



# A unique postemergence broadleaf herbicide for turf

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## Overview

Defendor™ specialty herbicide (common name florasulam) is a postemergence broadleaf herbicide effective in cool temperatures against key annual and perennial weeds in turf, such as white clover, dandelion, chickweed, shepherd's-purse and common groundsel. Defendor comes in a convenient liquid formulation and can be tank-mixed with compatible liquid fertilizers and other products, such as Dimension® 2EW specialty herbicide, to increase the spectrum of control. Additionally, all major species of turfgrass (cool- and warm-season) have shown acceptable tolerance to applications of Defendor.

Defendor is formulated as a 0.42-lb. a.i./gal. soluble concentrate (SC) with a "Caution" signal word. The registered application rate is 0.25 pt./A (0.013 lb. a.i./A) with a maximum of three applications per season. Defendor is effective at extremely low use rates compared with competitive postemergence products, reducing the total herbicide load on the environment.

Defendor™ specialty herbicide is registered by the U.S. Environmental Protection Agency for use on all established turf sites, except golf course putting greens and tees. Individual state registrations are pending.

## Herbicidal features

Defendor is a member of the triazolopyrimidine sulfonanilide class of chemistry, having an acetolactate synthase (ALS) mode of action. Cell division in susceptible weeds is inhibited, resulting in effective control over a two- to four-week period.

Defendor is a systemic, xylem and phloem mobile herbicide that can be absorbed via the leaves, shoots and roots of susceptible broadleaf weeds. Leaves and roots are the primary sites of herbicide uptake. Herbicidal symptoms include immediate growth inhibition, stunting and chlorosis, followed by necrosis and plant death. Size of the target weeds and environmental conditions that slow plant growth and metabolism (extreme cold, drought) will delay the speed of control.

Microbial degradation is the primary route of breakdown in soil. Degradation is rapid with a mean half-life of 14 days. It is weakly absorbed into the soil particles, and because of the rapid degradation, potential movement through soil is very low.

Composting studies conducted with turf treated with Defendor resulted in no visual effects or reduction in shoot weight of sensitive bioassay plant material. When used at recommended application or inclusion rates (up to 50 tons/A) for agricultural uses, compost containing Defendor is not expected to produce observable effects in the most sensitive plant species if composted for at least 60 days, a time period within normal parameters for the compost industry.

## Noteworthy benefits

Defendor™ specialty herbicide will provide turf managers a unique package of desirable performance and other benefits that will complement their current herbicide practices.

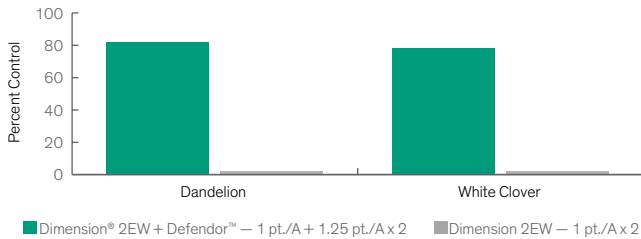
- 1 Applications can be made in conjunction with normal preemergence to early postemergence crabgrass applications of Dimension 2EW. Performance results have documented a minimum of 80 percent control of dandelion and white clover.
- 2 Effective weed control under low temperatures permitting early season broadleaf weed control.
- 3 Decrease in dandelion bloom giving lawn care operators (LCOs) a head start on their broadleaf weed control program, providing more flexibility when scheduling applications.
- 4 Applications made in the fall/winter will provide effective control of winter annual and perennial weeds, such as chickweed, white clover and shepherd's-purse.
- 5 Will complement Dimension 2EW, providing supplemental broadleaf weed control.
- 6 Effective at extremely low use rates compared with competitive postemergence products, thus reducing the total herbicide load on the environment.
- 7 Labeled for use on all key cool- and warm-season turf species.

## Performance

Most lawn care professionals use phenoxy-based herbicides to control broadleaf weeds in the spring, but applications are often ineffective when temperatures are suboptimal. Field studies conducted over the past several years have determined Defendor, when applied in conjunction with Dimension 2EW, provides effective broadleaf weed control. The following field data demonstrates the value of Defendor when applied prior to or at typical preemergence crabgrass timing for a given geography.

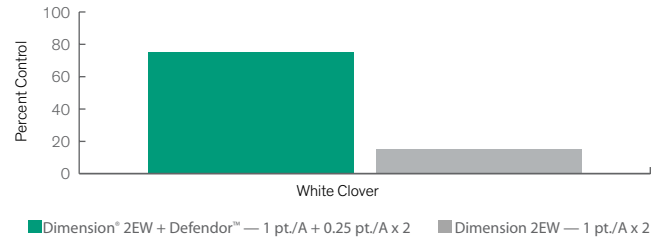
### The Ohio State University 2012

Applications: March 9 and May 3  
Evaluations: 56 DAA2 (days after application 2)



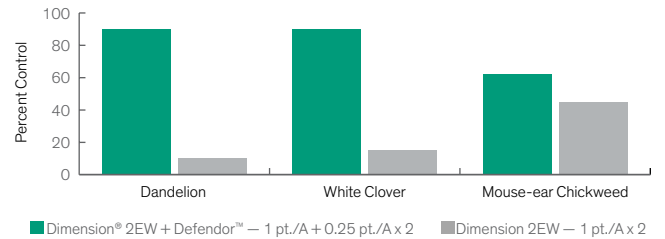
### Virginia Tech 2012 — Site 2

Applications: March 16 and May 4  
Evaluations: 42 DAA2



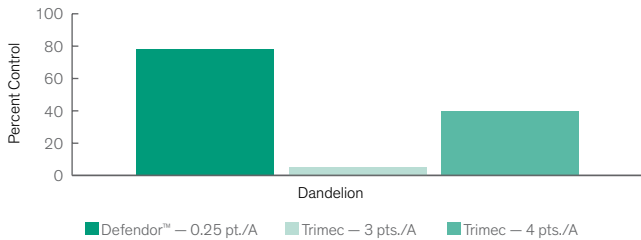
### Rutgers 2012

Applications: March 22 and May 3  
Evaluations: 42 DAA2



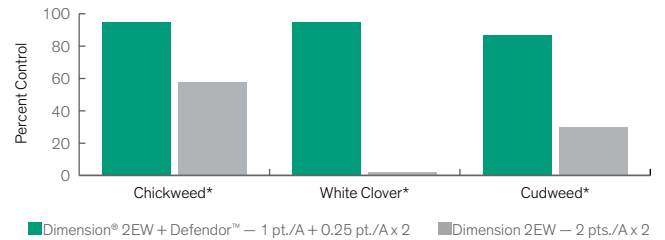
### Purdue University 2011

Application: March 18  
Evaluations: 55 DAA1 (days after application 1)



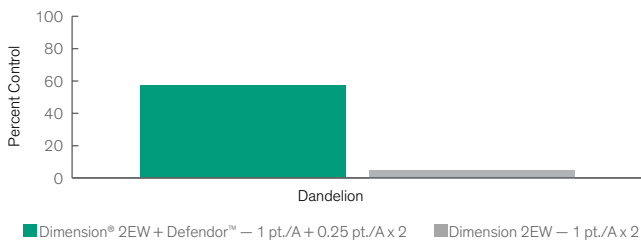
### Auburn University 2012

Applications: Feb. 15 and March 16  
Evaluations: 28 DAA2



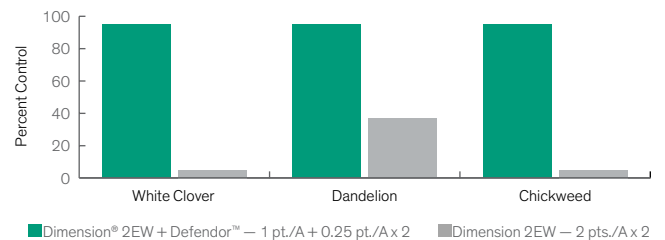
### Penn State University 2012

Applications: March 16 and May 3  
Evaluations: 49 DAA2



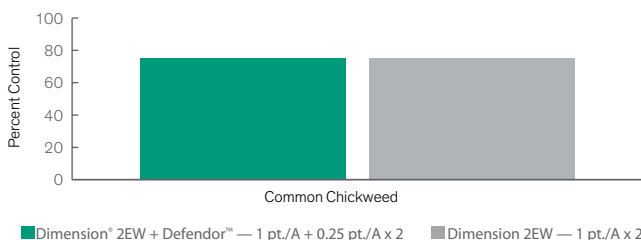
### University of Georgia 2012

Applications: Feb. 13 and March 12  
Evaluations: 28 DAA2



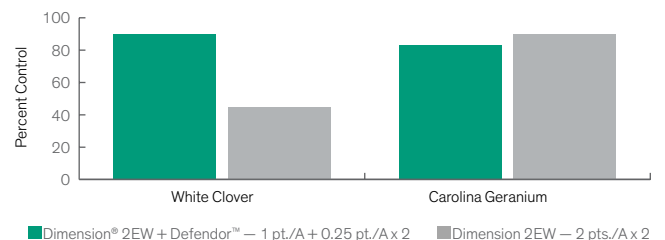
### Virginia Tech 2012 — Site 1

Applications: March 16 and May 4  
Evaluations: 42 DAA2



### North Carolina State University 2012

Applications: Feb. 2 and April 2  
Evaluations: 28 DAA2



\*Chickweed data from southern Alabama; clover and cudweed data from Auburn University.

### Purdue University 2011

Application: March 18

Evaluations: 55 DAA (days after application)



Defendor™  
0.25 pt./A



Trimec  
3 pts./A

### Penn State University 2012

Application: March 16

Evaluations: 58 DAA



Dimension® 2EW + Defendor™  
1 pt./A + 0.25 pt./A



Dimension 2EW  
1 pt./A

### Purdue University 2012

Application: March 16

Evaluations: 17 DAA



Dimension® 2EW + Defendor™  
1 pt./A + 0.25 pt./A



Dimension 2EW  
1 pt./A

### Auburn University 2012

Applications: Feb. 15 and March 16

Evaluations: 55 DAA2



Dimension® 2EW + Defendor™  
1 pt./A + 0.25 pt./A x 2



Untreated

### North Carolina State 2012

Application: Feb. 7 and April 2

Evaluations: 28 DAA2



Dimension® 2EW + Defendor™  
1 pt./A + 0.25 pt./A x 2



Dimension 2EW  
2 pts./A x 2

### University of Georgia 2012

Application: Feb. 13 and March 12

Evaluations: 15 DAA2



Dimension® 2EW + Defendor™  
1.5 pts./A + 0.25 pt./A x 2



Untreated

### Indianapolis Commercial Demonstration 2012



Dimension® 2EW + Defendor™  
1 pt./A + 0.25 pt./A

## Positioning

When it's too cold for other herbicides to be effective, Defendor provides early season control of unsightly dandelions, clover, chickweed and other annual and perennial broadleaf weeds. This postemergence herbicide can be applied at the same time turf professionals make their first fertilizer and preemergence applications of the season.

Defendor™ specialty herbicide comes in a convenient liquid formulation and can be tank-mixed with compatible liquid fertilizers and other products, such as Dimension 2EW, to increase spectrum of control.

## Summary

When temperatures are still cool, Defendor offers turf professionals an easy-to-use, unique and affordable weed control system for difficult-to-control annual and perennial weeds, including dandelion, clover and chickweed. When Defendor is coupled with Dimension® 2EW specialty herbicide, broadleaf weed control and preemergence crabgrass control has never been easier. Defendor gives lawn care professionals a head start on broadleaf weed control and more flexibility when scheduling herbicide applications.



*Solutions for the Growing World*



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T01-900-001 (01/13) BR 010-60837 DATOTURF2001