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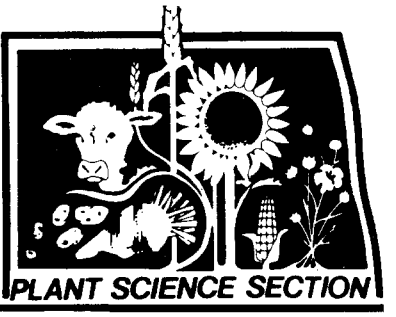


Circular S-F-600 (Revised)

JANUARY 1984

# Soil Organic Matter, Texture, and pH as Herbicide Use Guides

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The performance of soil applied herbicides may be influenced by soil organic matter, texture and pH.

## ORGANIC MATTER

Certain herbicides are partially adsorbed and inactivated by soil organic matter, so knowledge of the organic matter level will serve as a guide to selecting an effective herbicide rate. Herbicides such as Dual (metolachlor), Lasso (alachlor), Eptam (EPTC), atrazine, Bladex (cyanazine) and Ro-Neet (cycloate) require higher rates to be effective in high organic matter soils. On the other hand, crop safety may be marginal on low organic matter soils.

Certain herbicides give good weed control only when organic matter levels are low. For example, Pyramin (pyrazon) and Lorox (linuron) have not been effective in the Red River Valley, except on coarse-textured soils with less than 5 percent organic matter. The lower the organic matter, the more effective they become.

Many herbicides such as Treflan (trifluralin), Ramrod (propachlor), Far-go (triallate), Avadex (diallate) and most postemergence herbicides are affected only slightly by organic matter levels.

Determine organic matter levels on each field where organic matter sensitive herbicides are to be used. Organic matter levels change slowly and testing once every five years would be often enough. The organic matter is seldom uniform across fields with rolling topography. Expect lower organic matter levels on eroded hilltops. Sandy ridges also frequently have organic matter levels lower than the remainder of a field. The herbicide rate may have to be adjusted on hilltops and ridges to avoid crop injury.



## ADJUSTING EPTAM RATES TO ORGANIC MATTER LEVELS

Eptam is used on flax, sugarbeets, sunflowers, dry edible beans and potatoes. Sugarbeets have marginal tolerance to Eptam and the rate must be adjusted on various soils to give good weed control without crop injury. The following discussion on selecting an Eptam rate gives guidelines but does not give firm rules. Since other factors such as method of incorporation also affect Eptam performance (immediate and thorough incorporation gives best performance), each grower must decide on the best rate for his conditions. The suggested Eptam rate for sugarbeets is 2 to 3 pounds per acre. When a soil has a silty clay texture with more than 7 percent organic matter, the 3 pounds per acre rate would be expected to give good weed control without sugarbeet injury. When a soil is sandy loam or more coarse in texture and has less than 4 percent organic matter, crop injury to sugarbeets may occur even with the minimum rate of 2 pounds per acre. The Eptam rate should be adjusted within the 2 to 3 pounds per acre range when the soil is intermediate between the two extremes. Eptam at 2.5 pounds per acre should give good weed control and little crop injury on clay loam or finer textured soils with more than 5 percent organic matter. Safer herbicides such as TCA, Avadex, Ro-Neet, Pyramin + TCA, or Nortron + TCA may be used in sugarbeets on the low organic matter soils where Eptam injury may be excessive.

Eptam at 4 pounds per acre is labeled for fall application in flax. Flax tolerance to Eptam is marginal. Research at NDSU has shown that fall applied Eptam at 3 pounds per acre generally has given good weed control with less flax injury than the 4 pounds per acre rate in a coarse-textured soil. Stunted plants and stand reduction are symptoms of flax injury from Eptam. Usually, flax yield will not be reduced because the remaining plants will recover, branch out and compensate for a thin stand. However, with severe injury the stand may be thinned to the point where yield is reduced. Each grower should try Eptam on a small acreage of flax on the lighter soils to determine if the benefits from the Eptam offset possible injury.

## SOIL TEXTURE

Soil texture may also influence herbicide adsorption. The amount of sand, silt and clay in a soil determines its texture. Clay particles adsorb herbicides in much the same manner as organic matter, but to a lesser extent. Therefore, rates of many herbicides have to be increased on soils high in clay content to compensate for adsorption.

## SOIL pH

Soil pH is a measure of the acidity or alkalinity of a soil. A pH of 7 is considered neutral. Acid soils have a pH less than 7 while alkaline soils have a pH greater than 7. Soil pH affects the performance and carryover potential of triazine herbicides such as Sencor/Lexone (metribuzin), atrazine, and Bladex (cyanazine) and also sulfonylurea herbicides such as Glean (chlorsulfuron). In general, the triazines and sulfonylureas are adsorbed more tightly to soil colloids as the pH decreases, and less tightly as pH increases. Therefore, herbicide activity and residues (especially atrazine and Glean) may be less on a pH 6 (acid) soil than a pH 7.5 (alkaline) soil. As soil pH increases, triazine and sulfonylurea herbicides become more available to both crops and weeds. This increases weed control but may also increase the possibility of crop injury. For example, if soybean injury from Sencor/Lexone (metribuzin) occurs, injury will be greater on a pH 7.8 soil than on a pH 7.2 soil. Herbicide carryover problems also will be more likely to occur in areas of high pH, such as calcareous spots and eroded hilltops.

A knowledge of the organic matter content, soil texture and soil pH will help in selecting the proper herbicide rate and proper rate to use.



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