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CEU Series: How to Understand and Manage Pesticide Drift



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| May 14, 2018



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Pesticides are used widely in agriculture to control pests. It is estimated that on a worldwide basis, pests destroy up to a half of all food supplies. Without pesticides, the food losses could be even more significant. Pesticides increase work productivity, profits, and export incomes. Without pesticides, world hunger would increase, as would the price of food.

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While pesticides play an important role in the production of food and fiber and are indispensable in modern agricultural systems, the drift of spray from pesticide applications can expose people, plants and animals, and the environment to pesticide residues that can cause health and environmental effects and property damage.

Since the chemical and the application cost money, drift not only is environmentally wrong, but it also is a costly and inefficient way of doing business.

According to the EPA, 500 million pounds of pesticides are applied annually in the U.S. It is estimated that 3% of this total will drift. Both federal and state pesticide laws address the subject of drift. Chapter 487 of the Florida Statutes states: "It is unlawful for any person to apply a pesticide directly to, or in any manner cause any pesticide to drift onto, any person or area not intended to receive the pesticide."

Pesticide spray drift is the movement of pesticide dust or droplets through the air at the time of application or soon after, to any site other than the area intended to be treated. Pesticide droplets are produced by spray nozzles used in pesticide application equipment used to spray pesticides on crops, forests, turf and home gardens. Other pesticides may be formulated as very fine dry particles (commonly referred to as dust formulations) which can easily move away from the target site in windy conditions.

"Overspray" is not the same as drift. When overspray occurs, it is usually due to operator error. Overspray occurs when an applicator loses track of the borders of the target site and applies pesticide beyond the target site.

Drift can lead to litigation, financially damaging court costs, and appeals to restrict or ban the use of crop protection materials. Development and widespread urbanization has led to much of Florida's agricultural production being in areas of close proximity to the general public, including residential subdivisions, assisted living facilities, hospitals, and schools. Such sensitive sites heighten the need for drift mitigation measures to be taken by applicators of pesticides, particularly in areas where children and the elderly are present.

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As Florida's population has grown and fewer and fewer people are involved in agriculture, many agricultural practices are poorly understood by the public, which can cause anxiety and sometimes overreaction to a situation. Even the application of fertilizers or biological pesticides, like Bt or pheromones, can be perceived as a danger to the general public.

Drift can be defined simply as the unintentional airborne movement of pesticides to non-target sites. The goal of all pesticide applications is to reach a specific target and remain there. Scientists recognize that almost every pesticide application produces some amount of drift away from the target area. Not all drift may be harmful or illegal. Because some drift can occur with any application, the laws focus on preventing substantial drift. How much a pesticide may drift and whether it is harmful depends on interrelated factors that can be complex.

Drift is a significant legal concern in Florida. During 2009–2010, the Florida Department of Agriculture and Consumer Services (FDACS), which is the state pesticide regulatory agency, initiated 39 investigations in response to allegations of drift. Where significant drift does occur, it can damage or contaminate sensitive crops, poison bees, pose health risks to humans and animals, and contaminate soil and water in adjacent areas. Applicators are legally responsible for the damages resulting from the off-target movement of pesticides. It is impossible to eliminate drift totally, but it is possible to reduce it to a legal level.

Surveys during the 1990s by insurance companies investigating damage claims due to pesticide drift determined that the most common reason was applicator error. Several factors influence the potential for pesticide drift and cautious applicators should be aware of these factors and practice common-sense solutions for minimizing potential drift problems.

Drift typically occurs during or shortly after the pesticide is applied and occurs when wind or application equipment blows the pesticide off the intended site. However, drift is not limited to the period during or immediately after an application but can occur hours or even days later under certain circumstances.

Post-application drift occurs after an application is completed. Post-application drift may be the result of an illegal application; for example, an applicator may neglect to follow fumigant application rules. Fumigant pesticides can escape quickly from application sites and cause problems, resulting in illegal drift.

In some situations, post-application drift may also occur with correct applications. Days after application, pesticides can volatilize into a gas. Low levels of pesticides may be carried long distances by air currents. Vapor drift from a legal pesticide application is sometimes difficult to predict. It depends on factors like what the weather will be even days after the application. It is important to note that some pesticides evaporate more easily than others, as do some different formulations of the same pesticide.

Fumigants and certain volatile compounds are known to drift readily if certain precautions are not observed.

Fumigants are gaseous pesticides used to treat homes, storage bins, and soil before planting. Fumigants are typically injected into soil or released into buildings. Because they are gases, fumigants move easily through soil and air and will drift away from the application site unless they are confined. Various techniques are used. For example, applicators cover buildings with tarps and seal the edges to keep the fumigant in the structure. In fields, plastic mulch is laid over fumigated beds to minimize leakage. Over time, the gas slowly releases into the air. Because they are gases, fumigants are especially volatile. This means they are more likely to drift than other pesticides.

Some herbicide formulations are sufficiently volatile to cause plant injury from drift of vapor. For example, 2,4-D esters may produce damaging vapors, while 2,4-D amines are essentially nonvolatile and can drift only as droplets or dry particles. Herbicide vapor may drift farther and over a longer time than spray droplets.

Off-target movement of pesticides can be in the form of: spray droplet drift, vapor drift and particle (dust) drift.

Spray Drift

Spray drift refers to the off-target movement of fine droplets of pesticide generated during a liquid application. This is the result of small spray droplets being carried off-site by air movement. Spray drift occurs more frequently than the other two types of drift because almost all spray applications result in some off-target movement.

Small droplets are produced when pesticides are applied with small nozzle tips at high pressure and low spray volume. The distance that droplets may travel depends on droplet size, with smaller droplets traveling farther than larger droplets. High wind speed, low relative humidity, high temperatures, and height above the ground where the herbicide is released also may increase herbicide drift. Spray droplets may travel a few feet to several miles from the targeted area, depending on weather conditions and spray application; but the potential for drift damage decreases with distance because droplets are deposited or become diluted in the atmosphere.

In addition, a special consideration should be given to evaporation of water from the spray droplets when a spray droplet of any given size moves off target. In a long distance drift, it isn't uncommon for water droplets to evaporate completely; and herbicide will be airborne in a dry form. Research showed that small herbicide droplets that dry to particle forms before contact with leaves are biologically inactive. If the dry particles, however, fall on a leaf that is already wet, or if water falls on the leaf in a larger amount but not in a large enough amount to wash it off, some of the dry particles could be dissolved and pass into the leaf.

Vapor Drift

Vapor drift or volatility, refers to the ability of an pesticide to vaporize and mix freely with air and move in the form of gaseous vapors from the target area. Some pesticide formulations are extremely volatile and can change readily from a solid or liquid into a gas under the right conditions. This most commonly occurs with high air temperatures. Pesticides that have volatilized into a vapor or gas may drift farther and for a longer time than they would

have as spray droplets. Only those pesticides that are able to volatilize are susceptible to vapor drift. As air temperatures increase, the likelihood that these pesticides will volatilize and drift also increases.

Potential for vapor drift is dependent on the volatility of formulation. Whenever possible, applicators should choose a pesticide formulated as a low-volatility product. For example, the synthetic organo-auxin-like herbicide 2,4-D is available in formulations that differ in volatility. The order of 2,4-D volatility is 2,4-D ester (short chain) > 2,4-D ester (long chain) > 2,4-D amine. MCPA, clopyralid, and triclopyr are other synthetic organo-auxin-like herbicides that are produced in ester forms.

Dicamba is another hormonal-type herbicide that may drift in vapor form even though it is formulated as a salt. Drift injury from dicamba applications has made front page headlines in recent years and many states now require special applicator training prior to applying dicamba on large acreages. In general, herbicide injury symptoms and damage are more severe and more often from physical spray-particle than from vapor drift.

Other practices that applicators can follow to reduce the potential for vapor drift include avoiding applications of volatile pesticides on hot days. Some products can even volatilize several hours after application, so beware if high temperatures are predicted for later in the day. Many products carry precautions against applying these products when temperatures are above 85° F or expected to reach 85°. Remember to consult label precautions for product-specific concerns about vapor drift.

Particle Drift

Particle drift refers to the movement of solid particles from the target area by air during or just after an application. These solid particles may include pesticides formulated as dust or soil particles to which pesticides are attached. Some pesticides can remain active on soil particles for long periods after they are applied. If particles are blown off the target area, contamination or damage to sensitive areas can occur. Be sure to close all windows, vents, and turn off all circulating fans, forced-air heating systems, and air-conditioning units to prevent particle drift from nearby outdoor pesticide applications from entering a building.

Drift can occur during all types of pesticide application: using agricultural airplanes, ground sprayers, airblast sprayers, or irrigation systems.

In general, potential for drift can be influenced by the following factors:

- Spray solution characteristics
- Weather
- Application equipment
- Applicator decisions

Spray Characteristics

The overwhelming factor influencing drift potential is droplet size. Small droplets do not have enough mass to drop out of the airstream quickly, so they remain airborne and exposed to air movement longer than larger droplets. Droplets are measured in microns, or micrometers (µm). One micron

is equal to one millionth of a meter—the equivalent of 1/25,400th of an inch. Without magnification, particles less than 100 µm in diameter are practically invisible.

The term, volume median diameter (VMD) is used to indicate the relative droplet size of a volume of spray from a nozzle. A VMD of 400 µm means that half the volume of spray will be droplets that have a diameter of less than 400 µm, and the other half of the volume of spray will be droplets larger than 400 µm. Because smaller droplets have much less volume than larger droplets, most of the droplets will be smaller than the VMD.

The larger the droplet, the faster it will reach its target. The distance that a droplet will travel downwind is a function of the height of release and wind speed and is inversely proportional to its terminal velocity. In other words, larger droplets will fall faster and be less exposed to wind. The higher a droplet is released and the stronger the wind, the greater the chance that a droplet will travel downwind and drift.

Droplets that are smaller than 150 µm are considered drift-prone. As an example, the fastest a droplet with a diameter of 20 µm will fall is 4/100 of a foot per second. Due to evaporation, the final droplet diameter will be approximately 7 µm in diameter, and it will fall less than one inch (its deceleration distance). Therefore, this droplet size is very susceptible to drift. In contrast, a 200 micron droplet falls at 2.4 feet per second, has a much larger final droplet size because it evaporates more slowly, and will fall at least 25 inches.

Droplet size becomes a consideration when choosing a particular setup that will effectively reduce drift potential but still maximize coverage and penetration. In general, many small droplets provide greater coverage than a few larger droplets. The relationship between a droplet size and its volume is cubic; therefore, when comparing two droplets, for example a 250 µm and a 500 µm droplet, the latter carries 8 times more volume than the former. So using large droplets may be detrimental to some contact insecticides and fungicides that depend on coverage and penetration to be effective. Systemic herbicides can be effectively managed using large droplets since coverage and penetration are not so critical.

Selecting proper spray tips, lower spray pressures, and using drift reducing agents will decrease the number of fine droplets and the potential for spray drift.

Pesticide Formulation

The viscosity, or thickness, of the liquid affects droplet size. The viscosity of a liquid is a measure of its resistance to flow. For example, mayonnaise is more viscous than water. As the viscosity of the liquid increases, so does the droplet size, thus reducing the potential for off-target movement. Formulations, such as invert emulsions, have a pasty consistency that aids in reducing drift. Other formulations produce some spray drift when water droplets begin to evaporate before reaching the intended target. As a result, these droplets become very small and light and may move from the target site. Thus, invert emulsions have less water loss, and more of the pesticide reaches the target. Volatile herbicides are more likely to have the potential of vapor drift.

Drift Retardants

Drift retardants may be added to the spray mixture in order to increase the viscosity of the spray solution. Increasing the viscosity of the spray will reduce the number of small droplets (the ones smaller than 150 µm). There are several different drift retardants in the market with various degrees of efficacy. Although drift retardants are a tool to be used to decrease drift potential, their contribution is limited.

Research has shown performance of drift retardants to be inconsistent. The best management practices to minimize drift potential are to correctly manage nozzle type, height, and operating pressure. Applicators should not rely solely on drift retardants as there is no drift retardant that will eliminate drift.

Wind Speed

Wind speed is the most important weather factor influencing drift; but unfortunately, applicators have no control of it. High wind speeds will move droplets downwind and deposit them off target. On the other hand, dead calm conditions increase the likelihood of temperature inversions, which can favor off-site movement of volatile compounds. Drift potential is lowest at wind speeds between 3 and 10 miles per hour. Growers should attempt to apply pesticides during periods of low wind speeds and make applications if possible assisted by a gentle but steady breeze, blowing in a safe direction away from sensitive areas.

Winds often die down in the evening and early morning providing a grower an opportunity to make an application and reduce drift potential during periods of windy weather.

The most effective way to check wind speed is to use a wind meter. Depending on the level of accuracy desired, models on the market range in price from around \$20 to \$300. To be accurate, wind meters should be used in places with no obstructions and not in places, such as near buildings or large trees, which may mask wind speed.

Wind Direction

Wind direction will influence where off-target spray droplets will be deposited. A cautious applicator will strive to apply pesticides whenever the wind is blowing away from sensitive areas, especially areas where people are working or children may be playing. The use of a windbreak of tall hedges or trees downwind to protect sensitive areas and crops is an effective way to minimize drift.

Florida law should also be kept in mind regarding wind speed and direction. Florida has an Organo-Auxin Rule which was enacted to protect sensitive crops from injury caused by drift of volatile organo-auxin-like herbicides. Depending upon the location of a sensitive crop, there are defined wind speeds and direction that may prohibit the application of these herbicides.

Air Temperature and Relative Humidity

High air temperature and low relative humidity can combine to create a worst-case scenario for pesticide drift. Use special caution when relative humidity is below 50% and when temperatures are high. Drift is more likely during the hottest part of the day. Hot, dry conditions reduce droplet size

through evaporation and thereby increase drift potential. Under these conditions, spray droplets can evaporate very fast and become more susceptible to wind forces. Air temperature can also influence atmospheric stability creating up-drafts and windy conditions and raising the potential for the off-target movement of spray droplets.

For typical applications with ground applicators, droplets of 50 μm and less will completely evaporate to a residual core of pesticide before reaching the target. Droplets greater than 200 μm will have no significant reduction in size before being deposited on the target. Evaporation of droplets between 50 and 200 μm is significantly affected by temperature, humidity, and other weather conditions.

Temperature Inversions

A temperature, or thermal, inversion is a condition that exists when the air at ground level is cooler than the temperature of the air above it. Temperature inversions occur naturally and are part of a daily atmospheric cycle, occurring in the early morning hours when the ground cools the air layer immediately above it. Such a condition is conducive for pesticide drift. Inversion conditions result when warmer air above traps cooler air located near the surface of the ground; this can be readily visible if dust or smoke rises little from its source and fails to dissipate. These conditions are more likely to occur in the early morning or evening. Applications made under low-wind conditions can sometimes result in more extensive drift than those made under high winds. Drift that occurs over long distances (over a mile) is most often the result of applications made under stable atmospheric conditions such as temperature inversions.

Except in the case of temperature inversions, the early morning and evening are often the best times to apply pesticides because windy conditions are more likely to occur around midday when the temperature warms near the ground. This causes hot air to rise quickly and mix rapidly with the cooler air above it, favoring drift. During stable conditions, a layer of warm air can stay overhead and not promote mixing with colder air that stays below, closer to the ground. Inversions tend to dissipate during the middle of the day when wind currents mix the air layers. It is very important that applicators recognize thermal inversions and do not spray under those conditions.

Application Equipment

- Nozzle Selection

Applicators should select the correct nozzle type and size for each type of application you make and use drift reduction nozzles. Nozzles are cheap compared to the cost of materials and cheap compared to the yield losses or litigation costs that can result from a poor application. Most improved nozzle designs produce superior drop size characteristics and almost all major agricultural nozzle manufacturers offer low-drift nozzles.

Drift reduction nozzles are designed to create larger droplets at the same flow rate and operating pressure as comparable standard flat-fan nozzles. This has been accomplished by adding a pre-orifice to the nozzle tip assembly just ahead of the conventional discharge orifice, creating a venturi effect. Several

different designs are currently being marketed and are commonly referred to as air-induction or venturi nozzles. The pre-orifice reduces pressure at the exit orifice, creating larger droplets to reduce drift significantly.

Air-induction nozzles

Research evaluating different nozzle types has shown air-induction nozzles to produce fewer small droplets compared to standard flat-fan nozzles. The distance from the boom at which drift injury occurred was greater with the flat-fan tips than the other nozzle types. Using water-sensitive cards allows visual observation of relative droplet size under varying conditions. For example, the droplets produced by an air-induction nozzle are compared to those of a standard flat-fan nozzle. As droplet size decreases, the number of droplets prone to off-target movement increases.

To help applicators select nozzles according to droplet size, spray equipment manufacturers are including drop size charts with their respective catalogs and with websites that use color codes set by the American Society of Agricultural and Biological Engineers (ASABE). Pesticide labels often advise on specified droplet sizes to use when applying the product (to reduce drift potential).

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential but will not prevent drift if applications are made improperly or under unfavorable environmental conditions.

Boom/Nozzle Configuration

For ground sprayers, drift potential is reduced by keeping the boom close to the target (soil surface or plant canopy) in accordance with the nozzles being used. This means lowering the boom to the lowest practicable height. A good rule of thumb is that the boom should be 2x as high as the nozzle spacing. Nozzles with wider spray angles allow lower boom heights. Do not spray at greater heights than those recommended by the spray tip manufacturer.

For airblast sprayers often used to apply pesticides in groves, sprayer air deflectors, nozzle orientation, and number of nozzles should be adjusted to match the size and shape of the canopy and minimize spray wastage. For low volume rates (less than 100 gpa), reducing the number of nozzles and using smaller disc and core sizes, rather than spraying at higher ground speeds, may improve spray deposition. For high-volume rates (greater than 250 gpa), increasing the number of nozzles and spraying at higher ground speeds, instead of using fewer large disc and core sizes, may give higher deposition efficiency.

Spray Height

The spray release height will influence how far droplets will travel downwind. This may not be as critical for ground sprayers, but it is very important for aerial application. With aerial applications, pilots should try to maintain an optimum distance from the crop, generally with nozzles about 8 feet above the ground or crop, compared with forestry or rangeland applications that are sometimes made at 20 feet or higher.

Research data indicates that when nozzle height is changed from 8 feet to 22, approximately 2.5 times more drift is deposited 25 feet downwind. With ground applications, nozzles with wider spray angles allow lower boom heights. Any additional distance will give droplets an opportunity to be influenced by wind and be deposited off target.

Spray Pressure

Pesticide product labels contain generic statements concerning the use of the lowest possible spray pressures while achieving adequate droplet size and coverage. In general, higher pressures will produce more fine droplets and increase the drift potential of an application. Nozzle tips are available that, when operated at relatively high spray pressures, will produce coarse to very coarse droplets as compared to other designs of nozzles that would produce more fine droplets at the same pressure.

Increasing pressure is not an effective way to increase coverage and canopy penetration nor is increasing pressure is not an efficient method to make significant increases in output volume. In order to double output, pressure would have to be increased four-fold. For example, increasing flow from 5 gallons per acre (gpa) at 10 pounds per square inch (psi) to 10 gpa would require that pressure be increased to 40 psi. Such an increase would increase the number of fine droplets produced as well. When significant changes in output volume are necessary, changing to a nozzle tip with a larger orifice is most practical. Pressure gauges should be checked periodically for accuracy.

Carrier Volumes

Although some product labels require low volumes, there are others that you may select with a higher volume that allows the use of larger nozzles, which produce larger, less drift-prone droplets when operated at the correct pressure. Research at the University of Florida has shown that increasing carrier volume with the same nozzle type can also increase spray coverage. Using an extended-range nozzle tip, coverage increased from 53.3% when applied at 10 gallons per acre to 93.0% when applied at 20 gallons per acre, and 99.0% when applied at 30 gallons per acre.

Application Speed

Site conditions will ultimately determine application speed, but a speed that can be maintained without pushing the pressure limits of the nozzle and that does not cause the boom to bounce is optimal. Higher speeds are not only harder on equipment and difficult to maintain but also result in enough air movement to cause some drift. Increased operating speeds can cause the spray to be diverted back up into upward wind currents and vortexes behind the sprayer, which trap small droplets and can contribute to drift.

Calibrate the Sprayer and Replace Worn Nozzles

Calibration is the process by which the amount of pesticide being applied per a unit of area is determined. Calibrate your pesticide application equipment on a regular basis to ensure that output from each nozzle is consistent and the desired application rate is achieved.

Worn nozzles produce spray patterns and poor droplet distributions that result in poor coverage, increased drift, or both. Some nozzle materials wear faster than others, and applying certain abrasive pesticide formulations, such as wettable powders, increases the rate of wear.

Shielded Sprayers

Partially covering a sprayer boom with a shield has been shown to be helpful in reducing spray drift. Researchers have conducted wind tunnel tests with a shield placed near a nozzle to determine the effect on the path droplets follow after they are released from the nozzle. Results from laboratory tests conducted at the University of Missouri indicated that a mechanical shield could reduce spray drift deposit by up to 70%. Tests conducted in Ohio under field conditions generally showed reduction in drift deposits of up to 65% with a shield. Some manufacturers of equipment offer shielded sprayers for specific types of applications, such as for use on golf courses.

Applicator Decisions

Under a given spray situation, any one of the previously mentioned factors may be the most critical in reducing drift hazards. Ultimately, it is the applicator's job to determine the critical factors and to take precautions against it. To minimize concerns to neighbors and the environment, applicators must recognize sensitive areas around each field before beginning an application. By exercising sound judgment regarding both equipment and weather factors relative to each application, applicators can minimize drift potential in nearly every case.

Follow Label Directions

If there are specific conditions spelled out on a product label in regards to drift, they should be the first concern.

The following are examples of drift mitigation statements, which may be found on a pesticide label.

Wind Speed

Do not apply at wind speeds greater than 15 mph. Only apply this product if the wind direction favors on-target deposition and there are not sensitive areas (including, but not limited to, residential areas, bodies of water, known habitat for non-target species, non-target crops) within 250 feet downwind.

Temperature Inversions

If applying at wind speeds less than 3 mph, the applicator must determine if: a) conditions of temperature inversion exist or b) stable atmospheric conditions exist at or below nozzle height. Do not make applications into areas of temperature inversions or stable atmospheric conditions.

Susceptible Plants

Do not apply under circumstances where spray drift may occur to food, forage, or other plantings that might be damaged or crops thereof rendered unfit for sale, use or consumption. Susceptible crops include, but are not limited to, cotton, okra, flowers, grapes (in growing stage), fruit trees (foliage), soybeans (vegetative stage), ornamentals, sunflowers, tomatoes, beans, and other vegetables, or tobacco. Small amounts of spray drift that might not be visible may injure susceptible broadleaf plants.

Drift and Florida Law

Chapter 487 of the Florida Statutes: "It is unlawful for any person to apply a pesticide directly to, or in any manner cause any pesticide to drift onto, any person or area not intended to receive the pesticide."

Florida's Organo-Auxin Herbicide Rule

Due largely to problems with phenoxy herbicide applications in South Florida on sugarcane and drift or volatilization to nearby tomato crops and their subsequent destruction, FDACS enacted the Organo-Auxin Herbicide Rule. This rule applies to the application of organo-auxin herbicides anywhere within the state as there are many agricultural plants sensitive to organo-auxin herbicides. This rule dictates wind speed restrictions and that applicators observe certain set backs from sensitive crops and requires that applicators keep certain records when applying organo-auxin-herbiicides such as 2,4-D.

Other State and Local Requirements

Applicators must follow all state and local pesticide drift requirements regarding application of organo-auxin herbicides, such as 2,4-D. Where states have more stringent regulations, they must be observed.

Know the Right Conditions

If winds are blowing toward a sensitive area, do not spray at any wind speed. Ideally, winds should be in the range of 3 to 9 mph. Generally, pesticide should not be sprayed when winds exceed 10 mph. Use caution when winds are light and variable, especially when applications are to be made near susceptible vegetation. Be aware that very calm conditions could indicate the presence of a temperature inversion, especially during the early morning. Inversions favor pesticide drift. Also, use special caution when relative humidity is low and when temperatures are high. Drift is much more likely during the hottest part of the day as those conditions are conducive for drops to evaporate, form smaller droplets, and drift off target.

Buffer Zones

Buffer zones are untreated areas between the treatment site and sensitive areas. It is the area where no pesticide application should occur and is designed to catch off-target spray on their surfaces. If buffers are open areas, they will depend on distance to allow spray materials to settle. This means they need to be relatively wide areas and will be more effective if vegetation or other surfaces are present.

Keep Application Records

Keep records of air temperature, relative humidity, wind speed, and wind direction. These records, as well as equipment and application information, may be very helpful in dealing with drift-related litigation.

The Florida Pesticide Law requires licensed pesticide applicators to maintain records relating to the application of all restricted use pesticides. No one type of recordkeeping form is required; any recordkeeping form is acceptable as long as the required data are included. This allows applicators flexibility to fit the recordkeeping requirements into their current recordkeeping scheme. FDACS produces and has made available a Suggested Pesticide Recordkeeping Form.

Be a Good Neighbor and Communicate

Communicate with your neighbors and maintain a good relationship to prevent disagreements and misunderstandings. Many residents who have relocated into rural agricultural production areas have no understanding of where their food comes from and how important its production is to Florida's economy. Besides communicating with neighbors about the importance of agricultural production, some simple examples of good neighbor practices that growers could instill include:

Let neighbors know when pesticide applications will be made and, if possible, make applications during a time in which the fewest neighbors could be affected.

Let neighbors know what you are applying. Many people do not understand that fertilizer application and the use of biological pesticides will not harm them.

Work with new developments to have buffer zones and buffer plantings included in their development plan. Even if they only provide half of the buffer area, it will save you from taking additional field space out of production.

Drift is undesirable for economic, environmental and safety reasons. Efficient applicators don't spend money for pesticides to watch them drift away from their target fields. Today's chemicals are more potent and require more precise application.

Unsatisfactory pest control could result if a significant portion of the chemical is lost in drift. This could require re-spraying the same field. You may even find yourself in litigation if spray drift damages sensitive crops in a neighbor's field.

The environmental effects of spray drift are equally costly and unacceptable. By reducing drift to a minimum, you can reduce the potential for pollution of streams, lakes and other water supplies that could endanger fish and wildlife.

Regardless of how accurately an application is made, the possibility of drift is always present. Drift can be minimized by selecting the right equipment and using sound judgment when applying pesticides. Good judgment can mean the difference between an efficient, economical application or one that results in drift, damaging non-target crops and creating environmental pollution.

Reducing spray drift not only improves application efficiency but also reduces the risk of safety- and health-related problems caused by drift. Because it is impossible to eliminate drift altogether, applicators should always wear protective clothing when applying pesticides. A respirator is a must, especially if your tractor does not have a cab.

If there is any doubt about spraying that might result in drift, wait until you no longer have that element of doubt. Your goal should be to eliminate off-target movement of pesticides, no matter how small it may be.

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