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

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P. Glogoza, M. McMullen, R. Zollinger, A. Thostenson,
T. DeJong, W. Meyer, N. Schauer, J. Olson

North Dakota State University
NDSU Extension Service

ON-FARM SEED TREATMENT, BY CROP

Table 1 provides information on acres planted with treated seed, regardless if treatment was with a single, multiple, or a mixture of products. Data in Table 4 indicate acreage of individual crops planted to seed that was treated on-farm with single, several, or combinations of products.

For **wheat**, 31.9% of the acreage was planted to seed treated on-farm, with maneb + lindane as the individual seed treatment product used on the most acres at 7.8% of the acreage treated (Table 4). Carboxin was used on 6.9% of the acreage and carboxin + thiram on 4.2% of the acreage (Table 4). The grain auger method was used to treat 67.5% of the on-farm treated wheat. Insecticide seed treatments were used on 35% of the seed treated acres. Lindane was the seed treatment insecticide used on 99+% of the seed treated acres.

Barley seed was treated on-farm for 37.8% of the acres (Table 4). The most frequently used treatments were products containing carboxin, with 11.2% of the acreage planted to seed treated with carboxin alone, and 24.4% planted with carboxin + other pesticides. Maneb + lindane was used on seed treated for 7.1% of the barley acreage (Table 4). The grain auger method was used for 64.8% of the on-farm seed treatment of barley. Lindane was the most common insecticide used to treat barley seed. It was used on 31.7% of the seed treated barley acres, and 11.9% of the total barley acres.

On-farm seed treatment was used for only 1.7% of the **oat** acreage, non-significant levels of the **flax** acreage, and 6.4% of the **soybean** acreage (Table 4). Carboxin alone and maneb + lindane were the only measurable products for oats. Maneb + lindane was the only treatment mentioned for flax. Carboxin was the only measurable product for soybean on-farm treatment.

Canola seed is frequently treated for disease and insect control. Canola acres seeded with treated seed were 81.7% of the total acres (Table 4). The most frequently used fungicide was benomyl at 21.3% of the seed treated acres. The insecticide imidacloprid was used on 58% of the acres to manage crucifer flea beetles. Thiamethoxam, a new insecticide seed treatment registered as a Section 18 on a limited number of acres in 2000, was used on only 2.3% (Table 4). These seed treatment products were only available as a commercial seed treatment.

Over all the crops treated on-farm, 0.95 million acres were planted with seed treated with maneb fungicide + lindane insecticide; 0.95 million acres had seed treated with carboxin fungicide alone, and another 0.52 million acres had seed treated with carboxin + thiram fungicide (Table 5). Carboxin alone or in combination was used on seed planted to 1.9 million acres (compared to 3.74 and 3.05 million in 1996 and 1992, respectively), and maneb alone or in combination was used on seed planted to 1.1 million acres (compared to 2.30 and 2.38 million in 1996 and 1992, respectively). Seed treatment also included use of insecticide products such as diazinon, imidacloprid, lindane, and thiamethoxam either alone or in combination with fungicides.

TABLE 4. ON-FARM SEED TREATMENT BY CROP: Acres treated, percent of crop, and method of application for North Dakota, 2000

TREATMENT	Acres Seeded [1]	Acres Seeded	Treatment Method		
			Drill Box	Auger	Other
	(1000)	(%)	(%)	(%)	(%)
Wheat					
Bacillus subtilis	NS	NS	NS	NS	NS
Captan + Diazinon	NS	NS	NS	NS	NS
Captan + PCNB + Thiabendazole	26.6	0.3	11.2	88.8	---
Carboxin	699.9	6.9	26.6	68.5	4.9
Carboxin + Imazalil + Thiabendazole	118.1	1.2	---	100.0	---
Carboxin + Maneb + Lindane	104.0	1.0	33.8	66.2	---
Carboxin + Thiram	430.3	4.2	21.8	72.2	6.0
Carboxin + Thiram + Lindane	124.2	1.2	60.2	23.9	15.9
Difenoconazole	267.6	2.6	18.0	74.2	7.8
Formaldehyde	NS	NS	NS	NS	NS
Imazalil	49.3	0.5	53.5	46.5	---
Lindane	121.1	1.2	11.2	75.4	13.4
Mancozeb	NS	NS	NS	NS	NS
Maneb + Lindane	791.0	7.8	37.4	61.1	1.4
Metalaxyl	NS	NS	NS	NS	NS
Tebuconazole	317.7	3.1	12.6	67.1	20.3
Thiram	123.9	1.2	18.4	67.7	13.8
TOTAL	3243.2	31.9	26.0	67.5	6.5
Barley					
Captan	NS	NS	NS	NS	NS
Captan + Diazinon	NS	NS	NS	NS	NS
Carboxin	212.5	11.2	21.6	73.2	5.2
Carboxin + Imazalil + Thiabendazole	22.9	1.2	---	100.0	---
Carboxin + Maneb + Lindane	31.9	1.7	32.0	68.0	---
Carboxin + Thiram	89.9	4.7	19.9	64.8	15.3
Carboxin + Thiram + Lindane	30.4	1.6	75.9	17.4	6.8
Difenoconazole	12.9	0.7	24.1	62.6	13.3
Formaldehyde	NS	NS	NS	NS	NS
Imazalil	10.9	0.6	---	100.0	---
Lindane	29.2	1.5	25.5	55.4	19.1
Maneb + Lindane	135.6	7.1	45.7	53.2	1.1
Tebuconazole	97.2	5.1	21.5	62.3	16.1
Thiram	37.0	1.9	20.8	75.1	4.2
TOTAL	717.5	37.8	27.8	64.8	7.4

Table 4. ***Continued***

TREATMENT	Acres Seeded [1]	Acres Seeded	Treatment Method		
			Drill Box	Auger	Other
	(1000)	(%)	(%)	(%)	(%)
Oat					
Carboxin	4.2	0.7	39.8	60.2	---
Carboxin + Thiram	NS	NS	NS	NS	NS
Carboxin + Thiram + Lindane	NS	NS	NS	NS	NS
Lindane	NS	NS	NS	NS	NS
Maneb + Lindane	3.0	0.5	88.0	12.0	---
Metiram	NS	NS	NS	NS	NS
TOTAL	9.9	1.7	52.3	47.7	---
Flax					
Maneb + Lindane	NS	NS	NS	NS	NS
TOTAL	NS	NS	NS	NS	NS
Canola					
Benomyl	270.9	21.3	---	---	100.0
Captan	NS	NS	NS	NS	NS
Carboxin	NS	NS	NS	NS	NS
Imazalil	NS	NS	NS	NS	NS
Imidacloprid	738.3	58.1	---	---	100.0
Thiamethoxam + Metalaxyl + Fludioxonil + Difenoconazole	29.4	2.3	---	---	100.0
Thiram	NS	NS	NS	NS	NS
TOTAL	1068.4	81.7	---	---	100.0
Soybean					
Carboxin	30.0	1.6	---	100.0	---
Carboxin + Imazalil + Thiabendazole	NS	NS	NS	NS	NS
Carboxin + Thiram	NS	NS	NS	NS	NS
Carboxin + Thiram + Metalaxyl	NS	NS	NS	NS	NS
Fludioxonil	NS	NS	NS	NS	NS
Maneb + Lindane	NS	NS	NS	NS	NS
Metalaxyl	NS	NS	NS	NS	NS
Tebuconazole	NS	NS	NS	NS	NS
TOTAL	81.3	6.4	---	98.2	1.8

[1] Acres reported seeded with treated seed include multiple applications to the same seed and seed treatment products applied as a tank mixture were totaled separately unless applied as a commercial premix.
NS - not sufficient to estimate state projections.

TABLE 5. ON-FARM SEED TREATMENT BY ACTIVE INGREDIENT: Total acres treated, percent of selected crops, and method of application for North Dakota, 2000

TREATMENT	Acres Seeded		Treatment Method		
			Drill Box	Auger	Other
	(1000)	(%)	(%)	(%)	(%)
Bacillus subtilis	NS	NS	NS	NS	NS
Benomyl	270.9	21.3	2.6	2.8	94.5
Captan	14.3	0.5	9.0	---	91.0
Captan + Diazinon	NS	NS	NS	NS	NS
Captan + PCNB + Thiabendazole	26.6	0.3	11.2	88.8	---
Carboxin	956.3	6.0	24.4	69.8	5.8
Carboxin + Imazalil + Thiabendazole	148.4	1.1	---	100.0	---
Carboxin + Maneb + Lindane	135.9	1.1	33.4	66.6	---
Carboxin + Thiram	522.0	3.6	21.4	71.0	7.5
Carboxin + Thiram + Lindane	155.2	1.2	63.0	22.9	14.1
Carboxin + Thiram + Metalaxyl	NS	NS	NS	NS	NS
Difenoconazole	280.5	2.3	18.3	73.7	8.0
Fludioxonil	NS	NS	NS	NS	NS
Formaldehyde	NS	NS	NS	NS	NS
Imazalil	61.7	0.5	42.8	54.8	2.4
Imidacloprid	738.3	58.1	2.8	1.3	95.9
Lindane	150.3	1.2	14.0	71.5	14.5
Mancozeb	NS	NS	NS	NS	NS
Maneb + Lindane	950.4	6.3	38.4	60.3	1.4
Metalaxyl	14.0	0.1	2.3	97.7	---
Metiram	NS	NS	NS	NS	NS
Tebuconazole	417.8	3.0	14.6	65.9	19.6
Thiamethoxam + Apron + Maxim + Dividend	29.4	2.3	---	---	100.0
Thiram	166.5	1.2	18.3	67.1	14.6
TOTAL	5125.4	31.4	21.1	53.8	25.1

NS - not sufficient to estimate state projections.