

Efficacy of Weed Management Tactics



Before Planting

plant type	broadleaf						grass	
	annual			perennial			annual	perennial
lifecycle	fall/early spring			late spring			fall/spring	
emergence period	fall/early spring			late spring			fall/spring	
growth habit	seed			seed			simple	creeping
primary reproductive structure	seed			seed			seed	rhizome
example weed	chickweed	henbit/deadnettle	horseweed/marestail	lambsquarters, common	ragweed, common	dandelion	brome, downy	quackgrass
Crop Rotation ¹	Continuous monoculture (base system)	N	N	N	N	N	N	N
	Corn/soybean	N	N	F	F	P	P	N
	Add winter small grain	F	F	F	G	G	G	P
	Add perennial forage legume crop	G	G	G	G	G	G	P
Cover Crops (fall-seeded) ²	Winter and spring competition							
	small grain	G	G	E	G	F	G	N
	legume	F	F	G	F	P	F	N
	radish	F	F	F	D	D	F	N
	Early terminated ³			F	P	P	P	N
	Late terminated (heading stage) ³							
	small grain (rolled)			E	G	F	E	P
	legume			G	F	P	F	P
	small grain-legume mix (rolled)			E	G	F	E	P
	Tillage and Cultivation ⁴	No-till (base system)	N	N	D	D	N	D
Moldboard plow, once in four years ⁵		E	E	E	E	G	E	F
Annual fall moldboard plow		G	G	G	N	N	G	-
Annual spring moldboard plow		E	E	E	N	D	E	-
Spring disk or chisel plow ⁷		E	E	E	N	D	E	-
vertical tillage/turbo till (fall)		P	P	P	N	N	N	N
Planting ⁸	Early planting date							
	corn	N	N	N	P	P	N	N
	soybean	N	N	N	F	F	N	N
Chemical ⁹	Equipment sanitation ⁶	P	P	F	F	F	F	P
	Fall residual	G	G	F	N	N	-	N
	Spring burndown	E	E	G	G	G	G	G
	Residual with burndown ⁹	E	E	E	E	G	-	P
	Post harvest burndown	G	F	G	F	F	F	G

Tactics in *italics* target the weed seed bank rather than in-season management.

¹ Crop rotation based on the impact of planting date altering crop architecture only - not other weed control strategies associated with different crops. Continuous monoculture is the base system; ratings within crop rotation are based relative to this.

² Assumes timely planting (by October 15 for small grains, by October 1 for legumes, and by Sept 15 for radish), attaining at least 6,000 lbs of biomass per acre at termination, and cash crop planting within 2 weeks after termination.

³ No-till is defined as the base system and ratings within tillage/cultivation are relative to this.

⁴ Assumes effective herbicide use. Please consult the Mid-Atlantic Field Crop Weed Management Guide.

⁵ Ratings based on seedling emergence after cover crop termination.

⁶ Ratings based on first season following moldboard plow/inversion tillage only.

⁷ Spring tillage prior to planting.

⁸ Ratings based on spread of weed from field to field, not within a field.

⁹ Ratings based on effects of residual herbicide, not burndown.

Authors

Michael Flessner, Virginia Tech
 Kevin Bamber, Virginia Tech
 Thierry Besacon, Rutgers University
 Rakesh Chandran, West Virginia University
 Tommy Hines, Virginia Tech
 Quintin Johnson, University of Delaware
 Dwight Lingenfelter, Penn State
 Claudio Rubione, University of Delaware
 Lovreert Shergill, University of Delaware
 Vijay Singh, Virginia Tech
 Mark VanGessel, University of Delaware
 Kurt Vollmer, University of Maryland
 John Wallace, Penn State

Relative efficacy of various integrated weed management tactics rated prior to or after planting summer annual crops in the mid-Atlantic region.

D	Detrimental ; this tactic may increase weed problems by spreading propagules or increasing density
N	No effect ; this tactic will not impact management of this weed
P	Poor ; this tactic will marginally reduce weed density
F	Fair ; this tactic will moderately reduce weed density and may reduce competitiveness
G	Good ; this tactic consistently reduces weed density and competitiveness
E	Excellent ; this tactic significantly reduces weed density and minimizes competitiveness
-	No data ; or information available
	Not applicable

After Planting

plant type	broadleaf												narrow leaf												
	annual						perennial						annual		perennial										
lifecycle	late spring			early summer			season long			winter	summer			early summer	summer		perennial								
emergence period	late spring			early summer			season long			winter	summer			early summer	summer		perennial								
growth habit	simple			vining			simple			vining			prostrate	upright		prostrate/short	simple		creeping						
primary reproductive structure	large seed			small seed			large seed			small seed			large seed			seed	taproot	rhizome		small seed	large seed	small seed	tuber	rhizome	
example weed	ragweed, common	lambsquarters, common	cocklebur	velvetleaf	burcucumber	amaranth, Palmer/waterleaf	pigweed	morningglory, annual	dandelion	poleweed	dogbane, hemp	thisle, Canada	horsetail	crabgrass	foxtail spp.	goosegrass	nutsedge, yellow	Johnsongrass (rhizome)	quackgrass						
Crop Rotation ¹	Continuous monoculture (base system)	N	N	N	N	N	D	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
	Corn/soybean	P	P	P	P	P	F	N	P	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
	Add winter small grain	G	G	G	G	F	F	G	F	G	P	F	P	F	G	P	F	P	P	P	P	P	P		
	Add perennial forage crop	G	G	G	G	G	G	G	G	G	F	F	P	N	F	F	P	P	P	P	P	P	P		
Cover Crops (fall-seeded) ²	Early terminated ³	P	P	N	N	N	N	P	P	N	N	N	N	P	N	N	N	N	N	N	N	N	N		
	Late terminated (heading stage) ³																								
	small grain (rolled)	F	G	F	F	F	G	G	F	F	N	N	N	F	F	F	P	N	N	P	N	N			
	legume	P	P	P	P	P	P	P	P	P	N	N	N	N	P	N	P	P	N	N	P	N	N		
Tillage and Cultivation ⁴	No-till (base system)	P	P	P	P	F	D	D	P	D	D	D	D	N	N	N	N	D	D	N	N	N			
	Moldboard plow, once in four years ⁵	F	F	P	F	F	G	G	F	F	F	F	P	G	F	G	F	F	F	F	F	F			
	Annual fall moldboard plow	N	N	N	N	D	N	N	N	G	G	F	F	F	N	N	F	F	F	F	F	F			
	Annual spring moldboard plow	P	P	P	P	N	P	P	F	G	G	P	P	P	P	P	N	P	P	N	P	P			
	Spring disk or chisel plow ⁷	P	F	N	P	D	N	P	P	P	F	P	N	P	N	D	N	N	N	N	N	N			
	Vertical tillage/turbo till (fall)	N	P	N	N	N	N	N	P	N	N	N	N	N	N	N	N	N	N	N	N	N			
Planting ⁸	Early planting date ⁸																								
	corn	P	P	G	F	P	P	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P			
	soybean	P	P	P	P	P	P	P	P	P	P	P	P	P	P	F	P	P	P	F	P	P			
	Late planting date (double-crop soybean)	G	G	P	P	P	P	F	P	P	P	F	P	F	P	P	P	P	P	P	P	P			
	Increased soybean seeding rate	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P			
	Narrow row spacing (<15 inches)	F	F	F	F	F	F	F	F	P	P	P	F	F	F	F	P	P	P	F	P	P			
Fertility ⁹	Timing (multiple applications vs all at planting)	P	F	P	F	P	P	F	P	P	P	N	N	P	F	P	P	P	P	P	P				
	Placement (in furrow or 2 by 2 vs broadcast)	P	P	N	N	N	P	P	N	N	N	N	N	P	P	P	N	N	N	N	N				
Harvest ¹⁰	Harvest weed seed control ⁹	F	F	P	N	N	G	G	N	N	N	N	N	P	N	N	N	N	N	N	N				
	Crop stubble mowing ¹⁰	P	P	P	P	P	P	P	P	P	P	P	P	P	P	N	P	P	P	P	P				
	Equipment sanitation ¹¹	F	F	F	F	F	F	F	F	F	P	P	P	F	F	F	P	F	F	F	F				
Chemical ¹²	Spring burndown ¹²	F	P	N	N	N	N	P	P	G	P	N	P	N	N	N	P	N	F	P	P				
	Residual with burndown ¹³	G	G	P	F	P	F	F	F	G	P	P	P	G	F	P	F	P	P	P					
	Residual at planting	G	E	G	G	G	G	G	G	F	P	P	P	G	G	F	F	P	P	P					
	Timely post	E	E	G	E	G	G	G	F	G	G	G	G	G	E	E	F	G	G	-					
	Timely post with residual	E	E	E	E	E	E	E	G	G	G	G	G	G	E	E	E	G	G	-					
	Harvest aid	P	P	P	P	P	P	P	P	P	P	P	P	P	P	N	P	P	P						
Post harvest burndown ¹³	N	P	N	P	N	P	P	P	F	P	F	F	F	P	N	P	P	P							

Tactics in *italics* target the weed seed bank rather than in-season management.

¹ Crop rotation based on the impact of planting date altering crop architecture only - not other weed control strategies associated with different crops. Continuous monoculture is the base system; ratings within crop rotation are based relative to this.

² Assumes timely planting (by October 15 for small grains, by October 1 for legumes, and by Sept 15 for radish), attaining at least 6,000 lbs of biomass per acre at termination, and cash crop planting within 2 weeks after termination.

³ No-till is defined as the base system and ratings within tillage/cultivation are relative to this.

⁴ Assumes effective herbicide use. Please consult the Mid-Atlantic Field Crop Weed Management Guide.

⁵ Ratings based on seedling emergence after cover crop termination.

⁶ Ratings based on first season following moldboard plow/inversion tillage only.

⁷ Spring tillage prior to planting.

⁸ Planted 2 to 3 weeks earlier than a typical planting date for the region.

⁹ Harvest weed seed control with a grain head; do not use ratings for corn grain harvest.

¹⁰ Implemented approximately 2 to 3 weeks after harvest.

¹¹ Ratings based on spread of weed from field to field, not within a field.

¹² Full season burndown (not double crop soybean burndown timing).

¹³ Ratings based on effects of residual herbicide, not burndown.

