

WEED CONTROL IN FLUE-CURED TOBACCO

Charles S. Johnson, Extension Plant Pathologist, Tobacco

Good weed control uses crop rotation, early root and stalk destruction, cultivation, and appropriate use of herbicides. Application of a herbicide before transplanting (PPI) or over-the-top at transplanting (OT) will reduce reliance on the first cultivation for early-season weed control. The number of cultivations can often be reduced when a herbicide has been applied PPI or at transplanting. Some herbicides may also be applied to the row middle just after the last cultivation to obtain full-season weed control. Herbicide use should be based upon the specific weeds present in each field, the weed-control program that integrates best with overall farm management practices, herbicide cost in relation to performance and crop safety, and anticipated rotational crops. Herbicide performance and safety depend upon the use of correct application methods. Special effort should be made to apply all herbicides exactly as stated on the product label.

Important Considerations in Herbicide Use

Selecting the Proper Herbicide

Weed Identification – Identifying the problem weeds in each field should be the first step in any weed control program. Use of herbicides with rotation crops may reduce populations of hard-to-control weeds in tobacco fields and avoid some of the problems associated with use of tobacco herbicides. The table on page 39 is a relative summary of herbicide performance for the majority of weeds found in flue-cured tobacco fields in Virginia.

Soil Texture and Organic-Matter Content – Herbicide rates should increase as percent organic matter increases and as soil texture changes from coarse to fine. However, the lowest recommended rate should always be used when percent organic matter is less than 1 percent, regardless of soil texture. The soil textures listed in herbicide labels and recommendations are as follows: **Coarse Soils** - sands, loamy sands, and sandy loams; **Medium Soils** - sandy clay loams, loams, silt loams, and silts; **Fine Soils** - clay loams, silty clay loams, and clays. The percent organic matter of your soils can be determined by taking a soil sample and submitting it to a soils laboratory for analysis.

Proper Herbicide Application

Soil Preparation – Most herbicides used in tobacco fields control weeds by preventing seed germination. Already established weeds are not significantly affected. All weed growth and crop stubble should be thoroughly worked into the soil prior to the application of most tobacco herbicides. The soil should be moist and loose, with all clods broken up, before a herbicide is applied.

Spray Equipment – A standard low-pressure (25 to 50 psi) boom sprayer should be used to apply herbicides with liquid or wettable powder formulations. Use in 20 to 40 gallons of water per acre. Check for clogged nozzles and screens frequently while spraying. Use 50-mesh screens in strainers, nozzles, and suction units. Clean or replace dirty or worn out sprayer, boom, and nozzle parts to ensure uniform application. Be sure to calibrate the sprayer before use to avoid crop injury and/or poor herbicide performance from improper spray volume or a non-uniform spray pattern. Ensure that the spray solution is continuously agitated. Do not apply a herbicide in strong wind, since wind can cause uneven coverage. Poast must be applied at higher pressures (40 to 60 psi) using smaller spray volumes (5 to 20 gallons of water per acre). Use only hollow-cone or flat-fan nozzles to apply Poast. Never leave a spray mixture in a sprayer overnight!

Herbicide Incorporation – Herbicides should generally be incorporated as soon after application as possible. Use a field cultivator or a combination, tandem, double disc, or disc harrow set to cut 4 to 6 inches deep. Avoid using a large field disc to incorporate PPI herbicides. Discs should be no more than 24 inches in diameter and 8 inches apart. Shallow incorporation with implements set to cut less than 2 inches deep can result in erratic weed control. **A single cultivation does not adequately incorporate herbicides, and may increase crop injury and decrease weed control.** Incorporating equipment should be operated in two different directions, at right angles to each other, at 4 to 6 mph. PTO-driven equipment (tillers, cultivators, hoes) perform best on coarse soil types. PTO-driven equipment should be set to cut 3 to 4 inches deep and should not be operated at a speed greater than 4 mph. Tillage is often required with over-the-top herbicide use. Irrigation is also often required to incorporate tobacco herbicides applied at layby. Using incorporation equipment and/or tractor

speeds not listed on the product label may result in poor or erratic weed control and/or crop injury.

Undesired Effects of Herbicide Use

Effect of Preplant Applications on Early-Season Tobacco Growth – Herbicides applied before transplanting sometimes inhibit the root development of transplants, delaying plant growth during the first month after transplanting. Full-season weed control can be obtained, and possible early-season growth reductions avoided, by applying herbicides at transplanting and layby.

Effects of Herbicides on Rotation Crops – Residues from some tobacco herbicides may reduce the growth of crops following tobacco. These effects are discussed in the labels for the particular herbicides involved. Potential carry-over can be reduced by: 1) using the minimum labeled rates for the chemical, for your weed problems, on your soils; 2) applying herbicides in a band at transplanting and/or layby rather than broadcast PPI; 3) fall tillage for early root and stalk destruction; and, 4) by deep plowing before seeding the small-grain crop.

Flue-cured Tobacco Herbicides

Preplant Incorporated Herbicides (PPI) Apply the herbicide in an even broadcast application. Avoid spray overlap! Use fan-type, flood-jet, or raindrop nozzles. Incorporate the herbicide immediately after application using recommended equipment.

Over-the-Top after Transplanting (OT) and Layby Herbicides An OT application can be made as either a band or broadcast application within seven days of transplanting. Tillage is required immediately before or

at the time of an OT application if the OT application is made more than two days after transplanting, or if rain has fallen or irrigation was applied since the crop was transplanted.

1. **Band Application** – Apply the herbicide in a 14- to 24-inch band over the row using fan-type, even-spray nozzles (8004E, etc.). The amount of herbicide per acre of crop is reduced with band application and can be determined by the formula below.
2. **Broadcast Application** - Apply the herbicide in an even broadcast application using a sprayer equipped with fan-type nozzles (8004, etc.).

Apply **layby herbicides** as directed sprays to row middles immediately after the last normal cultivation. Use drops equipped with flat, flood-jet (TK2, TK4, etc.) or even, flat-fan (8004, etc.) nozzles to apply the herbicide solution in a 16- to 30-inch band in the row middles. Use nozzles that apply one-half (1/2) the normal number of gallons per acre where spray nozzles on the end of the boom pass over the same row middle twice (to prevent over-application). Use the formula above to determine the amount of product to use for a band application. Irrigation will be required if 1 to 2 inches of rain do not fall within seven to ten days after application (to ensure herbicide activation).

Precautionary and Restriction Statements

Read and follow all directions, cautions, precautions, and restrictions on each product label. Take labels seriously. This publication must not be used as the sole source of precautionary and restriction statements.

Band Application Formula

$$\frac{\text{Lbs of Product/Acre}}{\text{Band Width (inches)}} = \frac{\text{Row Spacing (inches) per/A}}{\text{Broadcast Rate}}$$

Relative effectiveness of herbicides for tobacco*

Grasses and Nutsedge

Herbicide	Barnyard-grass	Bermuda-grass	Broadleaf Signalgrass	Crab-grass	Crowfoot grass	Fall Panicum	Fox- tails	Goosegrass	Johnsongrass (seedling)	Texas Panicum	Nutsedge
Command	E	P-F	E	E	E	E	E	E	G	G	P
Devrinol	G	P	F	E	E	G	E	E	F	-	N
Poast	F-G	G	E	G	F	E	E	G	E	E	N
Prowl or Pendimax	G	P	G	E	E	G	E	E	G	G	N
Spartan	F	P	P	F	F	F	F	F	F	F	E
Tillam	G	P	P	E	E	G	E	G	G	P	G

Broadleaf Weeds

Herbicide	Carpet-weed	Cocklebur	Galinsoga	Jimsonweed	Lambsquarters	Morning-glory	Pig- weed	Purslane	Prickly sida	Rag- weed	Sickle-pod	Smart- weed
Command	P	F	P-F	G	G	P	P	G	E	F-G	P	G
Devrinol	G	F	P-F	P	G	P	G	G	P	F	P	P
Poast	N	N	N	N	N	N	N	N	N	N	N	N
Prowl or Pendimax	G	P	P	P	G	P	G	G	P	P	P	P
Spartan	G	F-G	F	F-G	G	G	G	G	P	P	--	G
Tillam	G	P	P	P	G	P	G	G	P	P	P	P

*E = 90 to 100% control; G = 76 to 90%; F = 50 to 75%; P = 20 to 50%; N = Less than 20%; - = no data. This table gives general ratings of relative herbicidal activity. Activity varies with weather conditions, soil type and application method. Under non-optimal conditions, activity may be less than indicated.

Weed control in flue-cured tobacco fields

Weed Problems	Soil ¹ Texture	Chemical Lbs Active Ingredient/A	Product per Acre	Application ² Method
Pigweed, lambsquarters, nightshade, purslane, smartweed, velvetleaf, spurred anoda, carpetweed, cocklebur, cotton, groundcherry, morningglory, common ragweed		Carfentrazone	Aim	Pretransplant burndown; shielded or hooded spray before layby; directed spray after 1 st harvest
		0.012-0.024	0.5-1.0 oz.	
		0.013-0.023	Aim EC or Aim EW 0.8-1.5 fl. oz.	
Remarks: Spray solution will cause extensive burn to broadleaf plants (and tobacco leaves) on contact. Pretransplant interval = 1 day; preharvest interval = 6 days. Do not apply more than 2.0 oz. Aim or 3.0 fl oz. Aim EC or EW per acre per season.				
Barnyardgrass, broadleaf signalgrass, crabgrass, field sandbur (suppression), foxtails, seedling Johnsongrass, fall panicum, velvetleaf, jimsonweed, lambsquarter, prickly sida, purslane, spurred anoda, venice mallow, common ragweed, smartweed, cocklebur (suppression), shattercane	Coarse	Clomazone	Command 3ME	OT
	Fine	0.75 1.0	2.0 pt 2.7 pt	
Remarks: Use the higher rate for heavy weed pressure or heavy soils. Transplants should be placed below the treated area. Do not use in plant beds.				
Barnyardgrass, carpetweed, crabgrass, fall panicum, foxtails, goosegrass, johnsongrass from seed, lambsquarters, pigweed, common purslane, ragweed (suppression), ryegrass; check label for uncommon weeds.	Coarse	napropamide	Devrinol DF	PPI, OT, Layby
	Medium	1.0	2.0 lb	
	Fine	1.0-1.5	2.0-3.0 lb 4.0 lb	
	Coarse	2.0	Devrinol 2E	PPI only
	Medium	1.0	2 qt	
	Fine	1.0-1.5 2.0	2-3 qt 4 qt	
Remarks: For PPI application, incorporate the same day as applied. Small grain injury may result from PPI application method.				
Grass weeds and volunteer small grain	All types	sethoxydim	Poast	Postemergence
	Single use:	0.28	1.5 pt + 2 pt oil concentrate	
	Sequential use:	0.19	1 pt + 2 pt oil concentrate	
Remarks: Apply to actively growing grasses at 40-60 psi in 5-20 gal/A through hollow-cone or flat-fan nozzles. May be banded or applied broadcast. Do not apply more than 4 pt/A per season or within 42 days of harvest.				

Weed control in flue-cured tobacco fields (cont.)

Weed Problems	Soil ¹ Texture	Chemical Lbs Active Ingredient/A	Product per Acre	Application ² Method	
Annual spurge, barnyardgrass, carpetweed, crabgrass, crowfoot grass, Florida pusley, foxtails, goosegrass, johnsongrass from seed, lambsquarters, panicums, pigweed, purslane, signalgrass.		pendimethalin	Prowl 3.3 EC or Pendimax 3.3		
	Coarse	0.74-0.99	1.8 – 2.4pt	PPI only	
	Medium	0.74-1.24	1.8 - 3.0 pt		
	Fine	0.99-1.24	2.4 - 3.0 pt		
		Coarse	0.50 – 0.74	1.2 – 1.8 pt	Layby only
		Medium	0.74 – 0.99	1.8 – 2.4 pt	
		Fine	0.74 – 0.99	1.8 – 2.4 pt	
		Coarse	0.95	Prowl H ₂ O 2.0 pt	PPI only
		Medium	0.95 – 1.19	2.0 – 2.5 pt	
		Fine	1.19	2.5 pt	
		Coarse	0.71	1.5 pt	Layby only
		Medium	0.95	2.0 pt	
	Fine	0.95	2.0 pt		

Remarks: For silt and silt loam soils, use 2.4-3.0 pt/A of Prowl 3.3EC or 2.5 pt/A of Prowl H₂O for PPI applications. Rates are for broadcast application and must be adjusted for banded sprays based on the width of the intended spray band and soil texture. Applied according to directions and under normal growing conditions, Prowl should not harm transplanted tobacco, but can temporarily retard growth under stressful conditions (cold/wet or hot/dry weather). Layby applications should be made as a directed spray in a 16- to 24-inch band centered between rows. Spray contacting tobacco leaves may cause deformations. Crop injury may result if winter wheat and winter barley are no-till planted in the fall after spring application of Prowl. Don't feed forage or graze livestock for 75 days after planting wheat or barley in Prowl-treated land.

Groundcherry, hairy galinsoga, jimsonweed, lambsquarters, morningglory (except pitted), nutsedge, pigweed, prickly sida, Pennsylvania smartweed. Suppresses most grasses, foxtail, panicums, cocklebur, signalgrass, spurges. Check label for uncommon weeds.		sulfentrazone	Spartan 75DF	After bedding,
	Coarse	0.25	5.3 oz	before
	Medium	0.31	6.7 oz	transplanting
	Fine	0.38	8.0 oz	After bedding,
	Coarse	0.25	Spartan 4F	before
	Medium	0.31	8 fl oz (0.50 pt)	transplanting
	Fine	0.38	10 fl oz (0.62 pt) 12 fl oz (0.75 pt)	

Remarks: Apply this product only as specified on the label. Do not apply to soils classified as sands with less than 1% organic matter and shallow groundwater. Most tobacco fields in Virginia contain coarse to medium textured soils. Do not impregnate on fertilizer. Apply to soil surface after field has been prepared for planting. Apply within 14 days of transplanting, **after** beds are knocked down for planting. **Do not** apply at or after transplanting. Do not disturb treated soil below a 2 inch depth. Crop injury can occur when incorporation is poor, transplants are set too shallow, or heavy rain falls near transplanting. **Do not** apply Spartan more than once per season. Do not seed small grains within 4 months of application. Do not plant cotton or canola within 18 months of use.

Weed control in flue-cured tobacco fields (cont.)

Weed Problems	Soil¹ Texture	Chemical Lbs Active Ingredient/A	Product per Acre	Application² Method
Barnyardgrass, bermudagrass, crabgrass, crowfoot grass, Florida pusley, foxtails, goosegrass, ground cherry, lambsquarters, henbit, pigweed, purslane, purple and yellow nutsedge, check label for uncommon weeds	All types	pebulate 4.0	Tillam 6E 2.6 qt	PPI

Remarks: Incorporate immediately after application.

¹When the soil has less than 1% organic matter, use the rate for the coarse soil texture recommendations. **Coarse** - sands, loamy sands, sandy loams; **Medium** - sandy clay loams, silts; **Fine** - clay loams, silty clay loams, clays.

²PPI = Preplant incorporated. Delay in growth may result under adverse conditions and/or when poor application practices have been used. OT = Over-the-top after transplanting as a band or broadcast application. Layby = Application of herbicide in row middle after last cultivation. Preplant burndown = broadcast spray before transplanting in conservation tillage production system. Shielded or hooded spray = application to row middles only using sprayer with shields or hoods to prevent spray contact to tobacco leaves. Directed spray = spray directed toward row middles and surface of row beds after sequential harvesting has removed sufficient leaves that spray will not contact remaining crop leaves.