

2013 National Sunflower Crop Survey

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For the last twelve years (except 2004), the National Sunflower Association has conducted in-depth fall surveys in producers' fields throughout the main sunflower growing regions of the United States as well as the Canadian province of Manitoba.

During the 2013 sunflower growing season, 32 trained teams - including agronomists, entomologists, pathologists, crop consultants and/or producers - randomly stopped at 209 sunflower production fields, which represent approximately one field for every 10,000-15,000 acres in sunflower-producing counties. Each team evaluated plant stand, yield potential, disease, insect, and weed issues for each field. They also assessed bird damage and agronomic practices used in the field. A sunflower seed sample was taken from each field to detect insect damage in the laboratory.

A yield estimate was calculated based on plant stand, head size, seed size, seeds per head and percent loss due to bird feeding. The 2013 average surveyed sunflower yield was 1,733 pounds per acre with an average per-acre plant population of 15,977 (Table 1).

Table 1. 2013 Fields surveyed per state, oil sunflower, and confectionary sunflower fields in percent, yield estimate and plant population per acre.

	Fields Number	Oil flowers % of fields	Confectionary % of fields	Yield (lb/a)	Plants Per acre
ND	100	87	13	1,736	16,867
MN	10	60	40	1,870	16,529
SD	55	78	22	1,871	15,373
MB	7	0	100	1,969	12,794
NE	6	100	0	1,047	14,212
VT	8	100	0	1,725	21,404
CO	6	50	50	1,344	11,337
TX	12	75	25	1,412	14,978
KS	5	60	40	1,640	9,565
Total	209	79	21	1,733	15,977

Determination of yield-limiting factors was based on the surveyors' judgment after considering all production aspects in the field. Table 2 shows the most-limiting and second most-limiting factors for the period 2011 through 2013. The limiting factors may be different in the various states. For instance, drought may have been less severe in some parts of North Dakota, Manitoba and Minnesota compared with southern states. The results of the survey do not include events that took place after the survey. For instance an early season snow storm caused lodging of sunflower plants in North and South Dakota. However, the event took place after the survey was conducted; therefore late season wind damage is not included in the results presented here.

Overall, the most limiting factor in 2013 was plant spacing within the row, followed by plant disease, drought, and lodging. The plant spacing difficulties consist of large skips within the row, or areas where plants grow too close together, causing some of the plants not to contribute to the sunflower yield. Equal distribution of plants is essential to obtaining maximum sunflower seed yield.

Table 2. Most limiting factor 2011 - 2013 sunflower surveys.

Limiting factor	Limiting factor 2011 ¹		Limiting factor 2012 ¹		Limiting factor 2013 ¹	
	First	Second	First	Second	First	Second
	-----Percent-----					
Plant spacing within row	18	17	18	14	26	10
Disease	16	10	7	7	17	9
Lodging	10	8	3	2	10	11
Birds	8	3	7	5	6	2
Drought	8	3	29	7	15	7
Weeds	8	10	8	11	4	6
Other	7	14	6	7	7	6
Insects	5	4	5	7	1	4
Uneven plant growth	3	1	3	5	2	2
Hail	3	0	1	1	1	3
No problem	14	30	13	34	11	40

¹Based on observations of 155 in 2011, 211 in 2012 and 209 in 2013.

Irregular plant spacing in the row may have been caused by poor seeding conditions, failure to adjust the planter, driving too fast, poor germination, disease, insect damage, or other factors. The average yield of 54 fields with plant distribution issues was 1,844 pounds per acre compared with 22 fields with no observed problems yielding 2,070 pounds per acre. Producers should pay attention to their management and refine their technique while seeding sunflower. Planter calibration may be the first step to reducing skips and achieving better plant spacing within the row.

The average yield in the fields with drought as a limiting factor was 1,324 pounds per acre, which is 64% of the yield obtained in fields without production issues.

In 2013 “no limiting factor” could be determined in 11% of the fields, and in 40% of the fields “no problem” was reported for the second limiting factor. The “no problem” category indicates that the evaluators felt the field reached its maximum yield potential for the 2013 growing season. Across the last three seasons surveyors did not find a second most yield limiting factor in about 35% of the fields.

The diseases of most concern in sunflower are leaf rust, Sclerotinia and Phomopsis. In 2013 sunflower leaf rust incidence (percent of fields in which rust was found) was higher in Kansas, Nebraska, Colorado, Texas and North and South Dakota compared with 2012. Rust was found in 65% of all fields surveyed compared with 38% in 2012. Sclerotinia head rot (percent of the plants) in fields with the disease was up in Minnesota and South Dakota, and down in North Dakota, Manitoba, and Vermont. Head rot was not diagnosed in the surveyed southern states (See graph 1). Phomopsis severity was in general higher in 2013 compared with 2012 (See graph 2).

Dectes long-horned beetle was found in 100, 33, 49, and 34% of the fields in Kansas, Colorado, South Dakota, and North Dakota, respectively. The percent of plants with *Dectes* was 66, 57, 35, and 42 in Kansas, Colorado, South Dakota, and North Dakota, respectively. Thirty three percent of all fields surveyed had *Dectes* present with on average 42% of the plants showing *Dectes* activity.

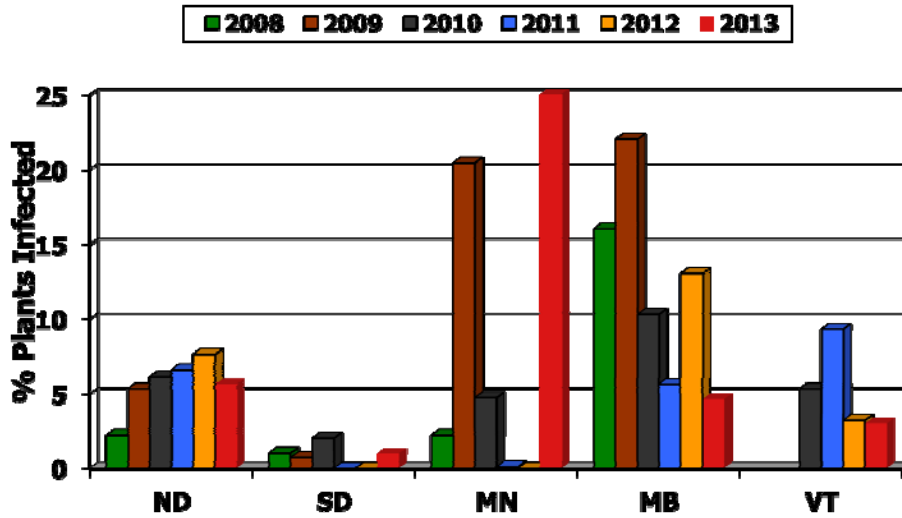
Seed weevil damage was found in 48% of the sunflower samples submitted to the USDA-ARS laboratory in Fargo, ND. Of the samples with seed damage the average number of seeds with seed weevil activity was 5.2% compared to 2.8% in 2012.

Bird damage was reported in 75% of the surveyed sunflower fields in Vermont, 51% in North Dakota, 43% in Manitoba, 18% in South Dakota, 17% in Nebraska, and 10% in Minnesota. The average damage per head across all the surveyed fields was 9%. As the survey was taking place a few weeks before harvest, it is very likely that actual bird damage numbers at harvest were higher.

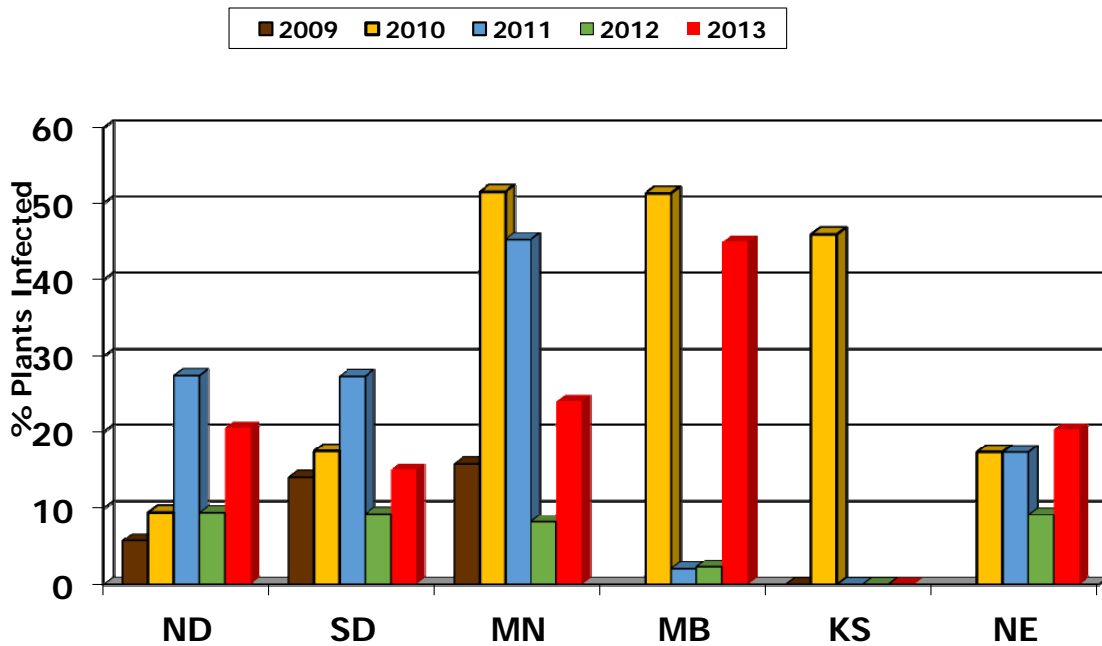
Broadleaf weeds continue to be more of a problem in sunflower fields than most grassy weed species. Palmer amaranth is a major problem weed in Kansas and was recorded as being present in 100% of the surveyed fields. In Texas, 75% of the fields contained Palmer amaranth. In fields where surveyors mentioned weeds as the most limiting factor the average yield was 1,776 pounds per acre, which is about 86% of the yield from the fields with no yield limiting factor reported.

The data generated in the National Sunflower Survey can be used by producers to make better

management decisions. The information is also providing trends over time. The survey data will be used to help define research priorities, improving sunflower crop production, and the bottom line for producers.



Graph1. Sclerotinia head rot severity (percent of the plants infected in fields with sclerotinia) in North and South Dakota, Minnesota, Manitoba and Vermont for the period 2008-2013.



Graph 2. Phomopsis severity (percent of the plants infected in fields with Phomopsis) for six States for the period 2009-2013.

2013 most limiting factor by problem and state.

	ND	SD	MN	MB	KS	NE	CO	TX	VE	Survey	1st %
No problem	9	2	2	0	0	1	0	6	2	22	10.5
Birds	9	2	0	0	0	1	0	0	1	13	6.2
Disease	21	4	4	6	0	1	0	0	0	36	17.2
Drought	9	8	0	0	4	2	4	4	0	31	14.8
Uneven plant growth	2	2	0	0	0	0	0	0	0	4	1.9
Hail	2	1	0	0	0	0	0	0	0	3	1.4
Herbicide damage	1	0	0	0	0	0	0	0	0	1	0.5
Insects	1	1	0	0	1	0	0	0	0	3	1.4
Lodging	10	8	1	0	0	0	1	0	0	20	9.6
Plant spacing within ro	26	20	3	1	0	1	1	2	0	54	25.8
Weeds	4	2	0	0	0	0	0	0	2	8	3.8
Other	6	5	0	0	0	0	0	0	3	14	6.7
Total fields	100	55	10	7	5	6	6	12	8	209	

2013 second most limiting factor by problem and state.

	ND	SD	MN	MB	KS	NE	CO	TX	VE	Survey	2nd %
No problem	40	15	6	3	0	3	4	9	5	85	40.7
Birds	1	0	0	2	0	0	0	0	1	4	1.9
Disease	11	3	3	0	0	0	2	0	0	19	9.1
Drought	7	7	0	0	1	0	0	0	0	15	7.2
Uneven plant growth	1	0	0	0	0	0	0	2	1	4	1.9
Hail	2	2	0	0	0	2	0	0	0	6	2.9
Herbicide damage	0	0	0	0	0	0	0	0	0	0	0.0
Insects	5	1	0	0	1	0	0	1	0	8	3.8
Lodging	10	11	0	2	0	0	0	0	0	23	11.0
Plant spacing within ro	11	9	0	0	1	0	0	0	0	21	10.0
Weeds	5	4	0	0	2	1	0	0	0	12	5.7
Other	7	3	1	0	0	0	0	0	1	12	5.7
Total fields	100	55	10	7	5	6	6	12	8	209	

Row spacing and tillage of 2013 surveyed fields.

Row Spacing	ND	SD	MN	MB	KS	NE	CO	TX	VE	Survey
Row spacing < 30 inch	29	2	3	0	0	0	0	1	0	35
Row spacing > 30 inch	71	53	7	7	5	6	6	11	8	174
Total fields	100	55	10	7	5	6	6	12	8	209
Row spacing < 30 inch in %	29	4	30	0	0	0	0	8	0	17
Row spacing > 30 inch in %	71	96	70	100	100	100	100	92	100	83
Tillage of fields	ND	SD	MN	MB	KS	NE	CO	TX	VE	Survey
No till	55	46	1	0	3	0	3	0	2	110
Minimum till	26	6	0	0	2	4	3	5	0	46
Conventional till	19	3	9	7	0	2	0	7	6	53
Total Fields	100	55	10	7	5	6	6	12	8	209
No till in %	55	84	10	0	60	0	50	0	25	53
Minimum till in %	26	11	0	0	40	67	50	42	0	22
Conventional till in %	19	5	90	100	0	33	0	58	75	25

Disease and Insect issues 2013 sunflower survey (Page 1 of 3).

Root upheaved	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with root uphv	30	15	0	0	0	0	1	0	1	47
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	30	27	0	0	0	0	17	0	20	22
% plants per field	15	11	0	0	0	0	15	0	6	14
Ground Lodging	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with ground lodg	31	16	1	5	4	3	0	5	0	65
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	31	29	10	71	67	38	0	42	0	31
% plants per field	16	3	2	5	5	1	0	2	0	9
Mid Stalk Lodging	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with Mid stalk lodg	24	25	2	6	4	4	0	1	1	67
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	24	45	20	86	67	50	0	8	20	32
% plants per field	8	4	4	4	6	7	0	2	42	6
Sclerotina wilt	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with sclerotina wilt	13	3	6	3	0	0	0	0	0	25
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	13	5	60	43	0	0	0	0	0	12
% plants in the field	6	3	8	5	0	0	0	0	0	6
Sclerotina Mid stalk rot	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with sclerotina mid stalk	17	2	4	7	0	6	0	0	0	36
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	17	4	40	100	0	75	0	0	0	17
% plants in the field	15	2	18	3	0	2	0	0	0	10
Sclerotina head rot	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with sclerotina head	27	1	5	7	0	1	0	0	0	41
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	27	2	50	100	0	13	0	0	0	20
% plants in the field	6	1	27	5	0	3	0	0	0	8
Rhizopus	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with Rhizopus	11	16	2	0	6	1	2	5	2	45
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	11	29	20	0	100	13	33	42	40	22
% plants in the field	24	13	3	0	28	1	15	3	5	16
Downy Mildew	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with Mildew	9	4	0	0	1	0	0	0	0	14
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	9	7	0	0	17	0	0	0	0	7
% plants in the field	11	2	0	0	8	0	0	0	0	8

Disease and Insect issues 2013 sunflower survey (Page 2 of 3).

	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Phomopsis	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with phomopsis	47	39	9	6	4	1	2	0	0	108
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	47	71	90	86	67	13	33	0	0	52
% plants per field	21	15	24	45	20	2	4	0	0	20
Phoma	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with phoma	59	42	6	6	6	5	6	4	3	137
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	59	76	60	86	100	63	100	33	60	66
% plants in the field	57	45	15	40	41	6	81	3	100	49
Verticillium	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
Fields with verticilium	0	12	1	7	2	2	0	0	0	24
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	0	22	10	100	33	25	0	0	0	11
% plants in the field	0	21	17	86	5	2	0	0	0	37
Charcoal Rot	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with charcoal	2	6	1	0	0	0	0	0	0	9
Total fields	100	55	10	7	6	8	6	12	4	208
Percent of fields	2	11	10	0	0	0	0	0	0	4
% plants per field	16	3	2	0	0	0	0	0	0	
Red Rust	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with Rust	72	43	5	2	5	0	2	2	5	136
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	72	78	50	29	83	0	33	17	100	65
% on plants per field	1.1	2.4	2.2	3.5	2.4	0	1.2	0.1	0.4	1.5
Bird damage	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with bird	51	10	1	3	1	6	0	0	0	72
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	51	18	10	43	17	75	0	0	0	34
% of heads	9	2	2	7	58	9	0	0	0	9
Sunflower Midge	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with midge	40	1	0	0	0	2	0	9	0	52
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	40	2	0	0	0	25	0	75	0	25
% of heads	16	1	0	0	0	0	0	15	0	15
SF Seed Maggot	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
fields with Maggot	35	22	1	0	0	0	0	0	0	58
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	35	40	10	0	0	0	0	0	0	28
% of heads	5	4	4	0	0	0	0	0	0	10

Disease and Insect issues 2013 sunflower survey (Page 3 of 3).

	ND	SD	MN	MB	NE	VE	CO	TX	KS	Survey
SF Bud Moth										
fields with Moth	39	14	1	4	0	0	0	1	0	59
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	39	25	10	57	0	0	0	8	0	28
% of heads	5	4	1	5	0	0	0	2	0	4
Long-horn beetle (Dectes)										
Fields with Long horn	34	27	0	0	0	0	2	0	5	68
Total fields	100	55	10	7	6	8	6	12	5	209
Percent of fields	34	49	0	0	0	0	33	0	100	33
% plants with long horn	42	35	0	0	0	0	57	0	66	42
Seed weevil										
Fields with seed weevil	56	21	0	1		5	3			86
Total fields	97	53	10	7		8	6			181
Percent of fields	58	40	0	14		63	50			48
% plants with weevil	6	4	0	1		1	12			5
Banded S. moth										
Fields with banded s. moth	36	9	2	0		4	0			51
Total fields	97	53	10	7		8	6			181
Percent of fields	37	17	20	0		50	0			28
% plants with banded s. moth	3	2	2	0		4	0			3
Sunflower moth										
Fields with sf moth	3	0	0	0		1	2			6
Total fields	97	48	10	7		8	6			176
Percent of fields	3	0	0	0		13	33			3
% plants with sf moth	2	0	0	0		1	1			2
Brown Spot										
Fields with brown spot	6	4	3	2			0			15
Total fields	13	7	6	7			3			36
Percent of fields	46	57	50	29			0			42
% plants with brown spot	4	2	1	1			0			3

Weeds observed in the surveyed fields 2013 (Page 1 of 2).

	ND	MN	SD	MB	NE	VE	CO	TX	KS	Survey
Annual smart weed	2	0	0	3	0	2	0	0	0	7
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	2	0	0	43	0	25	0	0	0	3
Biennial worm wood	11	1	0	1	0	0	0	0	0	13
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	11	10	0	14	0	0	0	0	0	6
Canada Thistle	29	0	2	5	0	0	0	0	0	36
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	29	0	4	71	0	0	0	0	0	17
Cockle bur	2	0	4	0	2	0	0	1	1	10
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	2	0	7	0	33	0	0	8	20	5
Common Lambs quarter	11	2	7	1	2	7	1	0	0	31
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	11	20	13	14	33	88	17	0	0	15
Devils claw	0	0	0	0	0	0	0	0	0	0
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	0	0	0	0	0	0	0	0
Kochia	25	2	26	3	2	0	0	1	4	63
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	25	20	47	43	33	0	0	8	80	30
Lance leaf Sage	5	0	1	0	0	0	1	0	0	7
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	5	0	2	0	0	0	17	0	0	3
Marsh elder	3	1	1	0	0	0	0	0	0	5
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	3	10	2	0	0	0	0	0	0	2
Night shade	4	0	1	0	2	1	2	5	0	15
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	4	0	2	0	33	13	33	42	0	7
Palmer amaranth	0	0	0	0	0	0	0	9	5	14
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	0	0	0	0	0	75	100	7
Prickly lettuce	12	1	2	0	0	1	0	0	0	16
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	12	10	4	0	0	13	0	0	0	8
Puncuture vine	0	0	0	0	0	0	0	0	3	
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	0	0	0	0	0	0	60	60
Red root pig weed	21	1	12	4	2	8	2	0	0	50
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	21	10	22	57	33	100	33	0	0	24
Russian Thistle	12	0	5	0	3	0	0	2	0	22
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	12	0	9	0	50	0	0	17	0	11

Weeds observed in the surveyed fields 2013 (Page 2 of 2).

	ND	MN	SD	MB	NE	VE	CO	TX	KS	Survey
Rag weed common	2	1	5	0	0	4	0	1	0	13
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	2	10	9	0	0	50	0	8	0	6
Rag weed giant	0	0	0	0	0	0	0	0	0	0
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	0	0	0	0	0	0	0	0
Water hemp	0	0	0	0	0	0	0	0	0	0
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	0	0	0	0	0	0	0	0
Wild buck wheat	28	0	5	3	0	0	0	0	0	36
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	28	0	9	43	0	0	0	0	0	17
Wild mustard	5	6	0	0	0	2	0	0	0	13
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	5	60	0	0	0	25	0	0	0	6
Wild sunflower	6	0	0	0	0	0	0	0	0	6
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	6	0	0	0	0	0	0	0	0	3
Woolly leaf bursage	0	0	0	0	0	0	0	1	0	1
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	0	0	0	0	0	8	0	0
Barnyard grass	3	0	1	0	0	0	2	3	0	9
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	3	0	2	0	0	0	33	25	0	4
Downy Brome	3	0	0	0	0	0	0	0	0	3
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	3	0	0	0	0	0	0	0	0	1
Field Sandbur	0	0	1	0	0	0	0	0	0	1
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	0	0	2	0	0	0	0	0	0	0
Foxtail green	21	0	9	6	0	5	0	0	0	41
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	21	0	16	86	0	63	0	0	0	20
Foxtail yellow	13	0	4	0	0	0	0	1	1	19
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	13	0	7	0	0	0	0	8	20	9
Quack grass	2	0	1	0	0	1	0	0	0	4
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	2	0	2	0	0	13	0	0	0	2
Volunteer grain	26	0	2	1	1	0	0	1	3	34
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	26	0	4	14	17	0	0	8	60	16
Wild oats	5	0	1	1	0	0	0	0	0	7
Total Fields	100	10	55	7	6	8	6	12	5	209
Percent	5	0	2	14	0	0	0	0	0	3