INFLUENCE OF TILLAGE SYSTEMS ON CORN WEED CONTROL

Russell R. Hahn
Department of Agronomy
Cornell University

Although weed control in conventionally tilled and planted corn fields can be challenging, the challenge becomes even greater as the number of tillage operations is reduced or eliminated. A reduction in tillage complicates weed control practices by increasing the spread and competitiveness of certain perennial weeds such as common milkweed and by limiting the control options available to the grower.

Quackgrass:

Many growers are accustomed to using a split application of atrazine for quackgrass control. One of the keys to this control program is the fact that a portion of the atrazine is plowed-down the first year of corn. Since atrazine is absorbed by plant roots and moves only upward in plants, this plow-down application provides the opportunity to place part of the atrazine in the root zone. When chisel plows or offset disks are employed as the primary tillage implement, there is still some opportunity to mix a portion of the atrazine in the root zone prior to planting; however, in no-tillage situations all the atrazine must be applied to the soil surface. In no-tillage situations, movement into the root zone is dependent on rainfall and is a slow process. Because of this, it may be advisable to apply a portion of the atrazine well ahead of planting in the spring or the previous fall to allow time for movement of the atrazine into the root zone.

Roundup of course can be used for quackgrass control in any tillage situation and can also be used as the knock-down herbicide for all vegetation before or at the time of planting no-tillage corn. Paraquat can also be used as the knock-down herbicide in no-tillage plantings, however, it has no lasting effect on quackgrass and should be used along with atrazine if quackgrass is a serious problem.

Yellow Nutsedge:

The fact that several of the yellow nutsedge recommendations involve the use of preplant-incorporated herbicides limits the control options greatly in no-tillage systems and may reduce the effectiveness of certain treatments in reduced tillage situations where proper herbicide incorporation may be difficult. The only recommendation that can be used for this perennial weed in no-tillage corn is a postemergence application of atrazine with an oil concentrate-surfactant blend. Since this is a rescue recommendation, it is suggested that no-tillage corn not be planted in fields that have severe yellow nutsedge infestations. Although the performance of the preplant incorporated nutsedge herbicides (Sutan+, Eradicane and Dual) is most consistent in conventionally tilled and planted fields, they can be used successfully in fields where the primary tillage was done with a chisel

plow or offset disk. If fields are chisel-plowed, it is recommended that they be tilled with a disk or field cultivator prior to herbicide application and incorporation.

Broadleaf Perennials:

The recommendations for suppressing creeping broadleaf perennial weeds such as common milkweed and horsenettle are the same for all tillage situations and involve the postemergence application of Banvel when the corn is perhaps two feet tall. Although the control recommendation for these weeds is the same for all tillage situations it is the author's belief that these broadleaf perennial weeds are more difficult to control in no-tillage situations than where the fields are tilled. In addition, simple perennials such as dandelions may become a problem in no-tillage while they seldom cause problems in reduced or conventionally tilled fields. Dandelions can be handled with applications of 2,4-D or Banvel postemergence to the corn.

Annual Weeds:

Preemergence or early postemergence control of annual weeds is similar for the different tillage situations except that some herbicides, like Prowl are not recommended for no-tillage corn and that the accumulation of crop and/or weed residues on the soil surface may tie-up some of these residual herbicides and interfere with their performance in continuous no-tillage fields. Annual grasses such as fall panicum and crabgrass are among the annual weeds that are most difficult to control in no-tillage situations. When these summer grasses become a problem in no-tillage fields, herbicide combinations that include two good annual grass herbicides should be considered.

Soil pH can also affect the availability and performance of preemergence herbicides. This is especially important for the triazine herbicides (atrazine, Bladex and Princep). These herbicides are most strongly adsorbed on clay and organic matter particles at low pH's. Although the amount of triazine adsorbed increases at all pH levels below 7.0, it is most dramatic at pH levels of 6.0 and below. In continuous no-tillage situations, the pH of the surface inch of the soil is often below 6.0 due to the leaching of carbonates and the acidifying effect of surface applied nitrogen fertilizers. These low pH's in conjunction with the accumulated organic matter can greatly reduce the effectiveness of these herbicides. To maximize herbicide efficiency in continuous no-tillage fields, surface applications of one or two tons of lime are recommended every year or so.