2007 National Sunflower Association Survey:
YIELD, CULTURAL PRACTICES AND YIELD LIMITING FACTORS

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Introduction:

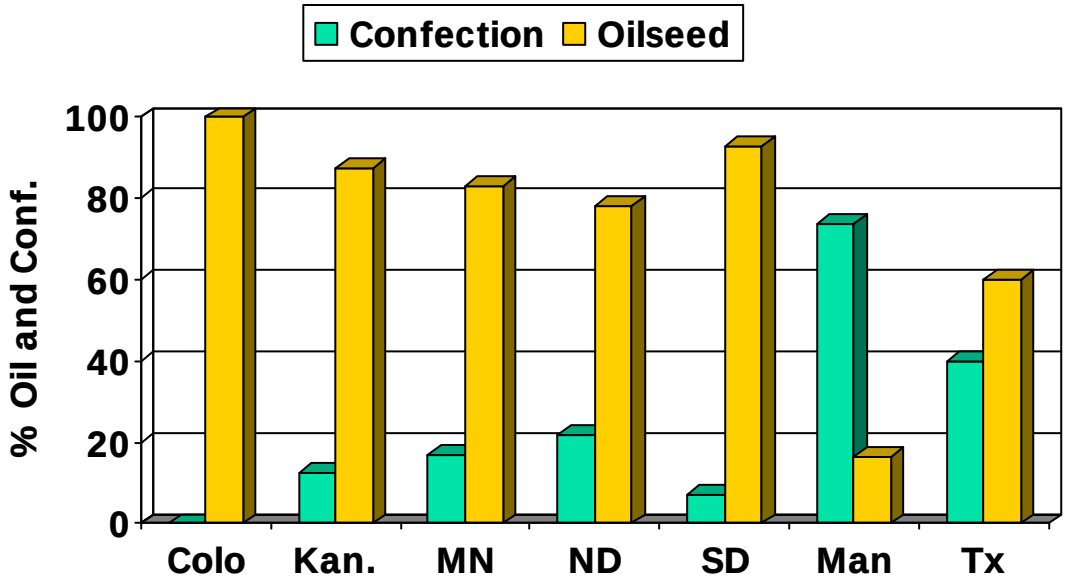
A sunflower field survey was conducted in September and early October in 2007 over six states in the Great Plains region which was similar to surveys in 2003, 2005 and 2006. Manitoba also was included in this year's survey for the first time. Yield and plant population were estimated and class (oil or confection), use of certain cultural practices, weed intensity, insect damage, bird damage, lodging, and disease levels (incidence or severity) were recorded. Seeds from each field surveyed were sampled for subsequent laboratory determination of seed damage.

One field was surveyed for every 10,000 acres in each state and county, based on the planted sunflower acres in 2007 as determined by Farm Service Agency and other state estimates.

The major yield limiting factors were determined for each field. Yield-limiting factors included: no problem, birds, disease, drought, drown-outs, hail, herbicide damage, insects, lodging, plant spacing, population and weeds. Diseases surveyed included Sclerotinia (wilt, head rot, mid stalk rot), Phomopsis, Phoma, Rhizopus head rot, Downy mildew, charcoal rot, Verticillium wilt and red rust.

Results, All States: A total of 158 fields were surveyed in 2007 compared to 162 in 2006. The percent of oilseed fields surveyed was as high as 100% in Colorado, 94% in South Dakota, 93% in Colorado, 91 % in North Dakota, 93% in Kansas and 60% in Texas. The percent of confection fields surveyed was highest in Manitoba at 73% of acres surveyed and with 27% oilseed.

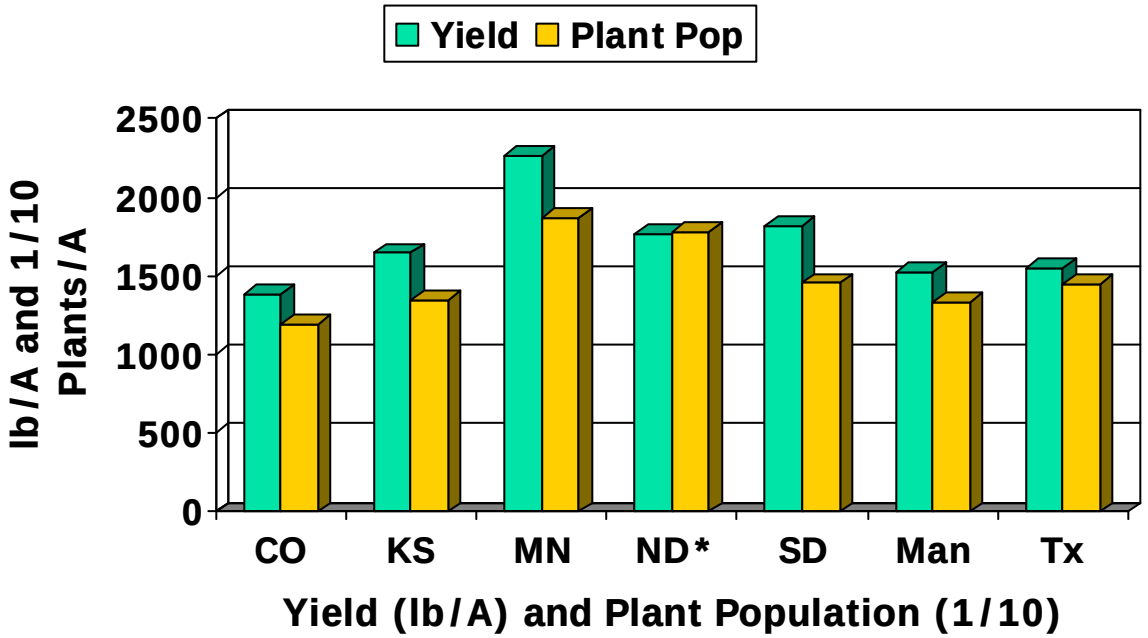
Oilseed and Confection Sunflower Acres-2007



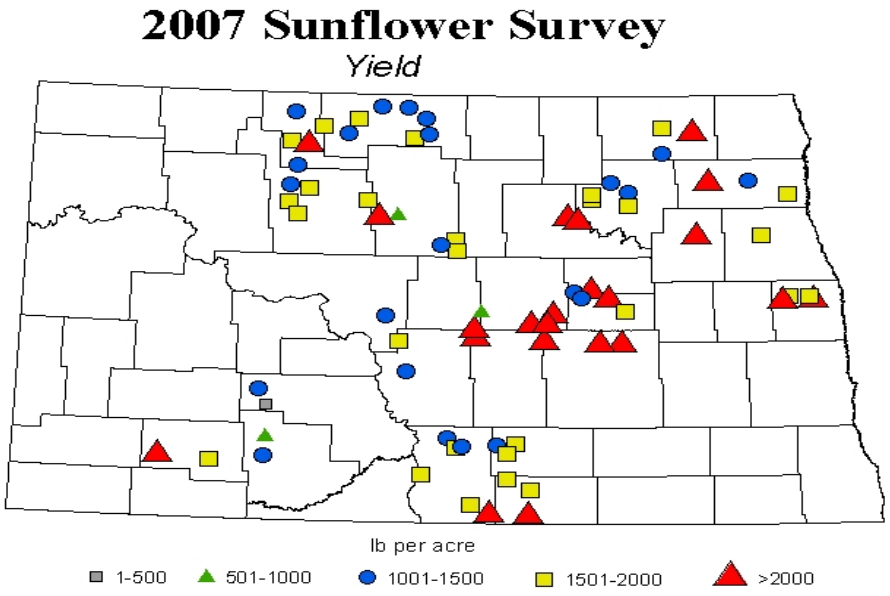
Estimated yields and plant populations: State average yield estimates in 2007 ranged from 1757 lbs/A in North Dakota, 2267 lbs/A in Minnesota, 1814 lbs/A in South Dakota, 1509 lbs/A in Colorado, 1451 lbs/A in Kansas and 1522 lbs./A in Manitoba. In general, 2007 yields were higher in North Dakota, Minnesota, South Dakota and Texas than in 2006. Plant populations at harvest in both North Dakota and Minnesota were greater than any of the states to the south. Colorado had the lowest populations reported which had a drier season. Plant

populations in Kansas, Texas, South Dakota and Manitoba were at or below 15,000 plants per acre. Manitoba had a large share of its sunflower planted to confection type which can attribute to lower plant populations.

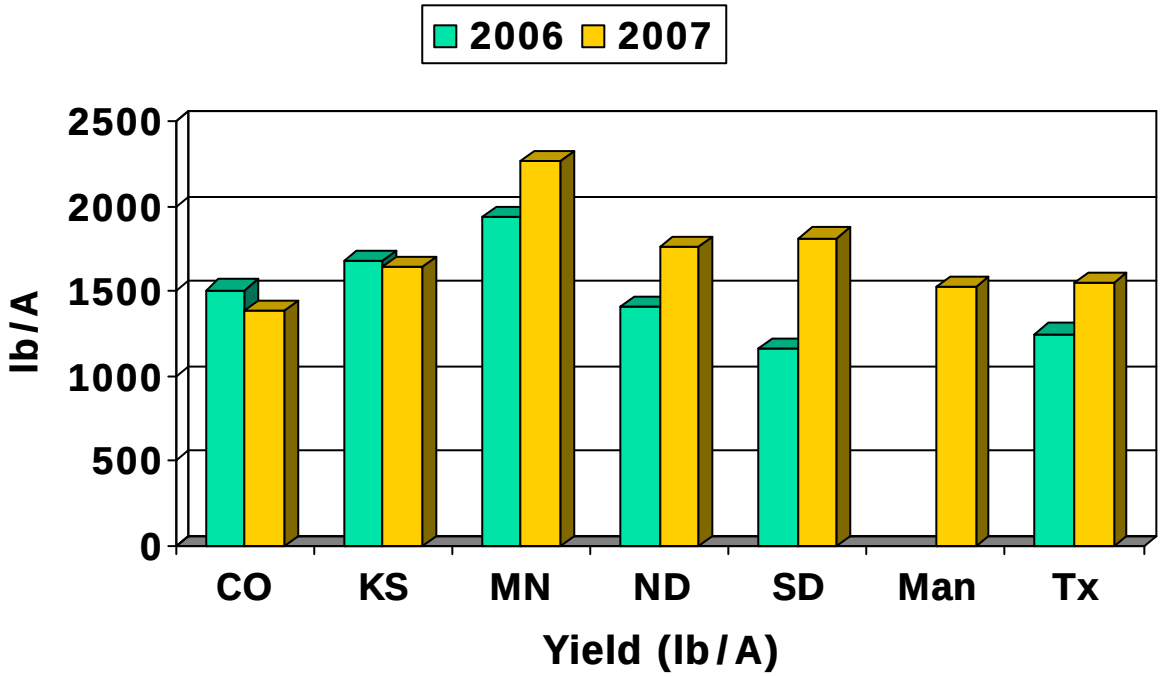
Sunflower Yields and Plant Population 2007



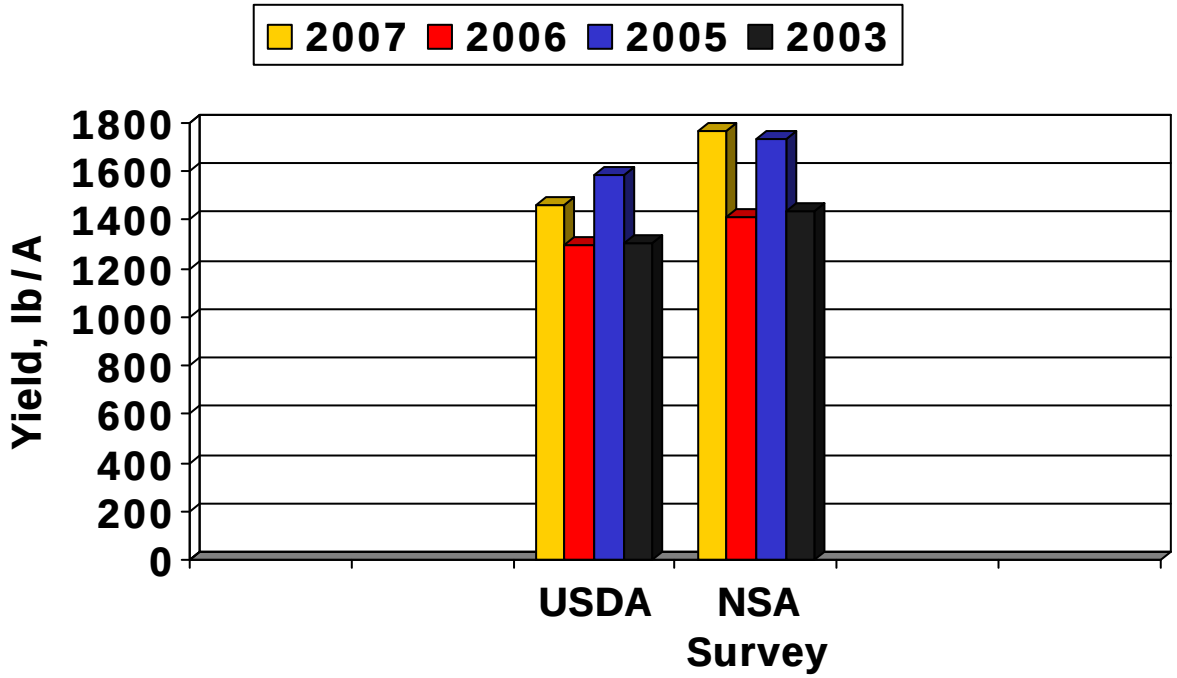
*North Dakota had a large number of surveyed fields that yields estimates well over 2000 lbs. per acre



Sunflower Yields Compared for 2006 vs 2007



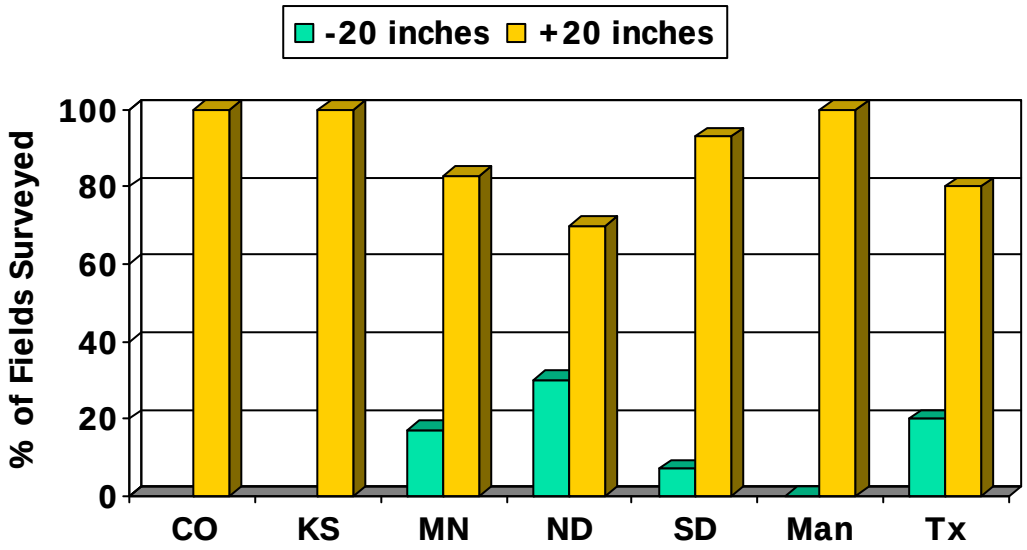
USDA and National Sunflower Association Surveys in North Dakota



When comparing the USDA Ag. Statistics data and the NSA survey data over the past years one can see that the NSA survey usually was reported at slightly higher state average yields that the USDA survey. The NSA survey had less data points each year and usually the survey is not taken in some of the most arid areas of North Dakota as in certain far western regions. The NSA survey also may be taken a little earlier in the season than the USDA survey. The trends do tend to agree with each other when compared within years with NSA being slightly higher.

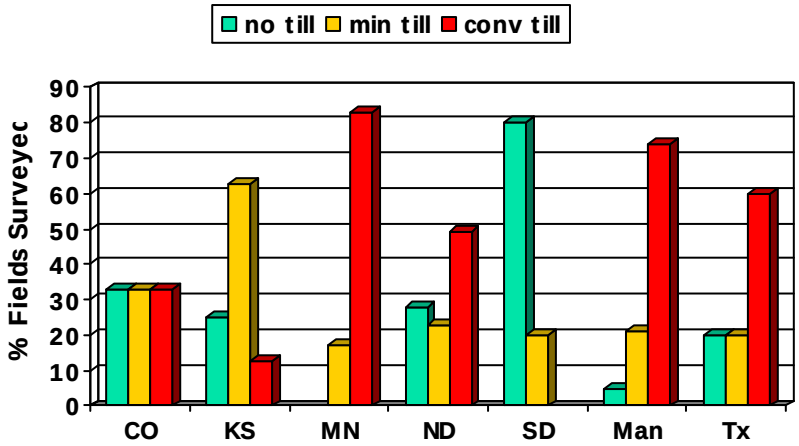
Row spacing: The majority of fields surveyed were planted with row spacing greater than 20 inches. In Colorado, Kansas and Manitoba all fields has row spacing greater than 20 inches. In North Dakota, approximately 33% of fields surveyed had narrow row spacing < 20 inches. In Minnesota about 18% of the fields had narrow rows and in South Dakota less than 10% were in narrow row spacing. In Texas, 4 out of 5 fields had wide rows.

Row Spacing in Sunflower-2007



Tillage Practices: Conventional till was greatest in Minnesota and Manitoba and close to 50 % of the North Dakota fields surveyed. Minimum till was reported as 33 % Colorado, 63% in Kansas, 23% in North Dakota, 17% in Minnesota, 20% in Texas and South Dakota. South Dakota led all states and areas again this year with 80% of its sunflower surveyed acres under no till. Colorado and North Dakota followed next with 33% and 28% of the acres planted to no till, respectively.

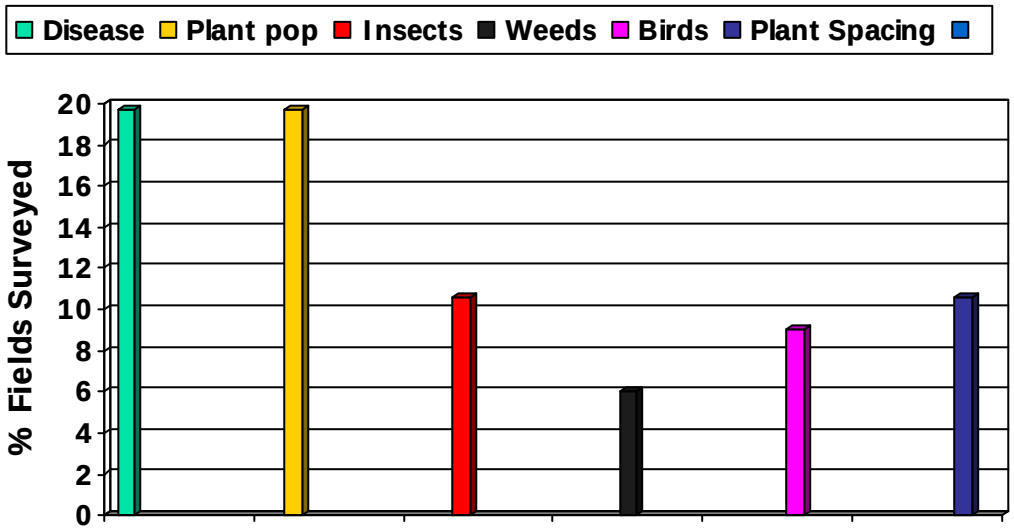
Tillage Practices in 2007 Sunflower Survey



Yield-limiting Factors: The number one yield-limiting factor had a common thread in several of the states. In North Dakota it can be noted that disease and plant populations were the major problem and limiting factor to higher yields and were reported as the problem in about 20% of all fields surveyed. They were followed by insect problems, bird damage and plant spacing as being other factors that limited yield potential. In Minnesota which is not shown, disease and bird damage were the two most important yield limiting factors in 2007.
It should be noted that in South Dakota plant populations and lodging were the two primary yield limiting factors. In Kansas the major yield limiting factors were drought, weed problems and plant spacing while in Colorado plant spacing was the main problem followed by drought, weeds and disease. In Texas, plant populations and plant spacing were once again identified as a problem to gain maximum yields. Manitoba, in the survey for the first time ever, identified weeds, birds and disease as its 3 major yield limiting factors

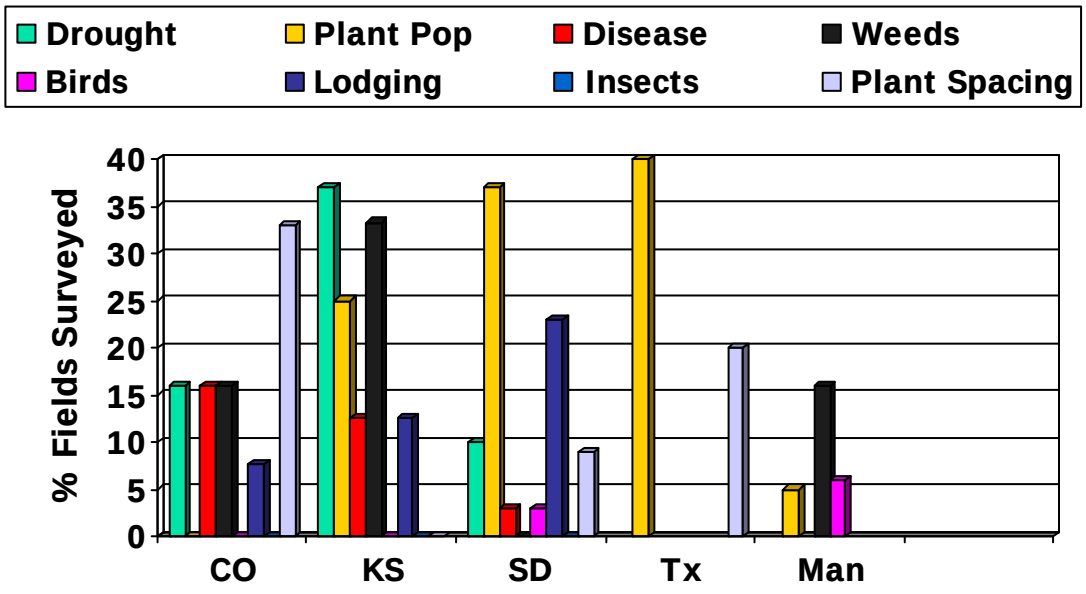
Major Yield Limiting Factors in Sunflower-2007

North Dakota



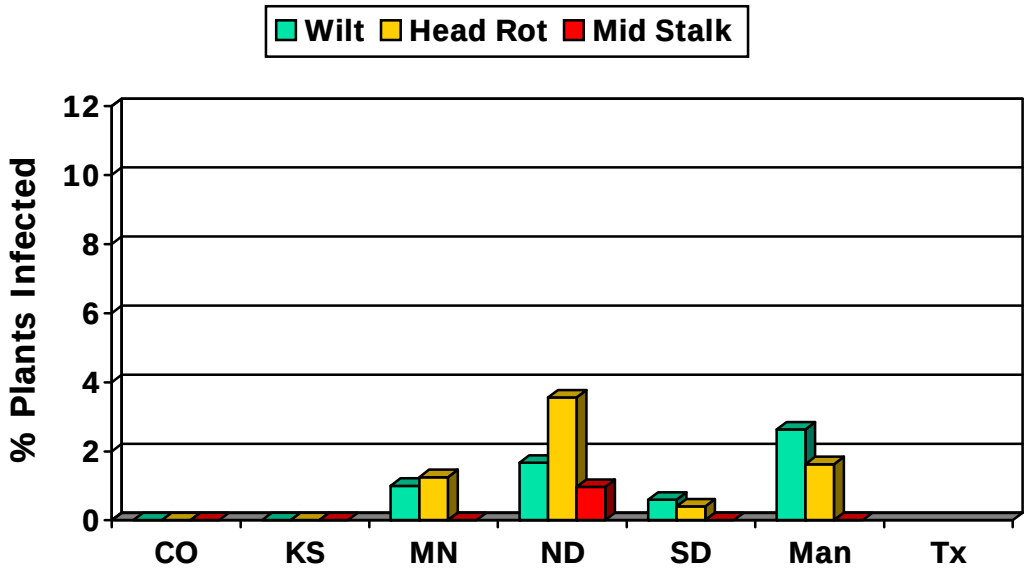
Major Yield Limiting Factors in Sunflower-2007

South Dakota, Kansas, Colorado, Texas and Manitoba



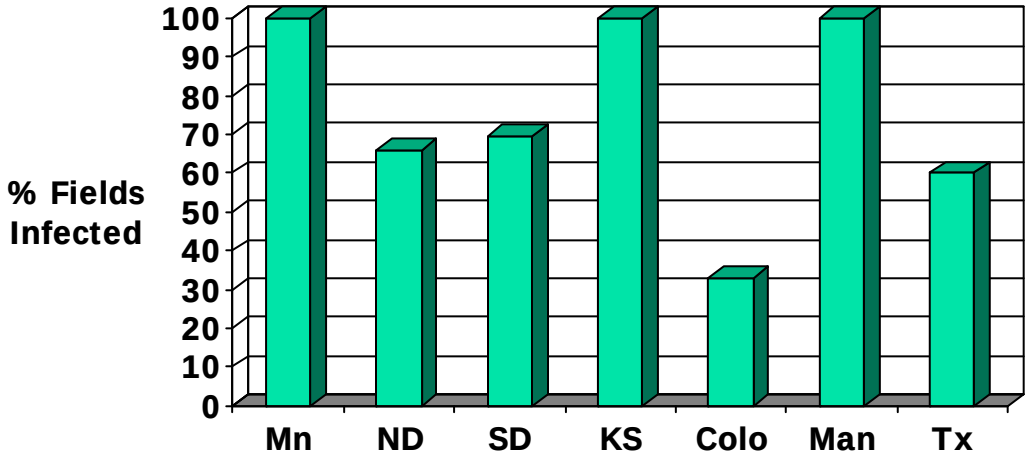
Sclerotinia Disease: Sclerotinia (wilt, head rot and mid stalk rot) was not a serious problem in 2007 due to the dry weather in many sunflower production areas. However, reports of more head rot did come in after this survey because of the warm, late fall and some rainy periods. Head rot was highest in North Dakota this year with an average infection reported at 3.6%. Most states reported a low incidence of the wilt and mid stalk rot. The percent of sclerotinia head rot in Minnesota was as high as 12% in 2005 and down to 3% last year.

Sclerotinia Disease in 2007 Sunflower Survey

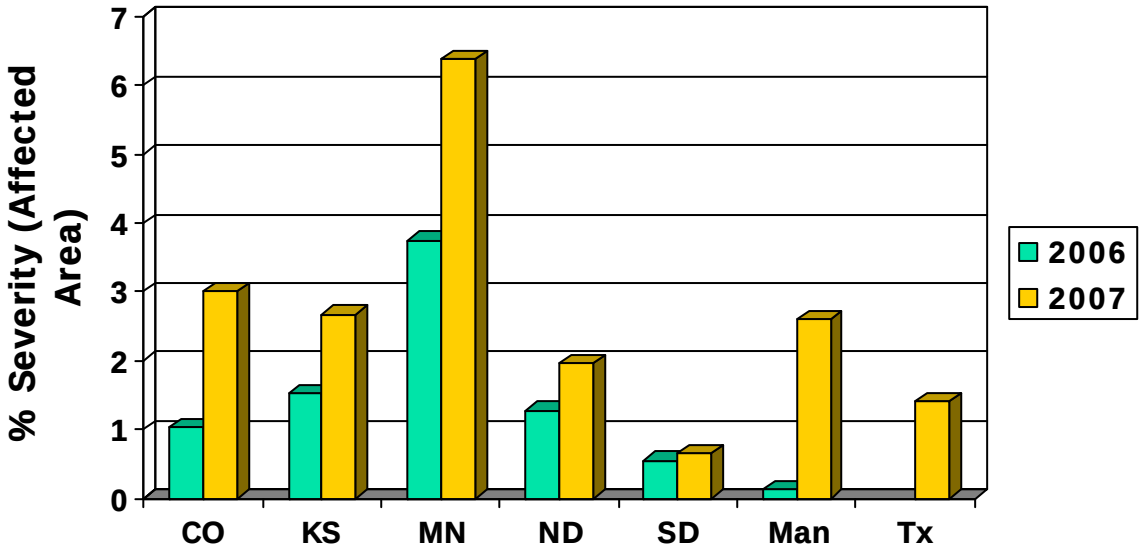


Red Rust Severity in 2007: Red rust in sunflower was reported in all states surveyed with some rust found in 100% of fields surveyed in Minnesota, Kansas and Manitoba. This disease continues to show up in more fields each and every year. When considering the severity of infection, it was most severe in Minnesota at 6.4%, Colorado, Kansas, and Manitoba between 2 to 3 %. Whereas, North Dakota had 2 % severity rating and South Dakota was lowest at 0.66% severity rating. Rust infected leaf samples sent to the USDA-ARS laboratory were found to contain no new races of sunflower red rust, but were very aggressive strains. Most of the sunflower rust infestation and infection appeared late in the season and thus had no great impact on yields. If the rust infection does occur early like in mid-July to early August then economic losses can occur.

Red Rust Incidence- 2007

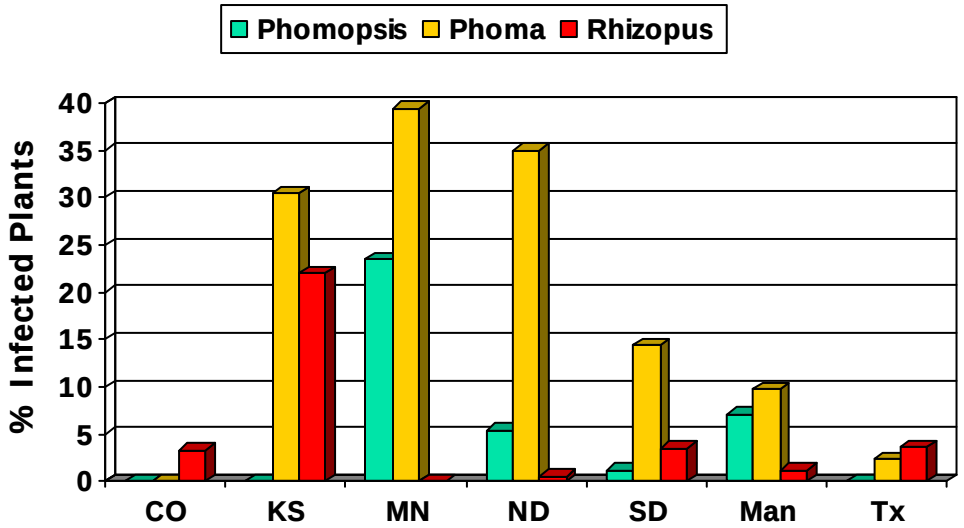


Sunflower Red Rust Severity as Reported in Survey



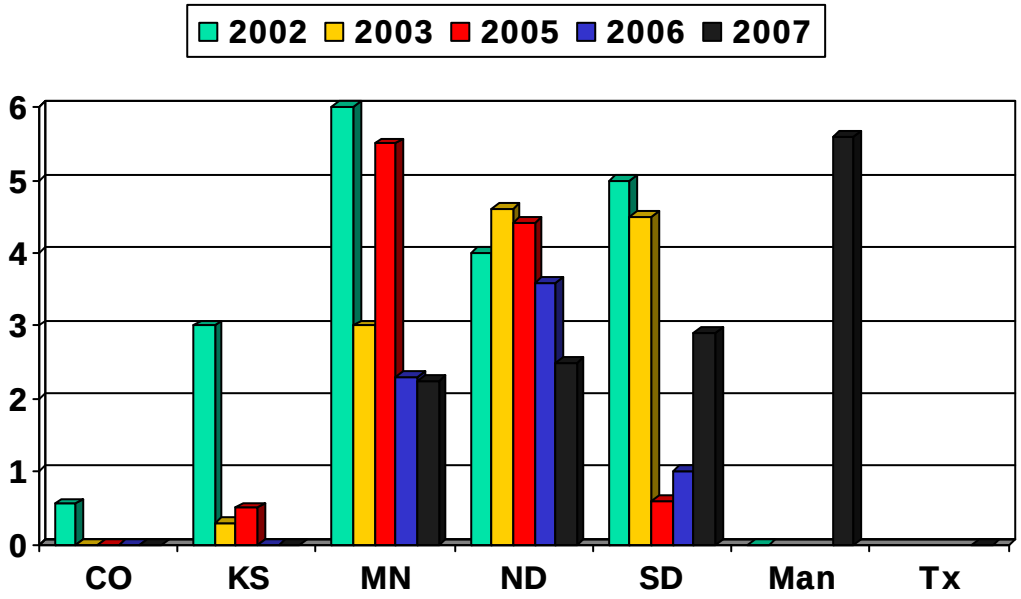
Other Sunflower Diseases: Rhizopus was reported in all states surveyed with Kansas being the only state with any serious problem. Phomopsis continues to be a very serious problem in Minnesota with nearly 23.5% infected plants followed by over 5 % in North Dakota and over 7 % in Manitoba. Phoma was the most highly reported disease infested and had the highest field incidence and infection levels. The leading states with this disease were Minnesota, North Dakota and Kansas with ranges from 30 to 39% of plants infected in the survey as reported. South Dakota and Manitoba had infection levels below 15 %. Downy mildew was reported in the survey but was somewhat mixed since a lot of the early infection levels were difficult if not impossible to detect during survey time in late Sept. to early October.

Incidence of Other Sunflower Diseases in 2007.



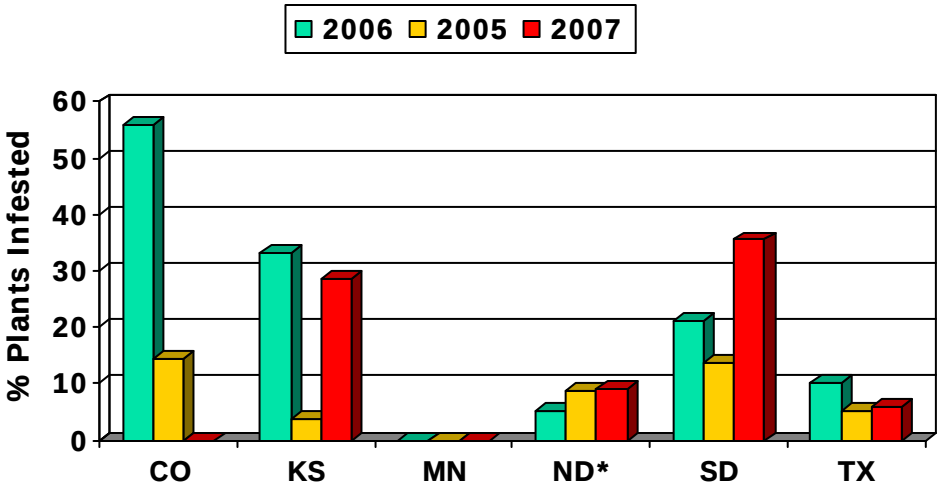
Bird Damage: Bird damage continues to be a problem for many sunflower growers in the Great Plains. The average field damage from blackbirds (the primary pest species) was slightly less in North Dakota in 2007 at 2.5 % compared to 2002 to 2006. It should be noted that Manitoba had the more damage reported by birds than any of the other states in the survey. In South Dakota the damage reported from birds was up in 2007 compared to damages in 2005 and 2006. In Minnesota bird damage was much lower than reported in 2002 and 2005. Kansas, Colorado and Texas reported little or no bird damage this past growing season. If one doesn't average the bird losses over all surveyed fields but only take into account those that had birds present and observed damage, the losses are much higher. In Manitoba and Minnesota the actual losses to birds in the infested fields were over 9 % yield loss and in North Dakota it would have been 5 % and South Dakota is was over 7 %. Bird damage in North Dakota continues to be most severe in the NC and SC regions of the state.

Bird Damage in Sunflower Surveys



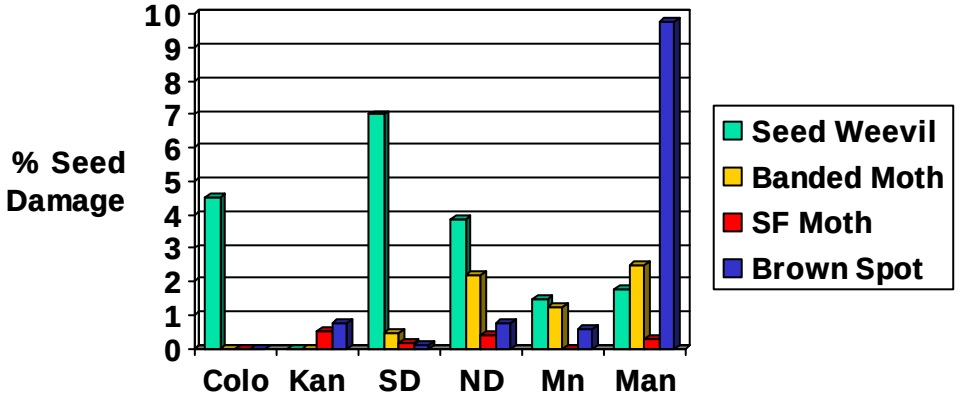
Insect Damage in Sunflower Fields- Sunflower plants including stalks were examined for damage by the Longhorned beetle. The highest number of Longhorned beetles were reported in South Dakota with 35 % of the plants infested, Kansas the second highest with 29 % infected plants and North Dakota averaged over 10 % of plants infested. Texas had a very low infection rate of 5%. North Dakota's number of Longhorned beetles at 10.4 % infection level increased considerably from the 2005 survey. Colorado had no reports of this insect in 2007.

Infestation of Long Horned Beetle in Sunflower



Other Insects: Sunflower seed weevil, banded SF moth, SF moth and Brown Spot damage were determined from seed samples taken in the fields in each state and sent in my survey teams. The most serious seed damage was observed in South Dakota seed samples where 7 % damage occurred from seed weevils. In North Dakota and Colorado the seed weevil damage was 4 % and 4.5 %, respectively. Another major insect problem occurred in Manitoba as brown spot was found on 9.8 % of seed samples. A large portion of the Manitoba seed produced was confection. Sunflower damage by banded moth or sunflower moth was limited in most areas. Note the data shows the head webbing on sunflower in Colorado, Kansas and North Dakota was quite high as it ranged from 23 % to 39 %, with the highest incidence noted in Colorado. Sunflower seed maggot a relatively new insect is on the increase in North Dakota and was only reported by North Dakota surveyors. It was reported to have infested over 8 % of the plants in acres surveyed. It does not kill or destroy the plant but heads are distorted and yields can be reduced and limited in potential.

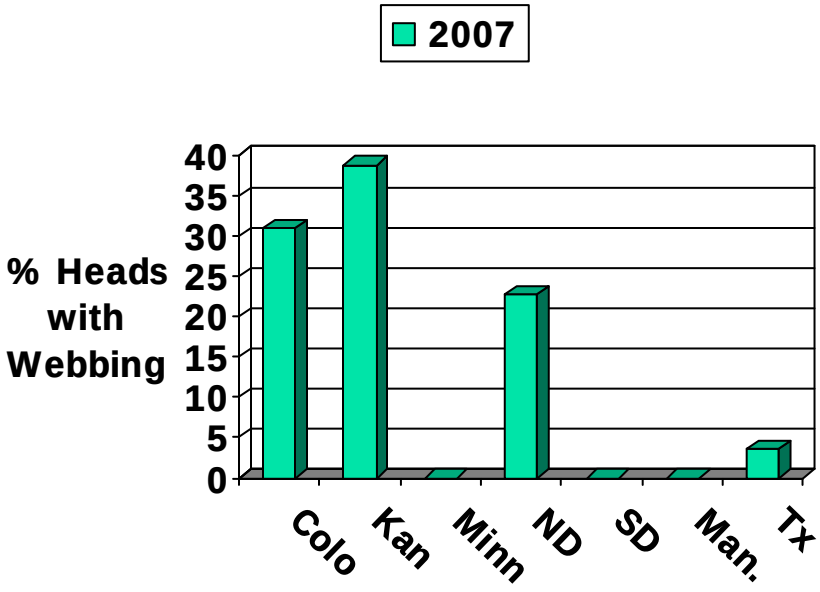
Insect Damage to Sunflower Seed



Other Insect Problems Noted in Field Surveys:

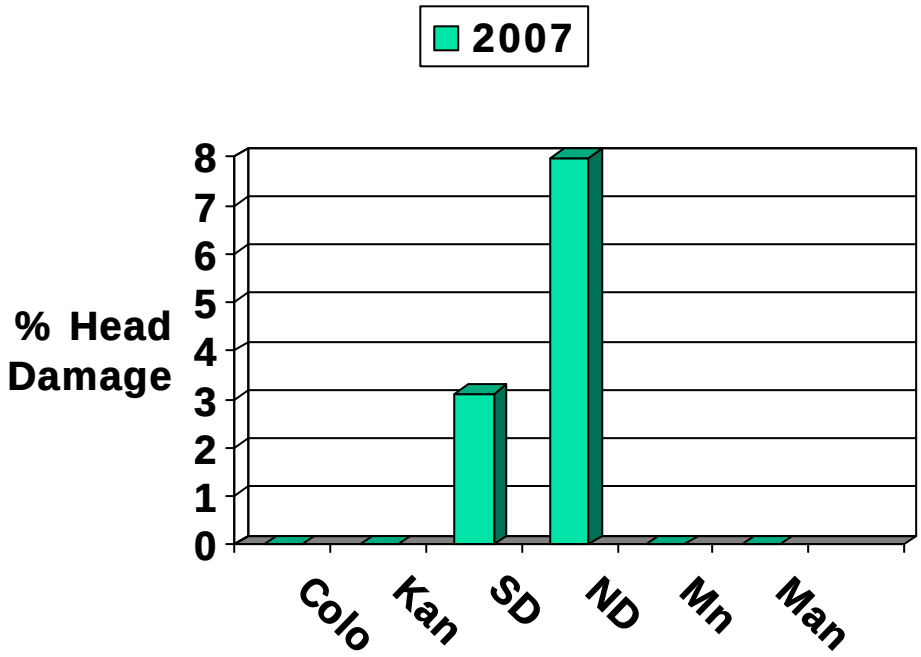
Webbing was most severe in Kansas, Colorado, North Dakota and Texas. These were the only states where it was reported in the survey. This was due to the higher incidences of sunflower moth in Kansas, Colorado and North Dakota.

Webbing in Sunflower Heads:



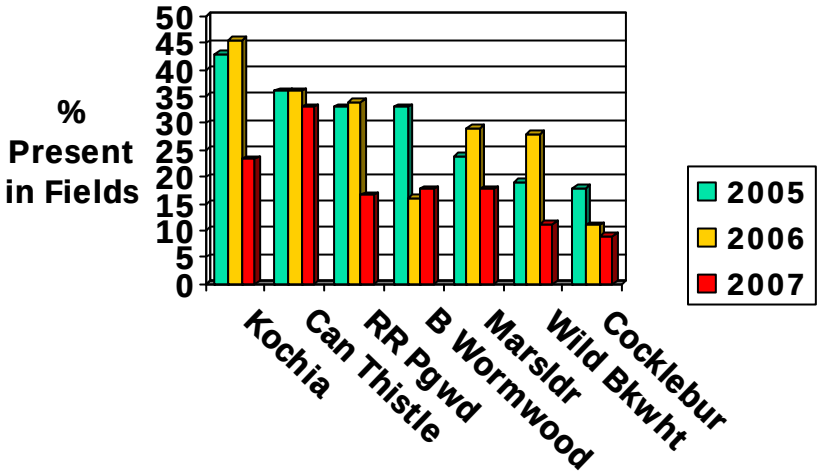
Sunflower Seed Maggot Damage:

The damage to heads caused by the sunflower seed maggot was only reported in North Dakota and South Dakota. It should be noted that this insect continues to be more prevalent in North Dakota. Note the incidence is highest in the NC and northern areas of the state.

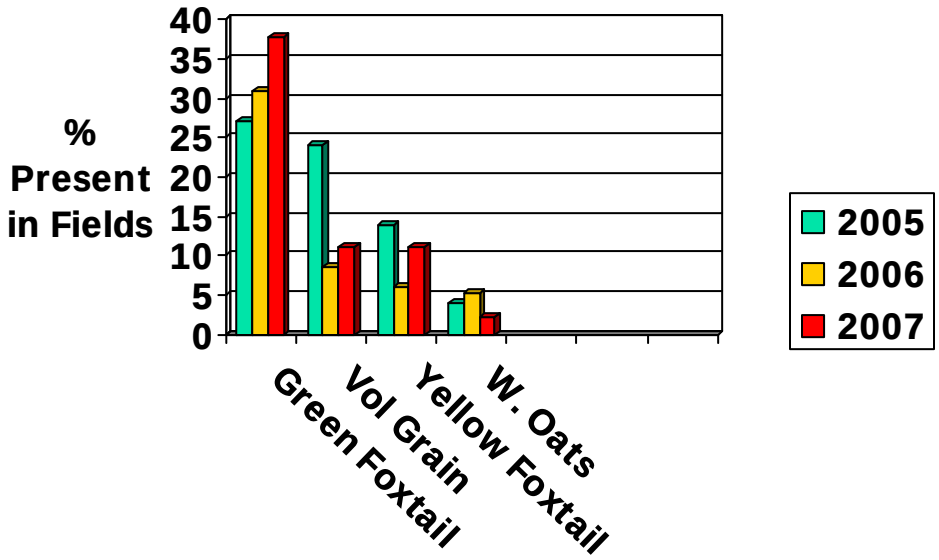


Weed problems in 2007 Survey in North Dakota and Minnesota - Twenty-nine common weeds were evaluated in the survey with the various infestation levels recorded. The ratings were: none, light, moderate and heavy. The data below indicates the percent of fields found with the following weed species being present. For broadleaf weeds in North Dakota and Minnesota, kochia, Canada thistle, marshelder, biennial wormwood and redroot pigweed were the most prevalent. Canada thistle was found in over 35 % of the fields surveyed while kochia was found in over 23 %. **In most of the fields the infestation levels were listed as very light and only present in the field and with little if any contribution toward reduced yields**. The main grassy weeds present in North Dakota and Minnesota were: green foxtail (37 %), volunteer grains and yellow foxtail both at 11%. Wild oats problem was under 5%.

Sunflower Fields with Broadleaf Weeds in 2005, 2006 & 2007 in North Dakota and Minnesota.

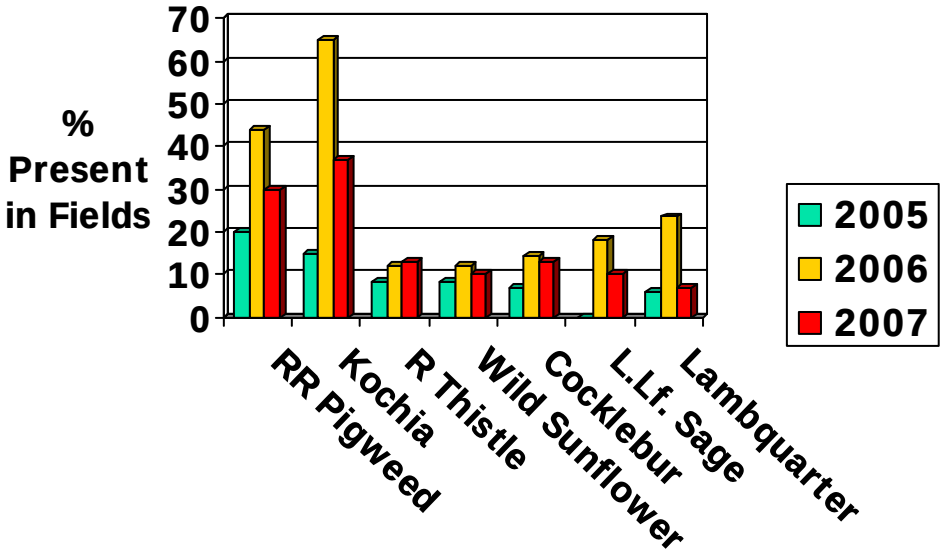


Percent of Sunflower Fields with Grassy Weeds Present in 2005, 2006, & 2007 in North Dakota and Minnesota.

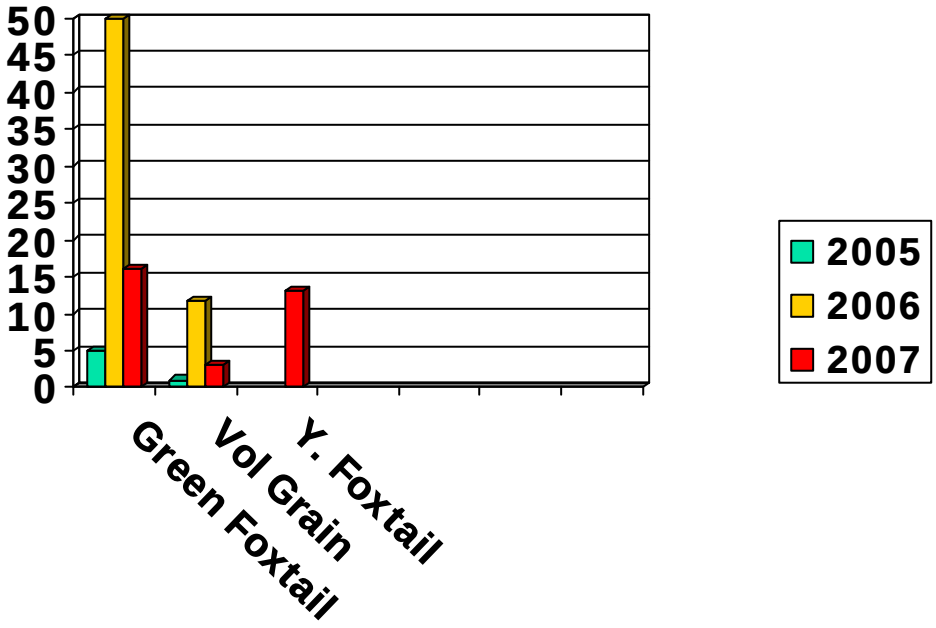


Weeds in other states: Weed species and percentage of fields these weeds were found are shown below. In South Dakota, kochia and redroot pigweed were found to be the most prevalent broadleaf weed. Whereas green foxtail was by far the most abundant grassy weed reported but a lot less than in 2006. Yellow foxtail was found this year and was noted in 13% of the surveyed fields. In Kansas, Palmer amaranth which is in the pigweed family was found to be in 87% of the fields surveyed. This was up from the 2006 survey. It was the highest incident weed followed by puncture vine at 74%, kochia and a low incidence of volunteer grain. The weed incidence reported in Colorado was much higher than reported in 2005 or 2006. Primary weeds in Colorado this past season were sandbur, a grassy weed, at 83%, followed by puncture vine, redroot pigweed, and kochia. Palmer amaranth was not reported in Colorado this year. In Texas, Palmer Amaranth was reported in 80% of the fields, Nightshade or Russian thistle in 40% plus Redroot pigweed, volunteer grains and barnyard grass also being reported in low incidence.

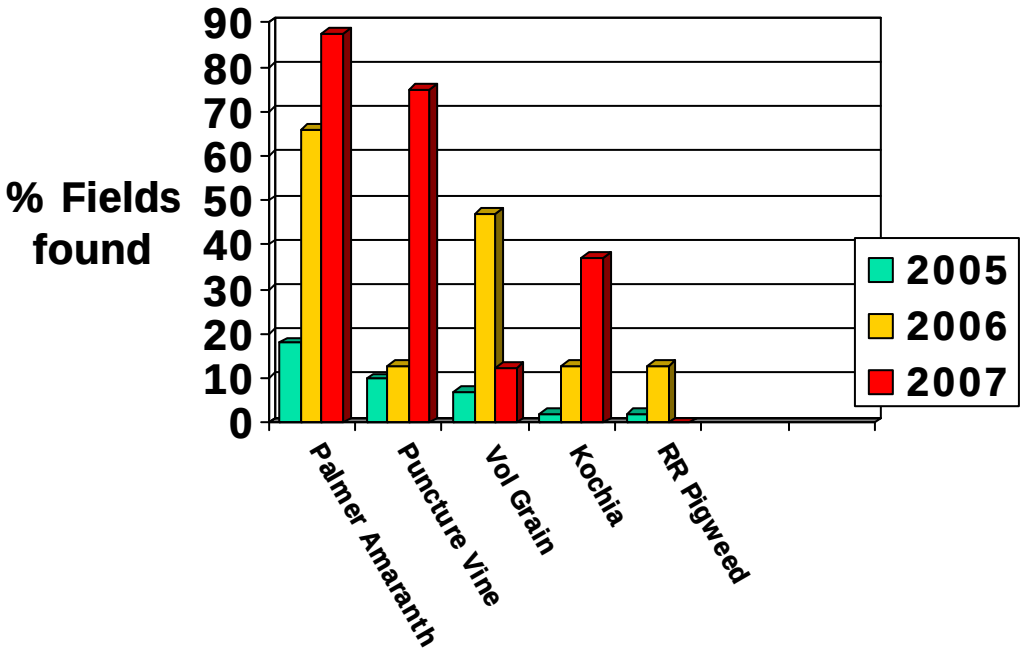
Incidence of Broadleaf Weeds Found in South Dakota



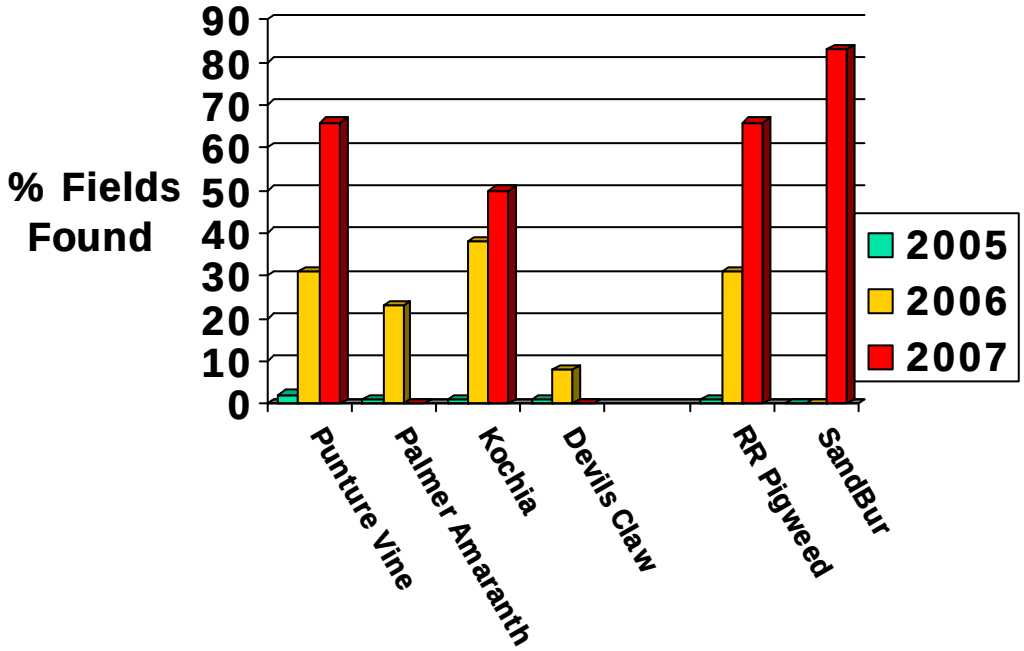
Incidence of Grassy Weeds in South Dakota



Incidence of Weeds in Kansas in 2005, 2006 & 2007

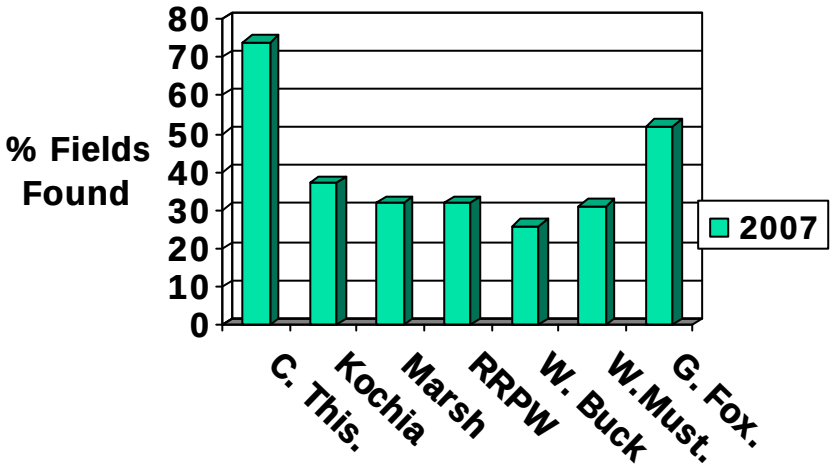


Incidence of Weeds in Colorado in 2005, 2005 & 2007



Weeds in Manitoba: The survey indicated that Canada thistle was the major weed problem in sunflower with approximately 74% of the fields having the presence of this difficult weed. This is similar to the problem in North Dakota and Minnesota but not as widespread as found in Canada. The second major weed incidence in Manitoba was the presence of green foxtail at over 50% in fields surveyed. Other weeds noted were marshelder, wild buckwheat, kochia, redroot pigweed and wild mustard.

Incidence of Weeds in Manitoba in 2007



Weed Summary: The crop survey results indicated a significant decrease in the incidence of broadleaf weeds in ND, MN, and SD. Incidence of kochia, redroot pigweed, marshelder wild buckwheat and cocklebur was cut in half this year compared to previous years. However, incidence of green foxtail was up in ND and MN but down in SD. The cleaner fields may be due to better activation of herbicides at planting and new herbicide tolerant technology in some sunflower hybrids now being planted. Incidence of weeds was higher in KS and CO this year compared to previous years of the survey. Palmer amaranth increased significantly in KS compared to other years and both sandbur and puncture vine were prevalent in both states. Manitoba fields had the most Canada thistle incidence as reported and fairly high in number of fields with green foxtail.

Survey Summary: The 2007 survey was conducted in the same six states as the 2002, 2003, 2005 and 2006 sunflower surveys. Manitoba in Canada was added this year as an addition to the northern plains survey.

In 2006, the number one and number two major yield limiting factors were as follows:
In North Dakota it was drought (30 %) and weeds (11 %), Minnesota had diseases (30 %) and lodging (30 %), South Dakota had severe drought problems (62 %) and low plant populations (26 %), in Kansas it was weeds (32 %) and insects (20 %), in Colorado it was drought (62 %) followed by weeds (15 %) and in Texas it was primarily plant population problems (40 %) and plant spacing (20 %).

The 2007 sunflower survey in North Dakota found the major issues identified as disease and lower plant populations and poor plant spacing. This was followed by insect problems and bird damage. Weed pressure and competition was not a major issue. In Minnesota, diseases were the major issue contributing towards yield reduction. In South Dakota, the major problems encountered were low plant populations and insects. In Kansas, the major problems were weeds, drought and low plant populations. In Colorado, the major yield limiting factors were drought, weeds and disease. In Manitoba the major sunflower production problems observed were weeds, disease and bird damage.
Over the Great Plains states however it was a very good production year for sunflower with yields being above the 5 year averages and pest problems in most respects limited to a few new problem issues. Namely red rust appears to be on the increase, along with the increase in the Longhorned beetle in some growing regions and as always the bird damage problem in the Northern Great Plains.

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