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# SOUTH CENTRAL CROPS AND SOILS RESEARCH STATION

Presho, South Dakota

## INTRODUCTION

This is the fifteenth annual report of the South Central Crops and Soils Research Station. The experimental area, located on the Glen Hutchison farm, is approximately ten and one-half miles south of Presho, South Dakota. The soil, a fine clay, derived from Pierre shale is identified as Promise clay. It contains 3.0% organic matter, is medium in available phosphorus, and is high in potassium.

Rainfall in 1972 was below normal for all months except April through July, but the total for the year was near normal. The rainfall pattern combined with below normal temperatures permitted the production of good yields of small grain, grain sorghum, and forages.

However, below normal temperatures in April, also had detrimental effects on many winter wheat fields in the area. The first symptoms discernible in early May were yellowing and stunting. At that time the more severely infected fields were destroyed. Those fields which were only lightly infected were left to mature and when harvested yielded grain with a high percentage of scab.

The annual field day was held June 28 with forty people in attendance. The topics discussed included Spring and Winter Grain Variety Trials, and Spring and Winter Wheat Fertility Studies.

A field tour for 1973 has not been scheduled but the station is open to visitors at all times.

## SOUTH CENTRAL CROPS AND SOILS RESEARCH STATION ADVISORY COMMITTEE

| Officers | Address | County |
|---|---|---|
| Ralph Reimers | Pukwana 57372 | Brule |
| George Fish, Jr. | Platte 57369 | Charles Mix |
| Ed Bailey | Lucas 57549 | Gregory |
| Lyn Lyman | Murdo 57559 | Jones |
| John Quillan | Kennebec 57544 | Lyman |
| Jerry Bruning | Wood 57585 | Mellette |
| Lyle Hedman | Hayes 57537 | Stanley |
| Dan Heinert | Parmelee 57566 | Todd |
| Don Jorgensen | Ideal 57541 | Tripp |

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This report was prepared by members of the South Dakota Agricultural Experiment Station. It is an annual report and results published herein are therefore neither complete nor conclusive.

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Table 1. Weather Data - South Central Crops and Soils Research Station, 1972

| Month | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rainfall in Inches* | 0.12 | 0.04 | 0.24 | 3.41 | 3.15 | 3.23 | 2.00 | 0.89 | 0.11 | 0.97 | 1.39 | 0.56 | 16.11 |
| Longtime Average** | 0.47 | 0.57 | 1.02 | 1.79 | 2.38 | 3.11 | 1.66 | 2.08 | 1.45 | 0.98 | 0.67 | 0.39 | 16.57 |
| Departure from Longtime Average | -0.35 | -0.53 | -0.78 | 1.62 | 0.77 | 0.12 | 0.34 | -1.19 | -1.34 | -0.01 | 0.72 | 0.17 | -0.46 |
| Average Temperature* | -- | -- | -- | 45.8 | 59.2 | 66.6 | 71.9 | 72.4 | 64.2 | 46.7 | -- | -- | |
| Longtime Average** | 18.6 | 21.9 | 31.8 | 47.6 | 58.9 | 68.7 | 76.8 | 75.0 | 74.5 | 51.4 | 34.8 | 23.9 | |
| Departure from Longtime Average | -- | -- | -- | -1.8 | 0.3 | -2.1 | -4.9 | -2.6 | -10.3 | -4.7 | -- | -- | |
| Av. Monthly Maximum - 1972* | -- | -- | -- | 56.7 | 68.9 | 76.1 | 85.1 | 88.9 | 78.1 | 57.4 | -- | -- | |
| Av. Monthly Minimum - 1972* | -- | -- | -- | 34.9 | 49.5 | 57.1 | 58.6 | 55.9 | 50.3 | 35.9 | -- | -- | |
| Inches of Water Evaporated from Free Surface | -- | -- | -- | -- | -- | -- | 6.01 | 7.61 | 6.49 | 1.97 | -- | -- | |

Note: The maximum recorded air temperature for the year was 105° and occurred on August 13.
Last killing frost - May 4; First frost - September 26; First killing frost - October 12; Growing season - 161 days.

*Data taken and recorded at South Central Crops and Soils Research Station.
**Longtime averages were recorded at Kennebec, South Dakota, based on 30 year period 1931-1960 inclusive.

# SMALL GRAIN VARIETY TESTING

H. A. Geise, D. G. Wells, P. B. Price, D. L. Reeves, and J. J. Bonnemann

Objective: To observe and compare small grain varieties and experimental strains for winterhardiness, grain yield, disease resistance, and other characteristics of area adaptability.

## RYE

The plots were seeded by using a deep furrow drill. The seeding rate was 5 pecks or 70 pounds per acre. The soil was fertilized by applying 15 pounds of elemental phosphorus with the seed. The results of the trial are presented in Table 2.

Table 2. Rye Variety Performance Trial - South Central Crops and Soils Research Station - Presho, South Dakota - 1972

| Variety | Date of Heading | Height Inches | Lodging* (1-5) | Percent** Protein | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|---|---|---|
| Von Lochow | May 29 | 51 | 2.3 | 13.2 | 56 | 57.1 |
| Pearl | 29 | 52 | 3.3 | 13.8 | 55 | 54.2 |
| Coloma | 28 | 53 | 2.0 | 14.6 | 54 | 54.1 |
| Cougar | 28 | 49 | 2.3 | 12.2 | 54 | 51.0 |
| Frontier | 28 | 52 | 3.7 | 13.6 | 56 | 46.8 |
| | | | | | Mean - | 52.6 |

*Lodging score: 1 - Upright; 5 - Prostrate.
**Percent Protein was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Note: Date of Planting: September 29, 1971
Date of Harvest: July 24, 1972
Height and Lodging notes were taken just prior to harvest

## WINTER WHEAT

Winter wheat varieties were evaluated in large drill-sized plots. They were fertilized by applying 15 pounds of elemental phosphorus with the seed by the use of a drill box attachment. The information is published in Tables 3 and 4.

Two Regional Performance Nurseries were grown off-station. These trials contained a number of old varieties which were used as controls or check varieties for comparing new or early generation crosses and selections. The results are published in Tables 5 and 6. Survival notes were taken in early April, while notes such as lodging and height were taken just prior to harvest.

Table 3. Winter Grain Variety Performance Trial (Late Seeded) - South Central Crops & Soils Research Station, 1972

| Variety | Date of Heading | Height Inches | Percent Survival | Rust Reaction* Leaf | Rust Reaction* Stem | Percent Lodging | Percent** Protein | Test Wt Lbs/Bu | Yield Bu/A |
|---|---|---|---|---|---|---|---|---|---|
| WINTER WHEAT | | | | | | | | | |
| Gage | June 7 | 37 | 92 | MR | R | 33 | 16.1 | 60.3 | 43.6 |
| Shawnee | 8 | 39 | 93 | MR | S | 17 | 15.8 | 60.3 | 41.5 |
| Weathermaster 106 | 7 | 38 | 93 | MR | R | 50 | 16.5 | 60.7 | 40.8 |
| Trader | 10 | 40 | 93 | S | R | 33 | 15.8 | 59.5 | 40.1 |
| NB66512 | 4 | 38 | 95 | S | R | 42 | 16.9 | 59.0 | 39.2 |
| Centurk | June 7 | 34 | 92 | MR | R | 32 | 16.2 | 59.5 | 38.6 |
| Trapper | 10 | 40 | 93 | S | R | 42 | 15.4 | 59.2 | 37.7 |
| Bronze | 6 | 38 | 92 | MR | R | 25 | 15.9 | 59.2 | 37.5 |
| Winoka | 11 | 41 | 96 | S | R | 17 | 15.9 | 60.7 | 36.7 |
| Hume | 7 | 39 | 96 | S | R | 50 | 16.3 | 59.2 | 36.4 |
| Triumph | June 5 | 36 | 95 | S | S | 32 | 17.1 | 60.5 | 35.9 |
| Scout 66 | 9 | 38 | 87 | S | R | 50 | 16.3 | 59.5 | 35.4 |
| Eagle | 6 | 39 | 83 | S | R | 25 | 18.4 | 59.5 | 34.7 |
| Froid | 11 | 41 | 99 | MR | R | 17 | 16.3 | 57.5 | 34.3 |
| Scoutland | 5 | 36 | 93 | S | R | 42 | 17.6 | 60.7 | 34.2 |
| SD 7117 | June 7 | 40 | 88 | R | R | 33 | 17.2 | 58.7 | 32.9 |
| Omaha | 7 | 37 | 95 | S | R | 50 | 17.6 | 59.0 | 31.7 |
| Lancer | 8 | 39 | 90 | S | R | 8 | 15.8 | 60.7 | 31.6 |
| Guide | 6 | 36 | 93 | S | R | 50 | 16.5 | 59.2 | 27.2 |
| Turkey | 8 | 40 | 90 | S | S | 50 | 16.4 | 57.5 | 26.1 |
| Minter | June 10 | 42 | 88 | S | R | 25 | 16.4 | 59.0 | 19.2 |
| Sturdy | 8 | 25 | 5 | R | S | 0 | 20.0 | 53.7 | 5.9 |
| WINTER TRITICALES | | | | | | | | | |
| Fas Gro 131 | June 5 | 46 | 73 | R | R | 8 | 20.9 | 48.5 | 34.3 |

LSD(.05) - 4.8 Bu/A C.V. - 8.6% Mean 33.7

Note: Values are an average of three replications; Date of Planting - Sept. 25, 1971; Date of Harvest - July 31, 1972. Samples for protein content and test weight were collected on July 29, 1972.

*Letter indicates reaction to rust: S-susceptible R-resistant MR-moderately resistant

**Protein content is reported on an oven-dry basis and was calculated from Kjeldahl nitrogen analysis.

Table 4. Winter Wheat Variety Performance Trial (Early Seeded) - South Central Crops & Soils Research Station, 1972

| Variety | Date of Heading | Height Inches | Percent Survival | Rust Reaction* Leaf | Rust Reaction* Stem | Percent Lodging | Percent** Protein | Test Wt Lbs/Bu | Yield Bu/A |
|---|---|---|---|---|---|---|---|---|---|
| Shawnee | June 5 | 42 | 96 | MR | S | 70 | 16.3 | 60.0 | 51.2 |
| Eagle | 5 | 41 | 88 | S | R | 44 | 16.9 | 58.8 | 46.6 |
| Trapper | 7 | 41 | 92 | S | R | 40 | 15.4 | 58.6 | 46.3 |
| Scout 66 | 4 | 41 | 88 | S | R | 76 | 16.6 | 60.8 | 46.2 |
| Trader | 6 | 42 | 89 | S | R | 50 | 16.8 | 56.4 | 45.9 |
| Weathermaster 106 | June 3 | 43 | 92 | MR | R | 76 | 16.6 | 60.6 | 45.2 |
| Centurk | 4 | 41 | 82 | MR | R | 44 | 16.4 | 59.6 | 44.9 |
| Triumph | 3 | 41 | 86 | S | S | 70 | 18.1 | 60.2 | 44.4 |
| Hume | 5 | 42 | 96 | S | R | 60 | 16.4 | 55.1 | 44.3 |
| Gage | 4 | 38 | 89 | MR | R | 36 | 17.2 | 59.4 | 44.0 |
| Winoka | June 7 | 42 | 95 | S | R | 56 | 16.9 | 58.2 | 43.4 |
| Bronze | 4 | 42 | 92 | MR | R | 36 | 17.6 | 55.5 | 43.4 |
| Omaha | 4 | 40 | 96 | S | R | 60 | 17.6 | 58.0 | 41.0 |
| NB66512 | 5 | 42 | 94 | S | R | 44 | 18.1 | 59.5 | 39.2 |
| Lancer | 5 | 42 | 90 | S | R | 36 | 16.8 | 59.6 | 37.8 |
| Caprock | June 5 | 38 | 69 | R | R | 30 | 17.0 | 57.9 | 35.3 |
| Minter | 7 | 46 | 96 | S | R | 56 | 16.9 | 57.2 | 35.2 |
| Guide | 3 | 40 | 86 | S | R | 44 | 17.2 | 57.0 | 31.5 |
| Froid | 7 | 46 | 96 | MR | R | 24 | 16.6 | 57.2 | 30.3 |

LSD(.05) - 5.8 Bu/A  C.V. - 9.7%  Mean - 41.9

Note: Values presented within the table are averages of four replications.
Date of Planting: September 2, 1971; Date of Harvest: August 4, 1972.
Samples for protein content and test weight were collected on July 29.

*Letter indicates reaction to ruse: S-susceptible R-resistant MR-moderately resistant
**Protein content is reported on an oven-dry basis and was calculated from Kjeldahl nitrogen analysis.

Table 5. Northern Regional Performance Nursery - George Anderson Farm - Presho, South Dakota - 1972.

| Varietal Name or Pedigree | Percent Scab (July 6) | Percent Necrosis (June 28) | Percent Rust | | Percent Survival (April 5) | Percent Lodging (July 18) | Test Wt Lbs/ Bu | Yield Bu/ A |
|---|---|---|---|---|---|---|---|---|
| | | | Leaf (June 28) | Stem (July 18) | | | | |
| NE68427 | 1 | 30 | 10 | 5 | 90 | 27 | 59.4 | 56.1 |
| NE68493 | 1 | 30 | 0 | 0 | 85 | 23 | 58.7 | 54.6 |
| SD 7117 | 1 | 85 | 0 | 0 | 85 | 37 | 60.5 | 53.6 |
| NE69442 | 0 | 25 | 10 | 0 | 90 | 57 | 57.2 | 53.5 |
| NE701134 | 1 | 35 | 0 | 0 | 80 | 30 | 57.2 | 52.4 |
| Centurk | 3 | 70 | 5 | 5 | 90 | 30 | 60.0 | 51.9 |
| NE69441 | 0 | 30 | 0 | 0 | 80 | 20 | 61.3 | 51.4 |
| SD 697 | 0 | 30 | 100 | 0 | 90 | 30 | 57.3 | 51.0 |
| 68F6635 | 0 | 30 | 0 | 5 | 90 | 50 | 57.7 | 50.6 |
| SD56713-10 | 0 | 25 | 5 | 0 | 90 | 37 | 56.8 | 47.8 |
| Warrior | 0 | 20 | 100 | 65 | 90 | 50 | 57.5 | 47.0 |
| SD66117-2 | 0 | 30 | 0 | 0 | 90 | 50 | 56.1 | 44.1 |
| KS6623 | 1 | 45 | 0 | 100 | 70 | 20 | 59.3 | 42.6 |
| Bronze | 0 | 30 | 65 | 0 | 90 | 40 | 55.6 | 41.9 |
| Kharkof | 0 | 25 | 100 | 25 | 90 | 53 | 55.1 | 41.8 |
| NE68510 | 0 | 50 | 10 | 0 | 85 | 57 | 57.3 | 41.4 |
| Bezostaya | 1 | 50 | 0 | 100 | 75 | 3 | 57.3 | 34.2 |
| Sundance | 0 | 20 | 5 | 65 | 90 | 40 | 50.5 | 26.7 |

All data in Tables 5 and 6 are averages of four replications. The plots were composed of four rows sixteen feet long and spaced nine inches apart. Seeding was completed on September 11 by using a Chain Plot Seeder. The two center rows of each plot were hand harvested for determining yield information, and was completed on July 31.

Table 6. Southern Regional Performance Nursery - George Anderson Farm - Presho, South Dakota - 1972.

| Varietal Name or Pedigree | Percent Scab (July 6) | Necrosis* (1-10) (June 28) | Percent Rust | | Percent Survival (April 5) | Percent Lodging (July 18) | Test Wt Lbs/ Bu | Yield Bu/ A |
|---|---|---|---|---|---|---|---|---|
| | | | Leaf (June 28) | Stem (July 18) | | | | |
| NE68435 | 1 | 3.5 | 25 | 25 | 90 | 30 | 57.2 | 53.6 |
| NE701132 | 3 | 1.0 | 0 | 0 | 90 | 13 | 57.6 | 50.5 |
| KS65274 | 1 | 5.5 | 0 | 0 | 75 | 40 | 57.5 | 49.5 |
| KS7016 | 1 | 5.0 | 0 | 0 | 90 | 43 | 55.6 | 48.7 |
| KS70H179 | 1 | 8.0 | 0 | 0 | 80 | 57 | 57.7 | 47.0 |
| Scout 66 | 1 | 6.5 | 45 | 0 | 90 | 73 | 57.7 | 46.5 |
| NE68440 | 5 | 2.5 | 25 | 0 | 90 | 80 | 55.4 | 46.0 |
| OK69740 | 1 | 7.0 | 0 | 0 | 90 | 53 | 56.7 | 45.8 |
| Centurk | 5 | 6.5 | 0 | 0 | 90 | 63 | 56.1 | 45.7 |
| KS70H134 | 1 | 8.5 | 0 | 0 | 80 | 60 | 57.2 | 45.3 |
| TX69A367 | 5 | 5.5 | 0 | 5 | 80 | 17 | 54.3 | 42.8 |
| OK696731 | 10 | 5.0 | 100 | 100 | 90 | 40 | 57.1 | 42.3 |
| NE68437 | 1 | 3.5 | 5 | 0 | 90 | 47 | 55.4 | 38.0 |
| TX69A571 | 2 | 4.5 | 100 | 40 | 80 | 27 | 57.3 | 37.9 |
| CO64043 (Scout Sel.) | 1 | 6.5 | 5 | 5 | 90 | 50 | 57.6 | 37.8 |
| CO695552 | 5 | 3.5 | 5 | 100 | 50 | 13 | 56.5 | 37.7 |
| SD 7117 | 0 | 8.0 | 0 | 0 | 90 | 53 | 57.3 | 37.6 |
| TX62A2522-1-4 | 5 | 3.5 | 10 | 100 | 85 | 7 | 54.3 | 30.9 |
| OK60118 | 1 | 3.0 | 100 | 65 | 25 | 20 | 57.0 | 26.6 |
| Kharkof | 0 | 2.0 | 5 | 40 | 90 | 75 | 53.2 | 26.6 |
| Pronto | 10 | 8.5 | 25 | 65 | 50 | 47 | 59.0 | 25.2 |
| TX65A1268 | 3 | 7.5 | 5 | 65 | 90 | 60 | 55.5 | 24.8 |
| Bezostaya | 1 | 2.5 | 0 | 40 | 65 | 7 | 56.5 | 21.4 |
| TX62A2782-4-2 | 0 | 5.5 | 0 | 65 | 60 | 10 | 54.5 | 19.5 |
| TX69A565 | 15 | 9.0 | 0 | 5 | 85 | 17 | 49.0 | 18.6 |

*Necrosis Score: 1-All tissue alive; 10-All tissue dead.

Table 7. Experimental Lines (Scout 66/Agent) Drill Strip Test - South Central Crops & Soils Research Station - Presho, 1972

| Variety | Date of Heading | Height Inches | Lodging* (1-5) | Percent Survival | Percent** Protein | Test Wt Lbs/Bu | Yield Bu/A |
|---|---|---|---|---|---|---|---|
| KS70H124 | June 8 | 36 | 3.0 | 95 | 15.5 | 55.5 | 42.2 |
| KS70H199 | 7 | 35 | 2.8 | 95 | 16.3 | 53.2 | 37.5 |
| KS70H179 | 7 | 35 | 2.5 | 95 | 15.4 | 54.8 | 35.7 |
| KS70H126 | 8 | 37 | 3.2 | 95 | 15.7 | 55.0 | 35.4 |
| KS70H128 | 6 | 35 | 3.0 | 95 | 16.2 | 54.1 | 33.9 |
| KS70H167 | 7 | 35 | 2.2 | 91 | 15.7 | 53.9 | 33.5 |
| KS70H169 | 7 | 33 | 1.5 | 95 | 15.8 | 54.6 | 32.4 |
| KS70H175 | 8 | 34 | 2.0 | 94 | 15.1 | 53.6 | 31.0 |
| KS70H168 | 7 | 34 | 1.5 | 95 | 16.4 | 53.1 | 28.9 |
| KS70H125 | 7 | 34 | 2.0 | 91 | 16.4 | 54.6 | 28.1 |

LSD(.05) - 3.8 Bu/A C.V. - 14.5% Mean - 33.6

*Lodging Score: 1-Upright; 5-Prostrate

**Percent protein was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Note: Date of seeding: September 23, 1971; Date of Harvest: August 4, 1972; Plot size: Six rows spaced twelve inches apart by one hundred feet long.

## SPRING WHEAT AND TRITICALES

All varieties reported in tables 8 through 11 were seeded in fallow. The soil was fertilized by broadcasting 40 pounds of nitrogen and 15 pounds of phosphorus per acre. An additional 15 pounds per acre of phosphorus was applied with the seed at planting. The plots were seeded in mid-April and harvested with a self-propelled combine in early August. Plant notes were taken just prior to harvest.

Table 8. Spring Triticales Variety Trial - South Central Crops & Soils Research Station - Presho, 1972

| Brand & Variety | Height Inches | Lodging (1-5) | Percent* Protein | Test Wt Lbs/Bu | Grain Yield Lbs/Acre |
|---|---|---|---|---|---|
| Rosner | 38 | 2.5 | 17.0 | 45.5 | 948 |
| Fas Gro 204 | 44 | 2.0 | 17.6 | 47.2 | 893 |
| Fas Gro 419 | 45 | 2.0 | 17.7 | 46.0 | 880 |
| Fas Gro 203 | 42 | 2.0 | 17.5 | 45.2 | 833 |
| CL-71 | 46 | 2.0 | 17.5 | 47.5 | 795 |
| Graze Grain 70 | 37 | 2.8 | 17.9 | 47.6 | 746 |

Yield differences are not statistically significant Mean - 849

*Percent protein was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Table 9. Hard Red Spring Wheat Variety Trial - South Central Crops and Soils Research Station, Presho, South Dakota, 1972

| Variety | Plant Height | Lodging (1-5) | Percent Moisture | Percent* Protein | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|---|---|---|
| Fortuna | 38 | 2.5 | 14.0 | 17.5 | 56.5 | 31.6 |
| Nordak | 38 | 2.5 | 12.8 | 18.9 | 54.2 | 26.8 |
| Waldron | 34 | 1.5 | 14.6 | 18.3 | 52.4 | 24.1 |
| Chris | 36 | 2.5 | 10.6 | 18.8 | 55.1 | 22.5 |
| Polk | 32 | 2.0 | 12.9 | 18.5 | 55.0 | 22.3 |
| Sheridan | 36 | 3.0 | 13.1 | 16.9 | 53.8 | 21.1 |
| Manitou | 34 | 3.2 | 9.8 | 18.2 | 53.9 | 16.0 |
| Neepawa | 35 | 2.5 | 10.8 | 19.3 | 51.1 | 15.0 |
| LSD(.05) - 2.6 Bu/A | | | C.V. - 7.9% | | Mean - | 22.4 |

*Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Table 10. Semi-dwarf Hard Red Spring Wheat Variety Trial - South Central Crops and Soils Research Station, Presho, South Dakota, 1972

| Variety | Plant Height | Lodging (1-5) | Percent Moisture | Percent* Protein | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|---|---|---|
| W.S. 1809 | 26 | 2.8 | 14.9 | 17.5 | 55.6 | 29.8 |
| Lark | 27 | 2.2 | 14.9 | 18.4 | 54.4 | 26.7 |
| Era (Feed Wheat) | 29 | 2.0 | 13.4 | 17.4 | 52.5 | 26.7 |
| Fletcher | 29 | 2.0 | 13.4 | 18.7 | 52.5 | 26.7 |
| DeKalb-Bonanza | 27 | 2.0 | 15.0 | 17.6 | 54.9 | 25.0 |
| Cargill-Bounty 208 | 28 | 3.0 | 13.1 | 17.8 | 56.8 | 22.5 |
| LSD(.05) - 2.7 Bu/A | | | C.V. - 6.8% | | Mean - | 26.2 |

*Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Table 11. Durum Wheat Variety Trial - South Central Crops & Soils Research Station, Presho, South Dakota, 1972

| Variety | Plant Height | Lodging (1-5) | Percent Moisture | Percent* Protein | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|---|---|---|
| Rolette | 39 | 2.0 | 15.8 | 19.1 | 55.2 | 33.0 |
| Wells | 40 | 2.0 | 15.6 | 19.3 | 55.1 | 32.1 |
| Hercules | 39 | 2.0 | 13.8 | 18.5 | 58.2 | 31.4 |
| Leeds | 39 | 2.2 | 15.5 | 19.3 | 55.2 | 29.2 |
| N.S. | | | C.V. - 15.6% | | Mean - | 31.4 |

## SPRING BARLEY

The plots were seeded in fallow and were fertilized by broadcasting 40 pounds of nitrogen plus 15 pounds of elemental phosphorus per acre. An additional 15 pounds per acre of elemental phosphorus was applied with the seed at planting time. Rate of seeding was 60 pounds per acre. Date of seeding was mid-April. The yields and other agronomic data presented in Table 12 were recorded at harvest.

Table 12. Spring Barley Variety Trial - South Central Crops & Soils Research Station - Presho, 1972

| Variety | Date of Heading | Height Inches | Lodging* (1-5) | Percent** Protein | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|---|---|---|
| Larker | June 16 | 36 | 3 | 15.5 | 42.0 | 61.5 |
| Nordic | 16 | 38 | 3 | 15.5 | 41.6 | 59.9 |
| Burk | 16 | 39 | 3 | 16.1 | 42.0 | 58.8 |
| Cree | 16 | 36 | 4 | 15.5 | 40.4 | 53.3 |
| Firlbecks III | 22 | 34 | 2 | 18.1 | 45.5 | 52.6 |
| Dickson | 20 | 36 | 3 | 15.6 | 40.4 | 52.0 |
| Primus II | June 14 | 34 | 4 | 14.0 | 41.4 | 50.1 |
| Conquest | 17 | 40 | 2 | 15.2 | 39.9 | 46.7 |
| Prilar | 15 | 36 | 3 | 15.0 | 40.0 | 46.3 |
| Liberty | 18 | 36 | 3 | 15.0 | 40.4 | 45.2 |
| Trophy | 20 | 36 | 2 | 15.6 | 39.5 | 40.4 |
| Paragon | 22 | 36 | 2 | 15.6 | 40.0 | 40.2 |

LSD(.05) - 9.2 Bu/A C.V. - 12.6% Mean - 49.9

*Lodging Score: 1-Upright; 5-Prostrate

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

## OATS

All varieties listed in Tables 13 and 14 were seeded on fallow. The soil was fertilized by broadcasting 40 pounds of nitrogen and 15 pounds of phosphorus per acre. An additional 15 pounds of phosphorus was applied with the seed at planting. The rate of seeding was 2 bushels or 64 pounds per acre. Seeding was completed in mid-April. The agronomic notes were taken just prior to harvest in early August. Harvesting of plots was accomplished by using a self-propelled combine.

Table 13. Oat Variety Trial - South Central Crops & Soils Research Station - Presho - 1972

| Variety | Date of Heading | Height Inches | Lodging* (1-5) | Percent** Protein | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|---|---|---|
| Burnett | June 17 | 39 | 3.5 | 17.5 | 35.6 | 119.1 |
| Kota | 22 | 42 | 2.8 | 17.2 | 33.6 | 103.4 |
| Froker | 24 | 42 | 1.2 | 18.2 | 34.8 | 103.1 |
| Dupree | 16 | 37 | 3.5 | 16.6 | 34.9 | 98.0 |
| Kelsey | 24 | 44 | 2.5 | 15.7 | 31.5 | 98.0 |
| Garland | June 17 | 37 | 2.8 | 17.2 | 34.9 | 97.6 |
| Trio | 16 | 41 | 3.2 | 17.5 | 34.9 | 96.3 |
| Pettis | 15 | 38 | 3.5 | 17.7 | 35.5 | 96.0 |
| Otee | 17 | 36 | 3.0 | 19.4 | 34.4 | 95.9 |
| Cayuse | 25 | 39 | 2.5 | 17.9 | 29.6 | 95.6 |
| Diana | June 16 | 38 | 2.8 | 19.4 | 34.0 | 94.2 |
| Nodaway 70 | 16 | 38 | 3.2 | 18.4 | 36.1 | 93.6 |
| Grundy | 16 | 37 | 3.0 | 17.2 | 34.4 | 91.2 |
| Holden | 19 | 42 | 2.5 | 17.3 | 33.8 | 91.2 |
| Portal | 20 | 42 | 3.0 | 16.5 | 34.2 | 90.9 |
| Rodney | June 30 | 48 | 2.0 | 17.9 | 32.5 | 90.5 |
| Dal | 26 | 39 | 2.8 | 19.4 | 33.1 | 89.2 |
| Chief | 17 | 39 | 2.5 | 19.2 | 34.4 | 88.5 |
| Mammoth | 28 | 43 | 3.0 | 18.3 | 32.0 | 86.0 |
| M-72 | 16 | 40 | 3.0 | 17.5 | 33.1 | 84.4 |
| Lodi | June 26 | 48 | 1.8 | 18.8 | 30.6 | 82.7 |
| Clintland 64 | 17 | 41 | 3.0 | 18.7 | 33.9 | 69.2 |

LSD(.05) - 11.7 Bu/A C.V. - 8.9% Mean - 93.4

*Lodging Score: 1-Upright; 5-Prostrate

Table 14. Oat Variety Trial (Forage Type) - South Central Crops and Soils Research Station

| Variety | Height Inches | Forage Yield*** | | | Grain Yield Bu/Acre |
|---|---|---|---|---|---|
| | | % Dry Matter | Protein** | Tons/Acre | |
| Cayuse | 39 | 60.0 | 11.1 | 5.6 | 95.6 |
| Dal | 39 | 56.5 | 12.9 | 5.2 | 89.2 |
| Rodney | 48 | 43.2 | 11.4 | 4.6 | 90.5 |
| Mammoth | 43 | 44.0 | 11.9 | 4.5 | 86.0 |
| Froker | 42 | 48.9 | 10.0 | 4.4 | 103.1 |
| Kelsey | 44 | 51.6 | 11.1 | 4.0 | 98.0 |
| Lodi | 48 | 48.0 | 11.2 | 4.2 | 82.7 |
| Portal | 42 | 55.3 | 12.2 | 3.8 | 90.9 |

LSD(.05) - .37 T/A C.V. - 5.7% Mean - 4.5

**Percent protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

***Forage Yields are reported on a 12% moisture content.

## FLAX

The flax variety trial was seeded on fallow soil at the rate of one bushel per acre. The soil was fertilized by broadcasting 100 pounds of 40-15-0 prior to field preparation and by placing an additional 15 pounds of phosphorus with the seed. The plots were sprayed for weed control with Bronate at the rate of one pound per acre. The plots were harvested in late August. Yield data are reported in Table 15.

Table 15. Flax Variety Trial - South Central Crops & Soils Research Station Presho, 1972

| Variety | Height Inches | Test Wt Lbs/Bu | Grain Yield Bu/Acre |
|---|---|---|---|
| Nored | 21 | 55 | 6.3 |
| B-5128 | 20 | 52 | 6.1 |
| Windom | 21 | 54 | 5.7 |
| Linott | 21 | 52 | 5.3 |
| Summit | 21 | 53 | 4.2 |
| Bolley | 20 | 53 | 2.7 |
| Foster | 24 | 50 | 2.5 |
| Norstar | 20 | 51 | 2.2 |
| LSD(.05) - 2.3 Bu/A | | | Mean - 4.4 |

## SPECIALTY CROP TESTING

H. A. Geise

Objectives: To observe and compare various specialty crop varieties and selections for grain yield, disease resistance, new management practices, and other characteristics for area adaptability.

## SUNFLOWER YIELD TRIAL

Sunflowers are grown as a crop for several purposes. The large-seed types are grown for whole-seed-uses in the confectionery trade. They are also preferred by some bird feeders because the large seed is less likely to attract sparrows and is less likely to be lost on the ground.

The small seeded varieties have a much thinner hull resulting in a proportionally larger meat. These thin hulled types are used primarily for their oil. Certain varieties contain over 50% high quality oil in the seed.

A variety trial containing 39 entries was seeded in 1972 but because of rodent damage stands were not uniform and the test did not provide reliable data. The average seed yields for the various types were: Birdfeed varieties-1655 lbs/acre, Open-pollinated oilseed varieties - 1798 lbs/acre, Hybrid oilseed varieties - 1912 lbs/acre.

## Crambe Testing

H. A. Geise

Crambe is a new oil crop which is being tested for adaptability to the area. The oil contains Erucic acid which is used in the manufacture of plastics, such as brush bristles and bearings.

Crambe can be planted after danger of killing frost is past. It should be seeded with a grain drill at 15 to 30 pounds per acre. The plants will mature in 75 to 85 days and may be harvested by direct combine. Crambe may lodge but this can be prevented by swathing while still slightly immature.

The market for Crambe seed and oil has been established but because of the cost of shipping and location of processors only carload lots should be considered. Marketing could best be accomplished by forming a growers association. Yield data of selections from a plant introduction are shown in Table 16. The plots were seeded on May 19 and harvested on September 27. They were on fallow land and received 15 pounds of phosphorus with the seed at planting time.

Table 16. Crambe Selection Yield Trial - South Central Crops & Soils Research Station - Presho, South Dakota

| Selection No. | Height Inches | Test Wt Lbs/Bu | Seed Yield, Lbs/Acre 1972 | 1969 |
|---|---|---|---|---|
| *Crambe abyssinica* | | | | |
| 67002 | 27 | 21.8 | 817 | 2575 |
| 67014 | 29 | 21.9 | 771 | -- |
| 67009 | 29 | 22.7 | 741 | 2270 |
| 67042 | 26 | 22.1 | 741 | -- |
| 67022 | 28 | 21.5 | 718 | 2305 |
| 67005 | 26 | 21.4 | 688 | 2215 |
| 67006 | 26 | 22.2 | 681 | 2170 |
| 67001 | 30 | 21.5 | 681 | 2230 |
| 67032 | 27 | 18.0 | 673 | -- |
| 67008 | 29 | 22.0 | 669 | 2430 |
| 67013 | 27 | 21.2 | 669 | 2765 |
| 67007 | 27 | 21.4 | 666 | 2995 |
| 67020 | 28 | 22.1 | 624 | 2305 |
| Prophet | 29 | 22.0 | 401 | -- |
| *Crambe hispanica* | | | | |
| Indy | 29 | 23.4 | 552 | -- |

# SORGHUM PERFORMANCE TESTING

## Sorghum Breeding

A. O. Lunden

Sorghum plantings in 1972 included the Regional Uniform Test and a group of hybrids and lines from the South Dakota Breeding Nursery. The yields were about 10% below the five-year average for full season hybrids but were 10-20% above average for the short-season and mid-season entries. Di-Syston, a recommended insecticide, applied at time of planting prevented injury from greenbugs. However, yields were limited by drought and frost. Seed quality was poor in late maturing entries because of immature seed at harvest. Lodging was severe in some entries resulting in very difficult harvest conditions.

Yields reported in Table 17, which ranged from 45 to 75 bushels per acre in 1972 are from 36-inch rows planted on May 22. The early maturing lines, SD 104 and SD 690363, which are intended for late planting in narrow rows would probably yield considerably more if they were planted in that way. Yields of these two lines were increased by 10% when planted June 2 at Highmore and 42% when planted May 31 at Beresford at the same row spacing and should be still better if planted in narrow rows.

Table 17. Yields of Grain Sorghum Entries - South Central Crops & Soils Research Station - Presho, South Dakota

| Entry | Height Inches | Percent Lodging | Maturity* (days) | Yield in Bushels per acre 1968-70 | 1971 | 1972 | 67-72 |
|---|---|---|---|---|---|---|---|
| HYBRIDS | | | | | | | |
| SD 451 | 47 | 8 | + 6 | 59.4 | 32.8 | 65.0 | 55.9 |
| SD 503 | 51 | 3 | + 5 | 68.2 | 39.6 | 76.8 | 64.9 |
| NB 505 | 44 | 0 | + 1 | 55.4 | 37.0 | 59.3 | 52.9 |
| RS 506 | 44 | 22 | + 4 | 69.1 | 37.7 | 64.5 | 63.1 |
| RS 610 | 44 | 1 | +10 | 64.8 | 40.7 | 52.7 | 58.7 |
| LINES | | | | | | | |
| SD 102 | 39 | 24 | + 1 | -- | 22.2 | 44.1 | -- |
| SD 104 | 39 | 17 | + 2 | -- | 24.8 | 53.9 | -- |
| SD 690363 | 38 | 9 | 0 | | 33.2 | 47.8 | -- |

*Additional days required to reach same point of maturity as check variety.

An experimental forage sorghum R873-71 was tested (Table 23) but a limited seed supply will delay release until at least 1975. This hybrid has a very short stature, considerable leafiness and excellent yield potential.

## Grain Sorghum Performance Testing

J. J. Bonnemann

Objective: To compare the performance of grain sorghum hybrid varieties as to yield and other agronomic characteristics.

Performance trials with grain sorghum hybrids have been conducted on a fee basis at the South Central Crops & Soils Research Station since 1962. Table 18 presents the 1972 yields and agronomic data. Long term averages and other information can be found in Circular 207, 1972 Grain Sorghum Performance Trials, South Dakota Agricultural Experiment Station.

The plots were seeded on May 22. They were treated with Di-Syston 15G at 1 #/acre active ingredients to control greenbugs, and Ramrod 20G at 4 #/acre active ingredients to control weeds. Row spacing was 36 inches. The plots were harvested on October 3.

## Sorghum Forage Testing

H. A. Geise

Objective: To compare the various forage sorghums and sudangrasses, or their hybrids as to their adaptability, their forage production, and their forage quality.

Sorghum forage testing at the South Central Crops & Soils Research Station is continued because of voluntary contribution of seed by commercial companies. With the exception of certain preselected "Check" varieties, which will remain unidentified, all other seed is donated.

The researcher will not make interpretations or verbal comparisons of the trials, because of what may be misconstrued as "Brand" favoritism.

When studying the tables, the reader should consider the unusual weather during the growing season. The limited days with high air temperatures delayed heading and maturity, and thus altered such measurements as maturity and plant type.

The data from these trials are presented in Tables 19, 20, and 21. The plots were seeded on May 26, and on October 19 the plant notes were taken. The sugar content, moisture content, and forage yields were measured at harvest time.

Table 18. Grain Sorghum Performance Trial - South Central Crops & Soils Research Station - Presho, South Dakota - 1972

| Brand & Variety | Date of Heading | Height Inches | Percent Lodging | Percent* Moisture | Test Wt Lbs/Bu | Yield Lbs/A |
|---|---|---|---|---|---|---|
| Pride P 550 BR | 7-31 | 45 | 7 | 19.1 | 57 | 4860 |
| RS 560 | 7-31 | 45 | 45 | 19.7 | 57 | 4810 |
| Frontier Super 400A | 8- 8 | 42 | 0 | 30.5 | 55 | 4705 |
| Western WS 201 | 7-31 | 43 | 20 | 19.7 | 57 | 4705 |
| ACCO R 1010 | 8- 2 | 47 | 12 | 17.0 | 59 | 4655 |
| Pioneer 878 | 8- 7 | 40 | 0 | 20.9 | 57 | 4645 |
| SD 25702 | 8- 2 | 40 | 20 | 19.6 | 56 | 4640 |
| DeKalb C-42A | 8- 8 | 39 | 2 | 27.6 | 58 | 4595 |
| SD 503 | 7-31 | 51 | 5 | 19.7 | 57 | 4585 |
| DeKalb A-26 | 8- 1 | 38 | 3 | 23.6 | 56 | 4570 |
| Pride P-500A | 7-30 | 43 | 40 | 20.3 | 57 | 4570 |
| Northrup-King 180 | 8- 4 | 44 | 5 | 23.5 | 57 | 4560 |
| Northrup-King 121 | 7-31 | 44 | 8 | 17.6 | 58 | 4560 |
| ACCO R920 | 7-28 | 44 | 30 | 17.0 | 56 | 4445 |
| DeKalb B-36 | 8- 1 | 42 | 3 | 20.9 | 58 | 4410 |
| ACCO R-1019 | 8- 8 | 42 | 30 | 29.2 | 59 | 4395 |
| Early Oro | 8- 6 | 42 | 2 | 29.0 | 57 | 4395 |
| Warner W-601 | 8- 7 | 40 | 4 | 20.6 | 57 | 4330 |
| Frontier 400C | 8- 8 | 44 | 2 | 25.9 | 57 | 4295 |
| ACCO X-7250 | 8- 4 | 37 | 6 | 21.8 | 58 | 4290 |
| Pioneer 894 | 7-29 | 37 | 4 | 16.1 | 58 | 4255 |
| DeKalb X-1355 | 8- 2 | 33 | 3 | 21.1 | 57 | 4240 |
| NK Mini-Milo 54BR | 7-25 | 39 | 3 | 15.9 | 57 | 4230 |
| Western WS100 | 7-31 | 47 | 35 | 16.8 | 54 | 4230 |
| RS 610 | 8-10 | 42 | 8 | 24.5 | 55 | 4230 |
| NB 635 | 8-10 | 42 | 25 | 31.2 | 58 | 4185 |
| Pride P-200 | 7-22 | 41 | 15 | 17.6 | 56 | 4170 |
| Warner W-55 | 8-10 | 36 | 0 | 19.2 | 50 | 4145 |
| Pioneer 883 | 8- 8 | 37 | 5 | 30.1 | 54 | 4145 |
| P-A-G 3849 | 7-30 | 41 | 15 | 16.5 | 57 | 4135 |
| Western WS206 | 8- 8 | 39 | 2 | 19.5 | 55 | 4130 |
| Pioneer 866 | 8- 8 | 44 | 5 | 28.7 | 56 | 4125 |
| Frontier GX410 | 8- 8 | 37 | 2 | 23.8 | 56 | 4110 |
| Coop SG-22 | 8-14 | 34 | 10 | 32.6 | 57 | 4040 |
| Warner W-501 | 7-26 | 47 | 60 | 16.5 | 55 | 4030 |
| Frontier GX700 | 7-31 | 43 | 15 | 18.9 | 57 | 3955 |
| NB 634 | 8-13 | 43 | 2 | 35.+ | 59 | 3935 |
| SD 451 | 7-30 | 45 | 45 | 17.1 | 55 | 3925 |
| Coop SG-21 | 8-12 | 36 | 15 | 32.4 | 58 | 3680 |
| Warner W-600 | 8- 4 | 37 | 10 | 15.8 | 48 | 3580 |

C.V. - 12.1% Mean - 4315

*Moisture content was determined by an electronic moisture tester, A "+" sign indicates the content to be above the upper limit of the tester.

The area harvested was 60 sq ft, and yields reported are an average of four replications.

Table 19. Performance Trial of Forage Sorghum Varieties - South Central Crops & Soils Research Station, 1972

| Brand & Variety | Date of Heading | Percent Lodging | Maturity* (1-5) | Height Inches | % Sugar in Sap | Plant** Type | Percent*** Protein | Forage Yield**** Tons/Acre |
|---|---|---|---|---|---|---|---|---|
| Rudy-Patrick 55F | 8- 4 | 29 | 1 | 76 | 11.9 | 3 | 7.6 | 6.9 |
| Rudy-Patrick Sumax | 8-11 | 21 | 1 | 79 | 14.7 | 3 | 6.3 | 6.7 |
| Acco FS401R | 8- 8 | 51 | 1 | 69 | 11.4 | 3 | 7.6 | 5.3 |
| Excel Silo-fill 33 | 8-16 | 22 | 2 | 62 | 5.2 | 3 | 7.5 | 5.1 |
| Asgrow Beefbuilder T | 8-18 | 22 | 1 | 83 | 11.9 | 3 | 6.0 | 5.0 |
| DeKalb FS-1a | 8- 4 | 14 | 1 | 57 | 4.4 | 8 | 8.2 | 4.6 |
| Frontier S-209 | 8- 9 | 4 | 2 | 90 | 13.4 | 4 | 7.8 | 4.5 |
| Funk's 102F | 8- 6 | 25 | 2 | 67 | 9.6 | 3 | 6.9 | 4.4 |
| Frontier S-212 | 8-25 | 11 | 2 | 80 | 13.8 | 3 | 7.7 | 4.4 |
| Acco FS531 | 9- 5 | 36 | 4 | 82 | 12.4 | 2 | 8.5 | 4.2 |
| Northrup-King 300 | 8- 9 | 28 | 1 | 62 | 4.3 | 3 | 11.6 | 4.1 |
| Acco X7804 | 8- 7 | 65 | 1 | 62 | 5.0 | 3 | 8.1 | 3.9 |
| Funk's 262S | 8- 9 | 38 | 2 | 58 | 6.4 | 7 | 6.8 | 3.9 |
| Niagara Protector | 8-23 | 8 | 2 | 76 | 14.6 | 3 | 7.9 | 3.9 |
| Advance 1085F | 8-26 | 14 | 2 | 72 | 11.8 | 3 | 7.6 | 3.9 |
| Rudy-Patrick 22F | 8- 9 | 29 | 1 | 67 | 9.3 | 3 | 7.5 | 3.8 |
| Funk's 93F | 8-27 | 24 | 2 | 86 | 15.6 | 3 | 6.9 | 3.8 |
| DeKalb FS-4 | 8-20 | 18 | 1 | 84 | 11.6 | 3 | 7.0 | 3.8 |
| Waconia | 8-13 | 14 | 1 | 74 | 13.1 | 3 | 5.9 | 3.7 |
| Pioneer 931 | 8-20 | 8 | 5 | 91 | 14.6 | 2 | 8.5 | 3.6 |
| Frontier S-205 | 8- 5 | 54 | 1 | 74 | 5.8 | 4 | 7.6 | 3.6 |
| Niagara Hi-Chew | 8-24 | 8 | 2 | 77 | 11.4 | 3 | 7.6 | 3.6 |
| SD 275F | 8- 4 | 9 | 1 | 58 | 6.0 | 7 | 8.6 | 3.6 |
| Advance 1071F | 8-25 | 21 | 1 | 84 | 16.0 | 3 | 6.9 | 3.5 |
| Acco FS403R | 8-24 | 9 | 2 | 82 | 9.2 | 3 | 8.0 | 3.5 |
| DeKalb FS-1b | 8-12 | 6 | 2 | 55 | 5.0 | 8 | 9.4 | 3.4 |
| Asgrow Duet | 8- 5 | 18 | 1 | 66 | 5.1 | 3 | 7.7 | 3.4 |
| Acco X8815 | 8- 5 | 45 | 1 | 69 | 4.5 | 3 | 8.1 | 3.4 |
| Northrup-King 367 | 9- 3 | 29 | 5 | 79 | 12.6 | 2 | 10.9 | 3.1 |
| Northrup-King 145 | 8- 7 | 45 | 1 | 75 | 5.7 | 4 | 9.2 | 2.8 |
| Frontier S-210 | 8-24 | 3 | 2 | 75 | 12.9 | 3 | 7.5 | 2.6 |
| Rancher | 7-28 | 3 | 1 | 74 | 14.6 | 5 | 8.1 | 2.5 |
| SD R873 | 7-31 | 5 | 1 | 37 | 8.4 | 7 | 8.8 | 2.3 |

Note: Footnote explanations can be found on pages 19 and 20.

**Legend for Plant Type - Tables 19-21.

| Score | Description | Score | Description |
|---|---|---|---|
| 1 | Tall-Extra Leafy-No Grain | 6 | Short-Extra Leafy-No Grain |
| 2 | Tall-Leafy-Some Grain | 7 | Short-Leafy-Some Grain |
| 3 | Tall-Leafy-Grain (50-50) | 8 | Short-Leafy-Grain (50-50) |
| 4 | Tall-Few Leaves-Some Grain | 9 | Short-Few Leaves-Some Grain |
| 5 | Tall-Few Leaves-No Grain | 10 | Short-Few Leaves-No Grain |

Table 20. Performance Trial of Sorghum-Sudangrass Crosses - South Central Crops & Soils Research Station, 1972

| Brand & Variety | Date of Heading | Percent Lodging | Maturity* (1-5) | Height Inches | % Sugar in Sap | Plant** Type | Percent*** Protein | Forage Yield**** Tons/Acre |
|---|---|---|---|---|---|---|---|---|
| Excel Super Chowmaker S | 8-13 | 25 | 1 | 53 | 9.3 | 7 | 8.5 | 4.2 |
| Frontier Hidan 39 | 8-12 | 29 | 1 | 87 | 10.7 | 4 | 8.3 | 4.1 |
| Funk's 83F | 8-17 | 31 | 1 | 86 | 14.1 | 4 | 8.2 | 4.0 |
| Funk's 78F | 8-19 | 28 | 1 | 85 | 12.5 | 4 | 7.3 | 3.9 |
| Northrup-King Sordan 70 | 8-11 | 30 | 1 | 84 | 9.9 | 4 | 6.7 | 3.6 |
| DeKalb ST 11 | 8- 7 | 25 | 1 | 85 | 11.2 | 4 | 9.3 | 3.3 |
| Excel Super Chowmaker A | 8-21 | 10 | 2 | 80/46 | 10.2 | 4/8 | 9.8 | 3.3 |
| Excel Chowmaker | 8-17 | 28 | 1 | 77 | 15.6 | 4 | 12.3 | 2.9 |
| Acco Sweet Sioux | 8- 2 | 26 | 1 | 96 | 12.6 | 4 | 7.0 | 2.8 |
| Excel Super Chowmaker | 8-20 | 24 | 4 | 78 | 13.9 | 5 | 8.3 | 2.7 |
| DeKalb ST 6 | 8- 7 | 24 | 1 | 96 | 15.4 | 4 | 6.1 | 2.6 |
| Asgrow Grazer N | 8- 3 | 28 | 1 | 86 | 11.2 | 5 | 6.9 | 2.6 |
| Doreman Sure-Graze | 8-12 | 34 | 1 | 86 | 13.1 | 4 | 9.0 | 2.5 |
| Frontier Hidan 35 | 8- 4 | 20 | 1 | 81 | 8.0 | 4 | 5.1 | 2.4 |
| Rudy-Patrick Su-4 | 8- 2 | 20 | 1 | 86 | 11.2 | 5 | 5.7 | 1.8 |
| Acco Sweet Sioux II | 8- 6 | 28 | 1 | 84 | 14.2 | 4 | 10.4 | 1.6 |

*See Legend on page 20.
**See Legend at top of page.
***Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.
****Forage yields are reported on the basis of 12% moisture content.

Table 21. Performance Trial of Miscellaneous Annual Forages - South Central Crops & Soils Research Station, 1972

| Brand & Variety | Date of Heading | Percent Lodging | Maturity* (1-5) | Height Inches | % Sugar in Sap | Plant** Type | Percent*** Protein | Forage Yield**** Tons/Acre |
|---|---|---|---|---|---|---|---|---|
| SILAGE CORN | | | | | | | | |
| Pioneer 3681 | 7-30 | 25 | 1 | 78 | 10.9 | 3 | 9.2 | 3.2 |
| Pioneer Blend BR | 7-30 | 0 | 1 | 76 | 8.8 | 3 | 10.9 | 2.9 |
| Pioneer Blend AR | 7-28 | 0 | 1 | 72 | 16.4 | 3 | 8.2 | 2.5 |
| Pioneer Blend CR | 8- 4 | 25 | 1 | 73 | 14.5 | 3 | 8.7 | 2.3 |
| SUDANGRASS | | | | | | | | |
| Acco FS-33 | 7-31 | 0 | 1 | 78 | 10.1 | 5 | 4.9 | 1.6 |
| Northrup-King Trudan 5 | 8- 2 | 25 | 1 | 78 | 10.1 | 5 | 5.4 | 1.5 |
| Rudy-Patrick Trudy | 7-31 | 25 | 1 | 72 | 7.3 | 5 | 6.5 | 1.3 |
| Cal/West Monarch | 7-31 | 0 | 1 | 75 | 10.4 | 5 | 5.1 | 1.2 |
| Piper | 7-29 | 0 | 1 | 78 | 10.7 | 5 | 4.6 | 0.8 |
| SORGHUM BLENDS | | | | | | | | |
| Acco 3 Little Indians | 8- 4 | 25 | 1 | 80 | 6.6 | 3 | 10.5 | 4.0 |
| Acco FB-44 | 8-12 | 43 | 1 | 78 | 10.0 | 4 | 9.1 | 2.8 |
| SOUTH DAKOTA FORAGE HYBRIDS | | | | | | | | |
| R873-71 | 8- 5 | 32 | 1 | 53 | -- | 6 | 4.4 | 4.5 |
| GRAIN SORGHUM CHECK | | | | | | | | |
| SD 503 | 8- 1 | 50 | 1 | 52 | 11.2 | 8 | 8.6 | 2.5 |

*Legend for Maturity: 1-Mature grain; 2-Hard dough stage; 3-Milk stage; 4-Pollinating stage; 5-Not headed

**See legend at top of page 19.

***Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

****Forage yields are reported on the basis of 12% moisture content.

## GRASS TESTING

### Grass Forage Production With Various Fertilizers and Row Spacings

H. A. Geise

Objective: To determine optimum rates and ratios of fertilizers to be used in the production of grass forage. The effects of wide and narrow row spacings are also included.

A statistical analysis (Table 22) show some of the 1972 yield differences to be real. In the early years of the study the yields of forage decreased when phosphorus fertilizer was added to the soil.

In recent years the longtime yield records indicate a slight advantage for phosphorus on Smooth Bromegrass plots but no real advantage on Intermediate Wheatgrass.

Table 22. Influence of Row Space and Fertilizer on Forage Yield of Smooth Bromegrass and Intermediate Wheatgrass - South Central Crops & Soils Research Station

| Species | Row Space | Fertilizer* Applied | Percent** Protein | Forage Yield-Tons/A 1972 | Forage Yield-Tons/A Av. 1960-72 |
|---|---|---|---|---|---|
| Smooth Bromegrass | 6" | 0-0-0 | 3.38 | 0.98 | 0.72 |
| | | 20-0-0 | 3.38 | 1.48 | 1.03 |
| | | 40-0-0 | 3.69 | 1.69 | 1.14 |
| | | 40-9-0 | 3.63 | 2.28 | 1.30 |
| | | 40-9-0+Zn | 4.00 | 2.35 | 1.16*** |
| | 42" | 0-0-0 | 2.88 | 1.22 | 0.99 |
| | | 20-0-0 | 3.94 | 1.71 | 1.17 |
| | | 40-0-0 | 4.94 | 1.62 | 1.19 |
| | | 40-9-0 | 4.56 | 2.14 | 1.27 |
| | | 40-9-0+Zn | 5.13 | 2.04 | 1.01*** |
| Intermediate Wheatgrass | 6" | 0-0-0 | 3.44 | 1.22 | 0.99 |
| | | 20-0-0 | 2.50 | 1.72 | 1.40 |
| | | 40-0-0 | 5.19 | 2.04 | 1.28 |
| | | 40-9-0 | 4.25 | 1.86 | 1.30 |
| | | 40-9-0+Zn | 4.00 | 1.62 | 0.96*** |
| | 42" | 0-0-0 | 3.06 | 2.33 | 1.21 |
| | | 20-0-0 | 4.69 | 2.87 | 1.36 |
| | | 40-0-0 | 5.25 | 2.98 | 1.43 |
| | | 40-9-0 | 4.13 | 2.28 | 1.40 |
| | | 40-9-0+Zn | 3.69 | 2.52 | 1.12*** |

*Nitrogen and Phosphorus fertilizers were applied as pounds of element at the rate indicated. Zinc was applied at 10 pounds per acre as zinc sulphate.

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

***Average yield for this treatment is for the period 1966-1972 only.

## MANAGEMENT, TILLAGE, AND CULTURAL PRACTICES

H. A. Geise

### Comparison of Different Techniques in Growing Winter Wheat

Objective: To compare yields of winter wheat grown, (1) continuously with and without commercial nitrogen, (2) in rotation with conventional fallow or sweet clover, (3) in rotation with corn or sorghum harvested as an ensilage crop, and (4) with or without the addition of phosphorus fertilizer.

The results of this study are reported in Tables 23 and 24.

Table 23. Yields of Winter Wheat from Plots Having Eight Different Management Practices - South Central Crops & Soils Research Station - 1972

| Management Practices | Fertilizer* | Percent Survival | Height Inches | Percent** Protein | Test Wt Lbs/Bu | Yield Bu/A |
|---|---|---|---|---|---|---|
| Continuous Wheat | 0- 0-0 | 74 | 27 | 13 | 55 | 14.6 |
| | 0-15-0 | 91 | 31 | 15 | 56 | 24.9 |
| Continuous Wheat | 40- 0-0 | 70 | 29 | 15 | 51 | 16.5 |
| | 40-15-0 | 90 | 31 | 15 | 56 | 27.6 |
| Continuous Wheat | 80- 0-0 | 70 | 29 | 16 | 52 | 13.5 |
| | 80-15-0 | 89 | 34 | 14 | 55 | 27.2 |
| Continuous Wheat | 120- 0-0 | 81 | 28 | 16 | 54 | 13.1 |
| | 120-15-0 | 90 | 32 | 15 | 56 | 28.0 |
| Wheat - Fallow | 0- 0-0 | 84 | 28 | 15 | 55 | 17.6 |
| | 0-15-0 | 90 | 31 | 15 | 57 | 26.8 |
| Wheat-Sw Cl Fallow | 0- 0-0 | 70 | 30 | 16 | 54 | 18.3 |
| | 0-15-0 | 88 | 33 | 15 | 55 | 30.6 |
| Wheat-Corn(Silage) | 0- 0-0 | 76 | 28 | 16 | 55 | 15.7 |
| | 0-15-0 | 90 | 30 | 15 | 57 | 26.1 |
| Wheat-Sorghum(Silage) | 0- 0-0 | 70 | 28 | 16 | 56 | 16.1 |
| | 0-15-0 | 84 | 30 | 15 | 56 | 24.0 |

LSD(.05) - 4.6 Bu/A C.V. - 14.6% Mean - 21.3

*Phosphorus fertilizer was applied with the seed at the rate of 15 pounds of element per acre, while nitrogen was broadcast on the surface at the rate indicated.

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

The data collected from this experiment in 1972 indicated only small differences were present between the main treatments of the experiment. The rate of application of commercial nitrogen fertilizer did not affect yield. Neither did the effects of summer fallow, sweet clover fallow, or the silage crops.

The major difference seems to have been influenced by the addition of phosphorus fertilizer, which directly affected winter survival. Although increases in protein and test weight were noted, they are probably due to more efficient use of soil moisture and nutrients.

Table 24. Yields of Forage Obtained from Sweet Clover, Corn and Sorghum-South Central Crops & Soils Research Station - 1972

| Crop | Fertilizer* Treatment | Percent Dry Matter | Percent** Protein | Forage Yield-Tons/Acre Wet | Dry*** | Av 1971-2 |
|---|---|---|---|---|---|---|
| Sweet Clover | 0 | 58.6 | 13.5 | 5.8 | 3.8 | --- |
| | P | 59.6 | 13.5 | 7.1 | 4.9 | --- |
| Silage Corn (Pioneer X8870) | 0 | 23.1 | 9.6 | 8.0 | 2.1 | 4.1 |
| | P | 23.9 | 9.7 | 8.5 | 2.3 | 4.4 |
| Forage Sorghum (Waconia) | 0 | 15.3 | 8.8 | 13.9 | 2.4 | 3.9 |
| | P | 17.9 | 6.7 | 15.3 | 3.1 | 4.9 |

*15 pounds of elemental phosphorus is applied with the seed of the alternating winter wheat crop.

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

***Dry forage yields are reported on a 12% moisture content.

## Management, Methods of Seeding Sorghum, and Fertilizer Effects on a Sorghum-Spring Wheat Rotation

H. A. Geise

Objectives: To determine the effects of nitrogen and phosphorus fertilizers, planting dates, and varieties of grain sorghum on grain yield, and effects of these practices on the yield of spring wheat the next year.

Grain yields in the sorghum-spring wheat rotations have varied among years because of weather conditions. Although the yields have been above the county averages, they are below the yields in other studies at the research station. Continuous cropping since 1957 may have depleted the subsoil moisture to cause the lower yields.

The spring wheat in this study has not yielded more even though nitrogen was applied. However, there has been a visual difference in the appearance of the fertilized and unfertilized plots. The nitrogen fertilized plots have had thicker stands, taller plants, and larger leaves per plant. While the test weights of the grain have been lower, the protein content has always been higher. These are characteristics of grain produced under moisture stress.

Table 25. Effects of Planting Date and Fertilizer Application of Previous Crop of Grain Sorghum on Spring Wheat Yields - South Central Crops & Soils Research Station

| Date of Planting Sorghum | Type of Grain Sorghum | Fertilizer* | Percent** Protein | Test Wt Lbs/Bu | Grain Yield-Bu/Acre 1972 | Av 1971-72 |
|---|---|---|---|---|---|---|
| June 1 | Short-Season | 0 | 19.6 | 52.6 | 15.0 | 11.6 |
| | | N | 18.3 | 52.1 | 15.4 | 11.2 |
| | | P | 19.9 | 55.6 | 15.8 | 12.4 |
| | | NP | 19.0 | 53.9 | 19.1 | 13.8 |
| | Mid-Season | 0 | 19.7 | 53.1 | 15.4 | 11.0 |
| | | N | 19.0 | 52.8 | 15.9 | 11.6 |
| | | P | 19.9 | 52.8 | 16.0 | 12.6 |
| | | NP | 19.7 | 52.9 | 19.5 | 14.8 |
| | Long-Season | 0 | 18.9 | 53.0 | 13.5 | 11.6 |
| | | N | 18.4 | 54.0 | 16.9 | 14.8 |
| | | P | 19.3 | 55.4 | 19.0 | 15.2 |
| | | NP | 19.0 | 54.0 | 18.8 | 16.4 |
| June 15 | Short-Season | 0 | 19.4 | 54.4 | 15.6 | 11.6 |
| | | N | 18.7 | 54.2 | 16.8 | 12.8 |
| | | P | 19.5 | 54.8 | 13.8 | 11.6 |
| | | NP | 19.6 | 52.8 | 18.3 | 14.6 |
| | Mid-Season | 0 | 19.8 | 53.4 | 17.1 | 12.4 |
| | | N | 19.0 | 54.5 | 15.9 | 12.4 |
| | | P | 20.0 | 54.4 | 20.1 | 14.8 |
| | | NP | 20.1 | 54.5 | 20.3 | 16.0 |
| | Long-Season | 0 | 19.2 | 54.2 | 13.2 | 10.8 |
| | | N | 17.8 | 54.2 | 15.8 | 12.4 |
| | | P | 19.9 | 55.1 | 19.4 | 14.5 |
| | | NP | 12.5 | 54.6 | 19.4 | 15.3 |
| June 30 | Short-Season | 0 | 18.9 | 54.0 | 15.9 | 14.2 |
| | | N | 17.8 | 53.9 | 13.8 | 13.4 |
| | | P | 19.6 | 54.8 | 16.4 | 15.4 |
| | | NP | 19.9 | 54.5 | 17.5 | 15.6 |
| | Mid-Season | 0 | 19.6 | 52.6 | 13.0 | 10.6 |
| | | N | 19.0 | 54.5 | 14.7 | 12.0 |
| | | P | 20.2 | 54.6 | 15.2 | 11.8 |
| | | NP | 19.6 | 52.8 | 19.6 | 15.9 |
| | Long-Season | 0 | 19.2 | 52.9 | 14.0 | 14.0 |
| | | N | 18.9 | 52.8 | 13.9 | 13.8 |
| | | P | 20.2 | 54.2 | 15.9 | 15.4 |
| | | NP | 19.4 | 53.4 | 17.1 | 16.2 |

* "O" indicates fertilizer was not used, "P" indicates 15# of Phosphorus per acre was applied, "N" indicates 40# of Nitrogen per acre was applied, "NP" indicates that both fertilizers were applied at the rate stated.

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Table 26. Effects of Planting Date and Fertilizer Application on Yield of Grain Sorghum Varieties of Varying Maturity - South Central Crops and Soils Research Station

| Date of Planting | Brand and Variety | Fertilizer** | Lodging Percent | Height Inches | Test Wt Lbs/Bu | Grain Yield Lbs/Acre |
|---|---|---|---|---|---|---|
| June 1 | See Footnote* | 0 | 78 | 69 | 53.9 | 1820 |
| | | N | 70 | 71 | 54.8 | 1932 |
| | | P | 78 | 68 | 53.8 | 1792 |
| | | NP | 78 | 67 | 54.4 | 1971 |
| | SD 506 | 0 | 94 | 53 | 55.4 | 2307 |
| | | N | 94 | 45 | 55.0 | 2732 |
| | | P | 95 | 50 | 56.0 | 2699 |
| | | NP | 96 | 46 | 56.5 | 3058 |
| | SD 503 | 0 | 80 | 50 | 56.1 | 2352 |
| | | N | 59 | 51 | 56.2 | 2816 |
| | | P | 84 | 48 | 56.7 | 2520 |
| | | NP | 74 | 52 | 56.0 | 2789 |
| June 15 | See Footnote* | 0 | 55 | 56 | 51.6 | 2167 |
| | | N | 62 | 54 | 52.0 | 2279 |
| | | P | 75 | 54 | 52.1 | 2060 |
| | | NP | 82 | 54 | 52.6 | 2144 |
| | SD 506 | 0 | 31 | 58 | 50.1 | 2676 |
| | | N | 44 | 54 | 50.7 | 2503 |
| | | P | 35 | 56 | 51.6 | 2828 |
| | | NP | 50 | 53 | 50.7 | 2581 |
| | SD 503 | 0 | 46 | 45 | 52.8 | 3186 |
| | | N | 31 | 44 | 53.2 | 2335 |
| | | P | 36 | 44 | 53.5 | 2413 |
| | | NP | 31 | 46 | 53.6 | 2374 |
| June 30 | See Footnote* | 0 | 6 | 64 | 42.2 | 78 |
| | | N | 5 | 63 | 42.3 | 123 |
| | | P | 6 | 65 | 42.6 | 168 |
| | | NP | 8 | 60 | 42.3 | 157 |
| | SD 506 | 0 | 4 | 46 | 43.7 | 548 |
| | | N | 0 | 46 | 42.8 | 436 |
| | | P | 0 | 45 | 43.3 | 543 |
| | | NP | 0 | 45 | 44.4 | 594 |
| | SD 503 | 0 | 0 | 46 | 45.0 | 246 |
| | | N | 0 | 45 | 46.0 | 392 |
| | | P | 0 | 45 | 45.7 | 308 |
| | | NP | 0 | 44 | 46.6 | 571 |

*SD 102 was selected as the Short-season variety but because of a seed mixture it was necessary to use a hybrid containing SD 102 as a parent.

** "O" indicates fertilizer was not applied. "P" indicates 15# of Phosphorus per acre was applied, "N" indicates 40# of Nitrogen per acre was applied, "NP" indicates that both fertilizers were applied at the rate stated.

The grain sorghum study has been revised over the years as data has been collected and interpreted. The best implement for seeding sorghum was either a conventional corn planter or a grain drill. These implements placed the seed at a depth satisfactory for rapid seedling emergence. They also do not leave furrows which collect water from heavy rains. Standing water in the furrows usually causes a puddled soil surface and a hard crust when the soil dries.

Soil temperature was also studied in relation to date of planting for grain sorghum. The optimum temperature for rapid germination and emergence is usually reached in mid-June. This planting date also had other advantages in that it permits the early growing weeds to be destroyed before the sorghum is planted.

The next variable which was studied was row width. The most satisfactory width of those studied was found to be 24 inches. This width produced the highest grain yields with the least weed problems.

The last variable which has been studied is the length of growing season required for varieties. The results of earlier studies indicate that the short-season variety produced a higher yield when planted later, the medium-maturing variety produced best when planted in mid-June, and the long-season variety produced the highest yields when planted early.

The results of the 1972 study presented in Table 26 do not agree with earlier data. Under the limited moisture conditions during July and August the late planted sorghum either headed, but was unable to pollinate and set seed, or was forced into dormancy until late summer when moisture was again available. In either situation, the seed produced was of low quality.

## Influence of Fertilizers on Yield of Winter Wheat

H. A. Geise

Objective: To study winter wheat responses which are influenced by addition of fertilizers.

This experiment was initiated to study the effects of fertilizing winter wheat in a Promise clay soil. The fertilizers used contained the plant nutrient elements: itrogen, phosphorus, potassium, and sulphur. The fertilizers were placed with the seed by using a drill attachment.

The experiment was placed on fallow land and consisted of various rates and ratios of plant food. The results of this trial (Table 27) contained so much variability because of winter-kill that positive interpretations could not be made.

The use of systemic insecticides increases the yield of winter wheat but as yet the reason for the increase has not been determined.

Table 27. Influence of Fertilizer on Winter Wheat in Fallow - South Central Crops & Soils Research Station - Presho, South Dakota

| Fertilizer Treatment* Pounds of Element/A | Height Inches | Percent Survival | Percent** Protein | Test Wt Lbs/Bu | Yield-Bu/A Av 1971-72 |
|---|---|---|---|---|---|
| 0-0-0 | 33 | 82 | 14.9 | 57.3 | 19.4 |
| 15-0-0 | 35 | 85 | 15.6 | 58.2 | 23.0 |
| 30-0-0 | 33 | 88 | 15.3 | 57.7 | 22.4 |
| 60-0-0 | 34 | 85 | 15.2 | 57.5 | 21.2 |
| 0-15-0 | 34 | 92 | 15.2 | 58.0 | 27.4 |
| 15-15-0 | 33 | 82 | 15.6 | 57.7 | 26.4 |
| 30-15-0 | 34 | 88 | 15.3 | 57.7 | 26.8 |
| 60-15-0 | 33 | 85 | 15.4 | 58.2 | 23.0 |
| 0-30-0 | 34 | 90 | 15.5 | 57.8 | 26.4 |
| 15-30-0 | 33 | 73 | 15.0 | 57.5 | 26.0 |
| 30-30-0 | 36 | 90 | 15.0 | 57.2 | 27.0 |
| 60-30-0 | 34 | 80 | 15.1 | 57.7 | 25.0 |
| 0- 0-30 | 31 | 82 | 15.4 | 57.5 | 17.4 |
| 0- 0-60 | 34 | 83 | 15.2 | 57.5 | 19.6 |
| 30-15-30 | 31 | 78 | 15.4 | 57.8 | 23.1 |
| 30-15-60 | 32 | 87 | 15.4 | 58.2 | 23.0 |
| 30-15-120 | 31 | 80 | 15.4 | 57.5 | 16.6 |
| $CuSO_4$ (Cu-15#/A,S-7#/A) | 32 | 88 | 14.7 | 57.3 | 24.3 |
| Furadan | 34 | 80 | 15.0 | 57.5 | 28.4 |
| Thimet | 34 | 72 | 15.0 | 57.7 | 22.2 |
| Di-Syston | 34 | 90 | 15.1 | 58.0 | 25.4 |
| Furadan +30-15-0 | 32 | 92 | 14.9 | 57.7 | 32.7 |
| Thimet +30-15-0 | 34 | 85 | 15.7 | 57.8 | 26.9 |
| Di-Syston +30-15-0 | 31 | 87 | 15.3 | 57.7 | 27.4 |

*Rate indicated is actual pounds of element applied per acre (N-P-K).

**Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

# CROP DISEASE CONTROL

## Wheat Streak Mosaic Development and Control in South Dakota

W. S. Gardner and H. A. Geise

The effect date of planting has on the severity of Wheat Streak Mosaic in winter wheat and on the yield of grain has been studied for twelve years at the South Central Crops and Soils Research Station. Wheat Streak Mosaic did not affect the yields at the station in 1971 and 1972 although it did in 1968, 1969, and 1970 (Table 29). The data for 1968, 1969, and 1970 is more typical of the long term average than the past two years data which is only similar to the 1960 data. Until the carry over of the virus and the Wheat Curl Mite mosaic vector is better understood, the control of the disease apparently will need to be by:

1. Destroying volunteer wheat and grassy weeds in stubble and in fallow seven to ten days before planting winter wheat.
2. Plant winter wheat in South Dakota between September 10 and September 15.

## Air Pollution Detection in South Dakota Using Sensitive Indicator Plants

W. S. Gardner

The South Central Crops and Soils Research Station has been used for two years (1971-1972), as a location for sensitive indicator plants for detection of air pollution. In 1971 none of the plant indicators showed evidence of air pollution at this station, while other locations in South Dakota had a positive response from ozone indicators. In 1972 this station's sensitive Bel W3 tobacco plants showed very light indication of ozone injury. This was the least injury found at any of 12 locations in South Dakota. The plants used and pollutant sensitivity are shown in Table 28.

Table 28. Indicator Plants Used to Determine the Distribution of Plant Damaging Air Pollutants in South Dakota - 1972

| Indicator Plant | | Reaction | Pollutant |
|---|---|---|---|
| Tobacco | (Bel-B) | Resistant | Ozone |
| Tobacco | (Bel-C) | Moderately Sensitive | Ozone |
| Tobacco | (Bel-W3) | Very Sensitive | Ozone |
| Tobacco | (Glutinosa) | Sensitive | PAN* |
| Petunia | (White Cascade) | Very Sensitive | PAN* |
| Gladiolus | (Snow Princess) | Sensitive | Flouride |
| Cotton | (Acala S-J-1) | Sensitive | Sulphur Dioxide |
| Bean | (Tempo) | Sensitive | Ambient Oxidant |

*Peroxyacetyl nitrate - a photochemical air pollutant.

Locations: Beresford, Sioux Falls, Elk Point, Brookings, Milbank, Big Stone City, Highmore, Presho, Spearfish, Belle Fourche, Buffalo.

Table 29. Response of Winter Wheat in 1967, 1968, and 1969 to Six Dates of Planting, Mosaic Development and Yield Compared With the 12 Year Average - South Central Crops and Soils Research Station

| Date of Planting | 1967 | | 1968 | | 1969 | | 3 Year Average | | 12 Year Average | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A |
| August 15 | 37 | 15 | 98 | 9 | 87 | 3 | 74 | 9 | 50 | 14 |
| August 25 | 25 | 21 | 89 | 12 | 62 | 3 | 59 | 12 | 43 | 19 |
| September 4 | 5 | 33 | 37 | 24 | 16 | 10 | 19 | 22 | 14 | 24 |
| September 14 | 0 | 40 | 26 | 27 | 5 | 14 | 10 | 27 | 5 | 26 |
| September 24 | 0 | 27 | 15 | 17 | 2 | 15 | 6 | 20 | 3 | 24 |
| October 4 | 0 | 22 | 2 | 7 | 0 | 9 | 1 | 13 | 1 | 18 |

Table 30. Response of Winter Wheat in 1960, 1971, and 1972 to Six Dates of Planting, Mosaic Development and Yield Compared With the 12 Year Average - South Central Crops and Soils Research Station

| Date of Planting | 1971 | | 1972 | | 2 Year Average | | 12 Year Average | | 1960 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A | Percent Mosaic | Yield Bu/A |
| August 15 | 1 | 38 | 13 | 24 | 7 | 31 | 50 | 14 | 1 | 31 |
| August 25 | 0 | 47 | 5 | 36 | 2 | 41 | 43 | 19 | 1 | 38 |
| September 4 | 0 | 47 | 4 | 34 | 2 | 40 | 14 | 24 | 1 | 36 |
| September 14 | 0 | 40 | 1 | 35 | 5 | 37 | 5 | 26 | 1 | 32 |
| September 24 | 0 | 35 | 0 | 35 | 0 | 35 | 3 | 24 | 0 | 24 |
| October 4 | 0 | 34 | 0 | 21 | 0 | 27 | 1 | 18 | 0 | 18 |

## Application of Furadan for Control of Mites and Insects Affecting Winter Wheat

H. A. Geise and W. S. Gardner

In 1971 and 1972 experiments were carried out to determine if Furadan, a systemic insecticide and miticide, would control the Wheat Curl Mite Vector of the virus and reduce the Wheat Streak Mosaic severity. The Date of Planting experiment was divided into a split plot design, with one half of each regular planting date treated with Furadan. The results for 1972 are shown in Table 31.

The original purpose of the experiment could not be tested in 1972 because Wheat Streak Mosaic was not a problem in that year. The experiment will need to be repeated to study the effect of Furadan on the spread of the insect and of the mosaic virus.

In 1971, an unexpected effect was noted in the August 15 planting. The untreated wheat had fewer plants per plot and yielded six bushels per acre less than the Furadan treated wheat. In 1972, no difference was noted between the appearance of Furadan-treated and untreated wheat, but there was a 10 bushel per acre increase in yield in the Furadan-treated wheat planted on August 15. Possibly the beneficial effect of the Furadan treatment on early planted winter wheat was control of cutworms, greenbugs or other pests.

Table 31. Winter Wheat Date of Planting Experiment Using Furadan* for Attempted Mosaic Control - South Central Crops and Soils Research Station - 1972

| Date of Planting and Treatment | Date of Heading | Height Inches | Percent** Moisture | Percent*** Protein | Test Weight Lbs/Bu | Grain Yield Bu/Acre | Percent Mosaic |
|---|---|---|---|---|---|---|---|
| August 15 | | | | | | | |
| Check | June 5 | 38 | 12.4 | 14.4 | 56 | 24.6 | 13 |
| Furadan | 5 | 38 | 13.3 | 13.8 | 57 | 34.3 | 22 |
| August 25 | | | | | | | |
| Check | June 4 | 38 | 13.1 | 14.8 | 58 | 35.6 | 5 |
| Furadan | 4 | 36 | 14.4 | 14.1 | 58 | 34.6 | 6 |
| September 4 | | | | | | | |
| Check | June 5 | 37 | 13.0 | 14.6 | 57 | 34.0 | 4 |
| Furadan | 5 | 34 | 13.8 | 14.6 | 59 | 42.5 | 5 |
| September 14 | | | | | | | |
| Check | June 7 | 37 | 12.7 | 14.4 | 58 | 35.0 | 1 |
| Furadan | 7 | 38 | 12.9 | 13.8 | 58 | 38.6 | 1 |
| September 24 | | | | | | | |
| Check | June 9 | 36 | 13.3 | 14.1 | 58 | 35.1 | 0 |
| Furadan | 8 | 38 | 12.6 | 13.8 | 57 | 32.5 | 0 |
| October 4 | | | | | | | |
| Check | June 9 | 35 | 12.2 | 14.3 | 57 | 21.3 | 0 |
| Furadan | 9 | 34 | 12.8 | 14.6 | 57 | 22.0 | 0 |

*Furadan is a systemic insecticide-miticide.
**Percent moisture content in grain at harvest was measured with a Steinlite moisture tester.
***Protein content was calculated from Kjeldahl nitrogen analysis and is reported on an oven-dry basis.

Note: Variety - Lancer; Method of Seeding - Deep Furrow Drill W/12 inch space and 4 inch shoe; Rate of Seeding: - 76 lbs/acre; Rate of Insecticide Application: 3% granules applied at the rate of 1.62 lbs of active ingredient per acre. Each value in table is average of 3 replications.