

HERBICIDES



United States
Department of
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Natural
Resources
Conservation
Service

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This is the fifth in a series of Soil Quality-Agronomy technical notes on the effects of land management on soil quality. This information is general and covers broad application.



Introduction

The Natural Resources Conservation Service promotes sustainable use of private land by providing information, delivering technical assistance, and encouraging voluntary adoption of conservation measures by private landowners. The enclosed herbicide information provides general information about specific herbicide groups. The purpose of this information is to provide field offices with a quick reference for herbicide behavior and use. The list does not encompass all herbicides, but it does cover many herbicides that are used today. The field office can use the "Herbicides" table for general planning purposes when discussing conservation systems.

Herbicide Use and Families

The use of pesticides in the United States is approximately 1,100,000 pounds per year. Herbicides account for 64 percent of total usage, insecticides 18 percent, and fungicides 8 percent. These levels have been fairly stable for the last ten years. Currently, the bulk of U.S. agriculture is driven by less than 100 compounds. In order to work with farmers to encourage adopting conservation practices, NRCS needs to be equipped to address herbicide related issues.

Herbicides are listed by family or group in the "Herbicides" table. This will enable field employees to learn for each family its:

- primary use,
- behavior in plants,
- fate in the environment,
- hazards, and
- leaching and runoff information.

Within each family, the name of a product is given by common name, followed by trade name. It is impractical to remember all herbicides, but by understanding the behavior of each herbicide family, field offices can provide technical information on herbicides within conservation planning.

In many instances, information about an herbicide family will be given at the top of each respective table, which will apply for all herbicides listed in the respective family. For example under Hazards, the Chloroacetamides can cause crop injury without a safener, and the entire group has an LD 50 of greater than 3000. This is mentioned once for the entire group within the Chloroacetamide family.

Use of the "Herbicides" Table

A field office employee can use information from "Herbicides" in conservation planning. For instance, if a farmer is considering converting to a no-till system and has traditionally used Thiocarbamates, use the Volatility/Solubility section to learn that this group needs incorporation to prevent losses by volatility. The planner can then direct the producer to another herbicide family that does not require incorporation by

tillage. Another example: the Hazard section states that Thiocarbamates can exhibit "soil conditioning" with repeated use for 5 consecutive years. Soil conditioning is when soil microbes adapt themselves to the herbicide in order to rapidly degrade it to the point that weed control is of insufficient duration. This information is helpful with addressing weed infestations due to using the same herbicide in a continuous monoculture system and may lead the producer to a conservation cropping rotation system.

Additional Information

Other information needed includes a general knowledge of selectivity of herbicide families to prevent carry over problems if one is recommending converting from a monoculture to a conservation crop rotation system. Fate in Environment, Hazards, and Leaching and Runoff Potential (SPISP ratings) can provide environmentally sensitive information, such as indicating a high potential for leaching when working with sandy soils with a shallow water table. The SPISP II ratings are an

updated list originally developed in 1990 (see references). These ratings are national lists developed to give leaching information for specific herbicides. If available in a local Technical Guide, use current local ratings specific to a location or state, rather than the national ratings.

Summary

"Herbicides" is general information to give the planner a reference for herbicide behavior and use. It discusses the herbicide families and unclassified herbicides like Glyphosate (Roundup). The "Herbicides" table does not need updating every time there is change in the herbicide market. However, as new families are marketed or new hazard and/or selectivity information are available, the table can be revised. If specific information is needed for a specific herbicide, direct the farmer to either the local Extension office or the label directions on the herbicide container. This technical note is also on the Soil Quality Institute's home page at: <http://soils.usda.gov/sqi>

References:

- Goss D., Wauchope R. D. " The SCS/ARS/CES Pesticide Properties Database II: Using it with soils data in a screening procedure" Proceedings of the Third National Research Conference on Pesticides, Nov. 8-9, 1990 Richmond Virginia. Weigmann D. L. editor.
- NRCS National Water and Climate Center. (2-18-2001 – last update). WIN-PST Pesticide Properties Database [online]. Available at: <http://www.wcc.nrcs.usda.gov/water/quality/common/pestmgt/ppd/ppd.htm> [Accessed October 2001]
- Wehtje Glenn. Agronomy 614, Use of herbicides in agriculture, compilation of lectures, 1996. Auburn University.

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