

## **'UC Verde' Buffalograss Tolerance to Herbicides**

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Buffalograss has been receiving a lot of attention recently in southern California as a drought tolerant and low maintenance alternative to commonly used turfgrass species such as tall fescue. Thus, more information is needed regarding its tolerance to agrochemicals, especially herbicides. Buffalograss is not a commonly used turfgrass species, thus tolerance and use information may be lacking on herbicide labels. This study was developed to evaluate newer or soon-to-be-released herbicides on 'UC Verde', a vegetatively-propagated cultivar developed by the University of California that is well adapted to southern California.

|                                 |  |
|---------------------------------|--|
| <b>Location:</b>                | UCR Turf Facility  |
| <b>Soil:</b>                    | Hanford fine sandy loam  |
| <b>Experimental Design:</b>     | Completely randomized design with 4 replications   |
| <b>Plot Size:</b>               | 4' by 6'   |
| <b>Species/Cultivars:</b>       | Mature stand of 'UC Verde' buffalograss established from plugs in July 2010  |
| <b>Application Information:</b> | CO <sub>2</sub> backpack sprayer<br>TeeJet 8002VS nozzles<br>9-inch nozzle spacing<br>12-inch boom height<br>Speed 2.4 mph<br>Output: 40 GPA<br>Pressure: 20 psi @ ank |
| <b>Application Timing:</b>      | A: 12 July 2011<br>B: 1 September 2011   |
| <b>Fertility:</b>               | 4.0 lbs N/1000 ft <sup>2</sup> /year   |
| <b>Mowing Height:</b>           | 2 inches   |

|                            |   |
|----------------------------|---|
| <b>Irrigation Regimes:</b> | Warm-season historic $K_c$ : $(ET_o * K_c) / DU$  |
| <b>Data Collection:</b>    | Total plot turf quality, percent weed tissue cover by species, and NDVI.  |
| <b>Acknowledgments:</b>    | Thank you to: Florasource, LTD for donating the plant material; Arysta LifeScience, Moghu Research Center, BASF, PBI Gordon, Syngenta, and DuPont for their support |

### **Results:**

- ✓ Weed pressure was sporadic, therefore the focus of this study was on buffalograss tolerance to the herbicides.
- ✓ In general, all of the herbicides tested exhibited some degree of safety on UC Verde, ranging from excellent to injury at high or exaggerated rates. High rates of amicarbazone and Imprelis caused the most significant injury; however, turf eventually recovered. Application(s) of either herbicide at 3 oz/A or less would be advised from the standpoint of buffalograss safety.
- ✓ Application of the higher rate of Tenacity resulted in bleaching of buffalograss leaves within 1-2 weeks after application. This symptom is characteristic of the mode of action, and was short-lived.
- ✓ Turf injury may have resulted, in part, to high daytime temperatures around the time of applications in July and September. Hence, this study could be considered as a worse case scenario in terms of evaluating herbicides for potential buffalograss injury.

**Buffalograss Herbicide Tolerance Plot Map**

**Plot Size: 4 ft x 6 ft**

North

|    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 17 | 21 | 23 |
| 9  | 17 | 13 | 6  | 19 | 7  | 10 | 4  | 2  | 21 | 18 | 15 | 16 |
| 17 | 7  | 12 | 1  | 9  | 14 | 4  | 3  | 21 | 11 | 23 | 5  | 22 |
| 15 | 5  | 3  | 12 | 4  | 7  | 6  | 11 | 9  | 15 | 6  | 22 | 20 |
| 10 | 13 | 18 | 10 | 13 | 2  | 16 | 1  | 12 | 8  | 20 | 1  | 18 |
| 14 | 2  | 20 | 5  | 8  | 11 | 14 | 8  | 19 | 3  | 22 | 19 | 16 |

Table 1. Buffalograss quality (1-9, 9 = best) following application of herbicides. Riverside, CA.

| Trt | Product                                 | Rate      | 7 DAIT     | 14 DAIT    | 28 DAIT    | 49 DAIT    | 58 DAIT    |
|-----|---|-----------|------------|------------|------------|------------|------------|
| 1   | Control                                 | --        | 6.0 a      | 6.0 a      | 6.0 ab     | 6.8 ab     | 7.0 a      |
| 2   | Amicarbazone                            | 3 oz/A    | 6.0 a      | 6.0 a      | 6.0 ab     | 6.8 ab     | 7.0 a      |
| 3   | Amicarbazone                            | 6 oz/A    | 5.0 b      | 4.8 b      | 5.2 cd     | 6.8 ab     | 6.5 abc    |
| 4   | Amicarbazone <sup>a</sup>               | 9 oz/A    | 4.2 c      | 3.0 cd     | 5.0 de     | 6.0 a-d    | 7.0 a      |
| 5   | Methiozolin                             | 2.8 oz/M  | 6.0 a      | 5.8 a      | 6.0 ab     | 6.2 a-d    | 6.0 cd     |
| 6   | Methiozolin                             | 4.2 oz/M  | 6.0 a      | 5.8 a      | 6.0 ab     | 6.8 ab     | 6.5 abc    |
| 7   | Tower                                   | 32 oz/A   | 6.0 a      | 6.0 a      | 6.0 ab     | 6.0 a-d    | 6.8 ab     |
| 7   | Pendulum AC                             | 48 oz/A   |            |            |            |            |            |
| 8   | Katana                                  | 3 oz/A    | 5.8 a      | 5.8 a      | 6.0 ab     | 7.0 a      | 6.8 ab     |
| 9   | Tower                                   | 21 oz/A   | 6.0 a      | 6.0 a      | 6.0 ab     | 6.8 ab     | 7.0 a      |
| 10  | Tower <sup>b</sup>                      | 21 oz/A   | 5.8 a      | 5.8 a      | 5.2 cd     | 5.2 b-e    | 6.8 ab     |
| 11  | Tower                                   | 32 oz/A   | 6.0 a      | 6.0 a      | 6.0 ab     | 7.0 a      | 7.0 a      |
| 12  | Tower <sup>b</sup>                      | 32 oz/A   | 6.0 a      | 6.0 a      | 6.0 ab     | 6.0 a-d    | 6.8 ab     |
| 13  | Tenacity 4SC                            | 8 oz/A    | 5.8 a      | 6.0 a      | 5.8 bc     | 6.5 abc    | 6.2 abc    |
| 14  | Tenacity 4SC                            | 16 oz/A   | 5.2 b      | 6.0 a      | 6.0 ab     | 6.8 ab     | 4.0 h      |
| 15  | Monument                                | 10 g/A    | 6.0 a      | 6.0 a      | 6.0 ab     | 7.0 a      | 7.0 a      |
| 16  | Monument                                | 20 g/A    | 6.0 a      | 6.0 a      | 6.5 a      | 7.0 a      | 7.0 a      |
| 17  | Tenacity 4SC                            | 8 oz/A    | 6.0 a      | 6.0 a      | 6.0 ab     | 6.8 ab     | 7.0 a      |
| 17  | Monument                                | 10 g/A    |            |            |            |            |            |
| 18  | Imprelis                                | 1.5 oz/A  | 5.0 b      | 5.5 a      | 5.8 bc     | 5.5 a-e    | 6.0 cd     |
| 19  | Imprelis                                | 3.0 oz/A  | 5.0 b      | 4.5 b      | 5.0 de     | 5.8 a-e    | 5.5 de     |
| 20  | Imprelis                                | 4.5 oz/A  | 4.0 cd     | 4.8 b      | 4.5 e      | 5.0 cde    | 4.8 fg     |
| 21  | Imprelis                                | 6.0 oz/A  | 3.8 d      | 3.2 c      | 3.8 f      | 4.8 def    | 4.8 fg     |
| 22  | Imprelis <sup>a</sup>                   | 9.0 oz/A  | 2.8 e      | 2.5 de     | 3.0 g      | 4.2 ef     | 5.2 ef     |
| 23  | Imprelis <sup>a</sup>                   | 12.0 oz/A | 2.0 f      | 2.0 e      | 2.0 h      | 3.0 f      | 4.3 gh     |
|     | <b>LSD (<math>\alpha = 0.05</math>)</b> | --        | <b>0.5</b> | <b>0.6</b> | <b>0.6</b> | <b>1.7</b> | <b>0.5</b> |

Treatment means followed by the same letter are not significantly different ( $\alpha = 0.05$ ).

<sup>a</sup>Treatment applied only once on 12 July 2011. Other treatments repeated on 1 September 2011. DAIT = Day after initial treatment. 58 DAIT = 8 days after second application.

<sup>b</sup>Spray output = 80 GPA; all other treatments = 40 GPA.

Table 2. NDVI on buffalograss following application of herbicides. Riverside, CA.

| Trt | Product                                 | Rate      | 7 DAIT      | 14 DAIT     | 28 DAIT     | 49 DAIT   | 58 DAIT     |
|-----|---|-----------|-------------|-------------|-------------|-----------|-------------|
| 1   | Control                                 | --        | 0.70 a      | 0.60 ab     | 0.59 ab     | 0.76      | 0.83 abc    |
| 2   | Amicarbazone                            | 3 oz/A    | 0.67 a-e    | 0.59 a-d    | 0.61 a      | 0.76      | 0.82 abc    |
| 3   | Amicarbazone                            | 6 oz/A    | 0.66 b-e    | 0.58 a-e    | 0.54 b-e    | 0.74      | 0.82 a-d    |
| 4   | Amicarbazone <sup>a</sup>               | 9 oz/A    | 0.65 c-f    | 0.54 cde    | 0.54 b-e    | 0.73      | 0.84 a      |
| 5   | Methiozolin                             | 2.8 oz/M  | 0.68 abc    | 0.61 a      | 0.58 abc    | 0.74      | 0.82 abc    |
| 6   | Methiozolin                             | 4.2 oz/M  | 0.68 a-e    | 0.58 a-e    | 0.59 ab     | 0.76      | 0.82 a-d    |
| 7   | Tower                                   | 32 oz/A   | 0.68 a-e    | 0.59 a-d    | 0.57 a-d    | 0.74      | 0.82 a-e    |
| 7   | Pendulum AC                             | 48 oz/A   |             |             |             |           |             |
| 8   | Katana                                  | 3 oz/A    | 0.64 efg    | 0.60 ab     | 0.61 a      | 0.78      | 0.80 cde    |
| 9   | Tower                                   | 21 oz/A   | 0.67 a-e    | 0.60 ab     | 0.58 ab     | 0.76      | 0.82 abc    |
| 10  | Tower <sup>b</sup>                      | 21 oz/A   | 0.64 efg    | 0.55 b-e    | 0.54 b-e    | 0.69      | 0.81 b-e    |
| 11  | Tower                                   | 32 oz/A   | 0.68 a-d    | 0.62 a      | 0.61 a      | 0.77      | 0.82 abc    |
| 12  | Tower <sup>b</sup>                      | 32 oz/A   | 0.68 abc    | 0.58 a-e    | 0.57 abc    | 0.73      | 0.82 a-d    |
| 13  | Tenacity 4SC                            | 8 oz/A    | 0.69 ab     | 0.60 abc    | 0.58 abc    | 0.75      | 0.82 abc    |
| 14  | Tenacity 4SC                            | 16 oz/A   | 0.68 a-e    | 0.62 a      | 0.57 a-d    | 0.75      | 0.77 fg     |
| 15  | Monument                                | 10 g/A    | 0.69 ab     | 0.62 a      | 0.59 ab     | 0.74      | 0.82 abc    |
| 16  | Monument                                | 20 g/A    | 0.68 abc    | 0.63 a      | 0.60 a      | 0.79      | 0.83 abc    |
| 17  | Tenacity 4SC                            | 8 oz/A    | 0.69 abc    | 0.60 ab     | 0.56 a-d    | 0.76      | 0.84 ab     |
| 17  | Monument                                | 10 g/A    |             |             |             |           |             |
| 18  | Imprelis                                | 1.5 oz/A  | 0.64 d-g    | 0.58 a-e    | 0.57 a-d    | 0.70      | 0.82 a-e    |
| 19  | Imprelis                                | 3.0 oz/A  | 0.60 g      | 0.53 ef     | 0.52 de     | 0.72      | 0.79 def    |
| 20  | Imprelis                                | 4.5 oz/A  | 0.60 g      | 0.54 cde    | 0.53 cde    | 0.71      | 0.77 fg     |
| 21  | Imprelis                                | 6.0 oz/A  | 0.61 fg     | 0.54 de     | 0.51 ef     | 0.69      | 0.75 g      |
| 22  | Imprelis <sup>a</sup>                   | 9.0 oz/A  | 0.56 h      | 0.48 fg     | 0.47 fg     | 0.71      | 0.82 abc    |
| 23  | Imprelis <sup>a</sup>                   | 12.0 oz/A | 0.54 h      | 0.46 g      | 0.42 g      | 0.65      | 0.78 ef     |
|     | <b>LSD (<math>\alpha = 0.05</math>)</b> | --        | <b>0.04</b> | <b>0.06</b> | <b>0.05</b> | <b>NS</b> | <b>0.03</b> |

Treatment means followed by the same letter are not significantly different ( $\alpha = 0.05$ ).  
NS = Not significant.

<sup>a</sup>Treatment applied only once on 12 July 2011. Other treatments repeated on 1 September 2011. DAIT = Day after initial treatment. 58 DAIT = 8 days after second application.

<sup>b</sup>Spray output = 80 GPA; all other treatments = 40 GPA

Table 3. Herbicides tested in the buffalograss tolerance study.

| <b>Product</b>    | <b>Manufacturer</b>   | <b>Common Name(s)</b> | <b>Notes</b>   |
|-------------------|-----------------------|-----------------------|--|
| Monument          | Syngenta              | Trifloxysulfuron      | Sulfonylurea; broadleaf and sedge control; transition herbicide  |
| Tenacity          | Syngenta              | Mesotrione            | Based on a naturally occurring compound secreted by the Callistemon (bottlebrush) plant. Inhibits carotenoid biosynthesis, causing bleaching. Pre and post activity in most cool-season turf except bentgrass; CA registration pending in 2012 |
| Amicarbazone      | Arysta LifeScience    | Amicarbazone          | New triazolinone herbicide with pre and post grass and broadleaf activity in warm- and cool-season turf; U.S. turf registration pending in 2012  |
| Methiozolin       | Moghu Research Center | Methiozolin           | New isoxazolinone herbicide for pre and post control of <i>Poa annua</i> and <i>Poa trivialis</i> in most warm- and cool-season turf   |
| Tower             | BASF                  | Dimethenamid          | Preemergence control of broadleaf, grass, and sedge weeds; CA turf registration pending in 2012  |
| Pendulum Aqua Cap | BASF                  | Pendimethalin         | Dinitroaniline preemergence herbicide  |
| Imprelis          | DuPont                | aminocyclopyrachlor   | Broad spectrum broadleaf control; CA registration pending  |
| Katana            | PBI Gordon            | Flazasulfuron         | Sulfonylurea; broadleaf and sedge control; transition herbicide; not currently registered in CA  |