Dealing with Perennial Broadleaf Weeds in Conservation Tillage Systems

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Introduction

Troublesome weeds encountered today differ somewhat from the plants which were of major concern in field crop production 20 years ago. The weedy plants found in crops are not necessarily newly introduced species, but a shift in the types of economically important weeds has evolved. Two factors that influenced this shift are: 1) an alteration or change in tillage practices, and 2) the introduction of new herbicide products and their impact on weed management practices.

General trends in weed population dynamics have been observed when tillage practices are reduced (Buhler, 1995). A population shift often occurs toward the increased presence of perennial, biennial, and winter annual weed species. Whereas, populations of some large-seeded broadleaf weed species have been shown to decline. Some examples of decreased weed populations observed include common cocklebur *(Xanthrum strumarium* L.) (Wrucke and Arnold, 1985), sicklepod *(Cassia obtusifolia* L.) (Banks et al., 1985) and velvetleaf *(Abutilon theophrasti* Medik.) (Buhler and Daniel, 1988).

The idea that weed problems intensify under conservation-tillage systems can be a misconception. A more realistic view is that under conservation-tillage practices, fields within a few years tend to revert more quickly towards their "native" climax vegetation. In conservation-tillage systems weed control practices must be implemented to control vegetation that is present when the crop is planted and to maintain adequate weed control levels throughout the crop growing season. Thus, innovative crop production and weed management strategies are essential for maintaining adequate control levels of the more common weeds and to curtail the introduction and spread of other weeds, especially those plants with biennial and perennial life cycles.

The repeated use of the more recently introduced herbicide products have also impacted the presence of escaped weed species observed in field crops. The development of new herbicide technology has given field crop producers additional options for dealing with many of the commonly occurring annual species. An added benefit has been the effectiveness of newer herbicide products as weed management tools for control of problem weeds such as johnsongrass. However, some weed species such as broadleaf signalgrass *(Brachiara platyphylla* (Grieseb.) Nash.) and several perennial broadleaf species have been observed more frequently in Kentucky.

A selected list of troublesome weeds that occur in agronomic crops and their life cycle are listed in Table 1. Most of these species are perennials that are capable of reproducing assexually by creeping root stocks or by rhizomes.

Field Studies

Two perennial broadleaf weeds of increasing concern are honeyvine milkweed *(Ampelamus albidus* (Nutt.) Britt.) and common pokeweed *(Phytolacca americana* L.). Both of these weed species are more evident in corn and soybean fields and have become of economic importance to corn and soybean producers in Kentucky.

Honeyvine milkweed is a climbing vine that can grow up to 10 feet in length. It becomes entangled with the crop and can cause lodging of corn and soybean plants. Honeyvine milkweed plants seldom reduce crop yield, but can create harvest problems in fields with large populations. It is considered a creeping perennial that is capable emerging from seed or producing new shoots from root buds. This plant is identified from other viney-type weeds by its simple lanceolate to cordate (i.e. heart-shaped) leaves attached in pairs at the stem nodes.

Control methods for honeyvine milkweed are limited. Cultural control options suggested for this plant generally consist of tillage. However, the benefit of tillage has been debated by scientists for several years. The freqency and timeliness of tillage can be factors in the success of this practice. Few herbicide options for suppressing growth are known.

Field studies have been conducted in Kentucky to evaluate the effectiveness of foliar applied herbicides used in corn. Traditional herbicide options such as dicamba (Banvel) and 2,4-D were compared with sulfonylurea type herbicides that have become recently available for foliar applications. Sulfonylurea herbicides included nicosulfuron (Accent), primisulfuron (Beacon), a premix formulation of primisulfuron:prosulfuron (Exceed), and halosulfuron (Permit). Complete control of honeyvine milkweed was not obtained with any of the treatments evaluated. Partial control or suppression of the above-ground growth was noted, which ranged from 60 to 75% based on visual observations. How-

Table 1. Selected troublesome weeds found in Kentucky's agronomic crops and their life cycle.

WEED SPECIES	ANNUAL	PERENNIAL	
		Simple	Creeping
Bindweeds			X
Broadleaf Signalgrass	X		
Burcucumber	X		
Curly Dock		X	
Groundcherry, Smooth			X
Hemp Dogbane			X
Johnsongrass			X
Milkweed, Common			X
Milkweed, Honeyvine			X
Morningglory, Bigroot		X	
Nightshade, Eastern Black	X		
Pokeweed, Common		X	
Ryegrass, Italian	X		
Trumpetcreeper			X

ever, measured vine length of honeyvine milkweed plants was significantly reduced by treatments evaluated compared with the untreated plots. Control observed with the sulfonlyurea herbicides tended to be somewhat better than dicamba alone. Tank mixtures of sulfonylurea herbicides with 2,4-D or dicamba did not greatly improve their effectiveness for suppressing growth.

Common pokeweed is an herbaceous perennial that reproduces from seed and large, fleshy taproots. Therefore, it is considered a simple perennial. Common pokeweed is a widely branched plant that can grow up to 10 feet in height during a growing season. This plant traditionally occurs along fence rows and other non-cropland sites, and is spreading into fields which have been subjected to long-term conservation-tillage practices. After it becomes established, common pokeweed is extremely difficult to control in both corn and soybeans. Curtailing the establishment and spread of individual plants is important for successful long-term control of common pokeweed.

Deep plowing and frequent cultivation can be an effective may of depleting root reserves, but is not a desirable option in conservation-tillage systems. A field study was initiated in 1995 to evalute the effectivenessoffoliar applied herbicides in corn. Treatments consisted of dicamba (Banvel), primisulfuron (Beacon), primisulfuron tank mixed with dicamba, a premix formulation of primisulfuron:prosulfuron (Exceed), and halosulfuron (Permit). The dicambatreatment provided the best results for suppressing plant growth. Common pokeweed growth has also suppressed by primisulfuron tank mixed with dicamba, the premix combination of primisulfuron:prosulfuron, and halosulfuron. Primisulfuron applied alone was not as effective in suppressing common pokeweed growth. Plant height measurements at six weeks after treatment also reflected differences noted between treatments. Plant height measurement prior to corn harvest; however, indicated that plant regrowth had occurred with some treatments evaluated.

Results from these field studies indicate that growth of some perennial broadleaf weeds can be suppressed with herbicide options currently available. However, further research efforts are warranted to discover acceptable weed management options to combat troublesome perennials.

Summary

Special crop management skills are often needed to deal with troublesome weed species, especially perennials. These skills include monitoring fields for the presence of potentially troublesome weeds before they become serious problems. It is also essential to select the appropriate weed management tools when a problem develops. In some cases, management approaches such as crop rotations, between crop herbicide treatments, and fallow-land programs can be beneficial in the development of an overall weed control strategy.

With the introduction of herbicide tolerant crops additional weed control options may be available for consideration. However, herbicide application rates required to obtain acceptable control and the size of weedy plants at time of application must be considered.

The cost of an intensive weed control program must also be evaluated relative to the long-term and economic benefits of implementing weed control strategies for perennial weeds. Not all weed species encountered will cause an economic yield loss compared to a field left untreated. However, the cost associated with curtailing the introduction and spread of future weed problems can reap long-term benefits.

Literature Cited

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