

HARVADE® 5F (DIMETHIPIN) PERFORMANCE AS A POST-DIRECTED HERBICIDE FOR COTTON

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Abstract

Harvade 5F (dimethipin) was labeled for post-directed use in 1999 for broadleaf weed control in cotton (Parker et al., 2000), and has been evaluated across the cotton belt during 1999 and 2000. With the loss of Bladex®/Cy Pro® (cyanazine) as a standard post-directed and lay-by cotton herbicide treatment, Harvade 5F (dimethipin) has been evaluated in many tank mix combinations as a replacement. With outstanding activity on morningglory (*Ipomoea sp.*), sicklepod (*Cassia obtusifolia*), and other important broadleaf weed species, Harvade 5F is an excellent replacement for Bladex (cyanazine) in tank mixes for post-directed weed control in cotton.

Introduction

Weed control practices for cotton are changing rapidly with the introduction of GMO technology, new herbicides, and low commodity prices. The loss of Bladex (cyanazine), recent rapid increase in the planting of Roundup Ready, BXN, and stacked gene cotton varieties, and the corresponding increase in use of Roundup® (glyphosate) or Buctril® (bromoxynil) for weed control has resulted in changing weed control strategies. The use of early season multiple applications of Roundup or Buctril helps provide the desired height differential between the cotton and newly emerging weeds needed to use a post-directed herbicide like Harvade for optimum results. Harvade fits well in combination with Roundup or Buctril applied under the hood or as a directed spray to the stem bark layer or row middles for broad spectrum weed control. Harvade fits equally in both genetically modified and conventional cotton with other commonly used post-directed tank mixes like MSMA to provide broad spectrum economical weed control.

Discussion

Harvade post-directed combinations were tested across the cotton belt in 2000 and data has shown that Harvade enhances broadleaf weed control especially on hard to control species such as morningglory (*Ipomoea sp.*), and sicklepod (*Cassia obtusifolia*). According to the 1999 Cotton Weed Loss Committee, morningglory (*Ipomoea sp.*) caused the greatest estimated cotton yield losses (18.7%) and had the second highest number of infested acres (5, 885, 000 acres) of all the weed species except pigweed (*Amaranthus*) species occurring in cotton (Byrd et al., 2000). Harvade has displayed excellent control of morningglory species when applied with proper coverage and timing.

Harvade was applied in tank mixes with MSMA (2 lb a.i./A), Roundup Ultra (1 lb a.i./A), Caparol (0.5-1 lb a.i./a), Diuron (0.5 lb a.i./A), Cotoran (2 lb a.i./A), Staple (1 oz a.i./A), Cobra (0.1 lb a.i./A), Gramoxone (0.5 lb a.i./A), and Buctril (0.25 lb a.i./A) etc. with good to excellent results in 2000. Harvade 5F applied at 6 oz. and 10 oz. per acre (0.23 - 0.38 lb ai/ac) tank mixed with Roundup Ultra (glyphosate) showed enhanced control of pitted morningglory (*Ipomoea lacunosa*) in a Tillar, AR trial (Guy, 2000). In a Georgia trial, Harvade tank mixed at 6 oz. with Roundup Ultra @ 32 oz/A increased activity from 84% to 99% control on small flower morningglory (*Jacquemontia tamnifolia*) compared to Roundup Ultra alone. Harvade @ 10 oz/A + MSMA also provided 99% control of this tough species. Harvade 5F applied at the 6 oz/A rate has performed well in tank

mixes when applied to weeds that are generally 4" or less in size. For weeds larger in size such as running morningglory vines, growers should consider Harvade use rates of 8 - 10 oz/A for greater coverage and activity.

Crop injury is a concern when applying post-directed or lay-by herbicides. Harvade has shown excellent safety similar to Bladex when applied to cotton 10" or greater in height when applied under the hood or directed to the stem bark layer avoiding the green, succulent tissue. It has been demonstrated that applications of Harvade tank mixes with nitrogen solutions will increase potential for cotton injury (Culpepper, 2000) so applications of mixes including nitrogen should be applied with a hood sprayer or directed only to the bark area of the cotton plant. Harvade has shown some residual activity, which reduced subsequent weed emergence of some weed species, as well as stunting and reducing emergence of replanted cotton.

Data from 32 field demonstrations (Griffith et al.) conducted during the 2000 season compared Harvade tank mixes with the grower standard. Locations ranged from NC to TX. Use rates of Harvade were 6 oz. (25 locations), 8 oz. (4 locations) and 10 oz. (3 locations). Primary targeted weeds in these trials consisted of morningglory (*Ipomoea sp.*) species (27 locations), sicklepod (*Cassia obtusifolia*) (17 locations), pigweed (*Amaranthus*) species (9 locations), common Cocklebur (*Xanthium strumarium*) (9 locations), various grass (*Digitaria*) species (5 locations), and nutsedge (*Cyperus*) species, hemp sesbania (*Sesbania exaltata*), prickly sida (*Sida spinosa*) (4 locations). Weeds that were primary in at least one trial included bristly starbur (*Acanthospermum hispidum*), Florida beggarweed (*Desmodium tortuosum*), Asiatic dayflower (*Commelina communis*) species, Florida pusley (*Richardia scabra*), balloon vine (*Cardiospermum halicacabum*), Mexican weed (*Caperonia castaniifolia*), spurred anoda (*Anoda cristata*), spotted spurge (*Euphorbia maculata*), wild poinsettia (*Euphorbia heterophylla*), sunflower (*Helianthus annuus*), red vine (*Brunnichia ovata*) species, honeyvine milkweed (*Amperlamus albidus*), and wild radish (*Raphanus raphanistrum*). Harvade 5F was tank mixed most often with either Roundup Ultra (glyphosate) + COC (crop oil concentrate) or MSMA + COC (13 locations each), Caparol (prometryn) + COC (9 locations) or diuron + COC (5 locations). Results from growers, consultants, and extension agents indicated that the Harvade 5F 6 oz. rate tank mixes provided equal or greater weed control 22 out of 25 locations, the 8 oz. rate provided equal or greater weed control 4 out of 4 locations, and the 10 oz. rate provided equal or greater weed control 3 out of 3 locations when compared with the grower standard. Included in these demonstration trials were 6 comparisons versus Bladex/Cy Pro tank mixes and all locations showed equal activity on the weed species in those trials.

Many field trials and demonstrations continue to show that adding at least 1 pint of COC to Harvade 5F tank mixes will enhance activity and improve tank mix performance. The addition of COC to Harvade tank mixes is always recommended.

Four replicated trials during 2000 have shown no antagonism from tank mixing Harvade 5F at 6 - 10 oz. per acre with the commonly used graminicides. Harvade tank mixed with graminicides showed no reduction in control of targeted grass species. No reduction in activity on broadleaf weeds was seen with the tank mixes compared with Harvade 5F alone. (Murdock, 2000)

Summary

Harvade offers an excellent economical tank mix with MSMA and Roundup as an alternative to Bladex/Cy Pro (cyanazine) for post-directed or lay-by broadleaf weed control in cotton. Harvade also fits well with Roundup Ready and BXN varieties in enhancing control of tough broadleaf weeds such as morningglory and sicklepod.

References

Byrd, J.D., Jr. Dept. of Plant & Soil Sciences, Miss. State Univ., 2000. Report of the 1999 Cotton Weed Loss Committee. 2000 Proceedings Beltwide Cotton Conferences, Jan 4 - 8, San Antonio, TX. Vol. 2, Pages 1455 - 1458.

Culpepper, S. 2000. Cotton lay-by herbicides applied in water and water/nitrogen solutions. University of Georgia. Field trial C35-00.

Griffith, K.H., Parker, R.C., A.W. Dalrymple, R.D. Hinkle. 2000. Post-directed weed control trials with Harvade on cotton in the southern cotton belt in the United States.

Murdock, E.C. 2000. Compatibility and efficacy of Harvade/graminicide tank mixes. Clemson University. Field trial-12C00- Horry Co., SC.

Parker, Roy C., K. Griffith, B. Hinkle, A.W. Dalrymple, B Rogerson. 2000. New use for Harvade 5F (dimethipin) as a post-directed weed control product on cotton. 2000 Proceedings Beltwide Cotton Conferences, Jan. 4 - 8, San Antonio, TX Vol. 1, Pages 652 - 65.

Table 1. Weed control in RR cotton with Harvade mixtures, Tillar, AR - 2000¹.

Name	Rate	14 DAT	
		Pitted	Morningglory
Harvade	0.38 lb ai/A		96.0 ab
Roundup	1.0 lb ai/A		
COC	1.0 pt/A		
Harvade	0.23 lb ai/A		92.0 b
Roundup	1.0 lb ai/A		
COC	1.0 pt/A		
Harvade	0.23 lb ai/A		92.8 b
Roundup	1.0 lb ai/A		
Roundup	1.0 lb ai/A		77.5 c
Harvade	0.23 lb ai/A		99.0 a
MSMA	2.0 lb ai/A		
COC	1.0 pt/A		
Harvade	0.38 lb ai/A		99.0 a
MSMA	2.0 lb ai/A		
COC	1.0 pt/A		
UTC			0.0 d

¹Charlie Guy, G&H Associates, Trial # HARPRG00.

Table 2. Weed control in RR cotton with Harvade mixtures, Tillar, AR - 2000¹.

Name	Rate	28 DAT		
		Pitted Morningglory	Prickly Sida	Hemp Sesbania
Harvade	0.38 lb ai/A	98.8 a	99.0 ab	96.8 a
Roundup	1.0 lb ai/A			
COC	1.0 pt/A			
Harvade	0.23 lb ai/A	92.0 a	97.8 b	92.5 ab
Roundup	1.0 lb ai/A			
COC	1.0 pt/A			
Harvade	0.23 lb ai/A	93.3 a	98.3 ab	97.3 a
Roundup	1.0 lb ai/A			
Roundup	1.0 lb ai/A	82.5 b	95.0 b	86.7 b
Harvade	0.23 lb ai/A	100.0 a	100.0 a	97.5 a
MSMA	2.0 lb ai/A			
COC	1.0 pt/A			
Harvade	0.38 lb ai/A	100.0 a	100.0 a	95.0 a
MSMA	2.0 lb ai/A			
COC	1.0 pt/A			
UTC		0.0 c	0.0 d	0.0 c

¹Charlie Guy, G&H Associates, Trial#HARPRG00.

Table 3. Morningglory control in RR cotton with Harvade mixtures, Attapulgus, GA - 2000¹.

Name	% Control	
	Smallflower	Morningglory
Roundup Ultra		84.0
Roundup + Harvade		92.0
Roundup + Harvade + COC		99.0
Harvade + MSMA + COC		99.0

¹Roundup Ultra 2 pt/A; Harvade 6 oz/A when mixed with RU and 10 oz/A when mixed with MSMA; MAM 2.68 pt/A. Dr. Stanley Culpepper, Univ. of GA, 2000 trial.

Table 4. Compatibility and efficacy of Harvade/graminicide tank mixes, Horry County, SC - 2000¹.

Name	Rate	Digitaria spp.	
		% 14 DAT	% 27 DAT
Fusion	12 oz/A	99.67 a	100.0 a
Harvade	6 oz/A		
COC	1.0 %		
Fusilade DX	12 oz/A	99.67 a	100.0 a
Harvade	6 oz/A		
COC	1.0 %		
Poast Plus	24 oz/A	99.67 a	100.0 a
Harvade	6 oz/A		
COC	1.0 %		
Assure	10 oz/A	99.0 a	100.0 a
Harvade	6 oz/A		
COC	1.0 %		
Select	10 oz/A	100.0 a	100.0 a
Harvade	6 oz/A		
COC	1.0 %		
Harvade	6 oz/A	13.3 b	1.67 b
COC	1.0 %		

¹E. C. Murdock, Clemson University.

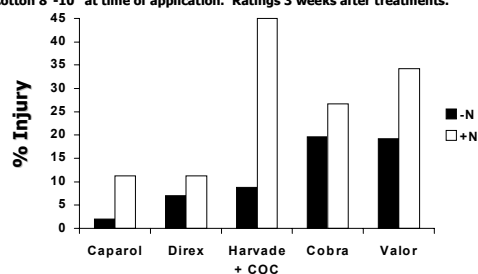
Table 5. Compatibility and efficacy of Harvade/graminicide tank mixes, Horry County, SC – 2000¹.

Name	Rate	Sicklepod	
		% 14 DAT	% 27 DAT
Fusion	12 oz/A	100.0 a	99.67 a
Harvade	6 oz/A		
COC	1.0 %		
Fusilade DX	12 oz/A	99.67 abc	92.67 ab
Harvade	6 oz/A		
COC	1.0 %		
Poast Plus	24 oz/A	88.33 c	86.67 b
Harvade	6 oz/A		
COC	1.0 %		
Assure	10 oz/A	90.00 bc	86.33 b
Harvade	6 oz/A		
COC	1.0 %		
Select	10 oz/A	93.33 abc	91.33 ab
Harvade	6 oz/A		
COC	1.0 %		
Harvade	6 oz/A	90.00 bc	87.50 ab
COC	1.0 %		

¹E. C. Murdock, Clemson University.

Cotton Injury from Directed Herbicides in Water & Water/N Mixtures. Tifton, 2000*

All treatments included MSMA @ 2 lb ai/A. N mixtures were half water and half 30% N. Cotton 8"-10" at time of application. Ratings 3 weeks after treatments.



* Dr. Stanley Culpepper, University of Georgia.

Figure 1. Cotton Injury from directed herbicides in water and water/N mixtures, Tifton, GA, 2000.