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Managing Pesticides on Corn to Avoid Contaminating Water

Water Quality Series

Michigan State University Extension Service

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# MANAGING PESTICIDES ON CORN TO AVOID CONTAMINATING WATER

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**When** selecting pesticides for use on corn, use the information on this fact sheet to select an appropriate pesticide that is least likely to contaminate surface or groundwater. Lakes, rivers, streams, and other surface water are a critical resource that must be protected by everyone. Many people who live in rural Michigan supply their homes with water from wells. Since well water is groundwater, it is easy to see why pesticides must be kept out of groundwater.

Two undesirable processes that can remove pesticides from the target area are **runoff** and **leaching**. Runoff is the movement of pesticides in water *across* the soil surface. It occurs as water moves over a sloping surface, carrying pesticides either dissolved in the water or bound to eroding soil. The amount of pesticide runoff depends on the grade or slope of an area, the erodibility and texture of the soil, the soil moisture content, the amount and timing of irrigation or rainfall, and properties of the pesticide. Leaching of pesticides occurs as water moves *downward* through the soil. Factors that influence leaching include whether the pesticide dissolves easily in water, soil structure and texture, the amount and timing of irrigation or rainfall, the amount of adsorption to soil particles, and the persistence of the pesticide.

The table on the back of this page lists the potential for leaching or runoff for some common pesticides used on corn. *(The listing of these products does not imply endorsement*

*by the Cooperative Extension Service or bias against those not mentioned.)*

These runoff/leaching potential ratings are from the ARS/SCS pesticide properties database and were developed for use with the SCS soils ratings for water quality in the SCS Soil-Pesticide Interaction Rating. Runoff ratings are based on the pesticide's ability to bind to the sediment in runoff.

Soil and site information along with pesticide characteristics must be taken into account when assessing the potential risk of pesticide use on water quality. If the *site* has a high potential for surface runoff or leaching (sandy soils and other soil characteristics), choose a pesticide that has a low potential for runoff or leaching or use a non-chemical method for pest control.

## Additional Precautions to Keep Pesticides Out of Surface and Groundwater

It is very difficult to clean contaminated surface and groundwater. The best solution is to prevent contamination in the first place. The following pesticide applicator practices can reduce the potential for surface and groundwater contamination.

- **Use integrated pest management programs**—Minimize pesticide use by combining chemical control with other pest management practices such as resistant varieties, cultural practices, crop rotation, biological control agents, etc.

- **Consider the geology of your area**—Be aware of the water table depth and the permeability of the geological layers between the surface soil and groundwater.

- **Consider soil characteristics**—Determine the susceptibility of the soil to leaching or runoff.

- **Select pesticides carefully**—Pesticides that are highly soluble, relatively stable, and not readily adsorbed to soil are the most likely to leach.

- **Follow label directions**—The label carries crucial information about the proper rate, timing, and placement of the pesticide.

- **Calibrate accurately**—Equipment should be calibrated carefully and often to avoid over or under application.

- **Measure accurately**—Concentrates need to be carefully measured before they are placed into the spray tank. Do not "add a little extra" to ensure the pesticide will do a better job.

- **Avoid back-siphoning**—The end of the fill hose should remain above the water level in the spray tank at all times to prevent back-siphoning of the pesticide into the water supply. Use an anti-backflow device when siphoning water directly from a well, pond, or stream.

- **Consider weather and irrigation**—If you suspect heavy rain will occur, delay applying pesticides. Control the quantity of irrigation to minimize potential pesticide leaching and runoff.

- **Avoid spills**—But when they do occur, contain and clean them up quickly with an absorbent material like cat litter.

- **Change the location of mixing areas**—Mix and load pesticides on an impervious pad if possible. If mixing is done in the field, change the location of the mixing area regularly.

- **Dispose of wastes properly**—Obey laws regulating the disposal of pesticide wastes. Triple rinse containers. Pour the rinsewater into the spray tank for use in treating the site or the crop.

- **Store and mix pesticides away from water sources such as wells, pond, and springs.**



## Common Corn Pesticides Potential for Leaching and Runoff

| Trade Name          | Common Name            | Potential for Leaching | Potential for Runoff |
|---------------------|------------------------|------------------------|----------------------|
| <b>Herbicides</b>   |                        |                        |                      |
| 2-4,D amine         | 2-4,D amine            | low                    | medium               |
| 2-4,D ester         | 2-4,D ester            | low                    | medium               |
| Arena               | alachlor               | medium                 | medium               |
| Atrazine (several)  | atrazine               | high                   | medium               |
| Banvel              | dicamba                | high                   | low                  |
| Basagran            | bentazon               | high                   | medium               |
| Bladex              | cyanazine              | medium                 | medium               |
| Buctril             | bromoxynil             | none                   | medium               |
| Dual                | metolachlor            | medium                 | medium               |
| Eradicane           | EPTC with protectant   | medium                 | medium               |
| Evik                | ametryne               | medium                 | high                 |
| Gramoxone Extra     | paraquat               | low                    | high                 |
| Lasso               | alachlor               | medium                 | medium               |
| Linex               | linuron                | medium                 | medium               |
| Lorox               | linuron                | medium                 | medium               |
| Princep             | simazine               | high                   | medium               |
| Prowl               | pendimethalin          | low                    | high                 |
| Ramrod              | propachlor             | low                    | medium               |
| Ranger              | glyphosate             | low                    | high                 |
| Roundup             | glyphosate             | low                    | high                 |
| Sutan Plus          | butylate               | medium                 | medium               |
| Tandem              | tridiphane             | low                    | high                 |
| <b>Insecticides</b> |                        |                        |                      |
| Ambush              | permethrin             | low                    | high                 |
| Asana XL            | esfenvalerate          | low                    | high                 |
| Counter             | terbufos               | low                    | medium               |
| Cygon               | dimethoate             | medium                 | low                  |
| Diazinon            | diazinon               | medium                 | medium               |
| Dipel               | Bacillus thuringiensis | *                      | *                    |
| Dyfonate            | fonofos                | medium                 | high                 |
| Force               | tefluthrin             | **                     | **                   |
| Furadan             | carbofuran             | high                   | low                  |
| Lorsban             | chlorpyrifos           | low                    | high                 |
| Malathion           | malathion              | low                    | low                  |
| Penncap M           | methyl parathion       | low                    | medium               |
| Pounce              | permethrin             | low                    | high                 |
| Rampart             | phorate                | low                    | high                 |
| Sevin               | carbaryl               | low                    | medium               |
| Thimet              | phorate                | low                    | high                 |

\* *Bacillus thuringiensis* is harmless to humans, animals, and useful insects.

\*\* Not listed in the ARS/SCS pesticide properties database.

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