NO-TILL WEED PROBLEMS AND CHALLENGES IN THE UPPER SOUTH

R. M. HAYES

INTRODUCTION

Most of the weed problems in no-till systems are also present in conventional systems, however, there are some exceptions. Indeed, it must be understood that the solutions to many of these problems do not lie in strictly conventional-tillage and cultivation. Perhaps if we had expended as much effort on these problems as we have on similar problems in conventional-tillage they would be of only minor consequence today.

The objective of this report is to identify weed problems in the Major no-till systems in the Upper South. As with conventional systems, some major problems are present in rather localized areas that, for reasons of space and scope, will not be mentioned, but this is not intended to infer that they don't exist.

JOHNSONGRASS

Johnsongrass is one of the major weed problems in no-till cropping systems in the Upper South. Most of the cropland in this area is either infested with johnsongrass or potentially can become infested. The best approach to handling this problem in no-till cropping systems is to have near complete control of johnsongrass for at least one year (preferably several years) prior to no-tilling. If this can be achieved the problem is then reduced to seedling johnsongrass which is much easier to control with available herbicides.

Experience in the Upper South has not shown much, if any, advantage of Roundup or Bronco (glyphosate) over Paraquat for rhizome johnsongrass control in early spring plantings of corn. Cool temperatures coupled with reduced susceptibility of very young johnsongrass usually means poor results. Also, much of the johnsongrass has not emerged at the time corn is planted. There are no selective preemergence or postemergence herbicides for rhizome johnsongrass control in corn or grain sorghum. Lasso (alachlor), Dual (metolachlor) or Prowl (pendimethalin) all effectively control seedling johnsongrass. Lasso and Dual can only be used with herbicide safened grain sorghum seed. Prowl is only labeled for postemergence incorporated application in grain sorghum. Dual or Prowl is effective on seedling johnsongrass in no-till cotton, however, compatibility problems exist in tank mixtures of Dual with Cotoran or Lanex (fluometuron).

In no-till soybeans, temperatures are warmer and rhizome johnsongrass is generally at a more susceptible growth stage for control with Roundup or Bronco than with earlier plantings.

Excellent initial rhizome johnsongrass control has been obtained with Bronco compared to Paraquat plus Lasso and this resulted in an 8 bushel per acre higher

R. M. Hayes, Associate Professor, Plant and Soil Science Department, University of Tennessee, Jackson, Tennessee.

yield (Table 1). Where Bronco was followed by a single application of Poast (sethoxydim) late season johnsongrass control was more than doubled and yields were improved another 11 bushels per acre. Two applications of Poast following Bronco gave excellent johnsongrass control throughout the season and soybean yields were 10 bushels per acre higher than the comparable treatment following Paraquat plus Lasso.

COVER CROPS

Until very recently, most of the no-till production was in small grain stubble, killed sod, or old crop residue. There is now considerable interest in growing legume cover crops which would provide soil cover and supply some nitrogen. One of the problems encountered with legume cover crops is when and how to kill these covers, especially for no-till corn and cotton. Cool, cloudy weather present at this time coupled with the rank growth of the cover crops often results in slow or incomplete kill. Of the legumes with which we have had experience, alfalfa, subterranean clover, red clover and arrowleaf clover have been the most difficult to control with Paraquat. Fortunately, the two legume covers which appear to be most promising, hairy vetch and crimson clover, are relatively easy to control with either Roundup or Paraquat in combination with residual herbicides such as Aatrex, etc. (atrazine) or Cotoran/Lanex.

HORSEWEED

Horseweed, sometimes and perhaps more appropriately called marestail, is virtually ubiquitious to untilled fields in the Upper South in the early spring. It is often 1 to 2 ft when no-till crops are planted in old crop residues. This weed is difficult to control with contact type herbicides like Paraquat. To be effective, the herbicide must kill all the growing points on the plant. Systemic herbicides like Roundup or 2,4-D are effective on this weed.

PERENNIAL WEEDS

Several perennial weeds are present in no-till cropping systems in the Upper South and are serious problems in localized situations. The more common ones are shown in Table 2.

ANNUAL WEEDS

Among the more serious annual weed problems are the annual grasses, especially fall panicum, giant foxtail, and crabgrass, These are often problems where they are well established at planting and are not killed by the "burndown" herbicide or where sufficient rainfall is not received to "activate" preemergence herbicides, or where excessive rainfall depletes the activity of preemergence herbicides. The recent introduction of Poast and Fusilade (fluazifop-butyl) should help to solve this problem.

Volunteer small grain is often mentioned as a problem in no-till double-cropped soybeans. It seems to be more of a problem as a host for small grain diseases than as a competitive weed.

Smartweed, common ragweed, and cutleaf evening primrose are often present in no-till double-cropped soybeans in wheat stubble. Often much of the leaf surface of these weeds is removed during combining and consequently contact kill of established plants is difficult. Systemic herbicides such as glyphosate provide better control of these weeds under these conditions.

Sicklepod is definitely a serious weed pest in no-till situations, especially in soybeans where herbicide activity is less than for those used in corn, grain sorghum or cotton. At the present time, partial control is attainable with preemergence herbicides such as Dual or Lasso plus Sencor/Lexone (metribuzin). Early overtop application of Attac (toxaphene) and oil concentrate will provide excellent control of sicklepod at the cotyledon stage. This program will provide a height differential for subsequent post-directed application of Paraquat, Sencor/Lexone, or Sencor/Lexone plus 2,4-DB (Table 3). In no-till corn, sicklepod can be effectively controlled with atrazine at 3 to 4 lbs ai/acre. No-till grain sorghum will not tolerate these rates of atrazine. In fact, we have observed more grain sorghum injury from atrazine at 2 lb ai/acre preemergence under no-till than conventional-tillage. This is possibly due to either more feeder roots close to the soil surface or greater movement of atrazine in the zone of root uptake.

Annual ryegrass, wild garlic, wild mustard, and cheat appear to be more prevelant in wheat fields not receiving fall tillage,

SUMMARY

Obviously, it is not within the scope of this paper to discuss all of the weed problems in no-till systems in this region. Similarly, this report does not imply that these problems are only found in no-till systems. These are just some of the more apparent problems. Perhaps the most important problem in weed control in no-till systems is to develop more economical weed control systems, especially where specific problems exist that require postemergence control measures. Secondly, as we continue in no-till systems year after year and both litter and organic matter are increased, we must be prepared to increase herbicide rates. Thirdly, we must not repeatedly rely on the same herbicide program year after year, hut rather develop rotational weed control programs that will allow a better opportunity for control of some of these weed problems.

Table 1. Johnsongrass control and effect on no-till soybean yields as influenced by Bronco or Paraquat plus Lasso alone or followed by one or two applications of Poast.

Treatment[1/]	Percent control 8-2-82	9-1-82	Dry wt 9/16	Yield Bu/A[2/]
Bronco	38	24	2110	21.6 e-h
Bronco + Poast	86	12	-	32.4 a-d
Bronco + Poast + Poast	92	9R	-	39.2 a
Paraquat + Laaao	0	15	4453	13.1 h-j
Paraquat + Lasso + Poast	81	44	-	18.0 f-i
Paraquat + Lasso + Poast + Poast	68	91	-	29.4 b-e

1/ 'Essex' soybeans planted and treated with preemergence herbicides on June 22. Firot application of Poast on July 12 and Recond application on August 4. Bronco 4 qts/A; Paraquat 1 qt/A; Lasso 2.6 qts/A; Poast - first application 1 1/2 pts/A; 1 pt/A second application.

** Values within a column followed by the same letter(s) are not significantly different at the 5% level according to Duncan's New Multiple Range Test.

Table 2. Perennial weeds and no-till crops in which they are a problem.

Weed Problem	No-Till Cropping Situation Corn	Grain Sorghum	Cotton	Soybeans	Wheat
Johnsongrass	X	X	X	X	
Bermudagrass	X	X	X		
Trumpetcreeper	X	X	X	X	
Honeyvine milkweed	X	X			
Nutsedge	X				
Bigroot morningglory	X	X	X	X	
Smooth groundcherry				X	
Goldenrod			X	X	
Pokeweed	X	X		X	
Wild garlic					X

Table 3. Sicklepod control with postemergence herbicides in no-till 'Essex' soybean at Springhill. Tennessee, 1981.

Treatment[1/]	Application[2/]	% Sicklepod control 8-5-81	9-3-81	Yield Bu/A[3/]
Lorox + 2,4-DB + X-77	POD	65	49	38.9 bc
Paraquat + X-17	POD	15	30	38.0 c
Sencor/Lexone + X-77	POD	80	80	40.1 bc
Sencor/Sexone + 2,4-DB	POD	96	90	45.6 a
Attac + C.O.C.; [4/]	O.T.			
Paraquat + X-77	POD	97	93	41.5 abc
Attac + C.O.C.;	O.T.			
Lorox + 2.4-DB + X-17	POD	95	87	43.6 ab
Attac + C.O.C.;	O.T.			
Sencor/Lexone + X-77	POD	91	93	41.5 abc
Attac + C.O.C.;	O.T.			
Sencor/Lexone + 2.4-DB + X-77	POD	98	94	45.7 s
No postemergence herbicide	-	0	0	33.0 d

1/ Entire experiment planted and treated with Dual, Lexone, Paraquat and X-77 at 1.5: 0.5, 0.5 lb ai/acre plus 0.5% volume/volume on June 16, respectively. Rates of other herbicides in lbs ai/acre are as follow: Lorox - 0.5; 2,4-DB - 0.2; Paraquat - 0.125; Sencor/Lexone - 0.5; and Attax - 2.0.

2/ O.T. = Overtop postemergence at cotyledon stage on July 1. POD = Post directed in soybeans 12 inches. 3 to 4 trifolates; and sicklepod from cotyledon to 5 inches on July 15.

3/ Values within a column followed by the same letter(s) are not significantly different at the 5% level according to Duncan's New Multiple Range Test.

4/ C.O.C. = Agridex crop oil concentrate at 0.5% volume/volume.