1992

EC92-107 Nebraska Proso, Sunflower and Amaranth Variety Tests, 1992

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ACKNOWLEDGEMENT

This circular is a progress report of proso, sunflower, and amaranth variety trials conducted in cooperation with the Panhandle Research and Extension Center, Scottsbluff, Nebraska. Conduct of the experiments and publication of results is a joint effort of the University of Nebraska-Lincoln Agricultural Research Division and the Cooperative Extension Service.

Thanks to Rex Nielsen for his efforts in trial maintenance and data analysis. Thanks to Jerry Nachtman and Don Thrailkill for their assistance on sunflower trial maintenance and data analysis. Special thanks to the USDA Central Great Plains Research Center, Akron, CO. and to the University of Wyoming, Torrington Research and Extension Center for their cooperation in the trials.

METRIC EQUIVALENTS

1 centimeter = 0.394 inches
1 hectare = 2.471 acres
1 kilogram = 2.205 pounds
1 hecroliter = 2.838 bushels
cwt = hundred weight
Kilogram/hectoliter = lb/bu x 1.287
Kilograms/hectare = bu/A x 62.78 (56# bu)
EXTENSION CIRCULAR 92 - 107

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ECONOMICS AND HISTORICAL PRICES OF PROSO MILLET

Daryl Ellis, David Baltensperger and Drew Lyon

The 1990 Farm Bill allows the flexibility of planting alternative crops on Flex acres. In the dryland areas of Nebraska, proso millet is one possible crop alternative. Proso is primarily grown in the 4-state region of North Dakota, South Dakota, Nebraska and Colorado. Historically Nebraska produces about 16% of U.S. millet grain production with an annual acreage ranging from 35,000 to 60,000 acres. The major producing area in Nebraska is Cheyenne County and counties adjacent to it. During 1992, Cheyenne County alone raised over 39,000 acres of proso millet.

Primary uses of proso millet are bird seed, livestock feed, and human consumption. The specialty markets, bird seed and the health food industry, are the major components of millet consumption. Generally, the U.S. exports 15-20% of annual production to over 70 countries. Netherlands, Canada, Japan, and United Kingdom are the top four U.S. export destination countries. Argentina is a major U.S. competitor.

Historical millet prices were collected from regional markets in the Nebraska Panhandle. Millet prices ranged from a low of $3.00 and a high of $9.47 per cwt during the 1988-1991 crop marketing years. An old rule of thumb indicates millet prices are generally 80-90% of the price of sorghum, however, as indicated in Figure 1, Nebraska Panhandle proso millet prices are generally above the national sorghum price. Since 1981, the proso millet price has averaged 1.27 times the national sorghum price and 1.17 times the Nebraska Panhandle corn price. Between 1986 and 1989, proso millet price exceeded corn and sorghum price levels. During the 1990 and 1991 crop years, proso millet prices dipped below corn and sorghum prices.
However during the Fall 1992, proso millet prices surpassed both corn and sorghum prices.

Historically, the upward price movement potential for proso millet has been much greater than price increases for corn and sorghum. Often proso millet prices rise rapidly, sometimes a $2.00-$3.00 price increase within a 60 day time period. Profit opportunities from storing proso appear to be much greater than for storing corn, sorghum, or wheat, especially when proso millet prices are below corn and sorghum prices.

Total economic cost of production is expected to range from $105 to $135 per acre depending on crop rotation and tillage practices. An average yield expectation ranges from 15 to 22 cwt per acre. Given these base values, the required breakeven price extends from under $5.00 to $9.00 per cwt. However, the breakeven price to cover cash costs of approximately $35 per acre is within the $1.70 to $2.30 per cwt range.
PROSO VARIETY TRIALS

1992

David Baltensperger, Glen Frickel, Randy Anderson and Mark Swanson

The 1992 proso trials contained 31 white seeded entries of which seven were named varieties used as check varieties. The other 24 entries were selections from crosses from the proso breeding program at the Panhandle Research and Extension Center. All these selections are screened for the primary purpose of identifying a better yielding, larger seeded variety. Sunup is the most recent variety release and has been superior to other cultivars tested. Some experimental lines appear to have improved seed size and yield potential and will be considered for release during the next year.

DESCRIPTION OF PLOT TECHNIQUES

Six proso variety trials were conducted in 1992. Four were located at the High Plains Agricultural Laboratory near Sidney, Nebraska. The irrigated trial was located at the Panhandle Research and Extension Center at Scottsbluff, Nebraska and one was located at the USDA Central Great Plains Research Center at Akron, CO.

These trials included a black fallow site, also, planted on wheat stubble, were an early planted and a late planted proso, two no-till sites, and an irrigated site. Table 1 shows the conditions of each of those sites. Plots were seeded with a 6-row double disc or hoe drill depending on planting conditions. Each plot was 24 feet long and six feet wide, except for the 15 feet long irrigated plot. The center four rows were harvested from each plot with a self-propelled combine when the variety was mature. Four replications of each variety in each location were planted and harvested. The irrigated plot was left out of the results due to high trial variation.

The "Heading" column in each table refers to the average date of the 4 replications relative to August 1.
DESCRIPTION OF CHECK VARIETIES

SUNUP

Sunup is a 1989 release from Nebraska. It is a white seeded variety with good yield potential. Its height is greater than Rise but is not as tall as Panhandle. Sunup is as lodging resistant as Dawn and Rise in spite of its taller height. Sunup is currently the most widely grown proso variety in Nebraska.

RISE

Rise is a 1983 Nebraska release. It is the result of a Dawn X Minn 402 cross made in 1975. It is later and taller than Dawn with many of the same characteristics in head type and lodging resistance. It has had a good yield record in the time it has been tested. It does not have the large seed size of Dawn. In comparison to Panhandle, it is shorter.

DAWN

Dawn is a 1976 Nebraska release. It has a large seed with good white color and has been well accepted in the bird seed trade. Its early maturity and short stature have made it less suitable under environmental stress conditions.

SNOWBIRD

Snowbird is a Minnesota release. It is a white seeded variety with an open panicle and early maturity. Yields have been poor in Nebraska.

PANHANDLE

Panhandle is a 1968 Nebraska release. It is the first variety selected from the common white proso grown in western Nebraska. It has a good yield but is lower yielding than newer varieties. It is white seeded.

EXPERIMENTAL LINES

Newdawn is a selection out of Dawn for uniform maturity and plant height. It is similar in seed size to Dawn and is currently being evaluated for release as a replacement for Dawn.

COPE

Cope is a 1978 Colorado release. It is much later maturing than other varieties. It has yielded well in Nebraska, especially when planted early.

MINCO

Minco is a joint Colorado-Minnesota release. It is taller and later than Panhandle. It has white seed and produces good yields.

870063 and 87014 are currently being considered for release as large seeded, high yield potential varieties.
Table 1. List of 1992 plot conditions.

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<tr>
<th>Location</th>
<th>Designation</th>
<th>Planting date</th>
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<th>Yield cwt/ac</th>
<th>Previous crop</th>
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<td>PREC</td>
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<td>wheat</td>
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<tr>
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Table 2. Seven year yield summary of varieties included in test.

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Table 3. Proso yields for 1992 variety trials at five locations.

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Table 4. Agronomic characteristics of lines and varieties in 1992 proso millet trials averaged over locations.

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The 1992 dryland sunflower trials were conducted in Cheyenne County, NE, Hitchcock County, NE, Perkins County, NE, and Laramie County, WY. An irrigated sunflower trial was also conducted at the Panhandle Research and Extension Center at Scottsbluff, Nebr. Each plot consisted of four, 30 inch rows and each hybrid was replicated four times. Plots were approximately 30 feet long. Of the four planted rows, the two center rows were harvested with a small plot combine. The growing season had above average moisture and considerably below average temperatures at all locations.

Oil percentage is based on 10% moisture. Analysis was provided by Dr. J.F. Miller, USDA-ARS in Fargo, North Dakota. Thanks to Dr. Miller and all of his assistants for their contributions to these tests.

The Cheyenne County wheat-sunflower-fallow trial was planted at the High Plains Agriculture Laboratory near Sidney, Nebr. 40 lbs. N and 1.5 pints/acre Prowl were applied preplant. 7 lbs. N and 24 lbs. P starter was applied at planting. Harvest stand was approximately 17,000 plants/acre. The plants were killed by frost on Oct. 8.

The Hitchcock County sunflower trial was planted on Jim Faimon's farm south of Trenton, Nebr. 50 lbs. N and 1 pint/acre Treflan were applied preplant. 18,300 seeds/acre were planted and harvest stand was good. The plot was sprayed with Asana XL and Methyl Parathion for head moth control at 10-20% flower.

The Perkins County sunflower trial was planted on Steve Martens' farm east of Grant, Nebr. 60 lbs. N and 1 pint/acre Treflan were applied preplant. 8 lbs. N and 28 lbs. P starter was applied at planting. 18,300 seeds/acre were planted and harvest stand was good. Parathion was sprayed for head moth control at 85% flower.

The Laramie County sunflower trial was planted on Stan Butler's farm at Carpenter, Wyoming. 1.5 pints/acre Treflan was applied preplant. No fertilizer was used. Harvest stand was 16,600 plants/acre.
Companies entering the 1992 Sunflower Test

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<td>West Fargo, ND</td>
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<td>Breckenridge, MN</td>
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Table 5. 1992 Sunflower plot culture summary.

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Table 6. Sunflower hybrids grown at the High Plains Ag Lab in 1992 in a wheat-fallow-sunflower-fallow rotation.

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<th>OIL %</th>
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<th>FLOWER August</th>
<th>HEIGHT Inches</th>
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Table 7. Sunflower hybrids grown at the High Plains Ag Lab in 1992 in a wheat-sunflower-fallow rotation.

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Table 8. Sunflower hybrids grown in Perkins County, Nebraska in 1992 in a wheat-sunflower-fallow rotation.

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Table 9. Sunflower hybrids grown in Hitchcock County, Nebraska in 1992 in a wheat-sunflower-fallow rotation.

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<td>YIELD Lbs/Acre</td>
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DESCRIPTION OF SAFFFLOWER PLOTS

David D. Baltensperger, Glen Frickel, and Mark Swanson

The 1992 safflower trial was conducted at the High Plains Agriculture Laboratory near Sidney, Nebraska. These plots were planted April 29, 1992 on fallowed ground with a 6 row double disk drill with a 12 inch row spacing. The 6 feet by 17 feet plots were trimmed to 10 feet prior to harvest on September 28 and 4 rows were harvested out of the center. Plots were treated prior to planting with 1 pint of Treflan/acre. Seeding rate was 15 lbs/acre. Plots were fertilized with 8 lbs N and 28 lbs. P starter at planting. The column in table 12 titled "Flower" refers to average date of flowering in July for the four replications. Oil % is at 10 % moisture. Thanks to Dr. Jerry Miller and his USDA/ARS staff at Fargo, ND for their assistance with oil analysis. All entries designated with an S were provided by Seed Tec International. Thanks to Dr. Jerald Bergman, Eastern Montana Research Center, for providing the other entries.


<table>
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<th>ENTRY</th>
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DESCRIPTION OF AMARANTH PLOTS

David D. Baltensperger, Glen Frickel, and Mark Swanson

The 1992 amaranth trial was conducted at the High Plains Agriculture Laboratory near Sidney, Nebraska. These plots were planted June 19 on fallowed ground with a 4-30 inch row corn planter. Each plot was 30 feet long and 2 rows wide. 8 lbs. N and 24 lbs. P starter fertilizer was applied at planting. No herbicides or insecticides were applied. After a killing frost on October 8, the plots were harvested on October 12. The column in table 13 headed "FLR" refers to the average date of flowering relative to August 1.

Plainsman grain amaranth was released to certified seed growers in 1991 and was commercially available for planting in 1992. It represents the first amaranth variety to be released by the University of Nebraska. Plainsman is shorter statured than Amont and has a dark red or purple head that produces a light tan seed. Plainsman is earlier in maturity and less susceptible to lodging than Amont when both are mature.

Table 13. 1992 Amaranth yield trial, High Plains Ag Lab.

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<tr>
<th>ENTRY</th>
<th>YIELD Lbs/Ac</th>
<th>TEST WT</th>
<th>HT In</th>
<th>H₂O %</th>
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