item for columns 1 & 2, Air Blast/Air-assisted and Ground Boom systems items. Select <u>other, specify</u> check box 6 and write in response for operations which use a different spray nozzle than listed for responses 1-5. Check box item 99 if operator does not know or is unsure of the response.

d. What is the typical nozzle used when spraying pesticide applications pre-emergence in 2020? Select one item only.	5667 1 ☐ Hollow Cone 2 ☐ Full Cone 3 ☐ Disc/Core Nozzle 4 ☐ Flat fan 5 ☐ Air-inclusion (AI) Air-induction 6 ☐ Other, specify:xxxx_____ 99 ☐ Don't Know	5638 1 ☐ Hollow Cone 2 ☐ Full Cone 3 ☐ Disc/Core Nozzle 4 ☐ Flat fan 5 ☐ Air-inclusion (AI)/Air-induction/Venturi 6 ☐ Other, specify: 5639_____ 99 ☐ Don't Know

Below are examples of typical nozzle types. Note that a disc/core nozzle is a type of hollow cone nozzle, despite the two questions being asked separately in the questionnaire.





Item 4e: Pesticide Application Ground Speed

Check only 1 item for columns 1 & 2, Air Blast/Air-assisted and Ground Boom systems items. List the typical ground speed (miles per hour, mph) for Air Blast/Air-assisted (column 1) and Ground boom systems (column 2).
Check item box 99 if operator unsure or does not know the response.

Continued)	1 For Air Blast/Air-assisted Sprayer(s) Systems	2 For Ground Boom tanks/systems
e. What is the typical ground speed when spraying pesticide applications pre-emergence in 2020? Select one item only.	5640 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	5641 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

Item 4f: Boom Height

Check only 1 item each for Air blast/Air-assisted systems (column1) or Ground Boom systems (column 2). List the typical boom height above the ground or plant canopy height in inches. Check response box 99 if operator does not know or is unsure.

f. What is the typical boom height above the ground when spraying pesticide applications pre-emergence in 2020? Select one item only.

	5668	5642
1	<24 inches	<24 inches
2	24 to <36 inches	24 to <36 inches
3	36 inches or greater	36 inches or greater
99	Don't know	Don't know

Item 4g: Target Droplet Size

Based on results from cognitive field testing with respondents, most operators will be unable to answer this question. Please encourage respondents to avoid guessing. **A "Don't Know" response is perfectly acceptable response.**

Respondents may know their target droplet size based on the color of their nozzles. See the table below for guidance.

ASABE S572.1 Droplet Size Classification

The American Society of Agricultural and Biological Engineers (ASABE) developed the ASABE S572.1 standard to measure and interpret spray quality from tips.

Spray Quality*	Size of Droplets	VMD Range (Microns**)	Color Code	Retention on Difficult to Wet Leaves	Used for	Drift Potential
Extremely Fine	Small	<60	Purple	Excellent	Exceptions	High
Very Fine		61-105	Red	Excellent	Exceptions	
Fine		106-235	Orange	Very Good	Good Cover	
Medium		236-340	Yellow	Good	Most Products	
Coarse		341-403	Blue	Moderate	Systemic Herbicides	
Very Coarse		404-502	Green	Poor	Soil Herbicides	
Extremely Coarse		503-665	White	Very Poor	Liquid Fertilizer	
Ultra Coarse	Large	>665	Black	Very Poor	Liquid Fertilizer	Low

*Always read the pesticide label to determine which spray quality is required.
**Estimated from sample reference graph in ASABE/ANSI/ASAE Standard S572.1

The ASABE S572.1

ASABE S572.1 standard uses eight droplet classification categories, six of which are common for agriculture and horticulture:

Very Fine | Fine | Medium | Coarse | Very Coarse | Extremely Coarse

Check only 1 response item for columns 1 & 2, Air Blast/Air-assisted (item 5643) and Ground Boom (item 5644) items. List the typical target droplet size spectrum in microns for Air Blast and Ground boom tanks/systems. Check response box 99 if operator does not know or is unsure.

g. What is the typical target droplet size spectrum for pesticide applications pre-emergence in 2020? Select one item only.	5643 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	5644 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

Item 4h: Reasons why Operation Changes Airspeed

Check all that apply for airblast/Air-assisted systems (column 1) only, this question does not apply to Ground Boom systems (column 2). Check all items which apply. Check item box 5650 for <u>other specify</u> reasons, write in the operator's response on line 5651.

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	

Item 4i: Drift Reducing Practices

An adjuvant is any substance added separately to a pesticide product, typically as part of a spray tank mixture that will improve the performance or handling of the pesticide product. Drift reducing adjuvants are also referred to as drift mitigation adjuvants. Three typical types of drift reducing adjuvants include the following:

(1) **Encapsulators**: Suspends small capsules (150-180 microns) of pesticide in the spray solution, reducing the amount of pesticide contained in drift susceptible fines

(2) **Thickeners or Viscosity Modifiers**: Increases the viscosity of spray solutions which in turn increases droplet size and reduces the amount of drift susceptible fines.

(3) **Velocity Modifier:** Changes the velocity that the droplet comes out of the nozzle

There are hundreds of brands of drift reducing adjuvants. However, common brands include

Array, In-Place, Vector, Interlock, AccuDrop, Strikezone, and Control.

Check all that apply for Airblast/Air-assisted systems (column 1) and Ground Boom tanks/systems (column 2).

i.	Which of the following practices were used pre-emergence in 2020? Check all that apply.	5675 ☐ Drift reducing adjuvant(s) 5676 ☐ Drift reducing nozzle(s) 5677 ☐ Shielded sprayers 5678 ☐ Don't know	5653 ☐ Drift reducing adjuvant(s) 5654 ☐ Drift reducing nozzle(s) 5655 ☐ Shielded sprayers 5674 ☐ Don't know

Item 5: These questions and corresponding instructions are identical to the questions for item 4, except that item 5 pertains to post-emergence pesticide applications.

Item 6a: Cleaning of Tanks/Systems

Select all that apply for Air Blast/Air-assisted and Ground Boom systems. Air Blast/Air-assisted systems (column 1) and Ground Boom systems (column 2). If 'other' then item 5432 and 5275 must be checked and response written on the Other, specify line, items 5463 and 5277, respectively. If response box 5464 or 5276 are checked, then go to item 24c in each respective column.

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

	1 For Air Blast tanks/systems	2 For Ground Boom tanks/systems
a. How often did this operation clean the system(s) in 2020? Check all that apply. [If the never box is checked for Item 5464 in Column 1 or 5276 in Column 2, then skip item 6b and go to 6c; otherwise go to 6b.]	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

Item 6b: Tank Cleaner

We are interested in whether operators rinse the tank with more than water for this item. Consequently, any tank cleaner should be recorded. Types of tank cleaners can range from label-

recommended tank cleaners to ammonia to common dish soap.

Select only one response item 1-4 or 99 for Air Blast/Air-assisted systems (item 5473) and Ground Boom systems (item 5279). Check response code 99 for a don't know response.

	5473	5279
b. For each time that the system(s) was cleaned, how often was a tank cleaner used?	1 ☐ Always (100%) 2 ☐ Often (51% or more) 3 ☐ Sometimes (50% or less) 4 ☐ Never (0%) 99 ☐ Don't know	1 ☐ Always (100%) 2 ☐ Often (51% or more) 3 ☐ Sometimes (50% or less) 4 ☐ Never (0%) 99 ☐ Don't know

Item 6c: Separate Spray Rigs for Herbicide applications

We are interested in whether operators keep separate sprayers/spray rigs for herbicide applications. For each column, Airblast/Air-assisted (column 1) and Ground boom (column 2), answer Yes=1, No=3, or Don't Know=99.

Item 6d: Nozzle Replacement Justification

Select all check boxes (5481, 5482, 5483, 5484, 5485, 5486, 5487, 5488, 5489) which apply for Air Blast/Air-assisted systems (column 1) and Ground Boom systems (column 2) check boxes (5491, 5492, 5493, 5494, 5495, 5496, 5497,5498, 5499). If boxes 5480 or 5490 are selected, a write in response is required for items 5480 or 5490.

d. What were the most common reasons for replacing the nozzles on the sprayers in 2020? 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

Item 7: Hedge Rows or wind-breaking structures

Hedge rows are dense woody vegetation planted in a linear design to achieve a natural resource conservation purpose.

Select only one item 1-5 or 99. Question number 99 must be checked for a don't know response.

Item 8, Frequency of Practices to Manage Pest Resistance

Column 1, complete for operations which use herbicides, column 2, for fungicides, column 3 for insecticides. Farming practices to manage resistance for herbicide, fungicide, or insecticide listed below (a-g). For choices 1-4 and 99=Don't know, answer the best choice, only 1 choice.

a. **Scouting**. Answer columns 1-3
b. **Field mapping weds and/or keeping records of field history and pesticide use to assist pesticide decisions**. Answer all columns (1-3).

Field mapping involving documenting weed, pathogen, or insect infestations that occur over multiple growing seasons. Mapping can be done in a variety of ways, ranging from on-the-ground record keeping of the field history (what pests occurred in the field – and where - from year to year and what pesticide(s) were used to control the pest – most common for weeds) to the use of global positioning systems (GPS) or other imagery technologies. Field mapping can also be done during harvest by assessing yield differences and other visual cues such as the presence and location of weeds.

c. Field Management/ Sanitation Practices

i. For weed control (e.g., managing weeds in field, tillage, preventing field-to-field and within field movement of weed seed). Answer column 1 only.

ii. For disease control (e.g., removing or incorporating unharvest fruit and/or other field litter). Answer column 2 only.

iii. For insect control (e.g. removing or incorporating unharvest fruit and /or other field litter). Answer column 3 only.

d. **Planting disease-resistant cultivars and/or rootstock.** Answer column 2 only.

e. **Use of pest diagnostic tools** (e.g. Integrated Pest Management (IPM) treatment threshold, predictive weather models (e.g., degree day models), pest forecasting systems, and/or assistance for diagnostic networks). Answer column 2-3 only.

f. **Pesticide Mode of Action (MOA) rotation**. Answer all 3 columns.

Insecticides, fungicides, and herbicides are each classified according to how they kill the pest (what vital function is disrupted). The classification scheme is known as Mode of Action (MOA) classifications. Each MOA is represented by a different number or letter which is displayed on the pesticide label. Resistance management recommends that growers either rotate or combine pesticides with different MOAs where each different pesticide used has similar activity against the target pest. For example, to control certain broadleaf weeds, a grower can tank mix or rotate a Group 2 and a Group 4 herbicide to slow resistance development.

g. **Pesticide Mode of Action (MOA) combination** (i.e., tank mix or pre-mix product). Rather than rotating MOA, this corresponds to applying multiple MOA products at the same time, either by combining products, or by purchasing pre-formulated mixes with multiple insecticide MOAs, for example (or fungicides or herbicides). This does NOT refer to combining an insecticide with a fungicide in the same tank; it refers to multiple insecticides or multiple fungicides or multiple herbicides mixed together to manage resistance. Answer all 3 columns.

Item 9: Sources of Information for making Pest Management Decisions

Source of Information Column, item j. Other, Specify item number 5319, write in response on

line 5319.

a. Pesticide product labels
b. University and/or Ag 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 distributers
f. Crop consultants paid for by the operation
g. Other grower(s)
h. Non-University decision tools
i. Weather forecasting tools
j. Other, Specify: write in response

Item 10, Column 1 only: University and/or Cooperative Extension source of Pest Management

Column 1, item a-h, choose item only one item, 1-4 or 99. Item i, Other, Specify item number 5330, write in response on line 5330.

University and /or Ag Cooperative Extension Services listed below:

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 Publication Handbook
g. Other Publications (e.g., fact sheets)
h. Decision Tools
i. Other , Specify: write in response required

Item 11, Reduce off-target impacts, operation information sources

Choose all that apply, see below. Write in responses required for items 6 and 7.

1. Neighboring crop producers
2. Nearby beekeepers
3. A local expert, such as an Agricultural Cooperative Extension Agent
4. 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)

5. Driftwatch – This is a voluntary communication tool which enables crop producers, beekeeper and pesticide applicators to work together to protect crops and apiaries through the use of mapping programs.
6. Other communication tool(s), Specify:
7. Other Specify.

Item 12, Best Management Practices (BMP)

Best Management Practices are listed for a-i. A write in response is required for item i. For each corresponding BMP item (a-i),column #1, choose only one item 1-4 or 99. If response in column #1 is 1,2, or 3, answer column 2, otherwise leave blank. Column 2, choose only 1 item: 1-4 or 99..

Item 13, Auditing Systems

Both GLOBALG.A.P (also referred to as EUREPGAP) and the Safe Quality Food (SQF) Program are private sector organizations which set voluntary standards for certification of production processes of agricultural products. Other auditing systems, which may not be food-safety specific, are also of interest and can be recorded in the "other, specify" option.

Check all answers which apply, 1-4 and/or 99. Checked item 5363 requires a write-in response, enter fill in response to line item 5365, for Other, Specify response.

Conclusion (Back Cover)

Survey Results

After completing the interview, ask if the respondent would like to receive a copy of the survey results. If yes, check the box and enter 1 in cell 099. Releases from this survey will be published in the summer of 2023.

Ending Time

Record the ending time of the interview in cell 005. Use military time. If more than one person was interviewed or the enumeration took place over more than one day, make notes outside the box so that a total elapsed time can be calculated. Be certain the ending time is greater than the beginning time entered on the face page.

Office Use - Time in Hours
The Office Use - Time in Hours box will be used by the survey statistician in the State office when an interview extends over more than one day. That

is, a respondent may be interviewed from 1600 to 1800 hours on November 2 (2.0 hours), and from 0800 to 1200 hours on November 3 (4.0 hours) to collect all the information for the survey. It will be critical that the enumerator write down these dates and times so that the survey statistician can calculate the time in hours it took to complete the entire interview. In the example above, 6.0 hours would be recorded in cell 006.

Records Use (Except California Version)

If the respondent used operation records to help in reporting pesticide data, mark cell 064 with a "1."

Supplements Used (Except California Version)

As instructed in earlier sections of this manual, record the total number of pesticide supplements used in completing this interview. Be sure all of the supplements are correctly identified and placed inside the questionnaire - before mailing the questionnaire or turning it over to a supervisor.

Response

The response code indicates whether the survey was completed, refused, inaccessible, office hold, or a known zero. Enumerators should only use completed, refused or inaccessible coding. Enter the proper code in cell 9901.

Code 1	Survey completed
Code 2	Respondent refused cooperation
Code 3	Respondent was not available and could not be reached

Respondent

The respondent code identifies the person who was interviewed. Enter the code identifying the person who provided the majority of the data in cell 9902.

Code 1	Operator or Manager
Code 2	Operator's Spouse
Code 3	Accountant or Bookkeeper
Code 4	Partner
Code 9	Someone other than those listed in codes 1 - 4 and 9

Record the respondent's name and phone number on the line provided.

Mode

Mode refers how the information was collected: either in person (3 = Face–

to– Face) or over the telephone (2 = Tel). Most surveys will be in person.

Enumerator

Sign the questionnaire and record your enumerator ID number in cell 098.

Date

Record the date the questionnaire was completed. Enter the date in MM DD YY format on the lines provided in cell 9910 ("14" is already printed for you). For example, if the interview was completed on November 16, 2024, enter 11 / 16 / 24 in cell 9910.

Final Review

Review the entire questionnaire before forwarding it to your Supervisor or the State office. Make sure all items are complete, including 'Yes' and 'No' boxes checked, and dashes (---) in cells when the response is 'None' or 'No' as appropriate. Make sure notes are present and complete for unusual situations.