UT Extension
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Preventing Off-target Herbicide Problems in Tobacco Fields

Herbicide Stewardship
Protecting Crops Environment Technology

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Introduction

A major issue in tobacco production is off-target movement of agricultural chemicals, particularly pasture and right-of-way herbicides. While these herbicides are valuable tools for weed management, off-target damage to tobacco often results in expensive fines and/or lawsuits, lost productivity for growers, and bad publicity for the industry. Fortunately, preventive steps can be taken to avoid these problems.

Herbicide Selection

Although highly effective on several broadleaf weeds in pastures and rights-of-way, the auxin or growth regulator herbicides can damage sensitive crops if not used properly. The characteristics of these herbicides determine which product to use in different situations. Volatile herbicides change from a liquid to gas or vapor and move away from the target. Typically, dicamba and 2,4-D are more volatile than aminopyralid or picloram. Keep in mind that while ester formulations are more likely to volatilize than amine (salt) formulations, some salts of 2,4-D and dicamba are more volatile than others.

Fig. 1. Off-target herbicide damage to tobacco.

The persistence of herbicides can affect future plans for a field. While dicamba and 2,4-D are highly active on tobacco even in minute doses, these materials are relatively nonpersistent in soil and in treated pasture grasses and hay. This is not the case with aminopyralid or picloram. Both of these herbicides can stay active in soil, pasture grass and hay for a year or longer. Moreover, aminopyralid is stable indefinitely in harvested hay. Since these herbicides are so difficult to rinse from sprayers, dedicating a sprayer to be used only on pastures and hay fields is the best way to avoid herbicide tank contamination issues on sensitive crops.

Another characteristic to consider is water solubility. Picloram is more soluble than aminopyralid and therefore more likely to be moved off-site by runoff.

While highly active on tobacco and other sensitive broadleaf crops, newer pasture and right-of-way herbicides such as aminopyralid have strong attributes in that they control some of our worst pasture and hay field weeds such as horsenettle, tall ironweed and beggarweed. Also, volatility, unlike in the case of 2,4-D, is not an issue.

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Drift Prevention

Several factors can contribute to herbicide drift to sensitive areas. Two types of drift, physical and vapor, can occur. Physical drift is the movement of liquid spray droplets away from the target, and it is influenced by spray equipment and wind. Calibrating your sprayer for low pressure (30 psi or less) and high volume (20 to 30 gallons per acre) applications will reduce the number of fine spray droplets. Lowering spray boom height also minimizes drift, but make sure that the correct spray pattern overlap is achieved. New advances in spray tip design, such as air induction technology, have allowed for adequate spray patterns while producing large droplets. In many cases, air induction nozzles require higher operating pressures than flat fan nozzles, so be sure to check the nozzle specifications. Another rule of thumb is to spray on calm days and when wind direction is away from sensitive areas. Calm conditions are more likely to occur early or late in the day. Drift reduction agents can also be used to reduce physical drift, but check the labels for compatibility.

Fig. 2. Herbicide applications made on calm days with low pressures and low boom heights can reduce the likelihood of physical drift.

Common auxin herbicides.

Common name	Chemical family	Trade names
aminopyralid	Pyridine-carboxylic acid	Milestone, ForeFront R&P, ForeFront HL, GrazonNext
picloram	Pyridine-carboxylic acid	Tordon, Surmount, Grazon P+D
2,4-D	Phenoxyacetic acid	Various names and mixtures
dicamba	Benzoic acid	Banvel, Clarity, Oracle, Rifle, Brash, Rangestar, Weedmaster

Vapor drift is the movement of spray vapor away from the target after the herbicide has been deposited on the target. It is mainly influenced by air temperature, but also by relative humidity (RH) and herbicide formulation. Some chemicals volatilize readily at warm (> 85 F) temperatures and dry air (RH < 40 percent) increases the likelihood of vapor drift. If sensitive crops are nearby, use the amine formulation of 2,4-D rather than the low volatile ester formulation. This is particularly important with late spring to summer applications, when warm temperatures are likely to be encountered at or shortly after spraying. Amine formulations are much less volatile than the low volatile ester formulation. This is very important to remember, in that vapor drift will be worse under warm conditions, and that it can occur even a few days after application. Herbicides containing dicamba are also temperature sensitive (see above table). Drift reduction measures such as low pressure, special nozzles, drift retardants, etc. do not reduce vapor drift.

Other considerations to bear in mind are proximity to sensitive fields and timing of herbicide application. Be familiar with adjoining properties and owners. For example, check on when your neighbor plans to set tobacco and which field he or she plans to use. If you are setting tobacco, be sure that your neighbors know your plans. Try to spray at a time of year when sensitive crops are not growing. This is often difficult to accomplish, because the optimum time for weed control may occur when a sensitive crop is in the field. However, some weeds, such as musk thistle, may be treated after mid-October with 2,4-D. This would be a good approach for a field across the fence from your neighbor's tobacco, in that you could treat at a time of year when the crop has already been harvested. A little communication with your neighbors can go a long way to reduce the likelihood of negative consequences.

Consider before you spray:

- *Proximity of sensitive crops.*
- *Herbicide label instructions.*
- *Potential volatility of the herbicide you choose.*
- *Future plans for the field.*
- *Current and forecast weather.*
- *Sprayer calibration and adjustment to minimize drift.*
- *Potential runoff into sensitive areas or irrigation waters.*
- *Inform your neighbors of your plans.*

Field Selection

The location, characteristics and history of a field influence future management strategies. A proper risk assessment should be performed before spraying a pasture with some of these herbicides. Rains can wash certain herbicides downhill to sensitive areas. Applications of picloram should not be made on sites with steep slopes and bare soils. It is also important to avoid situations where herbicide runoff can contaminate streams or reservoirs that may be used to irrigate sensitive crops. Vegetated buffer strips around ponds can help to reduce herbicide leaching.

Before planting tobacco, research the history of the field to see if it has been treated with any persistent herbicides in the past three years. Farm managers should keep up-to-date records of what has been sprayed in each field because it affects if and when tobacco can be planted. **Herbicides that contain aminopyralid or picloram are for use in permanent grass pastures and grass hay fields only. They should not be used in fields that will be rotated to tobacco or other broadleaf crops.**

Movement of Cattle and Handling of Manure

Cattle that graze on pastures treated with persistent herbicides (aminopyralid and picloram) should be monitored carefully. Aminopyralid and picloram remain intact in treated pasture grasses or hay, and when these forages are consumed by animals, the chemical passes through their digestive and urinary systems without change and into the manure and urine. It takes several days for aminopyralid and picloram to pass through the digestive and urinary systems of an animal. Take for example the case where a producer treats a pasture with picloram, grazes cattle in that pasture a few weeks later and then moves the cattle directly to a field of tall fescue destined for rotation to tobacco the next year. Everywhere the cattle defecate or urinate can, in effect, result in a dosage of aminopyralid or picloram in sufficient concentration to produce noticeable injury to transplants set the following year.

Fig. 3. Movement of cattle should be carefully managed because some pasture herbicides can remain active in manure and urine.

Cattle should be removed from a treated pasture for a period of three days for aminopyralid and seven days for picloram before manure can be used to fertilize tobacco. If rotating cattle to a field that is destined for rotation to tobacco, the same periods apply and cattle should be moved to an untreated holding area first.

According to the manufacturer, breakdown of aminopyralid in manure is more rapid under warm, moist soil conditions and may be accelerated by supplemental irrigation. Also, aminopyralid residues in manure will degrade faster if incorporated into the soil. Residues will break down much slower if manure is stored in a heap. Manure collected from animals that grazed treated forage or consumed hay harvested from treated areas should be stored away from other manure and properly labeled. Manure with aminopyralid residues can only be used to fertilize rangeland, permanent pastures, wheat and corn.

Consider before you plant:

- *What was sprayed in this field over the last 3 years?*
- *If manure was spread, what was its origin?*
- *Were cattle moved here from a pasture treated with aminopyralid or picloram?*
- *Can herbicides move into this field?*
- *Was treated hay stored in this field?*

Handling of Treated Hay

When purchasing hay, producers should know the origin of the hay and whether it was treated with persistent pasture herbicides. Hay of unknown origin should be used with caution if animals are located in a field that may be rotated to tobacco. Tagging of treated bales can be helpful in keeping track of which animals have been fed treated hay. Untreated hay bales should be kept separate from treated bales.

Cattle should be taken off hay for three days if treated with aminopyralid and seven days for picloram before they are moved to a sensitive area. Hay feeding areas should not be rotated to tobacco or other sensitive broadleaf crops.

Monitoring Results

Producers are encouraged to assess the performance of herbicides in pastures and hay fields. Tracking results will guide future decisions for weed control. It is important to keep a log of all applications with dates, products, field locations and weather conditions. (This is required by law for picloram, as it is a restricted use pesticide.) Also, cattle producers should keep records of which animals have grazed treated areas or have been fed treated hay and for how long. Adequate records will help producers keep herbicides contained within the target area, thereby reducing negative impacts to other farm operations and insuring the availability of these important tools for the foreseeable future.

Consider after you spray:

- *Documenting date, rate and location of herbicide application.*
- *Holding area for cattle that have grazed treated pasture or have been fed treated hay.*
- *Waiting period before cattle can be moved to an area destined for rotation to tobacco.*
- *Tagging and separate storage of treated hay.*

References

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Picture Credits

Fig. 2. Boom sprayer. Digital image. Accessed 21 Apr. 2012. Available online at http://gilmerdairy.blogspot.com/2011/06/weed-zappin.html

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