

# New and Existing Natural Weed-Control Products for Organic Lawn Cares

by Dave Gardner, Dept. of Horticulture and Crop Science, OSU

Several new herbicide active ingredients and combination products have been introduced to the market during the past few years. In fact, the number of active ingredients registered for weed control in turfgrass has doubled since the year 2000. However, pesticide use in turfgrass continues to be controversial and in certain parts of the country applicators are banned from using conventional pesticides on playing fields, lawns, and playgrounds. Where these laws were enacted the goal was to minimize pesticide exposure to children and restrict the use of pesticides to minimal risk ingredients. The products mentioned below can, in most cases, be used on these areas. Of course, you should be familiar with the laws and regulations in the areas where you make applications.

## Non Selective Herbicides

Natural weed control products that are non-selective have been around for many years, primarily for use in home lawn care. These materials are made of various plant oils or herbicidal soaps. Commercial grade vinegar (acetic acid) has also been used as a non-selective herbicide. An obvious disadvantage of these products is that, since they are non-selective, they also harm the desired turfgrass (Figure 1). In addition, while weed control with these products is very rapid, it is also, in most cases, temporary because these are contact herbicides. Contact herbicides provide no residual control, thus plants with underground structures, such as perennial broadleaf weeds and perennial grasses, as well as some well-established annuals, will grow back after application.

## Scythe® Herbicide

Depending on what source you read, this is classified either as a synthetic or a natural product. However, this product is sold by many vendors who market to organic lawn care providers. The active ingredient is pelargonic acid and related fatty acids. These fatty acids are a very fast acting contact non-selective herbicide. The herbicide disrupts cell membranes and results in cell leakage followed by death of all contacted tissue. Burn down of the contacted plant tissue may be achieved in as little as 20 minutes.

Non-selective herbicides can be used with some success as directed spot sprays on weeds that do not spread or where weed infestations are not severe. However, caution to avoid contact with turfgrass should be exercised and repeat applications will be required for complete control.

## Selective Herbicides

With the exception of corn gluten meal, selective organic herbicides are only a recent introduction to the turf market. Being selective brings the obvious advantage of the ability to make broadcast applications. However, because of economics, they are often applied as spot sprays or the application is limited to isolated weedy areas in the turf.

## Corn Gluten Meal

In 1986, Dr. Nick Christians at Iowa State University attempted to use corn meal as a growth media to inoculate a newly seeded putting green with pythium. No pythium was introduced, but, interestingly, the bentgrass did not germinate on the plots that received the fresh corn meal. During the next ten years a series of studies were conducted that determined that corn gluten meal, a by-product of the wet milling process, contained the highest concentration of the substances that prevented the bentgrass germination in his pythium study. The substances are dipeptides that mimic the action of some of the conventional preemergence herbicides on the market. Corn gluten meal is a natural product. It is an ingredient in many animal feeds and is fit for human consumption (though not very appetizing). Corn gluten meal contains 10% nitrogen by weight. Recommended use rate is 20 lbs per 1000 sq ft applied 2 times per year – in early April to control crabgrass and then again in late summer/early fall to provide partial control of germinating broadleaf weeds. These two applications will provide 4 lbs of N per 1000 sq. ft. annually. The nitrogen is slowly available and in tests applications as high as 100 lbs per 1000 sq. ft. did not cause burn to the turf. Corn gluten meal is primarily intended to control crabgrass. During the first year of use, reductions in crabgrass germination are around 40% and some conventional preemergence herbicide may still be required. During subsequent years, however, crabgrass control with corn gluten meal can be as high as 80-90%, which is nearly as good as most conventional preemergence herbicides. In some areas of the country crabgrass control is good and in other areas corn gluten meal is less effective. The reason for this has never been determined.

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Some control of broadleaf weeds from seed, including dandelion and white clover, is also possible. A website describing the product in more detail as well as a list of suppliers can be found at <http://www.hort.iastate.edu/research/gluten/>.

### Fiesta® Herbicide

Whether or not Fiesta® should be considered an organic product is debated. However, it is permissible to use it in many areas where conventional herbicide use has been banned. Fiesta® herbicide contains a proprietary chelated iron that, when applied to turf, acts as a selective postemergence herbicide against a wide spectrum of broadleaf weeds. Control is very rapid, with nearly 100% burn down achieved often

within 24 hours (Figure 2). It is important to note, however, that this is also a contact herbicide. Research has been conducted at Ohio State University to determine if a program of sequential applications can be effective to achieve long term weed control. We tested two applications in the fall, followed by two applications in the spring compared to three applications in the spring. At each of these times we applied 1.25, 2.5 or 5 gallons per 1000 ft<sup>2</sup> of a 2%, 4% or 8% solution (9 total rate/percentage combinations).

First and foremost, our results suggest that three applications every 21 days in the spring provides better long term control than 2 applications in the fall followed by two applications in the spring (this would be more cost-effective as well). Our results also suggest that when using Fiesta® to achieve long term weed control, the total amount of Fiesta® applied over



**Figure 1.** Contact herbicides, such as fatty acids, plant oils or herbicidal soaps, control weeds very rapidly (this photo was taken 24 hours after application). However, they are non-selective and will also damage turfgrass.



**Figure 2.** Control of dandelion and clover is very rapid with Fiesta® herbicide. This image was taken 24 hours after application. The treated plot is noticeable darker green. The untreated control is to the left.



**Figure 3.** Season long control of dandelion, white clover, ground ivy and broadleaf plantain can be achieved with 3 applications of Fiesta® herbicide in the spring. The plot on the left is the untreated control and the plot on the right received 3 applications (Days 0, 21 and 42). The picture was taken 84 days after the final application of Fiesta herbicide.



**Figure 4.** Control of dandelion and ground ivy 14 days after application of A.D.I.O.S. herbicide in the spring at Ohio State University. The picture on the left is the untreated control and the picture on the right is treated with A.D.I.O.S.

a season is more important than the gallon per acre spray rate or percent concentration. In other words, control is a function of the amount of chelated iron applied and 2.5 gallons per 1000 ft<sup>2</sup> of an 8% solution will result in control similar to 5 gallons per 1000 ft<sup>2</sup> of a 4% solution. Either of these rates applied 3 times in the spring resulted in excellent control of dandelion, white clover and ground ivy and good control of broadleaf plantain for up to 98 days (56 days after the last application was made – Figure 3). Since burn down is so rapid, the amount of control after three applications may actually be a little longer than with a traditional herbicide that might take up to 28 days to achieve control. Fiesta® is also labeled to control black medic, common chickweed, dandelion, moss, algae, plantains, Shepard's purse, thistles, veronica, and white clover.

Fiesta® is more expensive than a standard three way herbicide. However, this product is legal to use in most areas where conventional pesticide use is banned, and will be an important tool for turfgrass managers under these restrictions. One last note, the main injury symptom is to turn affected plants black (actually ultra-dark green, but they look black). The chelated iron is selective of broadleaf plants. However, it will cause some darkening of the turfgrass, which can look more like a blackening or phytotoxic response to the turfgrass. This can be greatly reduced or avoided if used in cooler temperatures, such as in the 60's or 70'. Application when temperatures are in the 80's or 90's may result in a noticeable and dramatic blackening of the turfgrass. This will go away after a few mowings, but can be visually striking. In our tests, Kentucky bluegrass and perennial ryegrass were quite tolerant of Fiesta® even when applied in warmer weather. Fine fescue turned noticeably darker in warmer weather, but this was almost more of a benefit than detraction. The tall fescue we tested was more susceptible. But, again, this phytotoxicity issue may be avoided by applying in cooler temperatures.

#### **A.D.I.O.S.**

This herbicide, manufactured by Herbanatur, is also a recent addition for turfgrass managers. It is a patented product used in Canada and also gaining popularity in those parts of the United States where application of conventional herbicides is not allowed. This product should not be confused with ADIOS, which is a cancelled formulation of DSMA, or Adios from Arysta, which is a cotton defoliant.

The active ingredient of A.D.I.O.S. is sodium chloride, which can be effective as a selective herbicide against broadleaf weeds such as dandelion, white clover and even ground ivy.

Control is rapid, with considerable burning of the effected plant tissues within 24 hours. In trials at Ohio State, A.D.I.O.S. performed very well when applied in the fall, resulting in up to 100% weed control. When applied in spring we are getting around 60% control of dandelion and 80-90% control of ground ivy for 2-3 weeks (Figure 4). Some browning of the turfgrass may occur. This is more likely if the application is made in warmer weather. However, the injury goes away after about 7-10 days. Of course, this could be minimized by using the product as a spot or directed spray.

One thing to consider, since the active ingredient is sodium chloride, is whether there will be any long term deleterious effects on the soil. High concentrations of sodium chloride result in dispersion of soil particles, which will negatively affect the structure of the soil. At too high of a concentration, turfgrasses will not be able to continue to grow. Kentucky bluegrass is most susceptible, followed by ryegrass and tall fescue. The warm season grasses tend to be more tolerant of high salt concentrations. But, for the same reason that you may have trouble maintaining turfgrass in areas that receive high amounts of winter deicing salts, you may need to exercise caution when using this product. Its best to use as a spot spray, rather than a broadcast application. Also, you should try to avoid use on soils that already drain slowly, such as those high in clay. Research is ongoing at Ohio State on this issue. Of course, you can monitor sodium levels on your soils tests to insure that they are not getting too high for good turfgrass growth.

#### **Future Organic Herbicides**

Phoma macrostoma, a promising herbicide which was being developed by Scotts and Ag Canada has apparently been shelved due to high production costs. However, many other materials are being developed as organic herbicides and may be released in the next few years.

## **MARK YOUR CALENDAR!**

### **JUNE 18:**

Northeast Seminar • OARDC, Wooster

### **AUGUST 13:**

Outdoor Summer Seminar • OSU, Columbus

### **NOVEMBER 7:**

A Grateful Embrace

Dayton National Veterans Cemetery – Dayton, OH  
Ohio Western Reserve Cemetery – Rittman, OH