

Sunflower Disease Survey



2000 Sunflower Disease and Midge Survey

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A field survey evaluated the incidence of downy mildew, Sclerotinia wilt, Sclerotinia head rot, Phoma black stem, Phomopsis and midge damage. It also evaluated rust severity.

Materials and Methods. Downy mildew incidence was determined in 90 fields in a June survey, with 50 plants examined at each of four locations for a total of 200 plants. The main survey was in late August and September, when the upper leaves and stalks were still green. Surveyors examined 220 fields in 22 counties: 50 plants were examined in each field in groups of 13, 12, 13, and 12 plants at four random locations. Market type (oilseed or confection) and row width was recorded for each field. The percent of plants with downy mildew, Sclerotinia wilt, Sclerotinia head rot, Phoma black stem and Phomopsis was determined and the incidence (percent infected plants) calculated. The upper four leaves were examined for rust and the

severity (percent infected area) determined using a published assessment key (Gulya, *et al. Sunflower Rust*. NDSU Ext. Circ. PP-998). Ten to 20 heads along the edge and 50 heads within the field were examined for clubbed heads and/or the bracts pulled back to determine the presence of sunflower midge tunneling. The percent infested heads was considered to be the incidence, and to be representative of the field infestation.

Counties surveyed were based on acreage in 1998 and 1999. Counties with over 50,000 acres of sunflower in the previous two years were included in the survey. An attempt was made to visit at least 10 fields in any county surveyed so there would be an adequate sample size to compare results among counties. In an attempt to survey one field for each 5,000 acres, more than 10 fields were randomly surveyed in counties with acreage greater than 50,000 acres.

Results

Market type. Confection hybrids accounted for 29.5% of sunflower acres surveyed and oilseed hybrids accounted for 70.5%

Row width. There were fewer solid seeded fields (27%) than fields planted in rows (73%). *Downy mildew* was present in 37 of 90 fields, or 41% of fields surveyed. Average percent infection across all fields was 4.3%. Average percent infection was 14.1% in the southwest part of the state, 1.3% in the northeast, 0.7% in the north central and 0.2% in the south central.

Sclerotinia wilt average incidence was 3.8%. It was highest in Cavalier and LaMoure Counties with 8.0 and 8.1%, respectively. In five contiguous counties where *Sclerotinia* wilt was common and there were both solid seeded and rowed fields, there was little difference in incidence: 4.4% in 14 solid seeded fields and 5.5% in 68 rowed fields.

Sclerotinia head rot average incidence was 4.4% in early September. Rainfall in mid-September resulted in some additional head rot. Pockets of increased head rot were found in the northeast. Many fields in the central and the south central were revisited in late September and early October. There was a significant increase in head rot in Stutsman and Barnes Counties. The highest *Sclerotinia* head rot, based on final figures, was 16.2% in Stutsman County, 13.5% in Wells County, 8.8% in Foster County and 8.0% in Barnes County.

Total Sclerotinia (Wilt + Head Rot) average incidence was 8.2%. The counties with the highest incidence included 20.3% in Stutsman, 13.8% in Barnes, 13.5% in Wells, 10.1% in LaMoure and 8.8% in Foster Counties (Figure 1). Since either *Sclerotinia* wilt or head rot can destroy the plant, yield losses may be similar to the percent of infected plants, or nearly 20% in Stutsman County.

Phoma Black Stem was the most prevalent disease in the survey, with an average incidence of 38.0%. The highest incidences were in the east central and north central area with 77.5% in McHenry, 74.3% in Bottineau, 68.8% in Pierce, 66.9% in Wells, 63.6% in Foster, 59.6% in Stutsman, 59.3% in Ward and 47.1% in Barnes counties. Although *Phoma* incidences were greater than those of *Sclerotinia*, losses may well have been less than those from *Sclerotinia* since *Phoma* does not destroy the plant unless infection occurs early.

Phomopsis average incidence was very low, with only 0.7%. Incidence was 2.2% in Barnes, 2.0% in Morton, 1.9% in Wells and 1.4% in Adams counties.

Rust severity averaged 0.13%. The highest incidence was in the north east with 2.4%. This is well below the 3% level before ray petal wilt that is considered to be economic for use of a fungicide. Comparison of rust severities between confection and oilseed hybrids was not possible in many areas. However, the number of confection and oilseed fields was similar in Foster, Stutsman and Wells counties where severity was 0.42% in 22 confection fields and 0.02% in 25 oilseed fields. *Charcoal rot* was observed in 6 of 35, or 17%, of fields in the southwest. The highest incidences were 34% and 28%, both in Hettinger County.

Sunflower midge was present in 72.5% of fields surveyed. The average incidence across all fields was 17% with the higher incidence of 20.7% being located in the field edge compared to 13.3% in the field. Average incidence ranked in order of highest to lowest by region is: 44.50% in the northeast, 29.85% in the southeast, 13.50% in the south central, 2.39% in the southwest, and 0% in the north central. In Figure 2, the relative incidence by county is shown. The “Hot” spot was Ramsey County where the area north of Devils Lake recorded severe damage due to sunflower midge. Counties with a high average incidence, near 50%, also included Cavalier, LaMoure, and southern Stutsman Counties. Very low levels (<10% average percent incidence) were recorded in the Southwest Region (Adams, Hettinger, Morton, Stark Counties), parts of the Central Region (Wells, northern Stutsman Counties), and parts of the Southeast Region (Emmons County). No sunflower midge was detected in the North Central Region. The range of incidence was large indicating that there was variability field to field, or spotty infestations of sunflower midge across North Dakota in 2000. The survey was supported by a grant from the National Sunflower Association.

