

**Iron-Based Herbicides:
Alternative Materials for Weed Control
in Landscapes and Lawns
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Some broadleaf weeds in a lawn or landscape may be considered undesirable or competitive to desired species of turfgrass or plants we want to grow. Few alternatives exist to using the chemical herbicide 2,4-D and its allies to reduce broadleaf weeds in turfgrass or glyphosphate in landscapes. This factsheet examines the use of iron-based products. Currently, there are approximately five commercial products registered by the EPA's Biopesticide Division and labeled for broadleaf weed control. Demand will likely result in additional iron-based herbicides being brought onto the market. These selective, broadleaf herbicides contain the active ingredient chelated iron. Fundamentally, these iron (Fe) products are similar to liquid products that treat micronutrient deficiencies in plants and are considered mineral based materials. This form of iron (Fe) is bound to a chelating agent (e.g. HEDTA or (hydroxyethylenediaminetriacetic acid) that keeps it soluble and readily available for plant uptake, causing iron oxidation. A 26.5% FeHEDTA product is 4.43% actual iron. Since broadleaf weeds absorb FeHEDTA more easily and in higher quantities than turf, weeds are impacted almost instantly while the turf remains unharmed. Iron oxidation causes plant necrosis causing the weed to quickly dry up, turn black, shrivel, and die within hours of application.

FeHEDTA is applied to actively growing small weeds in lawns in the spring or in the fall when temperatures are cool, and there is ample moisture. Treatments should be reapplied 4 weeks after the first application for long term control with up to four applications per year. A darkening of turfgrass leaf blades can occur after treatment. However, the grass will generally recover within a few days to a week. Labels on commercially available products suggest low, medium and high rates for controlling or suppressing specific weeds. Medium and higher rates are more likely to cause discoloration of cool season turfgrass. Most iron materials have been tested on turf-type tall fescues, perennial ryegrass and bluegrass species. Limited tests at the University of Maryland turfgrass plots have been conducted on these cool season species of turfgrass and found to cause no detectable long term impact on the health of the turfgrass after one year of application. Testing needs to be conducted on warm season grasses such as Bermuda and zoysia. Labels have precautions against use on bentgrass species. This FeHEDTA is labeled for lawns,

turf (right of way/non-crop areas), golf courses, parks, playgrounds, cemeteries, and athletic fields, patios, driveways, sidewalks and flower beds.

The FeHEDTA label application rate is dependent upon the weed to be controlled. Not all weeds have been tested to determine if the iron is effective at various rates. It is suggested that an application not be made before heavy rainfall incidences. The low rate allegedly controls black medic, slender speedwell, wild geranium, and moss. The middle rate controls dandelion, English daisy, false dandelion, white clover, bull thistle, Canada thistle, common chickweed, creeping charley (ground ivy), false dandelion, narrow-leaved plantain, dove-foot geranium, lawn burweed, and oxalis, as well as algae and lichens. The high rate is for harder to control weeds (e.g. broadleaved plantain and creeping buttercup). FeHEDTA also purportedly suppresses turf diseases such as dollar spot, rust, and snow mold. It is necessary to thoroughly wet the weed surface to the point of runoff. At the University of Maryland turfgrass plots fall applications are being compared to spring applications to determine if spring or fall is the best time to apply iron for broadleaf weed control.

Read the label for product limits. For example, commercial brand name products such as Iron X and Fiesta are labeled as being safe to use on new lawns. These labels state that lawns may be re-sown within one day of treatment. The EcoSense label suggests to not use its formulation on newly seeded lawns. All products except for EcoSense perform best in cooler weather (50-70 °F) and should not be applied when the daytime temperature will exceed 80 °F due to discoloration of desirable turf (Gardner, OSU, 2011). Although these products are mineral based, there are still precautions when handling them. The labels precautions that it can causes slight eye irritation. They suggest to avoid contact with eyes. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum or using tobacco. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

RESEARCH SUMMARY

Research using Fiesta in Ohio (Gardner 2012¹) showed that 3 applications (8% Fiesta solution) applied at 2.5 gallons per 1,000 square feet at 21-day intervals has resulted in excellent, rapid control of dandelion, white clover and ground ivy --and good control of broadleaf plantain-- for up to 70 days. They also found that 3 applications every 21 days in the spring provided better long-term control than 2 applications in the fall followed by 2 applications in the spring (this would be more cost-effective as well). For season-long weed control, the total amount of Fiesta applied over a season is at least as important as the schedule of the applications.

A Cornell study (Chinery et. Al., 2012) found that the effect of Fiesta varied by weed species, with henbit, ajuga, white clover, oxalis and motherwort controlled by one application, while ground ivy was controlled in 1-2 applications and other weed species (Plantain,mugwort,

Pennsylvania smartweed) required 3 applications for even partial control. Dandelion recovery was complete. Applications were made June through October.²

In Canada, where alternative products to traditional herbicides have been in use since 2009, a 2009 Guelph Turfgrass Institute study found that 3 blanket applications of Fiesta at 100 mL/m² (3.38 oz/1.2 yd²) applied 3 weeks apart resulted in turf that was 95% weed-free. More recent research conducted at the Guelph Turfgrass Institute indicated that there may be some re-growth from the root of certain weeds, suggesting that repeated applications as needed may eventually weaken the plant and result in complete eradication of the weeds. The label states no more than 4 applications per year.³

PROS (+)

- For lawns consisting of one or more of turfgrass species: Kentucky bluegrass, perennial ryegrass, and fescue. Do not apply to bentgrass.
- Visible results within hours of application.
- Desirable turfgrass has darker green color.
- People and pets can enter treated area when spray dries.
- Works in cool weather as well (down to 50 °F).
- No unpleasant odor.
- Easily mixed in a backpack sprayer for spot spraying weeds.
- Up to 4 applications per year in the same spot. Repeat applications can be made after 3 to 4 weeks.

CONS (-)

- Repeat treatment necessary in 3 to 4 weeks for best commercial results. Do not apply to the same area more than 4 times a year.
- Turf may darken slightly with application but will return to normal green color within days, depending on the label rate used, although results are dependent on weather conditions. Potentially some turf thinning may occur on KBG/PR.
- May stain thatch. Staining of hard surfaces may occur, such as light colored or white concrete.
- Any desirable plants or structures accidentally contacted during application should be rinsed with water. To avoid staining, wait until treated area dries before re-entry.
- Do not apply to drought stressed turf.
- Do not apply if rainfall is expected within 3 hours after application.
- Do not apply when the daytime temperature will exceed 85 °F. Fiesta can be applied down to 50 °F.
- Do not apply to bentgrass.

- Check product label for use on new lawns (Fiesta, Iron-X – use w/in one day of treatment; EcoSense -Apply to established turf only.
- May be corrosive to metal parts on sprayers.
- Causes eye irritation. Avoid contact with eyes, skin, and clothing. Inhalation may aggravate asthma.
- Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals (Fiesta label: “Potential skin sensitizer”). May aggravate pre-existing dermatitis or sores.

PRODUCTS

EcoSense Selected Lawn Weed Killer, 1.5% Chelated Iron (Scotts) 24 oz RTU \$26.67 (NOTE: Scotts® EcoSense® Weed B Gon® = available only in Canada)

Fiesta 26.5% FeHEDTA (Engage Agro/ Neudorff North America). 1gal \$83.43 (new label 2012: 1 gallon with lower rate now treats up to 10,800 ft²).

Iron X!TM Selective Weed Killer. 26.5% FeHEDTA (Gardens Alive, Gurney’s) 16 oz = \$34.95

Ortho Elementals Lawn Weed Killer, 1.5% FeHEDTA , (Ortho/Scotts) 24 oz RTU \$22.80

Whitney Farms Ready-to-Use Lawn Weed Killer, 1.5% FeHEDTA, (Scotts) 1 gal RTU \$15.77-\$24.95.

REFERENCES:

1. Gardner, David. 2013, New minimum-risk products offer turf pros new lawn treatment options. Turf Magazine. <http://www.turfmagazine.com/article-9690.aspx>
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3. Charbonneau, Pam. Ontario Ministry of Agriculture, Food and Rural Affairs. 2010. Efficacy of Iron Chelate Herbicide for Turf Broadleaf Weed Control. <http://archive.lib.msu.edu/tic/stnew/article/2010sum25.pdf>

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