

**Efficacy of Iron Chelate  
Herbicide for Broadleaf Weed Control in Turf  
2009**

P. Charbonneau, Ontario Ministry of Agriculture, Food and Rural Affairs

**Objective**

To evaluate the efficacy of fall applied iron chelate for control of broadleaf weeds in turf.

**Experimental Design/Methods**

Plots were located in a turf research area at the Guelph Turfgrass Institute, Guelph, ON. The site is an area of established turf (a mixture of Kentucky bluegrass and turf-type perennial ryegrass infested with dandelions, black medick, narrow-leaved plantain and other lawn weeds). Turf was maintained as a low maintenance turf with weekly mowing at 6 cm, no supplemental irrigation and fertilized once a year with 0.5 kg N/100m<sup>2</sup>.

The treatments were three different rates of Fiesta™ (active ingredient iron in the form of FeHEDTA, 4.43%) Neudorff Canada, Par III (a commercially available three way broadleaf herbicide consisting of 2,4 D, mecoprop and dicamba) applied at label rate and a weedy check for a total of five treatments (see Table 1). Fiesta™ was diluted with one rate (1 part Fiesta™ with 24 parts of water and the diluted product was applied at 3 different volumes). The volumes of diluted product were 200mL/m<sup>2</sup>, 400mL/m<sup>2</sup> and 800mL/m<sup>2</sup>. Each treatment was replicated four times in 2 x 2 m plots in a randomized complete block design. Percent cover of each weed species (dandelion, black medick, narrow-leaved plantain, clover and mouse-eared chickweed) was recorded in each plot at 7, 20 and 34 and 203 days after treatment on Oct. 16, 2009, Oct. 29, 2009, Nov. 13, 2009 and April 30, 2010 respectively. All measurements were analysed by the appropriate statistical analyses.

**Table 1. Treatments**

Treatment	Active Ingredient Rate (mL/m <sup>2</sup> )	Product Rate (mL/m <sup>2</sup> )
1. Weedy check		
2. Par III (2,4 D, mecoprop and dicamba)	0.55 mL	0.55mL/30mL water
3. Fiesta™ (lowest label rate)	8.6 mL	200 mL*
4. Fiesta™ (highest label rate)	17.2 mL	400 mL *
5. Fiesta™ (2 times the highest label rate)	34.4 mL	800 mL*

\* Volume of 1 part Fiesta™/24 parts water mixture/m<sup>2</sup>

**Application of the Treatments:**

The 200mL/m<sup>2</sup>, 400 mL/m<sup>2</sup> rates of Fiesta™ and Par III were applied using a CO<sub>2</sub>-powered bicycle sprayer at 20 psi. The 800 mL/m<sup>2</sup> of 1 part Fiesta™/24 parts water was applied using a standard 4L watering can. All treatments were applied on Oct. 9, 2009.

**Efficacy Assessments**

Efficacy assessments were made Oct. 16, 2009, Oct. 29, 2009, Nov. 13, 2009 and April 30, 2010 at 7, 20, 34 and 203 days after treatment (DAT). Four randomized point quadrats measuring 60 cm x 60 cm with 25 points in each quadrat (points 10 cm apart) for a total of 100 points in each plot were used to record estimated percent broadleaf weed cover of dandelion, black medick, narrow-leaved plantain, broad-leaved plantain, clover and chickweed per plot at each assessment date. Weed cover of each of the weed species previously mentioned was also measured prior to the start of the experiment on Oct. 5, 2009. Only data on percent dandelion, percent narrow-leaved plantain and black medick will be presented below. The

percentages of broad-leaved plantain, clover and chickweed were too low to give significant differences and will not be presented in this report.

## **Results and Discussion**

### **Visual observations**

Visual observations made within 24 hours of applying Fiesta™ showed that the turf responded to the iron by greening up. This green up lasted the entire duration of the experiment, including at the final rating on April 30, 2010. Within 24 hours of applying Fiesta™, the leaves of dandelions and black medick turned black and within 48 hours the leaves appeared brown and shriveled (Figure 1). The lower leaves of narrow-leaved plantain turned black within 48 hours but the smaller newer leaves at the centre of the rosette remained green and healthy (Figure 2).

### **Dandelion**

For dandelions, all rates of Fiesta™ reduced the % dandelion cover to < 1% by Oct. 16, 2009 (Figure 3). All the Fiesta™ rates were not significantly different from each other but were significantly better than the weedy check and the Par III at reducing % dandelion cover. By Oct. 29, 2009, the % dandelion cover increased to 2.25, 2.75 and 3.5 % for the 200 mL, 400 mL and the 800 mL Fiesta™ rates respectively, but these rates were not significantly different from one another or from Par III, but they were significantly better than the weedy check.

By Spring 2010 there were no significant differences in % dandelion cover between the weedy check or any of the Fiesta™ rates showing almost 100% re-growth of the dandelions. The only plots with significantly fewer dandelions in the spring were the Par III treated plots.

### **Black Medick**

The % black medick cover was also less than 1% for all of the rates of Fiesta™ by Oct. 16, 2009 (Figure 4) and all the Fiesta™ treated plots were significantly better than the Par III at that date. The % black medick cover had increased by Oct. 29, 2009 to 5.75, 1.25 and 2.75 for the 200 mL, 400 mL and 800 mL rates of Fiesta™ respectively. The % black medick of the 400 mL rate was significantly lower than the 200 mL rate but not significantly different than the 800 mL rate of Fiesta™ rates for that date. There was significant re-growth of the black medick also. The most significant re-growth was at the 800 mL and the 200 mL rate. This is probably an interaction between the application method and the application rate. The 200 mL rate was the lowest rate and was applied with the pressurized bicycle sprayer with good coverage. The highest rate had more product applied by it was applied with a watering can and the coverage was not as good. By Nov. 13, 2009, there was significant re-growth with the 200 mL rate. The other Fiesta™ rates (400 mL and 800 mL) had less re-growth and did not differ significantly from each other.

By spring 2010, the % black medick cover of all the Fiesta plots had increased. The 200 mL and 400 mL rate were not significantly better than the control but the 800 mL rate was significantly better than the weedy check with 5% black medick coverage.

### **Narrow-leaved Plantain**

The effect of Fiesta™ on narrow-leaved plantain was slower than for dandelions and black medick. At the last rating in the fall (Nov. 13, 2009), all of the Fiesta™ treatments and Par II were significantly better than the control. By the spring, the % narrow-leaved plantain in all the plots, including the weedy check was down from the start of the experiment, so there is something about the growth habit of narrow-leaved plantain. It is at its largest in the fall and plants are smaller the following spring, regardless of whether they have been treated with Fiesta™ or Par III. At the spring rating there was no herbicide effect due to either Fiesta™ or Par III.



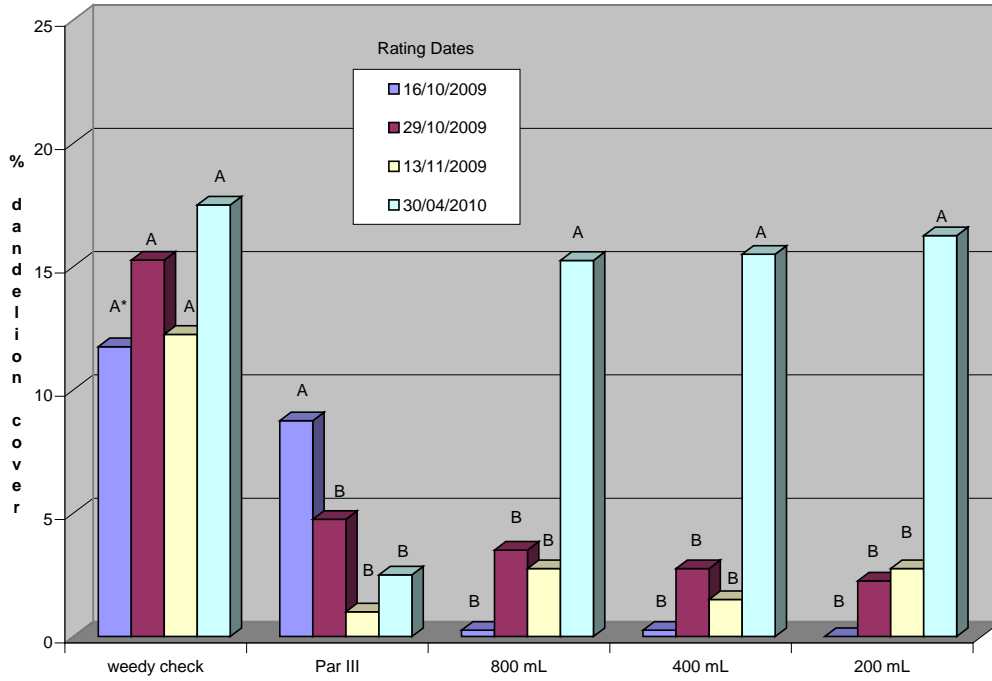
**Figure 1. Brown dandelion leaves 48 hours after Fiesta application**



**Figure 2. Blacken leaves of narrow-leaf plantain 48 hours after treatment with Fiesta™**

**Figure 3. Fiesta™ Efficacy on Dandelions**

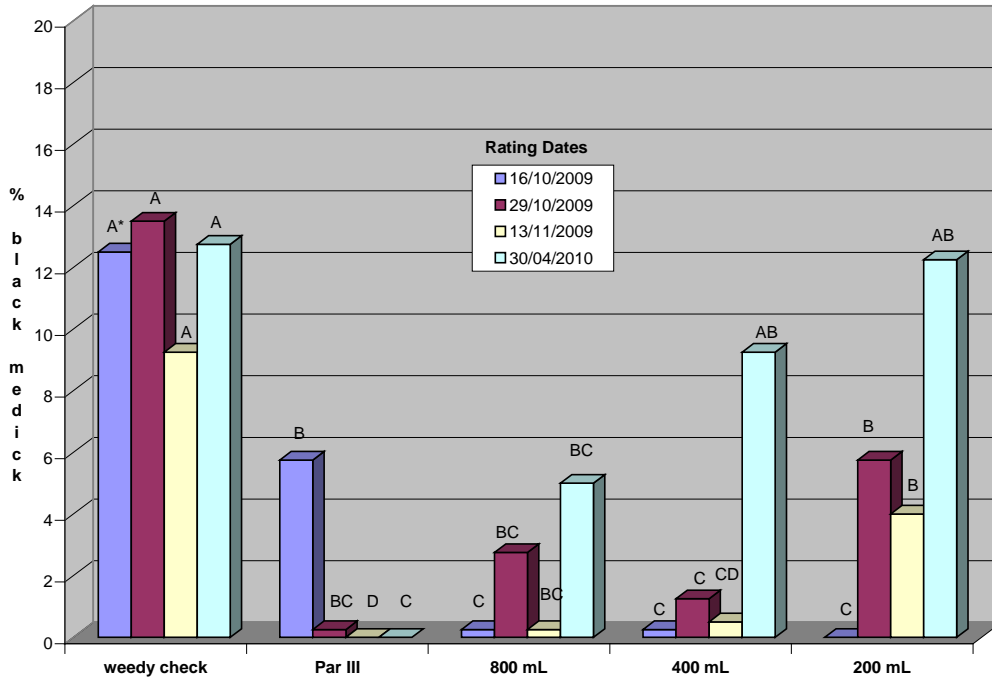
**Percent Dandelion Cover**



A\* - Bars of the same colour with different letters on top signify significant treatment differences.

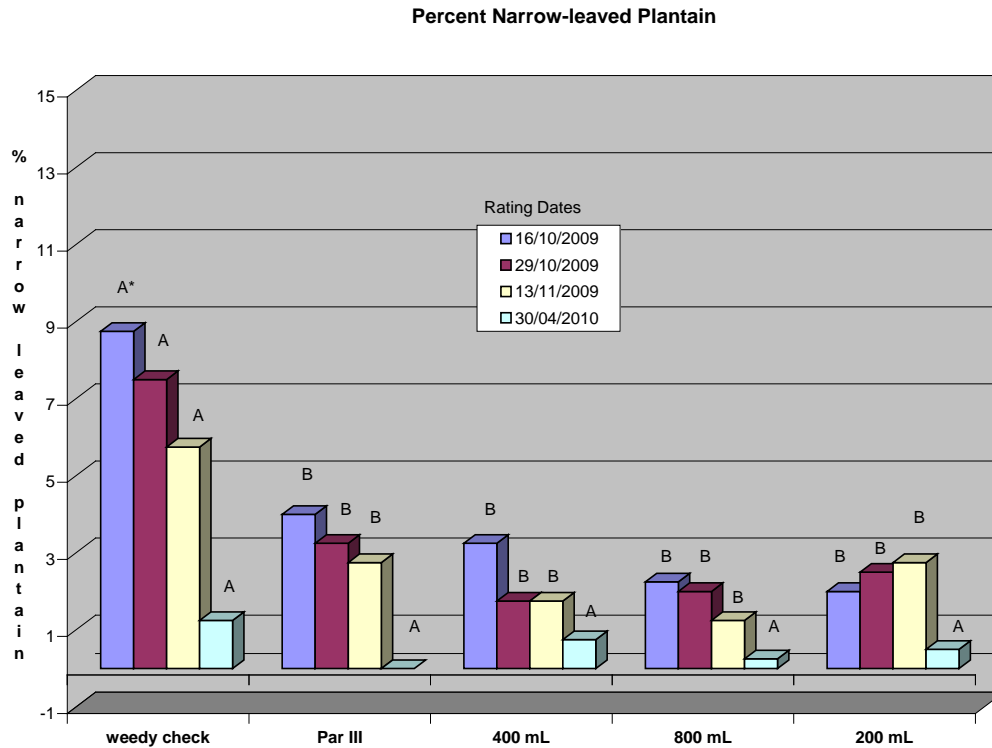
**Figure 4. Fiesta™ Efficacy on Black Medick**

**Percent Black Medick**



A\* - Bars of the same colour with different letters on top signify significant treatment differences.

**Figure 5. Fiesta™ Efficacy on Narrow-leaved Plantain**



A\* - Bars of the same colour with different letters on top signify significant treatment differences.

### Conclusions

The new broadleaf herbicide Fiesta™ (active ingredient iron in the form of FeHEDTA, 4.43%) provides a very quick defoliation of dandelion and black medick in a mixed stand with turf at all rates applied in this experiment. When applied as a broadcast application it also results in the greening up of the turf. All of the Fiesta™ rates showed some re-growth of dandelions regardless of which of the rates were used (200 mL, 400 mL or 800 mL). By the following spring the % dandelion cover was back up to the same level as at the beginning of the experiment for all of the Fiesta™ rates used in this trial. The Fiesta™ label does state that you can “repeat once in 4 or more weeks”. In this experiment, Fiesta™ was not re-applied because the application in early October did not allow time for a re-application before the onset of winter.

The re-growth of black medick was significantly higher by the last rating date in 2009 for the 200 mL rate. By the following spring, only the 800 mL rate had lower % black medick cover than the weedy check. The 200 and 400 mL rates had re-growth equal to the weedy check. Again, the second application that is allowed on the label at 4 or more weeks after the first was not applied, so this experiment does not shed any light on how well the Fiesta™ would work at controlling black medick with 2 applications 4 weeks apart.

The situation with the narrow-leaved plantain was a bit different than the dandelion or black medick. The Fiesta™ did not result in a quick defoliation. Instead, the % narrow-leaved plantain cover decreased at each rating date for all of the Fiesta™ rates and decreased more quickly than in the plots treated with Par III. By the spring, the % narrow-leaved plantain was almost completely gone from all of the plots,

including the weedy check. This indicates that the growth habit of the narrow-leaved plantain is such that it is slow to re-grow in the spring regardless of whether it has been treated with a herbicide or not. Again, a second application was not applied and the results may be quite different with a second application.

More trials are underway at the Guelph Turfgrass Institute on Fiesta™ rates, timing (spring applied vs. fall applied) and with and without re-application. There are also trials underway that follow tagged individual weeds (dandelions, black medick, narrow-leaved plantain, broad-leaved plantain and clover) that have been treated with Fiesta™ to evaluate re-growth. By the end of the 2010 season we should have a much clearer idea of how well this product works.

#### **Acknowledgements**

Cameron Wilson, Neudorff Canada for supplying the Fiesta™