

## **SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES ON SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2009**

Jeff M. Stachler<sup>1</sup>, Aaron L. Carlson<sup>1</sup>, John L. Luecke<sup>1</sup>, Mark A. Boetel<sup>2</sup>, and Mohamed F.R. Khan<sup>1</sup>

<sup>1</sup>Extension Sugarbeet Specialist, Sugarbeet Research Technician, Sugarbeet Research Specialist, and Extension  
Sugarbeet Specialist

North Dakota State University - University of Minnesota, Fargo, ND

and

<sup>2</sup>Associate Professor, Dept. of Entomology, North Dakota State University

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

The forty-first annual weed control and production practices questionnaire was mailed in September, 2009 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, acreage by sugarbeet type, acres of hand-weeded sugarbeet, herbicide application methods, and cost of hand thinning and hand weeding. Growers were also requested to provide the number of row cultivations by sugarbeet type, whether conventional herbicide rates increased, if any glyphosate-resistant weeds were observed, and list suspected glyphosate-resistant weed species. Insecticide use and fungicide use portions of the survey can be found in the Entomology and Plant Pathology sections.

Sugarbeet growers planted 676,345 acres of sugarbeet in the Red River Valley and West Central Minnesota in 2009. One hundred eighty seven growers responded to the survey, representing nearly 14% of the total acres planted. This represents a slight decline compared to 2008 (18%). The greatest number of growers responded to the survey from Polk County (30, representing 20,722 acres) (Table 13). Of the acres reported, 88% were Roundup Ready® (RR) sugarbeet and 12% were conventional sugarbeet. This very closely corresponds to the actual amount of RR sugarbeet planted in 2009 in eastern North Dakota and Minnesota. Grand Forks, Polk, and Chippewa Counties planted the fewest percentage of RR sugarbeets in 2009, 71, 72, and 77%, respectively (Tables 5 to 20). Conversely, 100% of reported acreage was planted to RR sugarbeet in Cass, Kittson, Pembina, Richland, and "Other" Counties. With the majority of acreage planted to RR sugarbeet after just the second growing season, RR sugarbeet has become the most rapidly adopted transgenic crop to date. The reported acreage of RR sugarbeets in 2009 increased 39% compared to 2008. Those growers planting both RR and conventional sugarbeet, planted approximately 60% of their acreage to RR sugarbeet in 2009. The responses to the weed control and production portions of the questionnaire are reported in Tables 1 to 34.

A summary of herbicide use and performance averaged over sugarbeet type and all counties is presented in Table 1. The number of growers reporting the use of an herbicide treatment is listed and the acres treated is expressed as a percentage of the total acreage reported. Multiple herbicide treatments are tabulated for each grower, therefore the number of growers reporting herbicide treatments exceeds the total number of survey responses. Also, multiple herbicide treatments on the same acreage are listed separately in the tables, thus acres treated exceeds 100%. Weed control and sugarbeet injury are presented as the percentage of growers evaluating weed control or sugarbeet injury according to the categories listed. Table 2 and 3 provides a summary of herbicide use and performance averaged over growers planting only conventional sugarbeet or only RR sugarbeet, respectively. A summary of herbicide use and performance averaged over sugarbeet type by counties is presented in Tables 5 through 20.

The herbicide trade names listed in the tables are the original trade names. The original trade names also represent the generic formulations of the same active ingredient. Thus Nortron also represents Etho SC and Ethotron; Betamix also represents D-P Mix and Phen-Des 8+8; Betanex also represents Des and Alphanex; Progress also represents Des-Phen-Etho and BNB Plus; Stinger also represents Clopyr Ag, Garrison, and Spur; Select also represents Select Max, Prism, Arrow, Clethodim 2EC, Intensity, Intensity One, Section, Shadow, Trigger, and Volunteer; and Assure II also represents Targa.

Total sugarbeet acreage treated with herbicides in 2009 was 230% (Tables 1 and 4) compared to 308% in 2008, 383% in 2007, 386% in 2006, 378% in 2005, 427% in 2004, 437% in 2003, 428% in 2002 and 368% in 2001. The acres treated do not include "other weed control methods" which were non-herbicidal methods. Growers planting only conventional sugarbeet in 2009 applied herbicides to 299% of their acreage (Tables 2 and 4), compared to 407% in 2008. Growers planting only RR sugarbeet in 2009 applied herbicides to 225% of their acreage (Tables 3 and 4) compared to 225% in

2008. The reduction in the percentage of total sugarbeet acreage treated with herbicides is attributed to the increased planting of RR sugarbeet and a decrease in the percentage of conventional sugarbeet acreage treated with herbicides. The decrease in conventional sugarbeet acreage treated with herbicides is likely due to late planting which usually reduces weed density.

Nortron and Dual were the only soil-applied herbicides reportedly used in 2009. Soil-applied herbicide use for all sugarbeet acreage was 47% in 1989, 32% in 1993, 11% in 1998, 4% in 2002, 29% in 2003, 31% in 2004, 24% in 2005, 23% in 2006, 25% in 2007, 20% in 2008, and 5% in 2009 (Table 1). Soil-applied herbicide use for only conventional sugarbeet was 18% in 2009 (Table 2), compared to 35% in 2008. The exact reason for the decline in soil-applied herbicide usage in only conventional sugarbeets is unknown, but may be due to late planting and choosing fields with minimal kochia populations. Almost no growers planting RR sugarbeet reported use of soil-applied herbicides in 2009 (Table 1 and 3).

Postemergence herbicide use for all sugarbeets declined again in 2009 to 224% (Table 1) compared to 279% in 2008, 340% in 2007, 335% in 2006, 336% in 2005, 379% in 2004, 380% in 2003, 388% in 2002 and 342% in 2001. Postemergence herbicide use for all sugarbeets in 2009 was at its lowest level since 1987 when use was 229%. Postemergence herbicide use for only conventional sugarbeet also declined in 2009 to 259% (Table 2) compared to 346% in 2008. Postemergence herbicide use for only RR sugarbeet slightly increased in 2009 to 225% (Table 3), compared to 223% in 2008. Growers planting only RR sugarbeet reduced the number of postemergence herbicide applications by only 0.35 applications in 2009, compared to growers planting only conventional sugarbeet. In 2008, growers planting only RR sugarbeet made 1.2 times fewer postemergence herbicide applications compared to growers planting only conventional sugarbeet. The slight difference in the number of postemergence herbicide applications between only RR and only conventional sugarbeet growers in 2009 is likely attributed to late planting and a cold growing season. Late planting and a cold growing season likely caused reduced weed populations in 2009, equating to a reduction in the number of postemergence herbicide applications, especially for only conventional sugarbeet growers. Growers were asked if conventional herbicide rates increased in 2009. Three percent of conventional sugarbeet growers reported an increase in conventional herbicide rates in 2009 compared to 2008. This slight increase in herbicide rate means the sensitivity of weed populations to conventional herbicides likely have not changed.

The usage of postemergence grass herbicides was 29% (Table 1) of all sugarbeet acreage in 2009 as compared to 104% in 2008, 189% in 2007, 215% in 2006, 203% in 2005, 226% in 2004, 214% in 2003, 209% in 2002 and 214% in 2001. The usage of postemergence grass herbicides was 194% of the only conventional sugarbeet acreage in 2009 (Table 2). The rapid decline in postemergence grass herbicide usage after 2007 is due to the rapid adoption of RR sugarbeet. Assure II was used on 13% of the total acreage in 2002, 15% in 2003, 9% in 2004, 12% in 2005, 6% in 2006, 13% in 2007, 3% in 2008, and 3% in 2009 (Table 1). Select was used on 190% of the total acreage in 2002, 180% in 2003, 198% in 2004, 165% in 2005, 199% in 2006, 167% in 2007, 92% in 2008, and 26% in 2009 (Table 1). Select was used on 194% of the only conventional sugarbeet acres in 2009, comparable to usage prior to RR sugarbeet. Poast was used on 17% of the acreage in 2002, 19% in 2003, 20% in 2004, 25% in 2005, 11% in 2006, 9% in 2007, 8% in 2008, and <1% in 2009 (Table 1). Most of the postemergence grass herbicides were applied in combination with the micro-rate or mid-rate herbicide treatments which included an oil adjuvant (20%), although 6% of the postemergence grass herbicides (Select and Assure II) were applied in combination with glyphosate (Table 1) to most likely control volunteer RR corn. The greatest percentage of RR sugarbeet acreage treated with Assure II and Select was reported by growers in Marshall (32%), Renville (26%), and Richland (16%) Counties (Tables 10, 14, and 15). About 3% of the acres reported were treated with a postemergence grass herbicide used alone.

Betanex was applied to 107% of total sugarbeet acreage in 2001, 112% in 2002, 100% in 2003, 71% in 2004, 51% in 2005, 62% in 2006, 67% in 2007, 32% in 2008, and 5% in 2009 (Table 1). Betanex was used on 35% of only conventional sugarbeet acreage (Table 2) in 2009, compared to 90% in 2008. Betamix was applied to 116% of total sugarbeet acreage in 2001, 139% in 2002, 115% in 2003, 125% in 2004, 95% in 2005, 93% in 2006, 122% in 2007, 53% in 2008, and 10% in 2009 (Table 1). Betamix was used on 112% of only conventional sugarbeet acreage in 2009 (Table 2), compared to 68% in 2008. Progress was applied to 81% of the total acreage in 2001, 97% in 2002, 122% in 2003, 137% in 2004, 149% in 2005, 157% in 2006, 131% in 2007, 75% in 2008, and 16% in 2009 (Table 1). Progress was applied to 91% of the only conventional sugarbeet acreage in 2009 (Table 2), compared to 259% in 2008. The approximate 66% reduction of Progress and Betanex applied to only conventional sugarbeet acreage in 2009 is likely caused by product shortages now that these products are no longer manufactured in the United States. Based upon total sugarbeet acreage, the use of Betanex, Betamix, and Progress was reduced 90% from a combined total of 320% in 2007 to 31% in 2009 (Table 2). This reduction is very similar to the percentage of RR sugarbeet planted in 2009. The most common conventional herbicide treatment in 2009 was Progress + Stinger + UpBeet + Select + Oil adjuvant, applied to 7.5% of total sugarbeet acreage (Table 1). Combination treatments that included oil generally would be micro-rate or

mid-rate treatments. Treatments including oil were applied to 26% of total 2009 sugarbeet acreage, 128% in 2008, 250% in 2007, 258% in 2006, 241% in 2005, 273% in 2004, 297% in 2003, 301% in 2002 and 265% in 2001. Conventional herbicide treatments were applied to 50 and 63% of the total acreage in Grand Forks and Polk Counties, respectively, indicating the greatest concentration of conventional sugarbeet acreage in eastern North Dakota and Minnesota (Tables 8 and 13). Conventional herbicide treatments were applied to fewer than 13% of the total acreage of all remaining counties, except for Chippewa County at 23% (Table 6).

The most common herbicide treatment in 2009 was glyphosate applied at 0.75 lb acid equivalent per acre (0.75 lb ae/A = 22 fl oz/A of Roundup PowerMAX/WeatherMAX and 32 fl oz/A of 3.0 lb ae/gal products) to 107% of total acreage (Table 1), compared to glyphosate applied at 1.0 lb ae/A to 53% of total acreage in 2008. Glyphosate was applied postemergence to 190% of the total sugarbeet acreage reported in 2009 (Table 1), compared to 105% in 2008. The increase in glyphosate usage is directly related to the increase in RR sugarbeet acreage. Glyphosate was applied to 224% of the only RR sugarbeet acreage reported in 2009 (Table 3), compared to 223% in 2008. Glyphosate plus Select and glyphosate plus Stinger were the most frequently reported tankmix partners by growers planting only RR sugarbeet in 2009 (Table 3). The greatest percentage of RR sugarbeet acreage treated with glyphosate plus Stinger was reported by growers in Richland and Traill Counties at 13% (Tables 15 and 16).

The average total rate of glyphosate applied per acre to RR sugarbeets in 2009 was 1.85 pounds acid equivalent per acre (lb ae/A), compared to 1.95 lb ae/A in 2008. The average total rate of glyphosate applied per acre is calculated by multiplying the percentage of acres applied to a particular glyphosate rate by the total acres in Table 1 by that glyphosate rate. Repeat that procedure for each glyphosate rate, add the pounds applied for each rate, and then divide by the total RR acreage in Table 4. The rate for GLYP OTHER LB was set at 0.94 lb ae/A and the rate for GLYP+STINGER, GLYP+SELECT, and GLYP+ASSURE II was set as the weighted average of the three given rates (0.86 lb ae/A). RR sugarbeet growers in Grand Forks, Kittson, and Cass Counties applied the lowest total rate per acre of glyphosate, 1.45, 1.51, and 1.62 lbs ae/A, respectively (Tables 5 to 20). Conversely, RR sugarbeet growers in Richland, Renville, and Wilkin Counties applied the greatest total rate per acre of glyphosate, 2.17, 2.15, and 2.11 lbs ae/A, respectively. Growers in Richland and Wilkin Counties likely applied larger amounts of glyphosate because of application delays caused by excessive rainfall, allowing weeds to become larger than normal. Renville County growers may have applied larger amounts of glyphosate due to the presence of glyphosate resistant or other difficult to control species.

Based upon postemergence herbicide applications, only RR sugarbeet growers reported excellent weed control on 77% of the acres (Table 3) compared to 22% of only conventional sugarbeet growers (Table 2). In 2008, only RR sugarbeet growers reported excellent weed control on 85% of the acres, compared to 34% of only conventional sugarbeet growers. The reduction in reported excellent weed control by RR sugarbeet growers can not be fully explained. However, since a similar reduction occurred for conventional sugarbeet growers, the short, cool, and wet growing season may likely be the culprit. Prior to the 2008 commercial release of RR sugarbeet, the largest percentage of growers reporting excellent weed control with postemergence herbicides was 38% in 1989. Glyphosate provides superior postemergence weed control in sugarbeet compared to conventional herbicides.

Outlook was the only lay-by treatment in 2009. Outlook was applied as a lay-by treatment to 22% of the only conventional sugarbeet acreage in 2009 (Table 2). Outlook was not applied as a lay-by treatment by any grower with only RR sugarbeet in 2009 (Table 3).

The rotary hoe or harrow were used on 2.4% of the acres in 2009 (Table 1) compared to 15% in 2008, 25% in 2007, 41% in 2006, 56% in 2005, 64% in 2004, 65% in 2003, 42% in 2002, 63% in 2001 and 62% in 2000. The percentage of reported acres treated with a rotary hoe or harrow dropped dramatically in 2007, 2008, and again in 2009 compared to previous years. This most likely was due to an unusually wet spring in 2007 which prevented the use of these implements by growers and the adoption of RR sugarbeet in 2008 and 2009. The electrical discharge system, weed pullers, mowing or swathing were used on 7.6% of the acreage in 1995, 1.6% in 1997, 2.4% in 2001, 3.1% in 2002, 2% in 2003, 0.5% in 2004, 1.9% in 2005, 1.7% in 2006, 2.6% in 2007, 0.4% in 2008, and <1% in 2009.

Sugarbeet acreage operated by respondents to the survey in 2009 varied from less than 50 acres to over 2,000 acres (Table 21) with the median sugarbeet acreage being 400 acres and the average being 502 acres. The most common acreage range was 400 to 599 acres for 23% of the respondents. Other common acreage ranges were 100 to 199 acres at 13%, 200 to 299 acres at 13%, 300 to 399 acres at 14%, and 600 to 799 acres at 14%. Eleven percent of the respondents reported over 1,000 acres and 15% had over 800 acres.

All survey respondents planting conventional sugarbeet reported a “worst weed” problem in 2009 (Table 23). Common lambsquarters (41%), pigweed (25%), and kochia (23%) were named most often as the “worst weed” problem by respondents planting conventional sugarbeet in 2009 (Table 22). This is the first time common lambsquarters was named most often as the “worst weed” problem within at least the past 25 years. Common cocklebur, ragweed, smartweed, waterhemp, and biennial wormwood were also named as the “worst weed” problems by respondents planting conventional sugarbeet in 2009 (Table 22 and 23).

None (39%), common lambsquarters (30%), and pigweed (12%) were named most often as the “worst weed” problem by survey respondents planting RR sugarbeet in 2009 (Table 24). Common lambsquarters was named worst weed by 7% of respondents in 2008. The increased prevalence of common lambsquarters in 2009 is likely caused by the cool weather during initial glyphosate applications and potentially the selection of glyphosate-resistant biotypes. Common cocklebur, kochia, nightshade, ragweed, smartweed, velvetleaf, wild buckwheat, wild oat, waterhemp, and RR crops were also named “worst weed” problems by respondents planting RR sugarbeet in 2009. Kochia is more effectively controlled in RR sugarbeet compared to conventional sugarbeet as indicated by the 93% reduction in responses reported by respondents planting RR sugarbeet compared to those planting conventional sugarbeet (Tables 22 and 24). Volunteer RR crops are a problem in RR sugarbeet compared to conventional sugarbeet, as indicated by the responses of respondents planting RR sugarbeet compared to the lack of responses reported by respondents planting conventional sugarbeet (Tables 22 and 24). Ragweed was named as a “worst weed” problem by respondents planting RR sugarbeet in Polk, Renville, and Traill Counties (Table 25). Glyphosate-resistant ragweeds have already been confirmed in those counties. Volunteer RR canola was not reported by respondents planting RR sugarbeet in 2009 compared to 2008.

Rhizoctonia/Aphanomyces were named most often as the “most serious production problem” by all survey respondents in 2009 at 30% of responses, compared to 24% in 2008, 18% in 2007, 13% in 2006, 22% in 2005, and 8% in 2004 (Table 26), the greatest percentage of responses in the history of the survey. The wet growing season and a change in Rhizoctonia population are likely causes for the increase in Rhizoctonia/Aphanomyces. Rhizoctonia/Aphanomyces tended to be reported more often by respondents planting conventional sugarbeet compared to RR sugarbeet in 2009 (Table 27). In 2009, Rhizoctonia/Aphanomyces were named most often as the “most serious production problem” by respondents in Cass, Renville, and Richland Counties at 67, 50, and 50% of responses, respectively (Table 28).

Emergence/stand were named next as the “most serious production problem” by all survey respondents in 2009 at 21% of responses, compared to 21% in 2008, 18% in 2007, 9% in 2006, 3% in 2005 (Table 26). Survey respondents in the Red River Valley (RRV) named emergence/stand more frequently as the “most serious production problem” compared to growers in southern Minnesota (Table 28). The cold and wet 2009 planting season in the RRV and cool and excessively wet early summer in the southern RRV likely caused the reduction in emergence/stand similar to the cold and dry conditions during the 2008 planting season. Emergence/stand were named more often by all survey respondents planting RR sugarbeet and respondents planting only RR sugarbeet compared to growers planting conventional sugarbeet in 2009 (Table 27). Emergence/stand reductions of respondents planting RR sugarbeet in 2009 was likely caused by the weather interacting with availability of disease resistance traits of RR sugarbeet hybrids.

Weeds were named as the “most serious production problem” by all survey respondents in 2009 at only 7% of responses, compared to 30% in 2008, 46% in 2007, 57% in 2006, 36% in 2005, 47% in 2004, and 61% in 2003 (Table 26). Weeds have never been reported so infrequently by all survey respondents in the history of the survey. Respondents planting only RR sugarbeet named weeds as the “most serious production problem” at 3% of responses in 2009, compared to 2% of responses in 2008 (Table 27). The effectiveness of RR sugarbeet and the amount of acreage planted has drastically reduced weeds as a “most serious production problem”. Weeds are still named the “most serious production problem” by respondents planting only conventional sugarbeets at 44% of responses (Table 27). Weeds were named more often by survey respondents in Grand Forks and Polk Counties compared to respondents from other counties (Table 28). This difference is caused by respondents in Grand Forks and Polk Counties planting the most acreage of conventional sugarbeet.

Weather was named as the “most serious production problem” by all survey respondents in 2009 at 12% of responses, compared to 4% in 2008, 7% in 2007, 5% in 2006, 22% in 2005, and 10% in 2004. Weather was named more often by survey respondents in Cass, Richland, and Walsh Counties compared to respondents from other counties (Table 28). Some of the respondents reporting weather as a problem provided the following comments: too wet, 8” of rain, wet harvest, weather, and no water. Excessive moisture occurred during most of the growing season in the southern RRV and throughout the entire RRV during planting. Three respondents reported late planting as a “most serious production problem” in 2009, caused by wet soils during planting. The “no water” comment was mentioned by a respondent from southern Minnesota. Other “most serious production problems” reported by respondents included fertility and wireworms by five and two respondents, respectively.

Eight percent (14 growers) of survey respondents planting RR sugarbeet observed the presence of glyphosate-resistant weeds in 2009, compared to 7% in 2008. Those respondents observing glyphosate resistance listed the following suspected glyphosate-resistant weed species: common lambsquarters, common ragweed, kochia, marestail (horseweed), smartweed, volunteer RR crops (canola, corn, and soybean), waterhemp, weed beet, wild buckwheat, and wild oat (Table 29). Common lambsquarters was listed glyphosate-resistant most frequently by respondents in 2009 at 38% of responses or 58% of respondents reporting glyphosate resistance, compared to only 12% of respondents reporting resistance in 2008. Survey respondents throughout eastern North Dakota and Minnesota reported the presence of glyphosate-resistant lambsquarters (Table 29). An additional 4% of survey respondents planting RR sugarbeet reported not having glyphosate-resistant weeds in RR sugarbeet, but listed the following species as present in other RR crops: common lambsquarters, common ragweed, kochia, and waterhemp (data not provided). Common ragweed and waterhemp have been confirmed glyphosate-resistant in Minnesota and/or North Dakota. Volunteer RR crops are obviously resistant to glyphosate. The weed beet, present in RR sugarbeet seed, contains the glyphosate-resistant gene found in RR sugarbeet. Marestail (horseweed) and common lambsquarters are most likely resistant to glyphosate in Minnesota and North Dakota. Kochia, smartweed, wild buckwheat, and wild oat have not been confirmed glyphosate-resistant and are currently not suspected of being resistant in Minnesota and North Dakota. Proper management of glyphosate in all RR crops is necessary to maintain the long-term effectiveness of glyphosate in RR sugarbeet.

The percentage of acreage hand-weeded was 62% in 1996, 45% in 1997, 28% in 1998, 25% in 2000, 23% in 2001, 32% in 2002, 30% in 2003, 28% in 2004, 23% in 2005, 28% in 2006 and 2007, 20% in 2008, and 4% in 2009 (Table 30). Hand-weeded acres continue to decline with the use of RR sugarbeet. Survey respondents from Chippewa and Grand Forks Counties reported the greatest hand-weeded acreage. Respondents from Chippewa and Grand Forks Counties reported 23 and 50% of total postemergence acreage were treated with conventional herbicides in 2009, explaining why hand-weeding was more prevalent.

The cost of hand weeding and hand thinning ranged from zero to greater than \$80/A in 2009 (Table 31). The most common cost in 2009 was zero dollars as reported by 89% of survey respondents. Zero cost responses were 57% in 2001, 48% in 2002, 41% in 2003, 47% in 2004, 57% in 2005, 45% in 2006, 48% in 2007, and 62% in 2008. When averaged over all survey respondents, the average cost of hand weeding as calculated from Table 30 was \$4.78/A in 2009 as compared to \$ 11.32/A in 2008, \$15.50/A in 2007, \$14.37/A in 2006, \$10.78/A in 2005, \$12.61/A in 2004, \$13.75/A in 2003, \$15.95/A in 2002, \$11.15/A in 2001 and \$34/A in 1995. The effectiveness of RR sugarbeet and the percentage of acreage planted to RR sugarbeet have caused the reduction in the average cost of hand weeding average over all respondents. When averaged over growers who reported hand-weeded acres, the average cost of hand weeding in 2009 was \$27.58/A, compared to \$27.41/A in 2008, and \$29.40/A in 2007.

Averaged over all herbicides, herbicides were band-applied to 7%, broadcast-applied with a ground sprayer to 92%, and broadcast-applied by air to 1% of the sugarbeet acreage in 2009 (Table 32). In 1998, 40% of the acreage was band-applied, 37% was band-applied in 2000, and 38% in 2002. Herbicides were applied by air to 17% of the acreage in 1998, 9% in 2000, and 14% in 2002. Glyphosate is nearly always broadcast-applied with a ground sprayer to RR sugarbeet compared to postemergence herbicides broadcast-applied with a ground sprayer to 15 to 100% of conventional sugarbeet acreage.

Row crop cultivation for weed control was used by 100% of survey respondents planting conventional sugarbeet in 2009 (Table 33), compared to 95% in 2008 and 99% in 2007. Only 28% of respondents used row crop cultivation for weed control in RR sugarbeet in 2009 (Table 33), compared to 32% in 2008. The average number of cultivations per field planted to only conventional sugarbeet was 1.9 in 2009 (Table 34), 1.4 in 2008, 1.7 in 2007 and 2006, 1.9 in 2005, 2.0 in 2000, 2.4 in 1998, 3.2 in 1992, and 3.4 in 1987. Row crop cultivation in conventional sugarbeet increased slightly in 2009, a 56% reduction compared to 1987. The average number of cultivations per field planted to only RR sugarbeet was 0.3 in 2009 (Table 34), a slight increase compared to 0.1 in 2008. RR sugarbeet has reduced row crop cultivation for weed control by 72 to 84% in 2009, based upon percent of respondents reporting row crop cultivations and average number of cultivations per field, respectively.

**TABLE 1. SUMMARY OF ALL HERBICIDES USED IN SUGARBEET REPORTED IN 2009.**  
**187 GROWERS REPORTED ON 93,849 ACRES. OF THIS TOTAL, 2 GROWERS**  
**WITH 238 ACRES REPORTED NO HERBICIDES USED.**

HERBICIDES (IN ORDER OF ACRES TREATED)	NUMBER GROWERS RPTG.	ACRES TREATED % OF TOTAL	Avg no. of appl	% GROWERS REPORTING WEED CONTROL					% GROWERS REPORTING CROP INJURY				
				NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES:</b>													
NORT(PRE/PPI)CONV	15	4.4	1.0	0	13	67	13	7	13	87	0	0	0
NORT(PRE/PPI)RR	1	0.5	1.0	0	0100	0	0	0	0	100	0	0	0
DUAL (PRE) RR	2	0.4	1.0	50	50	0	0	0	50	50	0	0	0
DUAL(PRE/PPI)CONV	1	0.2	1.0	0	100	0	0	0	0	100	0	0	0
TOTAL-PPI&PRE	19	5.4	1.0	5	21	58	11	5	16	84	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>													
GLYP 0.75 LB	111	107.4	2.0	11	79	9	1	0	11	86	2	0	2
GLYP 1.0 LB	61	57.4	1.9	10	72	15	2	2	10	90	0	0	0
GLYP 1.125 LB	15	11.3	1.7	7	87	7	0	0	7	93	0	0	0
PRG+STG+UP+SLT+O	12	7.5	2.2	8	8	83	0	0	8	42	42	8	0
GLYP+SELECT	19	6.1	1.3	16	74	11	0	0	26	63	5	0	5
GLYP OTHER LB	7	5.4	2.0	0	71	29	0	0	0	71	29	0	0
MX+ST+UP+SL+NR+O	6	4.6	2.5	33	17	50	0	0	33	17	33	17	0
BNX+STG+UP+ASR+O	1	2.2	4.0	0	0	0100	0	0	0	0	100	0	0
PROGRESS	4	2.1	1.5	0	0100	0	0	0	0	25	75	0	0
GLYP+STINGER	10	2.1	1.1	10	80	10	0	0	20	70	10	0	0
SELECT	9	1.9	1.1	0	67	22	11	0	11	89	0	0	0
PRG+STNG+UPB+OIL	5	1.8	2.6	0	60	20	20	0	0	60	40	0	0
PR+ST+UP+SL+NR+O	5	1.8	2.0	20	40	0	40	0	20	40	40	0	0
BMX+ST+UP+NRT+OL	3	1.5	2.3	0	0	67	33	0	0	0	67	33	0
BMX+STNG+UPB+OIL	4	1.5	2.0	0	0	50	25	25	0	25	75	0	0
BMX+STG+UP+SLT+O	5	1.2	1.0	20	20	60	0	0	20	20	60	0	0
NX+ST+UP+SL+NR+O	2	1.1	2.0	0	50	50	0	0	0	50	50	0	0
BNEX+STING+UPBET	2	0.8	1.5	50	0	50	0	0	50	50	0	0	0
SELECT RR	6	0.8	1.0	17	83	0	0	0	17	83	0	0	0
PROG+STING+UPBET	3	0.8	1.3	67	0	33	0	0	67	0	33	0	0
PRG+UP+SELCT+OIL	1	0.6	1.0	0	0100	0	0	0	0	0	100	0	0
PROGRESS+UPBEET	2	0.6	1.5	0	0100	0	0	0	0	50	50	0	0
PRG+ST+UP+NRT+OL	2	0.6	1.5	50	0	50	0	0	50	0	50	0	0
PROGRESS+STINGER	3	0.5	2.3	0	0	33	67	0	0	33	67	0	0
OTHER COMBINAT.	1	0.4	1.0	0	100	0	0	0	0	100	0	0	0
BNX+STG+UP+SLT+O	1	0.4	1.0	0	0100	0	0	0	0	0	100	0	0
BETAMIX	1	0.3	2.0	0	0100	0	0	0	0	0	100	0	0
BMIX+STING+UPBET	1	0.3	1.0	0	0	0100	0	0	0	100	0	0	0
GLYP+ASSURE II	1	0.3	1.0	0	100	0	0	0	0	100	0	0	0
BMX+UP+SELCT+OIL	2	0.3	1.0	0	0	50	50	0	0	0	50	50	0
BETANEX	1	0.2	1.0	0	0100	0	0	0	0	0	100	0	0
BNX+STNG+UPB+OIL	2	0.1	2.0	0	0	50	50	0	0	50	0	50	0
ASRE II OR TARGA	1	0.1	1.0	0	100	0	0	0	0	100	0	0	0
BETAMIX+UPBEET	1	0.1	1.0	0	0100	0	0	0	0	0	100	0	0
POAST	1	0.1	1.0	0	0100	0	0	0	100	0	0	0	0
TOTAL-POST	311	224.1	1.8	11	63	22	5	1	12	72	13	2	1
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES:</b>													
OUTLOOK (LAY-BY)	2	0.8	1.0	0	50	50	0	0	0	100	0	0	0
ROUNDUP (PRE)	1	0.1	1.0	0	100	0	0	0	0	100	0	0	0
TOTAL-PRE&LAY-BY	3	0.9	1.0	0	67	33	0	0	0	100	0	0	0
<b>D. OTHER WEED CONTROL METHODS:</b>													
ROTARY HOE	9	2.3	1.1	11	22	44	22	0	22	33	44	0	0
HARROW	1	0.1	1.0	0	0	0100	0	0	0	0	100	0	0
SWATH/FLAIL/MOW	1	0.0	2.0	0	0	0100	0	0	0	0	0	100	0
TOTAL-OTHER	11	2.3	1.2	9	18	36	36	0	18	27	45	9	0
<b>TOTAL TREATMENTS</b>	<b>344</b>	<b>232.8</b>	<b>1.7</b>	<b>10</b>	<b>59</b>	<b>24</b>	<b>6</b>	<b>1</b>	<b>13</b>	<b>72</b>	<b>13</b>	<b>2</b>	<b>1</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

**TABLE 2. SUMMARY OF HERBICIDES USED BY GROWERS WHO GREW ONLY CONVENTIONAL SUGARBEET IN 2009. 9 GROWERS REPORTED ON 3,209 ACRES.**

HERBICIDES (IN ORDER OF ACRES TREATED)	NUMBER GROWERS RPTG.	ACRES TREATED % OF TOTAL	Avg no. of appl	NR*	% GROWERS REPORTING WEED CONTROL					% GROWERS REPORTING CROP INJURY				
					EXC	GD	FR	PR	NR	None	Slt	Mod	Sev	
					-----	-----	-----	-----	-----	-----	-----	-----	-----	
<b>A. SOIL APPLIED HERBICIDES:</b>														
NORT(PRE/PPI) CONV	3	17.9	1.0	0	0	100	0	0	0	0	100	0	0	0
TOTAL-PPI&PRE	3	17.9	1.0	0	0	100	0	0	0	0	100	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>														
MX+ST+UP+SL+NR+O	2	82.9	2.5	0	50	50	0	0	0	50	50	0	0	0
PR+ST+UP+SL+NR+O	1	28.0	2.0	100	0	0	0	0	100	0	0	0	0	0
PRG+STG+UP+SLT+O	3	23.2	2.0	0	0	100	0	0	0	33	67	0	0	0
BMX+STG+UP+SLT+O	4	22.2	1.0	25	25	50	0	0	25	25	50	0	0	0
PROGRESS	1	19.0	1.0	0	0	100	0	0	0	0	100	0	0	0
PRG+UP+SELCT+OIL	1	19.0	1.0	0	0	100	0	0	0	0	100	0	0	0
OTHER COMBINAT.	1	13.1	1.0	0	100	0	0	0	0	100	0	0	0	0
BNX+STG+UP+SLT+O	1	10.6	1.0	0	0	100	0	0	0	0	100	0	0	0
PROGRESS+UPBEET	1	10.0	1.0	0	0	100	0	0	0	0	100	0	0	0
BETANEX	1	6.2	1.0	0	0	100	0	0	0	0	100	0	0	0
BNEX+STING+UPBET	1	4.7	1.0	100	0	0	0	0	100	0	0	0	0	0
PROG+STING+UPBET	1	4.7	1.0	100	0	0	0	0	100	0	0	0	0	0
BMX+UP+SELCT+OIL	1	4.7	1.0	0	0	100	0	0	0	0	100	0	0	0
PRG+ST+UP+NRT+OL	1	4.7	1.0	100	0	0	0	0	100	0	0	0	0	0
SELECT	1	3.4	1.0	0	100	0	0	0	0	100	0	0	0	0
BETAMIX+UPBEET	1	1.9	1.0	0	0	100	0	0	0	0	100	0	0	0
PRG+STNG+UPB+OIL	1	1.1	2.0	0	100	0	0	0	0	100	0	0	0	0
TOTAL-POST	23	259.2	1.3	22	22	57	0	0	22	26	52	0	0	0
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES:</b>														
OUTLOOK (LAY-BY)	1	22.1	1.0	0	0	100	0	0	0	100	0	0	0	0
TOTAL-PRE&LAY-BY	1	22.1	1.0	0	0	100	0	0	0	100	0	0	0	0
<b>D. OTHER WEED CONTROL METHODS:</b>														
ROTARY HOE	1	1.3	1.0	0	0	100	0	0	0	100	0	0	0	0
TOTAL-OTHER	1	1.3	1.0	0	0	100	0	0	0	100	0	0	0	0
<b>TOTAL TREATMENTS</b>	<b>28</b>	<b>300.6</b>	<b>1.3</b>	<b>18</b>	<b>18</b>	<b>64</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>39</b>	<b>43</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

**TABLE 3. SUMMARY OF HERBICIDES USED BY RESPONDENTS WHO GREW ONLY RR SUGARBEET IN 2009. 148 GROWERS REPORTED ON 70,333 ACRES. OF THIS TOTAL 2 GROWERS WITH 238 ACRES REPORTED NO HERBICIDES USED.**

HERBICIDES (IN ORDER OF ACRES TREATED)	NUMBER GROWERS RPTG.	ACRES TREATED % OF TOTAL	Avg no. of appl	NR*	% GROWERS REPORTING WEED CONTROL					% GROWERS REPORTING CROP INJURY				
					EXC	GD	FR	PR	NR	None	Slt	Mod	Sev	
					-----									
<b>A. SOIL APPLIED HERBICIDES:</b>														
DUAL (PRE) RR	1	0.4	1.0	100	0	0	0	0	100	0	0	0	0	
TOTAL-PPI&PRE	1	0.4	1.0	100	0	0	0	0	100	0	0	0	0	
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	96	125.4	2.0	10	80	8	1	0	10	86	1	0	2	
GLYP 1.0 LB	46	67.4	1.9	13	70	15	0	2	13	87	0	0	0	
GLYP 1.125 LB	12	13.6	1.8	8	83	8	0	0	8	92	0	0	0	
GLYP+SELECT	17	7.7	1.3	18	76	6	0	0	29	59	6	0	6	
GLYP OTHER LB	6	6.6	2.0	0	67	33	0	0	0	67	33	0	0	
GLYP+STINGER	10	2.7	1.1	10	80	10	0	0	20	70	10	0	0	
SELECT RR	5	1.0	1.0	20	80	0	0	0	20	80	0	0	0	
GLYP+ASSURE II	1	0.4	1.0	0	100	0	0	0	0	100	0	0	0	
TOTAL-POST	193	224.9	1.8	11	77	10	1	1	13	83	3	0	2	
<b>TOTAL TREATMENTS</b>	<b>194</b>	<b>225.2</b>	<b>1.8</b>	<b>12</b>	<b>77</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>13</b>	<b>82</b>	<b>3</b>	<b>0</b>	<b>2</b>	

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

**Table 4. Acres of sugarbeet and percent of sugarbeet acres treated with herbicide by grower groups in 2009.**

Respondents who grew... <sup>1</sup>	Respondents	Acres	% of Acres treated with herbicide
RR Sugarbeet	178	82,513	218
Conventional Sugarbeet	39	11,336	313
Only RR Sugarbeet	148	70,333	225
Only Conventional Sugarbeet	9	3,209	299
All Sugarbeet	187	93,849	231

<sup>1</sup>Growers with Roundup Ready sugarbeet may or may not have grown conventional sugarbeet. Likewise, growers with conventional sugarbeet may or may not have grown Roundup Ready sugarbeet. Growers with both Roundup Ready and conventional sugarbeet grew at least one acre of each type of sugarbeet.

**TABLE 5. CASS COUNTY: 3 GROWERS REPORTED ON 1,239 ACRES. OF THESE ACRES 1,239 WERE ROUNDUP READY.**

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NR*	NO. OF GROWERS REPORTING					WEED CONTROL				CROP INJURY			
						EXC	GD	FR	PR	NR	None	Slt	Mod	Sev				
						-----												
<b>B. POSTEMERGENCE HERBICIDES:</b>																		
GLYP 0.75 LB	3	1888	152.4	1.7	0	2	1	0	0	0	3	0	0	0				
GLYP 1.0 LB	1	590	47.6	1.0	0	1	0	0	0	0	1	0	0	0				
TOTAL-POST	4	2478	200.0	1.5	0	3	1	0	0	0	4	0	0	0				
<b>TOTAL TREATMENTS</b>	<b>4</b>	<b>2478</b>	<b>200.0</b>	<b>1.5</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>				

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 6. CHIPPEWA, KANDIYOHI, AND SWIFT COUNTIES: 19 GROWERS REPORTED ON 8,352 ACRES. OF THESE ACRES 6,475 WERE ROUNDUP READY.

TREATMENT	NO. OF GROWERS REPORTING													
	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES:</b>														
NORT(PRE/PPI)CONV	5	1179	14.1	1.0	0	1	3	0	1	1	4	0	0	0
NORT(PRE/PPI)RR	1	450	5.4	1.0	0	0	1	0	0	0	1	0	0	0
TOTAL-PPI&PRE	6	1629	19.5	1.0	0	1	4	0	1	1	5	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	14	9913	118.7	2.1	1	11	2	0	0	1	12	0	0	1
GLYP 1.0 LB	4	3690	44.2	2.3	0	2	1	1	0	0	4	0	0	0
BMX+STNG+UPB+OIL	2	1080	12.9	2.0	0	0	1	0	1	0	0	2	0	0
GLYP+SELECT	4	879	10.5	1.0	0	3	1	0	0	0	3	0	0	1
PRG+STNG+UPB+OIL	2	728	8.7	3.0	0	2	0	0	0	0	2	0	0	0
PROGRESS	2	645	7.7	1.5	0	0	2	0	0	0	1	1	0	0
SELECT	4	556	6.7	1.0	0	4	0	0	0	0	4	0	0	0
PROGRESS+STINGER	3	441	5.3	2.3	0	0	1	2	0	0	1	2	0	0
BMX+STG+UP+SLT+O	1	390	4.7	1.0	0	0	1	0	0	0	0	1	0	0
PROG+STING+UPBET	1	220	2.6	2.0	0	0	1	0	0	0	0	1	0	0
ASRE II OR TARGA	1	135	1.6	1.0	0	1	0	0	0	0	1	0	0	0
SELECT RR	2	64	0.8	1.0	0	2	0	0	0	0	2	0	0	0
BMX+ST+UP+NRT+OL	1	39	0.5	1.0	0	0	1	0	0	0	0	1	0	0
TOTAL-POST	41	18780	224.9	1.8	1	25	11	3	1	1	30	8	0	2
<b>D. OTHER WEED CONTROL METHODS:</b>														
ROTARY HOE	3	594	7.1	1.0	0	1	1	1	0	1	0	2	0	0
HARROW	1	49	0.6	1.0	0	0	0	1	0	0	0	1	0	0
TOTAL-OTHER	4	643	7.7	1.0	0	1	1	2	0	1	0	3	0	0
<b>TOTAL TREATMENTS</b>	<b>51</b>	<b>21052</b>	<b>252.1</b>	<b>1.6</b>	<b>1</b>	<b>27</b>	<b>16</b>	<b>5</b>	<b>2</b>	<b>3</b>	<b>35</b>	<b>11</b>	<b>0</b>	<b>2</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 7. **CLAY AND BECKER COUNTIES: 16** GROWERS REPORTED ON **5,997** ACRES. OF THESE ACRES 5,917 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	7	4484	74.8	2.0	1	6	0	0	0	1	6	0	0	0
GLYP 1.0 LB	7	4256	71.0	2.0	0	5	2	0	0	0	7	0	0	0
GLYP 1.125 LB	2	1600	26.7	2.0	0	2	0	0	0	0	2	0	0	0
GLYP+SELECT	2	690	11.5	1.5	0	1	1	0	0	1	1	0	0	0
GLYP OTHER LB	2	630	10.5	2.0	0	2	0	0	0	0	1	1	0	0
BMX+STNG+UPB+OIL	1	240	4.0	3.0	0	0	1	0	0	0	1	0	0	0
GLYP+STINGER	1	60	1.0	1.0	0	1	0	0	0	0	0	1	0	0
TOTAL-POST	22	11960	199.4	2.0	1	17	4	0	0	2	18	2	0	0
<b>D. OTHER WEED CONTROL METHODS:</b>														
ROTARY HOE	1	14	0.2	1.0	0	0	1	0	0	0	0	1	0	0
TOTAL-OTHER	1	14	0.2	1.0	0	0	1	0	0	0	0	1	0	0
<b>TOTAL TREATMENTS</b>	<b>23</b>	<b>11974</b>	<b>199.7</b>	<b>1.9</b>	<b>1</b>	<b>17</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>18</b>	<b>3</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 8. **GRAND FORKS COUNTY: 5** GROWERS REPORTED ON **2,194** ACRES. OF THESE ACRES 1,563 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
BNX+STG+UP+ASR+O	1	2100	95.7	4.0	0	0	0	1	0	0	0	1	0	0
GLYP 0.75 LB	3	1456	66.4	1.7	0	3	0	0	0	0	3	0	0	0
GLYP 1.125 LB	2	1020	46.5	1.5	0	2	0	0	0	0	2	0	0	0
BMX+ST+UP+NRT+OL	1	180	8.2	2.0	0	0	1	0	0	0	0	0	1	0
BNX+STNG+UPB+OIL	1	126	5.7	3.0	0	0	0	1	0	0	0	0	1	0
BMX+UP+SELCT+OIL	1	90	4.1	1.0	0	0	0	1	0	0	0	0	1	0
GLYP 1.0 LB	1	32	1.5	2.0	0	1	0	0	0	0	1	0	0	0
TOTAL-POST	10	5004	228.1	2.0	0	6	1	3	0	0	6	1	3	0
<b>D. OTHER WEED CONTROL METHODS:</b>														
SWATH/FLAIL/MOW	1	4	0.2	2.0	0	0	0	1	0	0	0	0	1	0
TOTAL-OTHER	1	4	0.2	2.0	0	0	0	1	0	0	0	0	1	0
<b>TOTAL TREATMENTS</b>	<b>11</b>	<b>5008</b>	<b>228.3</b>	<b>2.0</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 9. **KITSON COUNTY: 7** GROWERS REPORTED ON **3,332** ACRES. OF THESE ACRES 3,332 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	5	5261	157.9	1.6	0	5	0	0	0	0	5	0	0	0
GLYP 1.0 LB	4	1086	32.6	1.5	1	3	0	0	0	1	3	0	0	0
TOTAL-POST	9	6347	190.5	1.6	1	8	0	0	0	1	8	0	0	0
<b>TOTAL TREATMENTS</b>	<b>9</b>	<b>6347</b>	<b>190.5</b>	<b>1.6</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 10. **MARSHALL COUNTY: 12** GROWERS REPORTED ON **4,009** ACRES. OF THESE ACRES 3,986 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES:</b>														
NORT(PRE/PPI)CONV	1	23	0.6	1.0	0	0	1	0	0	0	1	0	0	0
TOTAL-PPI&PRE	1	23	0.6	1.0	0	0	1	0	0	0	1	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	6	5074	126.6	2.2	2	4	0	0	0	2	4	0	0	0
GLYP 1.0 LB	4	2659	66.3	2.0	0	3	1	0	0	0	4	0	0	0
GLYP+SELECT	1	1278	31.9	2.0	0	1	0	0	0	0	1	0	0	0
PRG+STG+UP+SLT+O	1	69	1.7	3.0	0	0	1	0	0	0	0	1	0	0
TOTAL-POST	12	9080	226.5	2.2	2	8	2	0	0	2	9	1	0	0
<b>D. OTHER WEED CONTROL METHODS:</b>														
ROTARY HOE	2	1039	25.9	1.0	0	1	0	1	0	0	2	0	0	0
TOTAL-OTHER	2	1039	25.9	1.0	0	1	0	1	0	0	2	0	0	0
<b>TOTAL TREATMENTS</b>	<b>15</b>	<b>10142</b>	<b>253.0</b>	<b>1.9</b>	<b>2</b>	<b>9</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>12</b>	<b>1</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 11. **NORMAN AND MAHNOMEN COUNTIES: 8** GROWERS REPORTED ON **3,099** ACRES. OF THESE ACRES 2,882 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	5	3495	112.8	1.8	0	5	0	0	0	0	5	0	0	0
GLYP 1.0 LB	1	1650	53.2	2.0	0	1	0	0	0	0	1	0	0	0
PRG+ST+UP+NRT+OL	1	428	13.8	2.0	0	0	1	0	0	0	0	1	0	0
GLYP 1.125 LB	2	340	11.0	2.0	0	1	1	0	0	0	2	0	0	0
PR+ST+UP+SL+NR+O	1	214	6.9	1.0	0	1	0	0	0	0	1	0	0	0
GLYP+STINGER	1	93	3.0	1.0	0	1	0	0	0	0	1	0	0	0
TOTAL-POST	11	6220	200.7	1.7	0	9	2	0	0	0	10	1	0	0
<b>TOTAL TREATMENTS</b>	<b>11</b>	<b>6220</b>	<b>200.7</b>	<b>1.7</b>	<b>0</b>	<b>9</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>1</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 12. **PEMBINA COUNTY: 6** GROWERS REPORTED ON **3,382** ACRES. OF THESE ACRES 3,382 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 1.0 LB	2	3936	116.4	2.0	0	2	0	0	0	0	2	0	0	0
GLYP 0.75 LB	4	2958	87.5	2.0	0	3	1	0	0	0	4	0	0	0
TOTAL-POST	6	6894	203.8	2.0	0	5	1	0	0	0	6	0	0	0
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES:</b>														
ROUNDUP (PRE)	1	100	3.0	1.0	0	1	0	0	0	0	1	0	0	0
TOTAL-PRE&LAY-BY	1	100	3.0	1.0	0	1	0	0	0	0	1	0	0	0
<b>TOTAL TREATMENTS</b>	<b>7</b>	<b>6994</b>	<b>206.8</b>	<b>1.9</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 13. POLK COUNTY: 30 GROWERS REPORTED ON 20,722 ACRES. OF THESE ACRES 14,942 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES:</b>														
NORT(PRE/PPI)CONV	5	2020	9.7	1.0	0	0	4	1	0	0	5	0	0	0
TOTAL-PPI&PRE	5	2020	9.7	1.0	0	0	4	1	0	0	5	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	11	15890	76.7	2.1	2	8	0	1	0	2	8	1	0	0
GLYP 1.0 LB	13	10734	51.8	2.0	0	10	3	0	0	0	13	0	0	0
PRG+STG+UP+SLT+O	7	5946	28.7	2.0	1	0	6	0	0	1	2	3	1	0
MX+ST+UP+SL+NR+O	5	4071	19.6	2.8	1	1	3	0	0	1	1	2	1	0
GLYP 1.125 LB	3	1620	7.8	1.3	0	3	0	0	0	0	3	0	0	0
PR+ST+UP+SL+NR+O	3	1308	6.3	2.0	1	0	0	2	0	1	0	2	0	0
BMX+ST+UP+NRT+OL	1	1200	5.8	4.0	0	0	0	1	0	0	0	1	0	0
BMX+STG+UP+SLT+O	3	696	3.4	1.0	0	1	2	0	0	0	1	2	0	0
PROGRESS	1	610	2.9	1.0	0	0	1	0	0	0	0	1	0	0
PRG+UP+SELCT+OIL	1	610	2.9	1.0	0	0	1	0	0	0	0	1	0	0
PROGRESS+UPBEET	2	600	2.9	1.5	0	0	2	0	0	0	1	1	0	0
GLYP+STINGER	2	484	2.3	1.0	0	2	0	0	0	0	2	0	0	0
OTHER COMBINAT.	1	420	2.0	1.0	0	1	0	0	0	0	1	0	0	0
BNX+STG+UP+SLT+O	1	340	1.6	1.0	0	0	1	0	0	0	0	1	0	0
PRG+STNG+UPB+OIL	1	310	1.5	2.0	0	0	1	0	0	0	1	0	0	0
NX+ST+UP+SL+NR+O	1	227	1.1	1.0	0	0	1	0	0	0	0	1	0	0
BETANEX	1	200	1.0	1.0	0	0	1	0	0	0	0	1	0	0
BMX+UP+SELCT+OIL	1	150	0.7	1.0	0	0	1	0	0	0	0	1	0	0
BETAMIX+UPBEET	1	61	0.3	1.0	0	0	1	0	0	0	0	1	0	0
SELECT RR	1	25	0.1	1.0	0	1	0	0	0	0	1	0	0	0
BNX+STNG+UPB+OIL	1	14	0.1	1.0	0	0	1	0	0	0	1	0	0	0
TOTAL-POST	61	45516	219.7	1.8	5	27	25	4	0	5	35	19	2	0
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES:</b>														
OUTLOOK (LAY-BY)	1	710	3.4	1.0	0	0	1	0	0	0	1	0	0	0
TOTAL-PRE&LAY-BY	1	710	3.4	1.0	0	0	1	0	0	0	1	0	0	0
<b>D. OTHER WEED CONTROL METHODS:</b>														
ROTARY HOE	3	501	2.4	1.3	1	0	2	0	0	1	1	1	0	0
TOTAL-OTHER	3	501	2.4	1.3	1	0	2	0	0	1	1	1	0	0
<b>TOTAL TREATMENTS</b>	<b>70</b>	<b>48747</b>	<b>235.2</b>	<b>1.7</b>	<b>6</b>	<b>27</b>	<b>32</b>	<b>5</b>	<b>0</b>	<b>6</b>	<b>42</b>	<b>20</b>	<b>2</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 14. RENVILLE, FAIRBAULT, LAC QUI PARLE, REDWOOD, SIBLEY, STEARNS, AND YELLOW MEDICINE COUNTIES: 24 GROWERS REPORTED ON 9,618 ACRES. OF THESE ACRES 9,113 WERE ROUNDUP READY. 2 GROWERS REPORTED NO HERBICIDE USED ON 238 ACRES.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES:</b>														
DUAL (PRE) RR	2	409	4.3	1.0	1	1	0	0	0	1	1	0	0	0
NORT(PRE/PPI)CONV	2	365	3.8	1.0	0	0	1	1	0	1	1	0	0	0
DUAL(PRE/PPI)CONV	1	150	1.6	1.0	0	1	0	0	0	0	1	0	0	0
TOTAL-PPI&PRE	5	924	9.6	1.0	1	2	1	1	0	2	3	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 1.0 LB	9	12418	129.1	2.0	3	6	0	0	0	3	6	0	0	0
GLYP 0.75 LB	13	7299	75.9	1.7	2	8	3	0	0	2	10	1	0	0
GLYP+SELECT	7	1868	19.4	1.0	2	5	0	0	0	2	4	1	0	0
PROGRESS	1	710	7.4	2.0	0	0	1	0	0	0	0	1	0	0
SELECT RR	3	649	6.7	1.0	1	2	0	0	0	1	2	0	0	0
PROG+STING+UPBET	1	355	3.7	1.0	1	0	0	0	0	1	0	0	0	0
SELECT	2	350	3.6	1.0	0	1	0	1	0	1	1	0	0	0
BETAMIX	1	300	3.1	2.0	0	0	1	0	0	0	0	1	0	0
GLYP+STINGER	1	30	0.3	1.0	0	0	1	0	0	0	1	0	0	0
GLYP OTHER LB	1	28	0.3	2.0	0	0	1	0	0	0	1	0	0	0
POAST	1	15	0.2	1.0	0	0	1	0	0	1	0	0	0	0
GLYP 1.125 LB	1	8	0.1	1.0	1	0	0	0	0	1	0	0	0	0
TOTAL-POST	41	24030	249.8	1.5	10	22	8	1	0	12	25	4	0	0
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES:</b>														
OUTLOOK (LAY-BY)	1	15	0.2	1.0	0	1	0	0	0	0	1	0	0	0
TOTAL-PRE&LAY-BY	1	15	0.2	1.0	0	1	0	0	0	0	1	0	0	0
<b>TOTAL TREATMENTS</b>	<b>47</b>	<b>24969</b>	<b>259.6</b>	<b>1.4</b>	<b>11</b>	<b>25</b>	<b>9</b>	<b>2</b>	<b>0</b>	<b>14</b>	<b>29</b>	<b>4</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 15. RICHLAND COUNTY: 10 GROWERS REPORTED ON 5,603 ACRES. OF THESE ACRES 5,603 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	7	5812	103.7	2.0	0	7	0	0	0	0	7	0	0	0
GLYP 1.125 LB	4	4302	76.8	1.8	0	4	0	0	0	0	4	0	0	0
GLYP 1.0 LB	2	1608	28.7	1.5	0	1	1	0	0	0	2	0	0	0
GLYP+STINGER	1	736	13.1	2.0	0	1	0	0	0	1	0	0	0	0
GLYP+SELECT	2	614	11.0	1.5	0	2	0	0	0	1	1	0	0	0
GLYP+ASSURE II	1	259	4.6	1.0	0	1	0	0	0	0	1	0	0	0
SELECT	1	50	0.9	1.0	0	0	1	0	0	0	1	0	0	0
TOTAL-POST	18	13381	238.8	1.7	0	16	2	0	0	2	16	0	0	0
<b>TOTAL TREATMENTS</b>	<b>18</b>	<b>13381</b>	<b>238.8</b>	<b>1.7</b>	<b>0</b>	<b>16</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 16. **TRAILL COUNTY: 9** GROWERS REPORTED ON **3,017** ACRES. OF THESE ACRES 2,792 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	6	4008	132.8	2.0	0	6	0	0	0	0	6	0	0	0
GLYP 1.0 LB	3	1740	57.7	1.7	0	3	0	0	0	0	3	0	0	0
GLYP+STINGER	2	383	12.7	1.0	0	2	0	0	0	0	2	0	0	0
MX+ST+UP+SL+NR+O	1	200	6.6	1.0	1	0	0	0	0	1	0	0	0	0
BNEX+STING+UPBET	1	150	5.0	1.0	1	0	0	0	0	1	0	0	0	0
PROG+STING+UPBET	1	150	5.0	1.0	1	0	0	0	0	1	0	0	0	0
PRG+STG+UP+SLT+O	1	150	5.0	2.0	0	0	1	0	0	0	0	1	0	0
PRG+ST+UP+NRT+OL	1	150	5.0	1.0	1	0	0	0	0	1	0	0	0	0
BMX+STG+UP+SLT+O	1	15	0.5	1.0	1	0	0	0	0	1	0	0	0	0
TOTAL-POST	17	6946	230.2	1.5	5	11	1	0	0	5	11	1	0	0
<b>TOTAL TREATMENTS</b>	<b>17</b>	<b>6946</b>	<b>230.2</b>	<b>1.5</b>	<b>5</b>	<b>11</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>11</b>	<b>1</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 17. **TRAVERSE, BIG STONE, GRANT, AND STEVENS COUNTIES: 10** GROWERS REPORTED ON **9,003** ACRES. OF THESE ACRES 7,847 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING									
					WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	9	15450	171.6	2.6	1	6	2	0	0	1	7	0	0	1
GLYP 1.0 LB	2	2264	25.1	1.5	0	1	0	0	1	0	2	0	0	0
SELECT	2	860	9.6	1.5	0	1	1	0	0	0	2	0	0	0
PRG+STNG+UPB+OIL	1	624	6.9	4.0	0	1	0	0	0	0	0	1	0	0
BNEX+STING+UPBET	1	600	6.7	2.0	0	0	1	0	0	0	1	0	0	0
GLYP+SELECT	1	360	4.0	3.0	0	1	0	0	0	0	1	0	0	0
BMIX+STING+UPBET	1	300	3.3	1.0	0	0	0	1	0	0	1	0	0	0
PRG+STG+UP+SLT+O	1	300	3.3	3.0	0	0	1	0	0	0	1	0	0	0
TOTAL-POST	18	20758	230.6	2.3	1	10	5	1	1	1	15	1	0	1
<b>TOTAL TREATMENTS</b>	<b>18</b>	<b>20758</b>	<b>230.6</b>	<b>2.3</b>	<b>1</b>	<b>10</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>15</b>	<b>1</b>	<b>0</b>	<b>1</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 18. WALSH COUNTY: 12 GROWERS REPORTED ON 5,486 ACRES. OF THESE ACRES 5,446 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING										
					WEED CONTROL					CROP INJURY					
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev	
<b>B. POSTEMERGENCE HERBICIDES:</b>															
GLYP 0.75 LB	7	7310	133.2	2.1	1	6	0	0	0	0	1	6	0	0	0
GLYP 1.0 LB	3	2532	46.2	2.0	0	3	0	0	0	0	0	3	0	0	0
GLYP 1.125 LB	1	1695	30.9	3.0	0	1	0	0	0	0	0	1	0	0	0
GLYP OTHER LB	1	400	7.3	2.0	0	1	0	0	0	0	0	1	0	0	0
PRG+STG+UP+SLT+O	1	120	2.2	3.0	0	0	1	0	0	0	0	1	0	0	0
TOTAL-POST	13	12057	219.8	2.2	1	11	1	0	0	0	1	12	0	0	0
<b>TOTAL TREATMENTS</b>	<b>13</b>	<b>12057</b>	<b>219.8</b>	<b>2.2</b>	<b>1</b>	<b>11</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

TABLE 19. WILKIN AND OTTERTAIL COUNTIES: 13 GROWERS REPORTED ON 7,721 ACRES. OF THESE ACRES 6,919 WERE ROUNDUP READY.

TREATMENT	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	NO. OF GROWERS REPORTING										
					WEED CONTROL					CROP INJURY					
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev	
<b>A. SOIL APPLIED HERBICIDES:</b>															
NORT(PRE/PPI)CONV	2	512	6.6	1.0	0	1	1	0	0	0	0	2	0	0	0
TOTAL-PPI&PRE	2	512	6.6	1.0	0	1	1	0	0	0	0	2	0	0	0
<b>B. POSTEMERGENCE HERBICIDES:</b>															
GLYP 0.75 LB	9	9513	123.2	2.1	1	7	1	0	0	0	1	8	0	0	0
GLYP 1.0 LB	4	4354	56.4	1.8	1	2	1	0	0	0	1	3	0	0	0
GLYP OTHER LB	2	3152	40.8	2.0	0	2	0	0	0	0	0	2	0	0	0
NX+ST+UP+SL+NR+O	1	840	10.9	3.0	0	1	0	0	0	0	0	1	0	0	0
PRG+STG+UP+SLT+O	1	460	6.0	1.0	0	1	0	0	0	0	0	1	0	0	0
GLYP+STINGER	1	140	1.8	1.0	0	1	0	0	0	0	0	1	0	0	0
PR+ST+UP+SL+NR+O	1	138	1.8	3.0	0	1	0	0	0	0	0	1	0	0	0
BMX+STNG+UPB+OIL	1	62	0.8	1.0	0	0	0	0	1	0	0	0	1	0	0
GLYP+SELECT	1	14	0.2	1.0	0	1	0	0	0	0	0	1	0	0	0
PRG+STNG+UPB+OIL	1	6	0.1	1.0	0	0	0	1	0	0	0	0	1	0	0
TOTAL-POST	22	18679	241.9	1.9	2	16	2	2	0	2	2	18	2	0	0
<b>TOTAL TREATMENTS</b>	<b>24</b>	<b>19191</b>	<b>248.6</b>	<b>1.8</b>	<b>2</b>	<b>17</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>20</b>	<b>2</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR

TABLE 20. **OTHER COUNTY: 3** GROWERS REPORTED ON **1,075** ACRES. OF THESE ACRES 1,075 WERE ROUNDUP READY.

TREATMENT	NO. OF GROWERS REPORTING													
	NO. RPTG.	ACRES TRTED	% OF TOTAL	Ave # App	WEED CONTROL					CROP INJURY				
					NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
<b>B. POSTEMERGENCE HERBICIDES:</b>														
GLYP 0.75 LB	2	970	90.2	1.5	1	1	0	0	0	1	1	0	0	0
GLYP OTHER LB	1	860	80.0	2.0	0	0	1	0	0	0	0	1	0	0
GLYP 1.0 LB	1	320	29.8	1.0	1	0	0	0	0	1	0	0	0	0
GLYP+SELECT	1	50	4.7	1.0	1	0	0	0	0	1	0	0	0	0
GLYP+STINGER	1	4	0.4	1.0	1	0	0	0	0	1	0	0	0	0
TOTAL-POST	6	2204	205.0	1.3	4	1	1	0	0	4	1	1	0	0
<b>TOTAL TREATMENTS</b>	<b>6</b>	<b>2204</b>	<b>205.0</b>	<b>1.3</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>

\*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

**Table 21. Total sugarbeet acreage operated by survey respondents in 2009.**

County	Respondents	Acres of sugarbeet										
		<50	50-99	100-199	200-299	300-399	400-599	600-799	800-999	1000-1499	1500-1999	2000+
		-----% of respondents-----										
Cass	3	-	-	33	-	-	67	-	-	-	-	-
Chippewa <sup>1</sup>	19	5	11	26	5	11	16	11	-	16	-	-
Clay <sup>2</sup>	16	-	6	6	31	13	25	19	-	-	-	-
Grand Forks	5	-	-	20	40	-	20	-	-	20	-	-
Kittson	7	-	14	-	43	14	-	-	14	14	-	-
Marshall	12	8	17	25	-	8	8	33	-	-	-	-
Norman <sup>3</sup>	8	-	13	25	-	25	13	13	13	-	-	-
Pembina	6	-	-	17	17	33	-	17	-	-	17	-
Polk	30	-	-	-	7	13	33	27	7	3	3	7
Renville <sup>4</sup>	24	8	4	25	17	8	29	-	-	4	-	4
Richland	10	-	-	-	10	10	40	30	-	10	-	-
Traill	9	-	-	11	22	33	33	-	-	-	-	-
Traverse <sup>5</sup>	10	-	-	-	10	20	10	30	10	-	10	10
Walsh	12	8	17	8	8	8	25	-	-	25	-	-
Wilkin <sup>6</sup>	13	-	8	15	15	8	15	8	15	-	15	-
No Response	3	-	-	-	-	67	33	-	-	-	-	-
Total	187	3	6	13	13	14	23	14	4	6	3	2

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

**Table 22. A summary of the worst weed problem responses in conventional sugarbeet for the past 25 years.**

Year	PIWE <sup>1</sup>	FXTL	COLQ	WIOA	WIBW	WIMU	KOCZ	COCB	SMWE	EBNS	COMA	LASA	VELE	WAHE	RAWE
-----% of responses-----															
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	-
2001	43	1	10	<1	1	0	32	1	4	4	<1	1	-	2	-
2002	44	<1	14	<1	<1	0	26	1	4	<1	<1	<1	2	5	-
2003	25	<1	18	<1	<1	0	46	<1	4	<1	<1	1	1	2	-
2004	21	<1	25	1	0	0	41	1	4	1	1	1	2	1	-
2005	42	<1	15	0	<1	0	29	2	4	<1	0	<1	1	1	-
2006	35	0	18	0	0	0	41	<1	3	0	0	0	1	<1	-
2007	34	<1	16	0	0	0	41	0	1	<1	<1	0	1	4	-
2008	24	0	19	0	0	0	33	5	10	2	0	0	0	0	-
2009	25	0	41	0	0	0	23	2	2	0	0	- <sup>2</sup>	0	2	2

<sup>1</sup>PIWE=pigweed species, FXTL=green & yellow foxtail, COLQ=common lambsquarters, WIOA=wild oat, WIBW=wild buckwheat, WIMU=wild mustard, KOCZ=kochia, COCB=common cocklebur, SMWE=smartweed, EBNS=eastern black nightshade, COMA=common mallow, LASA=lanceleaf sage, VELE=velevetleaf, WAHE=waterhemp, and RAWE=ragweed.

<sup>2</sup>- = species not listed on survey in that year

**Table 23. Worst weed problem in conventional sugarbeet by county in 2009.**

County	Responses	COCB <sup>7</sup>	KOCZ	COLQ	PIWE	RAWE	SMWE	WAHE	BIWW
-----% of responses-----									
Cass	0	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	9	-	-	67	22	-	-	11	-
Clay <sup>2</sup>	2	-	-	50	50	-	-	-	-
Grand Forks	3	-	33	33	33	-	-	-	-
Kittson	0	-	-	-	-	-	-	-	-
Marshall	1	-	100	-	-	-	-	-	-
Norman <sup>3</sup>	1	-	-	-	100	-	-	-	-
Pembina	0	-	-	-	-	-	-	-	-
Polk	16	6	31	31	25	-	-	-	6
Renville <sup>4</sup>	2	-	-	100	-	-	-	-	-
Richland	0	-	-	-	-	-	-	-	-
Trail	2	-	100	-	-	-	-	-	-
Traverse <sup>5</sup>	3	-	-	33	33	-	33	-	-
Walsh	2	-	50	50	-	-	-	-	-
Wilkin <sup>6</sup>	3	-	-	33	33	33	-	-	-
No Response	0	-	-	-	-	-	-	-	-
Total	44	2	23	41	25	2	2	2	2

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

<sup>7</sup>COCB=common cocklebur; KOCZ=kochia; COLQ=common lambsquarters; PIWE=pigweed species; RAWE=ragweed; SMWE=smartweed; WAHE=waterhemp; BIWW=biennial wormwood.

**Table 24. A summary of the worst weed problem responses in RR sugarbeet for the past 2 years.**

Year	Response	None	COCB <sup>1</sup>	KOCZ	COLQ	NISH	PIWE	RAWE	SMWE	VELF	WIBW	WIOA	WAHE	RR Crops
-----% of responses-----														
2008	57	54	0	7	7	0	16	-	0	0	5	4	2	5
2009	178	39	2	3	30	1	12	2	1	1	2	2	3	2

<sup>1</sup>COCB=common cocklebur; KOCZ=kochia; COLQ=common lambsquarters; NISH=nightshade; PIWE=pigweed species; RAWE=ragweed; SMWE=smartweed; VELF=velvetleaf; WIBW=wild buckwheat; WIOA=wild oat; WAHE=waterhemp; RR Crops=Roundup Ready crops.

**Table 25. Worst weed problem in RR sugarbeet by county in 2009.**

County	Responses	None	COCB <sup>1</sup>	KOCZ	COLQ	NISH	PIWE	RAWE	SMWE	VELF	WIBW	WIOA	WAHE	Other <sup>8</sup>
-----% of responses-----														
Cass	3	67	-	-	33	-	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	18	28	-	6	44	-	17	-	-	-	-	-	-	6
Clay <sup>2</sup>	17	24	-	6	47	6	6	-	6	-	6	-	-	-
Grand Forks	5	20	-	-	20	-	20	-	-	-	-	40	-	-
Kittson	7	57	-	-	-	-	43	-	-	-	-	-	-	-
Marshall	11	27	-	-	36	-	9	-	-	-	9	-	-	18
Norman <sup>3</sup>	7	43	-	-	43	-	-	-	-	-	-	14	-	-
Pembina	6	33	-	-	33	-	33	-	-	-	-	-	-	-
Polk	25	52	-	-	20	-	8	4	4	-	4	4	-	4
Renville <sup>4</sup>	25	38	-	-	36	-	4	8	-	8	-	-	16	-
Richland	10	30	10	-	30	-	30	-	-	-	-	-	-	-
Traill	8	38	-	13	25	-	-	13	-	-	13	-	-	-
Traverse <sup>5</sup>	11	27	-	9	36	-	27	-	-	-	-	-	-	-
Walsh	9	100	-	-	-	-	-	-	-	-	-	-	-	-
Wilkin <sup>6</sup>	13	46	15	8	15	-	15	-	-	-	-	-	-	-
No Response	3	33	-	-	33	-	-	-	-	-	-	-	33	-
Total	178	39	2	3	30	1	12	2	1	1	2	2	3	2

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahanomen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

<sup>7</sup>COCB=common cocklebur; KOCZ=kochia; COLQ=common lambsquarters; NISH=nightshade; PIWE=pigweed species; RAWE=ragweed; SMWE=smartweed; VELF=velvetleaf; WIBW=wild buckwheat; WIOA=wild oat; WAHE=waterhemp.

<sup>8</sup>Other=RR corn(1), RR soybean(1), grasses(1)

**Table 26. A summary of the most serious production problem responses for the past 25 years.**

Year	Production problem indicated as worst in sugarbeet										
	No Problem	Weeds	Weather	Emergence/ Stand	Labor mgmt.	Root maggot	Cercospora leaf spot	Rhizoctonia/ Aphanomyces	Rhizomania	Herbicide Injury	
-----% of responses-----											
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	14	2		
1998	3	25	9	4	1	1	36	17	3		
1999	14	39	14	12	2	1	6	9	2		
2000	8	48	9	10	1	<1	3	18	2		
2001	6	52	13	5	2	1	1	16	3		
2002	4	53	11	19	1	<1	<1	9	3		
2003	7	61	9	4	1	<1	1	11	2	4	
2004	6	47	10	21	2	1	0	8	1	1	
2005	3	36	22	3	3	0	0	22	11	0	
2006	9	57	5	9	1	0	<1	13	3	1	
2007	4	46	7	18	<1	<1	<1	18	2	1	
2008	12	30	4	21	3	0	<1	24	2	1	
2009	14	7	12	21	2	1	1	30	5	1	

**Table 27. Most serious production problem in sugarbeet by grower groups in 2009.**

Respondents who grew... <sup>1</sup>	Responses	percent of responses											
		No Prob.	Weeds	Rhizoc/ Aphan	Emerg/ Stand	Weather	Rhizo- mania	Herbicide Injury	CLS <sup>2</sup>	Fusarium	Labor Mangmt	Root Maggot	Other <sup>3</sup>
RR Sugarbeet	173	14	5	29	21	12	6	1	1	1	2	1	6
Conventional Sugarbeet	38	3	24	37	13	8	5	3	-	3	2	-	3
Only RR Sugarbeet	144	17	3	28	23	13	6	-	1	1	2	1	6
Only Conventional Sugarbeet	9	-	44	33	11	11	-	-	-	-	-	-	-
Both RR and Conv. Sugarbeet	29	3	17	38	14	7	7	4	-	4	4	-	4
All Sugarbeet	182	14	7	30	21	12	5	1	1	1	2	1	5

<sup>1</sup>Growers with RR sugarbeet may or may not have grown conventional sugarbeet. Likewise, growers with conventional sugarbeet may or may not have grown RR sugarbeet. Growers with both RR and conventional sugarbeet grew at least one acre of each type of sugarbeet.

<sup>2</sup>CLS=Cercospora leaf spot

<sup>3</sup>Other=late planting (3), fertility (5), wireworms (2).

**Table 28. Most serious production problem in sugarbeet by county in 2009.**

County	Responses	% of responses											
		No Prob.	Weeds	Rhizoc/ Aphan	Emerg/ Stand	Weather	Rhizo- mania	Herbicide Injury	CLS <sup>7</sup>	Fusarium	Labor Mangmt	Root Maggot	Other <sup>8</sup>
Cass	3	-	-	67	-	33	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	19	21	11	42	5	11	-	5	5	-	-	-	-
Clay <sup>2</sup>	14	7	7	21	29	-	-	-	-	14	7	-	14
Grand Forks	5	-	20	40	-	-	40	-	-	-	-	-	-
Kittson	7	43	-	14	14	-	-	-	-	-	-	-	29
Marshall	12	25	8	25	17	17	-	-	-	-	-	-	8
Norman <sup>3</sup>	8	12	12	13	25	12	13	-	-	-	13	-	-
Pembina	7	14	-	29	-	14	14	-	-	-	-	14	14
Polk	30	13	17	27	20	7	7	-	-	-	-	-	10
Renville <sup>4</sup>	26	12	4	50	8	12	12	-	-	-	-	3	-
Richland	8	-	-	50	13	37	-	-	-	-	-	-	-
Traill	9	11	-	22	33	11	-	-	-	-	11	-	11
Traverse <sup>5</sup>	10	20	-	20	40	-	10	-	10	-	-	-	-
Walsh	10	10	-	-	50	30	-	-	-	-	10	-	-
Wilkin <sup>6</sup>	13	8	8	23	46	15	-	-	-	-	-	-	-
No Response	1	-	-	-	100	-	-	-	-	-	-	-	-
Total	182	14	7	30	21	12	5	1	1	1	2	1	5

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnommen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

<sup>7</sup>CLS=Cercospora leaf spot

<sup>8</sup>Other= late planting (3), fertility (5), wireworms (2).

**Table 29. Weeds in sugarbeet suspected of being resistant to glyphosate in 2009.**

County	Responses	No. of									
		COLQ <sup>4</sup>	WAHE	RR CROP	WIBW	CORW	WIOA	KOCZ	SMWE	MARE	WEBE
Cass	1	100	-	-	-	-	-	-	-	-	-
Clay <sup>1</sup>	5	20	-	-	-	20	20	20	-	20	-
Marshall	3	33	-	-	33	-	-	-	-	-	33
Pembina	2	50	-	-	50	-	-	-	-	-	-
Polk	3	33	-	33	-	-	-	-	33	-	-
Renville <sup>2</sup>	2	50	50	-	-	-	-	-	-	-	-
Traverse <sup>3</sup>	3	33	-	67	-	-	-	-	-	-	-
Wilkin	1	100	-	-	-	-	-	-	-	-	-
No Resp.	1	-	100	-	-	-	-	-	-	-	-
Total	21	38	10	14	10	5	5	5	5	5	5

<sup>1</sup>Includes Becker County

<sup>2</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>3</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>4</sup>COLQ=common lambsquarters; WAHE=waterhemp; RR CROP=RR corn(1), soybean(1), canola(1); WIBW=wild buckwheat; CORW=commonragweed; WIOA=wild oat; KOCZ=kochia; SMWE=smartweed; MARE=marestail; WEBE=weed beet.

**Table 30. Sugarbeet acreage that was hand-weeded in 2009.**

County	Respondent acres planted	Hand-weeded
		% of acres planted
Cass	1,239	0
Chippewa <sup>1</sup>	8,352	18
Clay <sup>2</sup>	5,997	0
Grand Forks	2,194	14
Kittson	3,332	0
Marshall	4,009	0
Norman <sup>3</sup>	3,099	0
Pembina	3,382	<1
Polk	20,722	1
Renville <sup>4</sup>	9,618	7
Richland	5,603	0
Traill	3,017	3
Traverse <sup>5</sup>	9,003	6
Walsh	5,486	0
Wilkin <sup>6</sup>	7,721	8
No Response	1,075	0
Total	93,849	4

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

**Table 31. Cost of hand weeding and hand thinning in 2009.**

County	Respondents	Dollars per acre														
		0 <sup>7</sup>	1-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-70	71-80	80+
-----% of respondents-----																
Cass	3	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	19	63	5	5	5	-	-	5	-	-	-	-	5	5	-	5
Clay <sup>2</sup>	16	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Forks	5	60	-	-	-	20	-	-	20	-	-	-	-	-	-	-
Kittson	7	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marshall	12	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norman <sup>3</sup>	8	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pembina	6	83	-	17	-	-	-	-	-	-	-	-	-	-	-	-
Polk	30	93	-	-	3	-	3	-	-	-	-	-	-	-	-	-
Renville <sup>4</sup>	24	88	4	4	-	-	-	4	-	-	-	-	-	-	-	-
Richland	10	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Traill	9	78	-	-	-	-	11	-	-	-	11	-	-	-	-	-
Traverse <sup>5</sup>	10	90	-	-	-	10	-	-	-	-	-	-	-	-	-	-
Walsh	12	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wilkin <sup>6</sup>	13	77	-	-	-	8	-	8	8	-	-	-	-	-	-	-
No Resps	3	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	187	89	1	2	1	2	1	2	1	0	1	0	1	1	0	1

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

<sup>7</sup>0 includes both 'No Response' and '0' responses

**Table 32. Method of herbicide application in 2009.**

Herbicide	Acres treated	Method of application		
		Band	Broadcast Ground	Broadcast Air
		-----% of acres treated-----		
Glyphosate (PRE)	100	-	100	-
Dual (PRE/PPI/Lay-By) Conv Beets	150	-	100	-
Dual (PRE/PPI/Lay-By) RR Beets	159	-	100	-
Nortron (PRE/PPI) Conv. Beets	4089	86	14	-
Nortron (PRE/PPI) RR Beets	450	100	-	-
Outlook (Lay-By)	725	98	2	-
Betanex/Betamix/Progress	2465	25	75	-
Poast, Select, Assure II	2605	-	100	-
Bnex/Bmix/Prog+UpBeet	661	9	42	49
Bnex/Bmix/Prog+Stinger	441	-	100	-
Bnex/Bmix/Prog+UpBeet+Stinger	1120	-	100	-
Bnex/Bmix/Prog+UpBeet+Stinger+Oil	3190	19	81	-
Bnex/Bmix/Prog+UpBeet+Grass+Oil	850	72	28	-
<b>Bnex/Bmix/Prog+UpBeet+Stinger+Grass+Oil</b>	<b>8831</b>	<b>9</b>	<b>81</b>	<b>-</b>
Bnex/Bmix/Prog+UpBeet+Stinger+Nortron+Oil	1847	65	35	-
Bnex/Bmix/Prog+UpBeet+Stinger+Nortron+Grass+Oil	5294	81	15	4
<b>Glyphosate (POST)</b>	<b>161093</b>	<b>1</b>	<b>98</b>	<b>1</b>
Glyphosate+Stinger	1190	-	100	-
Glyphosate+Grass	5327	-	100	-
Other Combinations	420	100	-	-
<b>Total</b>	<b>201007</b>	<b>7</b>	<b>92</b>	<b>1</b>

**Table 33. Number of row crop cultivations per field for weeds in 2009.**

County	RR Sugarbeet			Conventional Sugarbeet						
	Number of responses	Zero	One	Two	Number of responses	Zero	One	Two	Three	
		-----% of responses-----				-----% of responses-----				
Cass	3	67	33	-	0	-	-	-	-	
Chippewa <sup>1</sup>	18	39	50	11	8	-	75	25	-	
Clay <sup>2</sup>	16	81	19	-	1	-	-	100	-	
Grand Forks	5	100	-	-	3	-	33	33	33	
Kittson	7	100	-	-	0	-	-	-	-	
Marshall	11	100	-	-	1	-	-	100	-	
Norman <sup>3</sup>	8	88	12	-	1	-	100	-	-	
Pembina	6	67	33	-	0	-	-	-	-	
Polk	24	96	4	-	15	-	20	80	-	
Renville <sup>4</sup>	24	46	46	8	2	-	50	50	-	
Richland	10	40	60	-	0	-	-	-	-	
Trails	8	88	12	-	2	-	50	50	-	
Traverse <sup>5</sup>	10	70	20	10	2	-	100	-	-	
Walsh	12	100	-	-	1	-	100	-	-	
Wilkin <sup>6</sup>	13	38	54	8	3	-	-	100	-	
No Response	3	67	33	-	0	-	-	-	-	
<b>Total</b>	<b>178</b>	<b>72</b>	<b>25</b>	<b>3</b>	<b>39</b>	<b>0</b>	<b>41</b>	<b>56</b>	<b>3</b>	

<sup>1</sup>Includes Kandiyohi and Swift Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomen County

<sup>4</sup>Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

<sup>5</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>6</sup>Includes Ottertail County

**Table 34. Average number of cultivations per field for weeds by grower groups in 2009.**

Respondents who grew...	Responses	Avg. no. of cultivations per sgbt field	
		RR	Conventional
RR Sugarbeet	178	0.6	-
Conventional Sugarbeet	39	-	1.6
Only RR Sugarbeet	148	0.3	-
Only Conventional Sugarbeet	9	-	1.9
Both RR and Conv. Sugarbeet	30	0.4	1.4

<sup>1</sup>Growers with RR sugarbeet may or may not have grown conventional sugarbeet. Likewise, growers with conventional sugarbeet may or may not have grown RR sugarbeet. Growers with both RR and conventional sugarbeet grew at least one acre of each type of sugarbeet.