

PAYNE COUNTY, OKLAHOMA

Soil-Pesticide Interaction Ratings

General

Soil-pesticide interaction ratings help determine the potential for pesticide loss from surface runoff and from leaching or percolation below the root zone when a specific pesticide is used on a specific soil.

Soil and Pesticide Ranking

Soils are ranked according to potential for pesticide loss from surface runoff and from leaching. This table lists the soil series, surface loss potential, and leaching potential. The surface loss potential and soil leaching potential are ranked as high, intermediate, or nominal.

Pesticides are also ranked according to potential for loss to surface runoff and leaching. The pesticide leaching tables are in section _____, Pesticide Data Base. In this section there is a list of pesticide properties that include the surface loss potential and leaching potential for each pesticide. The surface loss potential is ranked as large, medium, or small. The leaching potential is ranked as large, medium, small, or total use.

Procedure

The field office staff should determine the water resource concern (e.g. ground water or surface water quality), then select the appropriate procedure. The respective procedure determines the potential loss of a pesticide when used on a particular soil.

Both the pesticide rank and the soil rank are used to determine the potential for pesticide loss into surface runoff or to leaching. Follow these steps:

Potential pesticides loss to leaching:

1. Find the leaching potential for the soil series from the soil ranking tables.
2. Determine the pesticide leaching potential from the pesticide properties in Section _____, Pesticide Data Base.

3. Use these ratings with the potential pesticide loss to leaching matrix (figure 1) to determine potential 1 to 3.

Using the matrix: The intersection of the soil leaching potential and the pesticide leaching potential give the overall leaching potential--a potential 1, 2, or 3.

Figure 1. Potential pesticide loss to leaching matrix

Soil leaching potential	Pesticide leaching potential			
	Large	Medium	Small	Total Use
High	Potential 1	Potential 1	Potential 2	Potential 3
Intermediate	Potential 1	Potential 2	Potential 3	Potential 3
Nominal	Potential 2	Potential 3	Potential 3	Potential 3

Figure 1. Potential pesticide loss to surface runoff matrix

Potential pesticides loss to surface runoff:

1. Find the soil surface loss potential for the soil series from the soil ranking tables. If the soil mapping unit has a slope equal or less than 2 percent, reduce the soil surface loss by one unit, i.e. intermediate to nominal.
2. Determine the pesticide surface loss potential from the Pesticide Properties in Section _____, Pesticide Data Base.
3. Use these ratings with the potential pesticide loss to surface runoff matrix (figure 2) to determine Potential 1 to 3.

Soil surface loss potential	Pesticide leaching potential			
	Large	Medium	Small	Total Use
High	Potential 1	Potential 1	Potential 2	Potential 3
Intermediate	Potential 1	Potential 2	Potential 3	Potential 3
Nominal	Potential 2	Potential 3	Potential 3	Potential 3

Guidelines for use of Potentials 1, 2, or 3:

Potential 1: This pesticide applied on this soil has a high probability for being lost to surface runoff or leaching. Before deciding to use Potential 1 pesticides, they should be evaluated for their health hazard to humans and animals. If a pesticide is a potential danger to health, an alternative pesticide, or other pest management techniques should be selected.

Potential 2: Potential 2 is a gray area. This pesticide applied

on this soil has the possibility of being lost to surface runoff or leaching. However, the possibility of loss is not as great as Potential 1. The effect of the pesticide on the water resource will need additional site evaluation. Refer to the guidelines for Potential 1.

Potential 2 guidelines differ from Potential 1 in: (1) the pesticide surface loss potential may be reduced in rank, (i.e. Large to medium) if foliar applied, incorporated, or banded under the surface, (2) the pesticide leaching potential could be reduced on rank if foliar applied; and (3) the use of this pesticide on this soil could be considered similar to potential 3 if the rainfall probability is low.

Potential 3: This pesticide applied *on* this soil has very low probability of being lost to surface runoff or leaching. This pesticide could be used according to label instructions with little hazard to the respective water resource.

Refer to National Bulletin No. 430-9-3 and 430-9-12 for criteria used *in* rating soils for pesticide leaching potentials and surface loss potentials.

PAYNE COUNTY, OKLAHOMA

Soil Rating for Nitrate and Soluble Nutrients

General

This section provides a way to determine the degree to which water percolates below the root zone in certain soils. Percolating water containing dissolved nitrates or other soluble nutrients could be a hazard to ground water. The method is based on a Leaching Index (LI).

For areas with ground water concerns, the LI should be determined to evaluate the potential for contaminating the ground water with soluble nutrients. The LI uses annual precipitation, hydrologic soil group, and rainfall distribution data.

Leaching Index

An LI map for each hydrologic soil group and weather station data was developed for each state. The hydrologic group describes those soils that do not have dual hydrologic ratings because of differences in drainage. If the soil has a high LI and is over a shallow aquifer, soluble nutrients (especially nitrates) may contaminate the water.

The LI does not account for irrigation. If irrigation is applied only to supply needs, there will be little additional loss below the root zone. The additional loss would be relative to the precipitation events after the soil profile is saturated or nearly saturated due to irrigation.

In areas of marginal water quality, the amount of irrigation water applied includes a leaching fraction to insure that salts do not build in the soil. If a leaching fraction is applied, this amount of water must be added to the LI.

Procedure

Follow these steps to determine the, leaching index of a certain soil:

1. Find the soil's hydrologic group
2. Locate the iso-leaching map for that group or use weather station list.
3. From the map or weather station list, based on the soil location, determine the LI.

Guidelines for using LI:

1. An LI less than 2 inches would probably not contribute to soluble nutrient leaching below the root zone.
2. An LI between 2 and 10 inches may contribute to soluble nutrient leaching below the root zone and nutrient management should be considered.
3. An LI greater than 10 inches will contribute to soluble nutrient leaching below the root zone. Nutrient management practices should be intense or soluble nutrients should not be applied. Also, consider using conservation practices that minimize infiltration, such as strip cropping rather than pipe outlet terraces.