Pesticide Use and Pest Management Practices for Major Crops in North Dakota - 2000

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PESTICIDE USE FOR WHEAT

Wheat has the greatest number of acres of any crop grown in North Dakota. The state grows primarily hard red spring and durum wheats; limited acres of winter wheat are produced. Production statistics for **ALL WHEAT** in North Dakota are summarized in Table 6.

The most frequently applied herbicide was 2,4-D which was used on 51.3% of the wheat acres in 2000 (Table 7), compared to 50% in 1996, 52% in 1992, 55% in 1989, and 64% in 1984. The next most frequent was fenoxaprop-p, applied to 23.9%; followed by dicamba at 20.7%, and MCPA at 16.7%. The top five herbicide active ingredients reported from the past three pesticide use surveys are summarized in Figure 1. The greatest increase in the use of an active ingredient was with fenoxaprop-p. Wheat acreage treated with sulfonylurea type herbicides (chlorsulfuron, metsulfuron, thifensulfuron, triasulfuron, and tribenuron) was 44% in 2000, an increase from 32% in 1996, and 21% in 1992 and 1989. The farm operator applied 87% of the herbicides to wheat, and 95% of the applications were applied with ground equipment.

Insecticides were applied on only 1% of the wheat acreage in 2000 (Table 7). In the past, insecticide usage on wheat acres has been strongly influenced by regional outbreaks of grasshoppers. In 1996, the orange wheat blossom midge, *Sitodiplosis mosellana*, had a significant influence on insecticide usage when 3.6% of the acres were treated with chlorpyrifos (Figure 1). Insecticide applications were applied 54% of the time by air.

Fungicides were applied to 6.7% of the wheat acres (Table 7). The most frequently applied fungicide was tebuconazole on 4.9% of the acres. Tebuconazole was first made available for use on wheat in 1997 under a Section 18 Emergency Exemption label for management of fusarium head blight, or head scab.

TABLE 6. Production summary for ALL WHEAT, North Dakota, 1996-2000 (NDASS, 2001)

Year	Acres		Yield		Marketing Year Avg. Price	Value of Production	Value per harvested Acre	U.S. Production	
	Planted	Harvested	Per Acre	Production					
	(000 Acres)		*(Bu.)*	*(000 Bu.)*	*($/Bu.)*	*(000 Dols.)*	*(Dols.)*	*(%)*	*(Rank)*
1996	12,680	12,515	31.6	395,130	4.19	1,638,379	130.91	17	1
1997	11,625	11,095	24.3	269,290	3.82	1,019,426	91.88	11	2
1998	9,770	9,610	32.0	307,700	3.03	930,897	96.87	12	2
1999	9,410	8,657	28.0	242,280	2.77	670,237	77.42	11	2
2000	10,170	9,413	33.3	313,785	2.71	857,369	91.08	14	2

TABLE 7. WHEAT: Herbicide, Insecticide, and Fungicide usage and application method. North Dakota, 2000

	Acres Treated [2]	Acres Treated	Applications			Applicator		Method of Application	
			1 x	2 x	3 x	Farm Operator	Custom	Aerial	Ground
	(1000)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Herbicide [1]									
2,4-D	4778.6	47.0	99.2	0.8	---	85.8	14.2	6.4	93.6
2,4-D + Dicamba	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acetochlor + Safener + Atrazine	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acifluorfen	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acifluorfen + Bentazon	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ametryn	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 7. ***Continued***

	Acres Treated [2]	Acres Treated	Applications			Applicator		Method of Application	
			1 x	2 x	3 x	Farm Operator	Custom	Aerial	Ground
	(1000)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Herbicide [1]									
Atrazine	NS	NS	NS	NS	NS	NS	NS	NS	NS
Bromoxynil	91.6	0.9	100.0	---	---	84.1	15.9	---	100.0
Bromoxynil + MCPA	1266.1	12.4	95.9	4.1	---	93.0	7.0	2.59	97.5
Clodinafop	64.6	0.6	100.0	---	---	80.3	19.7	9.6	90.4
Clopyralid	21.1	0.2	100.0	---	---	84.9	15.1	---	100.0
Clopyralid + 2,4-D	225.0	2.2	100.0	---	---	77.3	22.7	8.5	91.5
Clopyralid + MCPA	41.3	0.4	100.0	---	---	72.6	27.4	18.2	81.8
Dicamba	2104.1	20.7	100.0	---	---	87.8	12.2	4.4	95.6
Dicamba + Primisulfuron	NS	NS	NS	NS	NS	NS	NS	NS	NS
Diclofop	NS	NS	NS	NS	NS	NS	NS	NS	NS
Difenzoquat	26.1	0.3	100.0	---	---	69.7	30.3	30.3	69.7
Fenoxaprop + 2,4-D + MCPA	181.3	1.8	81.2	18.8	---	77.0	23.0	15.9	84.1
Fenoxaprop + MCPA	190.9	1.9	100.0	---	---	82.5	17.5	6.4	93.6
Fenoxaprop+MCPA+ Thifensulfuron +Tribenuron	419.3	4.1	100.0	---	---	67.6	32.4	4.2	95.8
Fenoxaprop-P + Safener	2426.7	23.9	98.7	1.3	---	89.4	10.6	3.6	96.4
Fenoxaprop-P-ethyl +MCPA + Isooctylester+Thifensulfuron	21.7	0.2	100.0	---	---	58.1	41.9	16.2	83.8
Fluroxypyr	226.5	2.2	98.8	1.2	---	94.4	5.6	2.0	98.0
Fluroxypyr + 2,4-D Ester	32.9	0.3	100.0	---	---	92.7	7.3	---	100.0
Fluroxypyr + MCPA Ester	NS	NS	NS	NS	NS	NS	NS	NS	NS
Glyphosate	425.0	4.2	86.8	13.2	---	80.4	19.6	7.7	92.3
Glyphosate + Dicamba	NS	NS	NS	NS	NS	NS	NS	NS	NS
Imazamethabenz	182.2	1.8	100.0	---	---	85.9	14.1	14.1	85.9
Imazethapyr	NS	NS	NS	NS	NS	NS	NS	NS	NS
MCPA	1698.1	16.7	99.6	0.4	---	88.3	11.7	2.3	97.7
Metsulfuron	80.3	0.8	100.0	---	---	91.0	9.0	3.9	96.1
Metsulfuron + Chlorsulfuron	23.0	0.2	100.0	---	---	86.6	13.4	---	100.0
Oxadiazon	NS	NS	NS	NS	NS	NS	NS	NS	NS
Paraquat	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pendimethalin	NS	NS	NS	NS	NS	NS	NS	NS	NS
Picloram	20.3	0.2	100.0	---	---	74.2	25.8	---	100.0
Quizalofop-P	5.6	0.1	100.0	---	---	84.8	15.2	---	100.0
Sethoxydim	12.3	0.1	100.0	---	---	100.0	---	---	100.0
Thifensulfuron	248.9	2.4	100.0	---	---	83.9	16.1	6.6	93.4
Thifensulfuron + Tribenuron	286.5	2.8	97.8	---	---	86.0	14.0	8.5	91.5
Tralkoxydim	244.5	2.4	100.0	---	---	82.2	17.8	0.7	99.3
Triallate	105.9	1.0	100.0	---	---	83.9	16.1	4.4	95.6
Triallate + Trifluralin	132.6	1.3	100.0	---	---	81.1	18.9	---	100.0
Triasulfuron	63.3	0.6	100.0	---	---	91.6	8.4	8.4	91.6
Tribenuron	1207.0	11.9	97.4	2.6	---	86.7	13.3	3.4	96.6
Trifluralin	385.9	3.8	100.0	---	---		10.7	---	100.0
All Herbicides	17333.2	170.4	98.3	1.7	---	86.6	13.4	4.7	95.3
Insecticide									
Chlorpyrifos	66.0	0.6	100.0	---	---	62.4	37.6	31.8	68.2
Dimethoate	NS	NS	NS	NS	NS	NS	NS	NS	NS
Encapsulated Methyl Parathion	14.7	0.1	100.0	---	---	---	100.0	100.0	---
Esfenvalerate	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ethyl Parathion	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lambda-cyhalothrin	NS	NS	NS	NS	NS	NS	NS	NS	NS
All Insecticides	101.0	1.0	84.3	15.7	---	57.4	42.6	54.5	45.5

Table 7. ***Continued***

	Acres Treated [2] (1000)	Acres Treated (%)	Applications 1 x (%)	Applications 2 x (%)	Applications 3 x (%)	Applicator Farm Operator (%)	Applicator Custom (%)	Method of Application Aerial (%)	Method of Application Ground (%)
Fungicide									
Benlate	26.6	0.3	100.0	---	---	78.9	21.1	50.4	49.6
Chlorothalonil	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mancozeb	36.7	0.4	100.0	---	---	28.8	71.2	71.2	28.8
Propiconazole	119.3	1.2	99.5	0.5	---	64.3	35.7	32.9	67.1
Tebuconazole	494.2	4.9	96.5	3.5	---	47.1	52.9	51.3	48.7
All Fungicides	678.5	6.7	97.3	2.7	---	50.3	49.7	49.2	50.8

[1] Herbicides applied as a tank mixture were considered separately unless a commercial premix was used.
[2] Multiple applications to the same acre were reported as separate values. Acres treated can exceed 100% of the planted acres.
NS - not sufficient to estimate district or state projections.

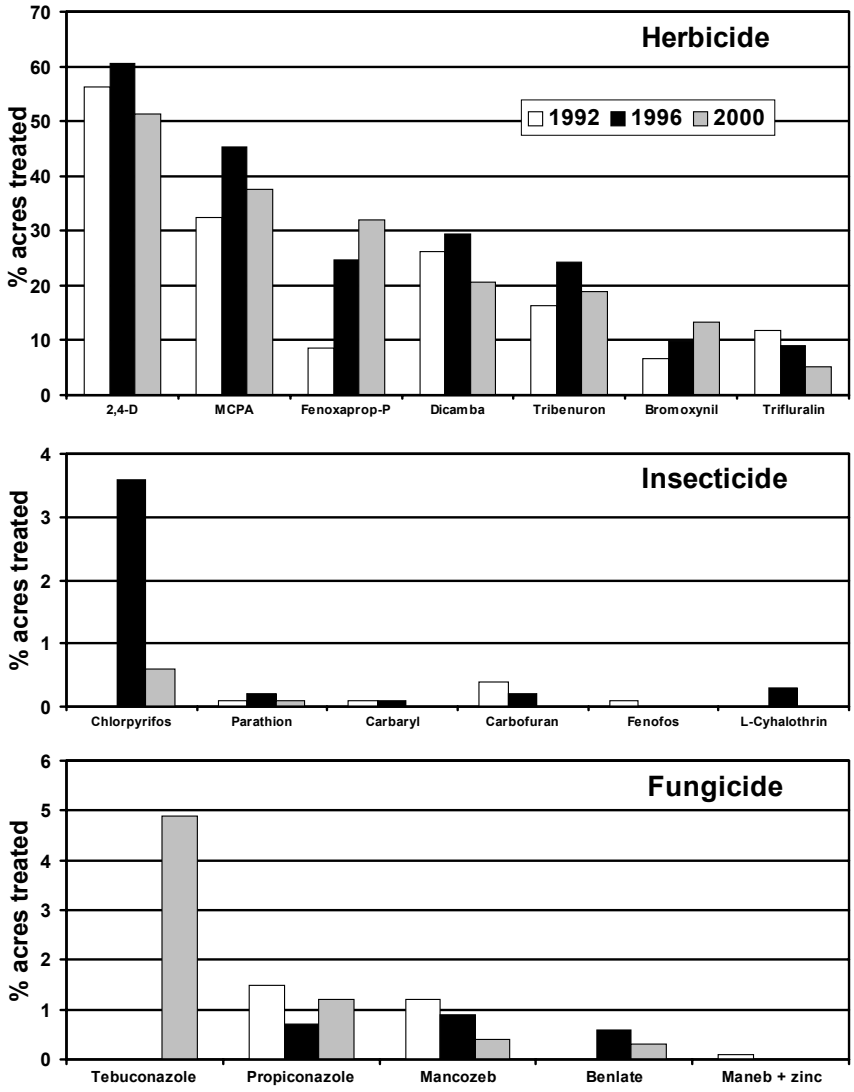

Figure 1. Percent of North Dakota wheat acres treated with the top five active ingredients from the herbicide, insecticide, and fungicide pesticide groups reported in the 1992, 1996, and 2000 statewide pesticide use surveys.