SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES
ON SUGARBEET IN EASTERN NORTH DAKOTA AND MINNESOTA - 2001

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Other portions of the survey are published in the
Entomology and Plant Pathology sections.

The thirtythird annual weed control and production practices questionnaire was mailed in September, 2001 to sugarbeet growers producing sugarbeet for the American Crystal Sugar Company, the Minn-Dak Farmers Cooperative, and the Southern Minnesota Beet Sugar Cooperative. Growers were requested to evaluate weed control and sugarbeet injury from specific herbicides, and to list the most important weed and production problems. In addition, growers were requested to list insecticide use, fungicide use, total acreage, acres of hand-weeded sugarbeet, thinning practices, herbicide application methods, cost of hand thinning and hand weeding, cultivation practices and soil fertility practices. Insecticide use and fungicide use portions of the survey can be found in the Entomology and Plant Pathology sections.

Approximately 3,600 sugarbeet growers planted 723,000 acres of sugarbeet in the Red River Valley and West Central Minnesota in 2001. Growers representing 31 percent of the total acres responded to the survey. The responses to the questionnaire are reported in Tables 1 to 26.

Table 1 gives a summary of herbicide use and performance averaged over all counties. The number of growers reporting the use of a herbicide treatment is listed and the acres treated is expressed as a percentage of the total acreage reported on the survey. Multiple herbicide treatments are tabulated for each herbicide treatment, thus the number of growers reporting in Table 1 exceeds the total number of responses. Also, multiple herbicide treatments on the same acreage are listed separately in the tables, thus acres treated exceeds 100%. The ratings of weed control and sugarbeet injury are presented as the percentage of growers who judged weed control as excellent, good, fair or poor. Data for individual counties are in Tables 2 through 17.

Total sugarbeet acreage treated with herbicides in 2001 was 368%, which compares to 348% in 2000, 346% in 1999 and 393% in 1998. The acres treated does not include “other weed control methods” which were non-herbicidal methods. Eptam, Ro-Neet and Nortron, used in combination as well as used alone, were the only soil applied herbicides reported in 2001. Soil applied herbicide use was 96% in 1984, 47% in 1989, 32% in 1993, 32% in 1997, 11% in 1998, 4% in 1999 and 4% in 2001. Postemergence herbicide use was 342% in 2001, 338% in 2000, 337% in 1999, 374% in 1998, 421% in 1997,and 389% in 1996. The decline in postemergence herbicide use from 1997 to 2001 is partly due to the increased use of herbicide combinations. In 1997, nearly all of the grass herbicides were applied separately and those acres were totaled as separate acres. In 2001, most of the grass herbicides were applied in combination with other herbicides so the acres treated are only totaled once for all herbicides in the combination.

The usage of postemergence grass control herbicides was 214% of the acreage in 2001 as compared to 235% in 2000, 213% in 1999 and 176% in 1998. Assure II was used on 15% of the acreage in 2001, 26% in 2000 and 20% in 1999. Prism/Select was used on 163% of the acreage in 2001, 176% in 2000 and 161% in 1999. Poast was used on 36% of the acreage in 2001, 33% in 2000, and 32% in 1999. Most of the grass herbicides were applied in combination with the micro-rate which included an oil adjuvant. Only about 25% of the acres treated with a grass herbicide were treated with a grass herbicide used alone.

Betanex use was 89% of the acreage in 1995, 176% in 1997, 190% in 1999, 149% in 2000 and 107% in 2001. Betamix use was 52% of the acreage in 1996, 74% in 1997, 95% in 1999, 107% in 2000 and 116% in 2001. Progress use was 70% of the acreage in 1995, 13% in 1997, 21% in 1999, 54% in 2000 and 81% in 2001. Progress use is increasing due to the

increase in kochia in sugarbeet. UpBeet use was 110% of the acreage in 1996, 249% in 1998, 301% in 2000 and 278% in 2001. Stinger use was 55% of the acreage in 1995, 138% in 1997, 291% in 1999, 298% in 2000 and 274% in 2001. The most common herbicide treatment in 2001 was Betamix + UpBeet + Stinger + Select + Oil adjuvant on 52% of the acreage. This combination was used on less than 1% of the acreage in 1997. Combination treatments that included an oil generally would be micro-rate treatments. Treatments including oil were applied to 265% of the acreage in 2001, 285% in 2000, 273% in 1999 and 162% in 1998. The decline in the use of POST herbicides from 2000 to 2001 may partially explain the increase in late season weeds observed in 2001. Perhaps the last POST treatment was eliminated in some fields which allowed survival of a late weed flush.

The rotary hoe or harrow were used on 63% of the acres in 2001 compared to 62% of the acres in 2000 and 48% in 1999. The electrical discharge system, weed pullers, mowing or swathing were used on 7.6% of the acreage in 1995, 1.6% in 1997, less than 1% in 1999, 1.7% in 2000 and 2.4% in 2001.

Redroot pigweed was named most often as "worst weed" in sugarbeet in 2001replacing kochia which was named most often in 2000 (Table 18). The percentage of respondents indicating redroot pigweed as their worst weed was 53% in 1997, 51% in 1998, 40% in 1999, 18% in 2000 and 43% in 2001. Late emerging pigweed was especially bad in 2001. Kochia was named the most important weed problem by 32% of the survey respondents in 2001 compared to 43% in 2000, 33% in 1999, 13% in 1998 and 3% in 1997. The increasing appearance of kochia that is resistant to UpBeet may explain the increase of kochia being named as worst weed. The question on "worst weed" was first asked in 1977 and 2000 was the only year that redroot pigweed was not named most frequently.

Weeds were named as the most serious production problem by 52% of the survey respondents in 2001 compared to 48% in 2000, 39% in 1999, 25% in 1998 and 34% in 1997 (Table 19). The percentage of respondents who named emergence and stand as their worst problem was 2% in 1995, 12% in 1997, 4% in 1998, 12% in 1999, 10% in 2000 and 5% in 2001. The percentage of respondents who named Cercospora leaf spot (CLS) as their worst problem was 24% in 1995, 3% in 1996, 5% in 1997, 36% in 1998, 6% in 1999, 3% in 2000 and 1% in 2001. The Section 18 label for Eminent in 1999, 2000 and 2001 probably explains the reduction in Cercospora being identified as the worst problem. Rhizoctonia/aphanomyces was named as worst problem by 6% in 1996, 14% in 1997, 17% in 1998 9% in 1999, 18% in 2000 and 16% in 2001. Soil moisture and soil temperature have a very large influence on sugarbeet injury caused by rhizoctonia and aphanomyces.

Rhizomania was listed as a "worst problem" choice for the first time in 1997 (Table 19). Rhizomania caused identifiable yield loss only in the Southern Minnesota Beet Sugar Cooperative in 1998 but it was identified in the Red River Valley in 1999. Rhizomania was named as worst problem by 3% of the respondents in 1998, by 2% in 1999 and 2000, and by 3% in 2001.

The percentage of acreage hand weeded was 72% in 1995, 62% in 1996, 45% in 1997, 28% in 1998, 26% in 1999, 25% in 2000 and 23% in 2001 (Table 20). This is the lowest percentage of acreage hand weeded recorded on the annual survey.

Percentage of acreage not thinned was 75% in 1997, 76% in 1998, 83% in 1999, 79% in 2000 and 89% in 2001 (Table 20). Acreage hand thinned was, 7% in 1997, 5% in 1998, 2% in 1999 and 1% in 2000 and 2001. Acres thinned with an electronic thinner were 5% in 1996, 4% in 1997, 1998 and 1999, 3% in 2000, and 1% in 2001. The use of various forms of mechanical thinning was 6% of the acreage in 1996, 11% in 1997 and 1998, 8% in 1999, 13% in 2000 and 7% in 2001.

Averaged over all herbicides, herbicides were band applied to 41%, broadcast applied with a ground sprayer to 49% and broadcast applied by air to 10% of the sugarbeet acreage (Table 21). In 1997, 57% of the acreage was band treated, 40% was band treated in 1998, 30% was band treated in 1999 and 37% was band treated in 2000. Herbicides were applied by air to 9% of the acreage in 2000, 22% in 1999, 17% in 1998 and 9% in 1997.

The cost of hand weeding and hand thinning varied from zero to over $70/A in 2001 (Table 22). The most common cost was zero dollars for 57% of the respondents. Zero cost responses were 26% in 1996, 41% in 1997, 58% in 1998, 55% in 1999 and 56% in 2000. The average cost of hand weeding as calculated from Table 22 was $11.15/A in 2001 as compared to $11.90/A in 2000, $11.20/A in 1999, $18.50/A in 1997 and $34/A in 1995. The percentage of respondents who used no hand labor varied by county from 28% in Chippewa county to 83% in Norman County.

Sugarbeet acreage operated by respondents to the survey varied from less than 50 acres to over 2,000 acres (Table

23). The most common acreage was 400 to 599 acres for 20% of the respondents. Other common acreages were 100 to 199 acres at 14%, 200 to 299 acres at 15%, 300 to 399 acres at 13% and 600 to 799 acres at 13%. Nine percent of the respondents reported over 1,000 acres and 19% had over 800 acres. In 1998, 5% reported over 1,000 acres and 11% had over 800 acres.

The number of cultivations reported on the survey varied from zero to five (Table 24). The most common number of cultivations was two with 55% of the respondents, 28% cultivated once, 15% cultivated three times, and 1% did not cultivate. This question was asked previously in 1992 and 1998 and 1999. The average number of cultivations was 3.2 in 1992, 2.3 in 1998, 2.2 in 1999, 2.0 in 2000 and 1.9 in 2001.

Starter fertilizer was used on 28% of the acreage reported on the survey in 2001 (Table 25). Starter fertilizer was used on 49 to 56% of the acreage in Polk, Clay, Grand Forks and Kittson counties. Less than 5% of the acreage was treated in Chippewa, Renville, Traverse and Wilkin Counties. Starter fertilizer was used on 22% of the acres reported on the 1995 annual survey and on 11% of the acres in 1997.

The survey responses indicated that 52,152 acres of crops followed the 2000 sugarbeet crop and were fertilized with the N credit method (Table 26). The 52,152 acres is not adjusted for the fact that 31% of the sugarbeet acreage was represented on the survey. An estimate of the total acres of rotational crops fertilized by the N credit method would be $52,152 \div 0.31 = 168, 232$ acres. The ranking of satisfaction with the N credit method was very good with only 10% of the users giving a ranking of 1 or 2.

A summary of the most important weed problem responses from 1977 to 2001.

	Weed indicated as most important weed problem in sugarbeet												
Year	RRPW[1]	FXTL	COLQ	WIOA	WIBW	WIMU	KOCZ	COCB	SMWE	EBNS	COMA	LASA	COMW	WAHE
	Percent of respondents													
1977	51	20	3	8	5	1								
1978	55	19	3	8	6	1								
1978	53	22	5	5	7	1								
1980	43	23	10	10	8	1								
1981	46	20	8	6	9	3	5							
1982	44	8	7	9	11	7	14							
1983	50	8	11	6	5	4	12							
1984	54	5	6	6	5	4	10							
1985	43	2	11	9	6	5	12							
1986	71	5	4	3	2	1	5	4						
1987	61	7	6	3	6	2	6	2						
1988	75	2	5	1	2	<1	9	1						
1989	54	5	4	1	5	<1	21	1						
1990	51	2	8	1	5	0	23	1	3					
1991	59	3	4	0	2	0	18	2	3					
1992	47	4	8	3	4	<1	16	3	8					
1993	38	3	6	6	8	1	13	3	9	3	2			
1994	61	2	6	2	8	1	8	2	6	2	1			
1995	71	2	4	1	2	1	4	1	8	4	1			
1996	72	4	4	2	1	1	3	2	6	2	1			
1997	53	7	4	2	6	1	3	2	5	4	1			
1998	51	9	7	2	4	1	13	1	4	1	<1			
1999	40	2	10	2	1	<1	33	1	3	1	<1	2		
2000	18	2	19	<1	2	<1	43	2	3	<1	<1	2	<1	1
2001	43	1	10	<1	1	0	32	1	4	4	<1	1	<1	2

[1]RRPW = Redroot pigweed, FXTL = Green & Yellow foxtail, COLQ = Common lambsquarters, WIOA = Wild oats, WIBW = Wild buckwheat, WIMU = Wild mustard, KOCZ = Kochia, COCB = Common cocklebur, SMWE = Smartweed, EBNS = Eastern black nightshade, COMA = Common mallow, LASA = Lanceleaf sage, COMW = Common milkweed and WAHE = Waterhemp.

A summary of the worst production problem responses from 1977 to 2001.

	Production problem indicated as worst in sugarbeet								
Year	No Problem	Weeds	Weather	Emergence/ stand	Labor mgmt.	Insects	Cercospora leaf spot	Rhizomania	Rhizoctonia/ Aphanomyces
	percent of respondents								
1977	10	13	42	29	4	1	0		
1978	21	47	16	7	6	2	0		
1978	19	41	28	6	4	1	0		
1980	5	23	42	28	2	0	0		
1981	4	35	38	16	1	0	6		
1982	10	39	35	9	3	4	0		
1983	3	37	37	13	2	1	5		
1984	5	26	49	8	2	1	2		
1985	4	20	45	17	1	1	1		
1986	4	39	31	18	1	1	1		
1987	5	42	23	22	2	0	2		
1988	1	37	12	40	1	1	1		
1989	5	38	19	16	3	8	2		
1990	5	42	20	10	2	8	4		
1991	3	26	4	18	1	26	7		8
1992	11	45	9	15	5	9	1		3
1993	3	40	21	16	4	1	2		12
1994	3	56	12	13	4	1	3		8
1995	2	51	6	2	3	<1	24		11
1996	6	53	12	11	6	2	3		6
1997	15	34	13	12	3	1	5	2	14
1998	3	25	9	4	1	1	36	3	17
1999	14	39	14	12	2	1	6	2	9
2000	8	48	9	10	1	<1	3	2	18
2001	6	52	13	5	2	1	1	3	16

TABLE 18. Worst weed problem in sugarbeet, 2001.

County	Respondents	No Problem	CATH[1]	COCB	COLQ	COMA	COMW	EBNS	FXTL
		% of respondents							
Cass	21	0	0	5	0	5	0	0	5
Chippewa[2]	24	0	0	4	50	0	0	0	0
Clay[3]	36	0	0	0	8	0	0	0	3
Grand Forks	18	0	0	0	6	0	0	0	0
Kittson	18	0	0	0	0	0	0	0	0
Marshall	27	0	0	0	4	0	0	0	0
Norman[4]	18	0	0	0	11	0	6	0	0
Pembina	28	4	0	0	4	0	0	0	4
Polk	65	1	3	2	8	0	2	0	3
Renville[5]	35	0	0	0	26	0	0	11	0
Richland	16	0	0	0	0	0	0	0	0
Traill	16	0	0	0	0	0	0	0	0
Traverse[6]	19	0	0	0	10	0	0	0	0
Walsh	25	0	0	0	0	0	0	0	0
Wilkin[7]	25	0	0	0	8	0	0	0	0
Total	398	<1	<1	1	10	<1	<1	4	1

Table continued

TABLE 18 (con't). Most important weed problem in sugarbeet, 2001.

County	KOCZ	LASA	RRPW	SMWE	WAHE	WIBW	WIMU	WIOA	Other[8]
	% of respondents								
Cass	10	5	67	0	0	0	0	5	0
Chippewa[2]	0	0	29	12	4	0	0	0	0
Clay[3]	33	3	47	0	3	0	0	0	3
Grand Forks	61	0	28	6	0	0	0	0	0
Kittson	56	0	39	0	0	6	0	0	0
Marshall	56	0	30	0	0	7	0	0	4
Norman[4]	33	0	50	0	0	0	0	0	0
Pembina	57	0	32	0	0	0	0	0	0
Polk	42	0	32	6	0	0	0	0	2
Renville[5]	0	0	26	17	14	0	0	0	6
Richland	10	10	80	0	0	0	0	0	0
Traill	44	0	56	0	0	0	0	0	0
Traverse[6]	5	0	79	0	5	0	0	0	0
Walsh	72	0	24	0	0	0	0	4	0
Wilkin[7]	8	4	72	0	0	0	0	0	8
Total	32	1	43	4	2	1	0	<1	2

[1]CATH = Canada thistle; COCB = Common cocklebur; COLQ = Common lambsquarters; COMA = Common mallow; COMW = Common milkweed; EBNS = eastern black nightshade; FXTL = Green & yellow foxtail; KOCZ = Kochia; LASA = Lanceleaf sage; RRPW = Redroot pigweed; SMWE = Smartweed; WAHE = Waterhemp; WIBW = Wild buckwheat; WIOA = Wild oats.
[2]Includes Swift and Kandiyohi Counties.
[3]Includes Becker County.
[4]Includes Mahnomen County.
[5]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[6]Includes Grant, Stevens and Big Stone Counties.
[7]Includes Ottertail County.
[8]Other weeds = velvetleaf, Venice mallow, Powell amaranth, curled dock.

TABLE 19. Most serious production problem in sugarbeet, 2001.

County	Respon-dents	No Prob	Weeds	Emerg/ Stand	Labor Mangmt	Root Maggot	CLS[1]	Rhizo-mania	Rhizoctonia/ Aphanomyces	Weather	Other[8]
		% of respondents									
Cass	20	10	60	0	0	0	5	0	10	15	0
Chippewa[2]	26	8	42	15	4	4	0	15	4	8	0
Clay[3]	32	3	44	3	3	0	3	6	31	6	0
Grand Forks	17	0	65	0	0	0	0	0	12	24	0
Kittson	19	5	10	10	0	0	5	0	26	42	0
Marshall	22	14	41	0	4	0	0	0	9	32	0
Norman[4]	16	12	44	12	0	0	0	0	25	6	0
Pembina	27	11	59	7	4	0	0	0	7	11	0
Polk	59	8	48	5	2	0	2	2	15	18	0
Renville[5]	31	3	58	3	0	0	3	10	16	6	0
Richland	21	10	62	5	5	0	0	0	19	0	0
Traill	17	0	47	6	0	0	0	0	18	24	6
Traverse[6]	17	0	76	0	0	0	0	0	24	0	0
Walsh	25	8	76	0	4	0	0	4	8	0	0
Wilkin[7]	22	0	50	14	0	0	0	0	27	4	4
Total	374	6	52	5	2	<1	1	3	16	13	<1

[1]CLS = Cercospora leaf spot.
[2]Includes Swift and Kandiyohi Counties.
[3]Includes Becker County.
[4]Includes Mahnomen County.
[5]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[6]Includes Grant, Stevens and Big Stone Counties.
[7]Includes Ottertail County.
[8]Other = price, lygus, cutworm, leafminer.

TABLE 20. Sugarbeet acreage that was hand weeded and thinned by various methods, 2001.

County	Acres planted by respondents	Hand weeded	Mech[1] thinner	Elec[1] thinner	Hand thinned	Not thinned
		% of acres planted				
Cass	9977	29	8	0	0	92
Chippewa[2]	13673	43	2	0	0	98
Clay[3]	25474	6	4	0	<1	96
Grand Forks	9608	13	5	0	0	93
Kittson	8045	8	0	0	4	81
Marshall	10764	8	4	1	<1	93
Norman[4]	12413	8	18	3	0	82
Pembina	15441	30	2	1	8	89
Polk	44131	11	6	<1	0	94
Renville[5]	12863	64	23	1	2	72
Richland	13590	31	3	0	0	95
Traill	7184	23	4	0	0	96
Traverse[6]	7819	29	12	0	1	71
Walsh	14976	29	6	2	2	89
Wilkin[7]	15141	40	14	3	6	77
Other	735	0	0	0	0	100
Total	221,834	23	7	1	1	89

[1]Mech = Mechanical, harrow, rotary hoe; Elec = Electronic.
[2]Includes Swift and Kandiyohi Counties.
[3]Includes Becker County.
[4]Includes Mahnomen County.
[5]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[6]Includes Grant, Stevens and Big Stone Counties.
[7]Includes Ottertail County.

TABLE 21. Method of herbicide application, 2001.

Herbicide	Band	Method of application: Broadcast ground	Method of application: Broadcast air
	----------% of acres----------		
Eptam + Ro-Neet, Eptam, Ro-Neet	24	76	0
Nortron (PRE/PPI)	92	0	8
Betamix/Betanex/Progress	30	48	22
Poast, Select, Assure II	29	60	11
Bnex/Bmix/Progress+UpBeet	27	50	22
Bnex/Bmix/Progress+Stinger	32	68	0
Bnex/Bmix/Progress+UpB+Stinger	48	37	15
Bnex/Bmix/Prog+UpB+Sting+Grass	45	49	6
All herbicides	41	49	10

TABLE 22. Cost of hand weeding and hand thinning sugarbeet, 2001.

County	Respondents	Dollars per acre					
		0	1-10	11-15	16-20	21-25	26-30
		% of respondents					
Cass	21	52	0	5	0	38	0
Chippewa[2]	29	28	7	17	14	14	10
Clay[3]	41	68	0	2	7	12	5
Grand Forks	22	64	0	4	14	9	9
Kittson	23	65	0	0	0	9	13
Marshall	31	74	0	0	0	10	0
Norman[4]	24	83	4	4	0	4	0
Pembina	28	43	0	0	18	14	7
Polk	74	80	0	5	4	11	0
Renville[5]	41	29	12	17	12	5	10
Richland	26	54	0	4	12	12	8
Traill	18	44	0	0	11	22	0
Traverse[6]	20	60	5	0	0	5	10
Walsh	33	42	0	0	12	27	15
Wilkin[7]	28	39	4	0	7	21	7
Total	462	57	2	4	7	13	6

Table continued.

TABLE 22 (con't) Cost of hand weeding and hand thinning sugarbeet, 2001.

County	Dollars per acre							
	31-35	36-40	41-45	46-50	51-55	56-60	61-70	>70
	% of respondents							
Cass	0	5	0	0	0	0	0	0
Chippewa[2]	0	3	3	0	3	0	0	0
Clay[3]	2	0	0	0	0	2	0	0
Grand Forks	0	0	0	0	0	0	0	0
Kittson	0	4	4	0	0	4	0	0
Marshall	3	6	3	3	0	0	0	0
Norman[4]	0	0	0	4	0	0	0	0
Pembina	0	0	0	0	14	4	0	0
Polk	0	0	0	0	0	0	0	0
Renville[5]	12	0	0	0	0	2	0	0
Richland	4	4	0	0	0	4	0	0
Traill	0	0	0	0	6	6	0	11
Traverse[6]	5	5	0	0	0	5	5	0
Walsh	0	3	0	0	0	0	0	0
Wilkin[7]	4	4	0	7	0	4	4	0
Total	2	2	1	1	1	2	<1	<1

[2]Includes Swift and Kandiyohi Counties.
[3]Includes Becker County.
[4]Includes Mahnomen County.
[5]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[6]Includes Grant, Stevens and Big Stone Counties.
[7]Includes Ottertail County.

TABLE 23. Total sugarbeet acreage operated by respondents to the survey, 2001.

County	Respondents	Acres of sugarbeet					
		<50	50-99	100-199	200-299	300-399	400-599
		% of respondents					
Cass	21	0	0	14	5	19	33
Chippewa[1]	29	7	3	10	3	20	28
Clay[2]	41	0	5	12	10	17	24
Grand Forks	22	0	0	14	27	14	18
Kittson	23	0	17	35	4	13	0
Marshall	31	0	10	36	16	3	19
Norman[3]	24	4	4	12	17	8	21
Pembina	28	4	4	11	18	14	18
Polk	74	0	3	11	10	10	18
Renville[4]	41	2	15	17	24	10	15
Richland	26	0	0	0	19	15	38
Traill	18	0	0	17	28	11	33
Traverse[5]	20	5	5	5	25	30	10
Walsh	33	9	3	6	18	15	18
Wilkin[6]	28	4	14	7	18	7	14
Total	462	2	6	14	15	13	20

Table continued.

TABLE 23 (cont.). Total sugarbeet acreage operated by respondents to the survey, 2001.

County	Acres of sugarbeet				
	600-799	800-999	1000-1499	1500-1999	>2000
	% of respondents				
Cass	19	10	0	0	0
Chippewa[1]	7	17	3	0	0
Clay[2]	7	7	12	0	5
Grand Forks	9	18	0	0	0
Kittson	22	4	4	0	0
Marshall	6	0	10	0	0
Norman[3]	12	12	4	0	4
Pembina	7	7	11	7	0
Polk	20	16	12	1	0
Renville[4]	15	2	0	0	0
Richland	8	8	12	0	0
Traill	0	6	6	0	0
Traverse[5]	15	5	0	0	0
Walsh	18	6	3	3	0
Wilkin[6]	18	4	4	11	0
Total	13	9	6	2	1

[1]Includes Swift and Kandiyohi Counties.
[2]Includes Becker County.
[3]Includes Mahnomen County.
[4]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[5]Includes Grant, Stevens and Big Stone Counties.
[6]Includes Ottertail County.

TABLE 24. Number of postemergence row crop cultivations, 2001.

County	Number of cultivations					
	0	1	2	3	4	5
	% of respondents					
Cass	0	42	53	5	0	0
Chippewa[1]	0	31	69	0	0	0
Clay[2]	0	24	51	24	0	0
Grand Forks	4	41	36	18	0	0
Kittson	9	46	46	0	0	0
Marshall	0	45	48	7	0	0
Norman[3]	0	26	74	0	0	0
Pembina	0	11	52	33	4	0
Polk	1	25	58	12	1	1
Renville[4]	3	32	60	5	0	0
Richland	0	4	46	42	8	0
Traill	0	17	67	17	0	0
Traverse[5]	0	25	50	25	0	0
Walsh	0	30	60	10	0	0
Wilkin[6]	0	18	54	29	0	0
Total	1	28	55	15	1	<1

TABLE 25. Starter fertilizer use in 2001.

County	Treated with starter fertilizer
	% of acres
Cass	26
Chippewa[1]	0
Clay[2]	50
Grand Forks	50
Kittson	56
Marshall	28
Norman[3]	39
Pembina	11
Polk	49
Renville[4]	2
Richland	10
Traill	31
Traverse[5]	4
Walsh	12
Wilkin[6]	4
Total	28

[1]Includes Swift and Kandiyohi Counties.
[2]Includes Becker County.
[3]Includes Mahnomen County.
[4]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[5]Includes Grant, Stevens and Big Stone Counties.

[6]Includes Ottertail County.

Table 26. Acres of crops following the 2000 sugarbeet crop that were fertilized using N credits based on satellite imagery and a ranking of satisfaction with the N credit method, 2001.

County	Acres fertilized using N credit method[7]	Rank of satisfaction: Not satisfied 1	2	3	4	Completely satisfied 5
	acres	----------% of users of the N credit method----------				
Cass	1970	0	33	33	33	0
Chippewa[1]	140	0	0	100	0	0
Clay[2]	1320	0	0	67	33	0
Grand Forks	4166	0	36	36	18	9
Kittson	3323	14	14	14	50	7
Marshall	2974	0	9	36	36	18
Norman[3]	2308	0	0	17	67	17
Pembina	7437	0	0	54	38	8
Polk	16339	3	0	29	51	17
Renville[4]	112	17	0	50	33	0
Richland	610	0	0	33	67	0
Traill	4853	0	0	31	54	15
Traverse[5]	0	0	0	0	0	0
Walsh	5900	0	6	44	50	0
Wilkin[6]	700	0	0	0	0	100
Total	55,152	3	7	35	45	11

[1]Includes Swift and Kandiyohi Counties.
[2]Includes Becker County.
[3]Includes Mahnomen County.
[4]Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle and Sibley Counties.
[5]Includes Grant, Stevens and Big Stone Counties.
[6]Includes Ottertail County.
[7]The acres reported in the table are the actual acres reported on the survey, not adjusted for the fact that 31% of the total sugarbeet acreage was represented on the survey. An estimate of total acres fertilized by the N credit method would be 52,152 ÷ 0.31 = 168,232 acres.