

## **Matrix Tree and Vine Herbicide - Performance and Crop Safety Update**

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Matrix, (*Rimsulfuron*), from DuPont Crop Protection is not a new herbicide, however it is newly registered (November 2007) for citrus fruit, stone fruit, pome fruit, tree nuts, and grapes. Matrix is a sulfonylurea herbicide with an ALS (acetolactate synthase) inhibitor mode of action. As the only sulfonylurea herbicide now registered on tree and vines it will provide growers with a mode of action chemistry for weed resistance management.

Major attributes of Matrix include:

- Provides broad spectrum pre and post-emergence control of many broadleaf weeds and grasses
- It is extremely effective on flaxleaf fleabane and horseweed
- Provides improved burn down of emerged weeds in combination with Roundup and other contacts
- Applied at a low use rate of 4 oz. product per treated acre
- Can be tank mixed with other residual and contact herbicides
- Has excellent crop safety
- It is non-volatile with no application cutoff date
- There are no groundwater limitations
- Controls Roundup resistant ryegrass and horseweed
- Provides partial control of yellow nutsedge

For best control Matrix should be applied in combination with another pre-emergence herbicide, such as Prowl or Surflan, and include a contact herbicide if emerged weeds are present. When applied winter to early spring (November - February) in a band application at a rate of 4 oz. product per acre and receives ½ inch of rainfall or irrigation within 2 to 3 weeks after application, weeds are controlled 120 to 150 days. The crop should be established at least one full growing season prior to application.

### **Matrix Performance**

Research studies, as well as grower experience, has shown Matrix to provide excellent control of many broadleaf weeds such as flaxleaf fleabane, horseweed, filaree, clovers, common groundsel, henbit, pigweed, mustard, purselane, puncture vine, panicle willowherb, and grasses such as barnyardgrass, crabgrass, green and yellow foxtail, foxtail barley, and ryegrass.

A study conducted in 2008 on nectarines (Table 1) indicated Matrix applied in combination with either Surflan, Prowl, or Chateau with Roundup provided 150 days control of

flaxleaf fleabane, horseweed and barnyardgrass. Dandelion, a perennial, was also being controlled up to 85 percent. In the same study field bindweed was being suppressed up to 150 DAT (days after application).

A study in 2006 in wine grapes (Table 2) indicated the importance of early winter applications. Matrix applied on January 4 was providing 100 percent control of both horseweed and redstem filaree on May 11, (120 DAT) and 78 percent control of yellow nutsedge. But, when applied on April 6, in combination with Goal Tender control of horseweed was only 68 percent, redstem filaree, 57 percent and yellow nutsedge 47 percent.

An additional study on wine grapes in 2006 (Table 3) exhibited Matrix in combination with Rely at 180 days after treatment providing 95 to 100 percent control of panicle willowherb, fluvelin, and sowthistle when applied on December 12. When applied on February 10 control was somewhat reduced (90 to 95 percent), but still providing extremely effective control.

### **Matrix Crop Tolerance and Safety**

One of the biggest advantages of Matrix is its crop safety. Matrix has been extensively tested for crop tolerance. There is excellent crop safety in almonds, pistachios, walnuts, grapes, apples, pears, cherries, peaches, nectarines, plums, and citrus.

Matrix simulated drift and fruit marking studies in 2007 and 2008 indicated crop tolerance and safety (Table 4 & 5). Matrix applied to foliage of fruit trees with young developing fruit from the 4 oz. use rate to rates as low as 0.25 oz., to simulate drift, exhibited slight yellowing of foliage with no visual symptoms to fruit at 21 DAT. Symptoms were slight to negligible with the low simulated drift rates. Plums appeared to be more sensitive than peaches or nectarines with apples being the least affected. At 67 DAT there were no injury symptoms on foliage or fruit of peaches, nectarines, or apples with plums still exhibiting a slight yellowing of foliage with no symptoms or marking on the fruit.

A plant sucker study in 2008 (Table 6) showed slight yellowing of grape and apple suckers at 21 DAT when Matrix was applied at 4 and 8 oz. product. At 43 DAT no symptoms were evident on grape suckers. There were no injury symptoms in the upper canopy of either grapes or apples at both 21 and 43 DAT. When Matrix was applied in combination with Rely, plant suckers were completely burned off.

The only concern in crop safety is with replanting of trees and vines into treated soil. The label states, "Trees or other desirable plants whose roots extend into treated crop use areas may be injured." A study conducted in 2008 (Table 7) indicated the importance of not putting Matrix treated soil into the planting hole. When Matrix treated soil was put into planting holes of almonds, plums, and grapes at 100 days after planting crop growth and development was being

reduced 90 to 95 percent. At 120 to 150 days after planting all crops evaluated in this study were dead.

With little to no concern for crop safety issues, Matrix will provide growers with an additional herbicide with the flexibility of being used as a pre-emergence or post-emergence treatment for the control of many broadleaf weeds and grasses, especially flaxleaf fleabane and horseweed. And as an alternative mode of action chemistry growers will have an additional tool to be used in the development of a weed resistance management program.

**Table 1 Matrix, Nectarine Study, 2008**

Treatments	Rate	Percent Control - 150 DAT				
		Horseweed	Flaxleaf Fleabane	Wild Celery	Dandelion	BYG
Matrix + RU	4 oz + 2 qt	100	100	100	85	97
Matrix + RU + Surflan	4oz + 2qt + 4qt	100	95	100	80	100
Matrix + RU + Prowl	4oz + 2qt + 4qt	97	100	100	75	100
Matrix + RU + Chateau	4oz + 2qt + 12oz	100	95	100	85	95
Matrix + RU + Surflan	2oz + 2qt + 4qt	45	50	50	70	90
Control		0	0	0	0	0

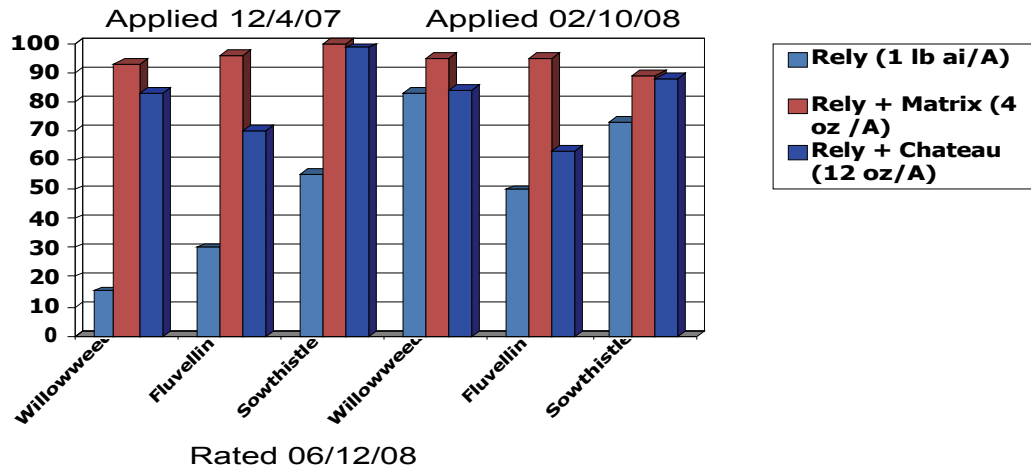
Ron Vargas Consulting LLC, and Terri Oswald & Dave Kelly, DuPont Protection

**Table 2 Matrix Timing for Weed Control in Wine Grapes, Lodi, UCCE 2006**

Treatments	Marestail				Redstem Filaree			Yellow Nutsedge
	Feb 16	Mar 8	Mar 30	May 11	Mar 8	Mar 30	May 11	May 11
Matrix 4 oz Jan 4 (pre)	100	100	100	100	100	100	100	78
Matrix 4 oz + Goaltender Feb 10 (early post)	3	93	100	99	87	93	100	78
Matrix 4 oz + Goaltender Apr 6 (late post)	0	0	0	68	0	0	57	47

Steve Colbert, DuPont Research Development

**Table 3 Matrix on Wine Grapes, 2008**



John Roncoroni, UCCE Napa Co.

**Table 4 Matrix, Drift/Fruit Marking, 2008**

Treatments	Percent Injury, Foliage, 21 DAT				
	Rate Oz	Peach	Nectarine	Plum	Apple
Matrix	4.0	22	27	25	5
Matrix	2.0	20	15	30	10
Matrix	1.0	12	5	25	7
Matrix	0.50	5	10	25	5
Matrix	0.25	2	0	25	5
MSO	1%	0	0	0	0
NIS	0.25%	0	0	0	0
Untreated		0	0	0	0

No injury to fruit of any species

Ron Vargas Consulting, LLC and Terri Oswald & Dave Kelley, DuPont Crop Protection

**Table 5 Matrix, Drift/Fruit Marking, 2008**

Treatments	Percent Injury, Foliage, 67 DAT				
	Rate Oz	Peach	Nectarine	Plum	Apple
Matrix	4.0	2	2	12	0
Matrix	2.0	0	0	8	0
Matrix	1.0	0	0	10	0
Matrix	0.50	0	0	5	0
Matrix	0.25	0	0	7	0
MSO	1%	0	0	0	0
NIS	0.25%	0	0	0	0
Untreated		0	0	0	0

No injury to fruit of any species

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**Table 6 Matrix, Plant Suckers, 2008**

Treatments	Rate	Percent Control		
		21 DAT Grapes	43 DAT Grapes	21 DAT Apples
Matrix	4 oz	30	0	23
Matrix	8 oz	33	0	30
Matrix + Rely	4 oz + 2 qt	80	100	87
Matrix + Rely	8 oz + 2 qt	100	100	83
Control		0	0	0

No injury in upper canopy

Ron Vargas Consulting, LLC and Terri Oswald & Dave Kelley, DuPont Crop Protection

**Table 7 Matrix Plant Back, 2008 - Percent Growth Reduction – 110 DAT/100 DAP**

Treatments	Rate Oz	Almonds	Plums	Grapes
Matrix	4	95	92	90
Matrix	8	85	90	92

All treatments; MSO @ 1%

Ron Vargas Consulting, LLC and Terri Oswald & Dave Kelly, DuPont Crop Protection