

AGRICULTURAL CHEMICALS IN TEXAS: ASSESSMENT OF GROWER PREFERENCES AND PRACTICES

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Abstract

Cotton is the target of 28% of all pesticides used on crop and pastureland in Texas; herbicides make up 49% of the pesticide use in cotton. Our survey showed that 96% of the cotton acreage was treated with one or more herbicides even though 98% of the fields were cultivated (usually 3 or more times). Growers used 6.1 million pounds (ai) of herbicides on 5.2 million acres. Over 18 different herbicides were reported by growers but the market was dominated by six, which represented a diversity of herbicide chemistry. About two-thirds of the Texas cotton crop is grown under a recognized set of IPM practices; yet 12.1 million pounds of chemicals were still necessary for insect, weed, and harvest preparation in 1994.

Introduction

This survey involved 15% the state's 5.4 million acres of cotton. Through the Texas Agricultural Statistics Service, over 1,500 growers responded to detailed questions on their cultural and IPM practices and the pests and pesticides encountered in their 1994 cotton crop. The state was segmented into three regions. This paper summarizes statewide weed, herbicide, and harvest-aid chemical responses. Weeds were the major biological pest confronting cotton growers. Growers cultivated an average of 3.1 times to control annual and perennial weeds on 98% of the fields. They treated more than 96% of the cotton acreage in Texas with one or more herbicides. About 75% of them calibrated sprayers and 60% rotated their crops and/or herbicides to reduce weed problems.

Results and Discussion

The Cotton Herbicide Market

Herbicide use was consistently high across the state. Essentially all of the acreage was both cultivated and treated. Growers treated 5.3 million acres of cotton for weeds, using a total of 6.167 million pounds of herbicide (Table 1). The preplant chemical trifluralin (Treflan) was clearly the leading herbicide in Texas cotton fields, with over 4.1 million acres treated with 3.2 million pounds (ai). The second and third most common herbicides were prometryn (Caparol) and pendimethalin (Prowl), which

were used on 1 to 1.2 million acres of cotton. Other prevalent herbicides were diuron (Karmex), fluometron (Cotoran), and glyphosate (Round Up). These six chemicals made up 86% of the cotton herbicide market in Texas.

Application

Preplant treatments (51%) and/or preemergence sprays (24%) were used on 75% of the acreage. After 30 years of advocacy, we noted that directed post emergence treatments were used less than 4% of the time, while selective spot treatments made up 12% of all treatments (mostly for glyphosate on johnsongrass). Over-the-top herbicides of Fusilade DX, Poast Plus, Select, and Assure II were rather new in the marketplace in 1994 and showed only nominal use in this survey. These selective postemergence products are strategically important now in weed management strategies. Less than 3% of all herbicides were aerially applied.

Weed Priorities and Control

We asked growers to rank their weed problems in order of importance (Table 2) and to identify the key chemicals used for each pest.

Pigweed (several *Amaranthus* spp) was ranked as the number one weed pest across all regions and was the target of 53% of all herbicide applications. Trifluralin (most commonly the Treflan formulation) was the predominant herbicide for pigweed and dominated the market (making up 61% of all herbicide treatments for this pest). Pigweed is such a prevalent and highly predictable problem that this preplant incorporated treatment has become a basic control measure for most growers. Growers also used pendimethalin (Prowl) for 15% and prometryne (Caparol) for 13% of the applications for pigweed control.

Johnsongrass was the second most cited weed pest and was the target of 17% of all herbicide applications in 1994. On established johnsongrass, 37% of growers in this survey used spot treatments or wick applications of glyphosate. About 20% of the growers used trifluralin, and 20% used over-the-top applications of fluzifop-P-butyl (Fusilade DX). These three herbicides made up 77% of the chemical applications for johnsongrass suppression, in addition to crop rotational practices.

Other key weed pests listed by growers were silverleaf nightshade (4%), cocklebur (4%), morningglories (4%), sunflower (3%), 'other broadleaves' (9%), and (undesignated) annual grasses (4%).

Other weed species receiving some mention by growers included: devil's claw (*Proboscidea louisianica*), lanceleaf sage (*Salvia reflexa*), woolyleaf bursage (*Ambrosia grayi*), Texas blueweed (*Helianthus ciliaris*), nutsedge (generally yellow nutsedge), field bindweed (*Convolvulus arvensis*),

Texas panicum (*Panicum texanum*) and Russian thistle (*Salsola iberica*).

PRGs and Harvest-aid Chemicals

Ethephon (Prep) was applied on over 500,000 acres to suppress cotton growth (Table 3). In one year paraquat rapidly assumed the market position of arsenic acid which was canceled after 1993. Paraquat is now the leading desiccant for cotton and was applied on 1.2 million acres in 1994. Sodium chlorate, another non-proprietary desiccant, was applied on 163,000 acres. In the defoliant market, tribufos (DEF/Folex) dominated and was applied on 853,000 acres, followed by two formulations of thiadiazuron (Dropp and Ginstar) on 747,000 acres. Over 50% of the harvest aids were applied by farmers, with ground-broadcast equipment.

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References

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Table 1. Herbicides Applied to Texas Cotton in 1994.

Active ingredient	Recognized Trade Name	Planted acres treated (x 1000)	Total lbs ai applied (x 1000)
Trifluralin	Treflan	4,109	3,240
Prometryn	Caparol	1,227	815
Pendimethalin	Prowl	1,094	808
Diuron	Karmex	455	237
Fluometuron	Cotoran	304	198
Glyphosate	Round Up	276	192
Clomazone	Command	196	77
MSMA	Several	187	240
Fluazifop	Fusilate DX	187	21
Norflurazon	Zorial	143	73
Metalochlor	Dual	121	148
Cyanazine	Bladex	110	66
Dicamba	Banvel	43	31
Clethodim	Select	38	7
Quizalofop	Assure II	33	2
Fenoaprop	Bugle	33	2
Sethoxydim	Poast Plus	33	8
Linuron	Lorox	11	3

total of 5.3 million acres treated with 6.17 million pounds of herbicide

Table 2. The 'Worst Weeds List' of Texas Cotton Growers.

Order of Importance	Weed	Percent of total weed problem
1	pigweed	53%
2	johnsongrass	17
3	silverleaf nightshade	4
4	cocklebur	4
5	morningglory	4
6	sunflower	3
7	other broadleaves	9
8	annual grasses	4
9 to 16	8 other weeds mentioned	2

Table 3. Plant Growth Regulators and Harvest Aid Chemicals applied in Texas in 1994.

Chemical	Acres treated (X 1000)	lbs ai applied (X 1000)
PRGs		
Ethephon	506	411
Mepiquat chloride	384	12
Harvest Aids		
Paraquat	1,237	361
Tribufos	713	713
Thidiazuron	747	136
Sodium chlorate	163	387
Endothall	53	2
Dimethipin	35	10
Cacodylic acid	29	20