



Science, plants, soils, water
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Planning to apply pesticides

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for
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Q

What can I do to protect people, pets, and the environment, and legally apply pesticides according to Federal and Florida State laws?

A

Make sure you are trained and certified with the proper license² (under the right Chapter, 482 or 487, class of license, and Category) from the Florida Department of Agriculture and Consumer Services (FDACS). Make sure that you have identified the pest, if any, determined whether biological control or a pesticide is appropriate, read the pesticide label, and set up all the details including calibrating equipment, obtained the right PPE, checked the weather and other conditions, and have a plan for keeping records.

1. Checklist of pesticide application dos and don'ts
2. Objectives, survey, define and identify pest problem
3. Pesticide label
4. Equipment and PPE
5. Nozzles, booms, calibration, calculation, mixing
6. Weather
7. Recordkeeping
8. Other: licenses, cleanup, follow-up

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² For helpful information on determining what license you need, how to apply for it, and search for sample labels for pesticides, and links to other helpful information, visit the UF/IFAS Pesticide Information Office and click "For Applicators" <https://pested.ifas.ufl.edu/> Purchase Pesticide Exam Study Materials at: <http://ifasbooks.ifas.ufl.edu/default.aspx/>

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Checklist of pesticide application dos and don'ts³

✓	Do this before applying	Don't do it and this happens
<input type="checkbox"/>	Accurately identified target pest, site, crop, and environmental conditions	Wrong pesticide damaged turf, failed to solve the problem and wasted money
<input type="checkbox"/>	Surveyed and measured area to be treated and looked for obstacles and human uses	Bent up the spray boom by running it into a tree
<input type="checkbox"/>	Carefully read and understood the pesticide label, not just application rate	Missed details on nozzle tip type and droplet size, so product ineffective
<input type="checkbox"/>	Applicators and handlers properly licensed for this type of application on this property	While spray application went well, applicator and boss were not certified, and both were fired
<input type="checkbox"/>	Appropriate personal protective equipment (PPE) is available for applicators and handlers	Applicator's health was endangered and developed a severe skin rash
<input type="checkbox"/>	A standard method for recording and keeping pesticide records is available and will be used	Pesticide damage later discovered, unexplained because records, if any, made no sense
<input type="checkbox"/>	Applicator has inspected the different parts of the spray equipment—in good condition	Hoses restricted due to past failures to rinse, restricting nozzle discharge and spray rate
<input type="checkbox"/>	Have proper nozzle tips and replacements for pressure and rate based on label	Bad combination of nozzle and pressure caused wrong droplet size and loss of control
<input type="checkbox"/>	Predicted wind speed will be less than 4–6 mph, confirmed during spraying	Spraying when wind speed over 6 mph caused drift and damage to neighboring farm
<input type="checkbox"/>	Sprayer is ready and was checked with pure water at least one day before planned use	Unanticipated leaks and distribution problems caused abandonment of job and damage
<input type="checkbox"/>	Ground speed, nozzle spacing, and discharge measured and calculated for spray rate	Too much or too little product applied, so sprayed at double rate, and ran out in middle of application
<input type="checkbox"/>	Tested discharge of each nozzle and observed uniform pattern of water on asphalt	Spray nozzles tips not identical, causing skips and gaps, lack of uniformity and damage
<input type="checkbox"/>	Planned a method for turning off spray on turns at the ends of passes	Not turning off spraying caused crescent-shaped overlaps at the ends of the field
<input type="checkbox"/>	Foam marker or other system functioning to achieve precise overlap of successive passes	Overlaps were guessed, causing double application and damage stripes
<input type="checkbox"/>	Name of the herbicide carefully read and compared letter-for-letter with intended product	A different herbicide with similar name caused the destruction of an entire field
<input type="checkbox"/>	After the previous use of equipment, it was properly rinsed	Previous pesticide, not cleaned out, ate gaskets, or killed sensitive plants
<input type="checkbox"/>	Agitator checked and is working properly to keep materials mixed properly	Most of the active ingredient sprayed at one end of the field, causing damage
<input type="checkbox"/>	Measured height of nozzle tips above target, consistent for nozzle spacing	Boom height too low caused "striping"
<input type="checkbox"/>	There is a reliable and accurate method for controlling ground speed	A foot pedal was used to control speed; it was way off, and results were horrible
<input type="checkbox"/>	Schedule recommended second application x days after first application	This couldn't be done because it landed on a holiday; weeds recovered before retreatment
<input type="checkbox"/>	Can see liquid level in the tank under worst-case conditions	Could not read liquid level in early morning light, so ran out of product mid-operation
<input type="checkbox"/>	Only a few products were mixed in the tank and all had been checked out in mixture	The 8 different ingredients in mix caked into a thick, gelatinous mass that was discarded
<input type="checkbox"/>	Adjuvant used was exactly the one indicated on the pesticide label	Extra adjuvants used, beyond what was called for on the label, interfered with effectiveness

³ Adapted from Busey, Phil. 2019. Ready...Set...Spray Principles of Spraying and Checklist. Florida Turf Digest 36(1):8-12.

Sample horticultural certifications and chapters 482 vs. 487⁴

- Limited Urban Commercial Fertilizer (LUCF, 482) – **fertilizer only, no pesticides**, “for-hire,” also called Green Industry Best Management Practices (GI-BMP)
- Limited Commercial Landscape Maintenance (LCLM, 482, the “Roundup” license) — no power equipment; **no** RUP, “caution” label only, **plant beds, no turf**
- Limited Lawn or Ornamental (LLO, 482) — working **on employer’s property** including public, allows powered equipment, allows RUP (restricted uses pesticides), allows turf, but may **not** supervise and does **not** authorize a pest control business.
- Ornamental and Turfgrass (O&T, 487) – allows RUPs, may supervise up to 15 employees, allows **turf and ornamentals not around buildings** so it is for golf courses, sports fields, parks, cemeteries, and nurseries but **not for home lawns**
- Lawn and Ornamental Pest Control Operator (PCO L&O, 482) – for **pest control business including around buildings**; allows RUP, powered equipment, may supervise uncertified employees with employment ID card; requires insurance, past experience.

Exam questions⁵

1. What statement about pesticide label names and ingredients is true?
 - a. Inert ingredients are responsible for the pesticidal activity.
 - b. The active and inert ingredients must be listed by chemical name
 - c. The common names are those accepted officially by the manufacturer.
 - d. Various manufacturers use different trade names, even though the products contain the same active ingredient.
2. What two things should pesticide applicators be most aware of to avoid spray drift?
 - a. Air stability and temperature
 - b. Droplet size and wind direction and speed
 - c. Temperature and pesticide volatility
 - d. Viscosity of liquid pesticides and air turbulence
3. Which type of pesticide application procedure involves the uniform application of a pesticide to an entire area or field?
 - a. Band application
 - b. Basal application
 - c. Broadcast application
 - d. Directed-spray application

⁴ None of these cover fumigation. See <https://blogs.ifas.ufl.edu/polko/2021/11/02/the-pesticide-license-you-need-in-the-florida-green-industry-gi/> and <https://edis.ifas.ufl.edu/pdf%5Carchived%5CPI%5CPI006%5CPI006-2715431.pdf>

⁵ Adapted mostly from Fishel, Frederick M. 2020. Applying pesticides correctly, 7th edition, Publication SM 1 by University of Florida, Institute of Food and Agricultural Sciences. Available from <http://ifasbooks.ifas.ufl.edu/c-114-pesticide-exam-study-materials.aspx>

4. Which statement is true about PPE as required by the label?
 - a. Sometimes a label has different PPE requirements for pesticide application and mixing concentrates.
 - b. Wearing the PPE listed on the label ensures that you will not be exposed to pesticides.
 - c. You are not required to wear all the PPE listed on the label
 - d. You should not wear more PPE than the label requires.
5. What is the purpose of the signal word?
 - a. Informs the user of how toxic the pesticide is to wildlife and the environment
 - b. Informs the user of what type of PPE to wear
 - c. Tells the user what type of first-aid treatment to seek in case of exposure
 - d. To give the user an indication of the relative acute toxicity of the product to humans and animals
6. What is the first logical step in a pest management plan?
 - a. Evaluation of the control strategy
 - b. Identifying the pest
 - c. Selecting a control measure
 - d. Spraying a pesticide
7. The process of measuring and adjusting the amount of pesticide your equipment applies or delivers to a specific area is known as:
 - a. Application coefficient
 - b. Calibration
 - c. Equipment performance ratio
 - d. Standard of operation
8. Which statement is true about protecting honeybees from pesticide injury?
 - a. Applying pesticides in the early morning or evening is recommended.
 - b. It is best to spray crops when they are in bloom.
 - c. Microencapsulated formulations are the safest.
 - d. Treat sites that have lots of blooming weeds around them.
9. Which would increase the likelihood of pesticide resistance?
 - a. A pest that has only one generation per year
 - b. Applying a pesticide that has little or no residual effect
 - c. Continual use of the same pesticides from the same family
 - d. Limiting the number of pesticide applications
10. For a traveling boom, what three measurements are needed to determine volume of spray mix (water carrier plus pesticide) per acre, e.g., such as gallons per acre?
 - a. Boom height, nozzle spacing, and pressure
 - b. Nozzle angle, nozzle type, and wind speed
 - c. Nozzle discharge rate, travel speed, and nozzle spacing on the boom
 - d. Tank volume, droplet size, and area to be sprayed