

Techniques to Enhance Herbicide Effectiveness

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Summary

Herbicides only work when the correct product is applied at the correct time at the correct rate to a susceptible weed species. Even when this occurs, there are other factors that can reduce how effectively an herbicide controls the weeds in a strawberry field. Following is a list of recommendations that can improve the effectiveness of herbicides.

Know your weeds

It is important to be able to properly identify common weed species to ensure you select the correct product. Common errors I have seen include misidentification of a sedge as a grass (Figure 1) and applying a grass herbicide on a sedge. Grass herbicides with active ingredients such as sethoxydim and clethodim do not have activity on sedges. Other herbicide groups such as sulfonylureas (examples: Sandea, Envoke, Matrix) control very specific broadleaf weed species and not others. Read the label and use the right product for the right weed species.

Correct growth stage

A few general rules to follow are: (1) smaller weeds are easier to kill than large weeds, (2) weeds that have already flowered are harder to kill than weeds that have not flowered, (3) grasses are typically easier to kill if they are less than 6" tall, tufted grasses have a diameter less than 4 inches, and they have not flowered (Figure 2).

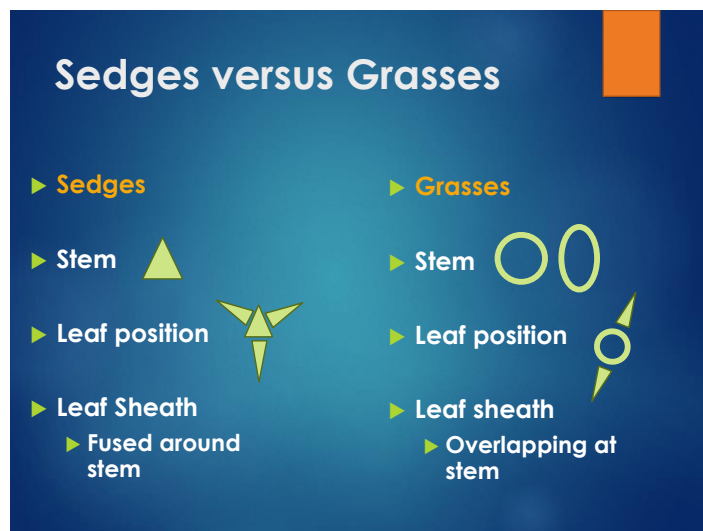


Figure 1. Differences between sedges and grasses



Figure 2. The two pictures represent a reasonable size range from smallest (right) to largest (left) to spray annual grasses.

Correct application rate

It may be tempting to use low rates to save money or high rates because, 'if a little works then a lot should work better', but don't. Agrochemical companies spend a lot of money on research to determine the proper application rate. The use of low rates may reduce control, and some products do not work as well when excessively high rates are applied (Figure 3). Read the label and apply the recommended rate.



Figure 3. Chateau damage on strawberry when extremely high rates were applied.

Hit the target

Application of a soil active herbicide to a field with a dense weed population will reduce how well it works if the leaves of the weeds intercept the herbicide before it reaches the soil. Excessive rainfall or irrigation can also move the herbicide below the seed germination zone (2-3 inches deep for many species) where it will not work as well. Herbicide drift can damage neighboring fields but it also reduces the amount of herbicide where you need it. Finally, if the weeds are below the crop canopy the herbicide can be intercepted by the crop and the overall effectiveness will be reduced.

Adequate coverage

There are two main herbicide categories. Contact herbicides commonly called burn-down products kill the part of the plant they touch. Systemic herbicides

move in the plant and can kill throughout the plant. Adequate coverage is important for all herbicides but especially important for contact products. To achieve proper coverage: (a) use an adequate application volume, (b) use the proper pressure to achieve acceptable droplet sizes, (c) add a surfactant to help spread the herbicide on the leaf surface, and (d) apply herbicides to annual weeds when they are small.

Correct environment

Herbicides such as glyphosate work best if the weeds are actively growing. Do not apply during excessively hot or dry periods when plants may be dormant.

Water pH

Most pesticides work best if the pH is between 4 and 7. In Florida, water tends to be alkaline (pH greater than 7) which can lead to alkaline hydrolysis or the breakdown of herbicides in water. Sulfonylurea herbicides (example: Sandea, Envoke, Matrix) tend to work best in slightly alkaline conditions whereas herbicides such as 2,4-D, glyphosate, and flumioxazin break down more rapidly when the pH is greater than 7. To overcome this problem add a buffer or acidifier when needed. Also note that water pH is especially important if the herbicide is stored in a tank for an extended period of time. The longer the herbicide remains in the tank the more important the proper pH. It is recommended that you only mix what you plan to spray immediately.

Water hardness

Positively charged ions in your water (aluminum, iron, magnesium, calcium, sodium) can bind with negatively charged herbicides (examples: 2,4-D, dicamba, glyphosate) and reduce effectiveness. To address this problem reduce time between applications and mixing, add a surfactant and add ammonium sulfate to glyphosate applications.

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