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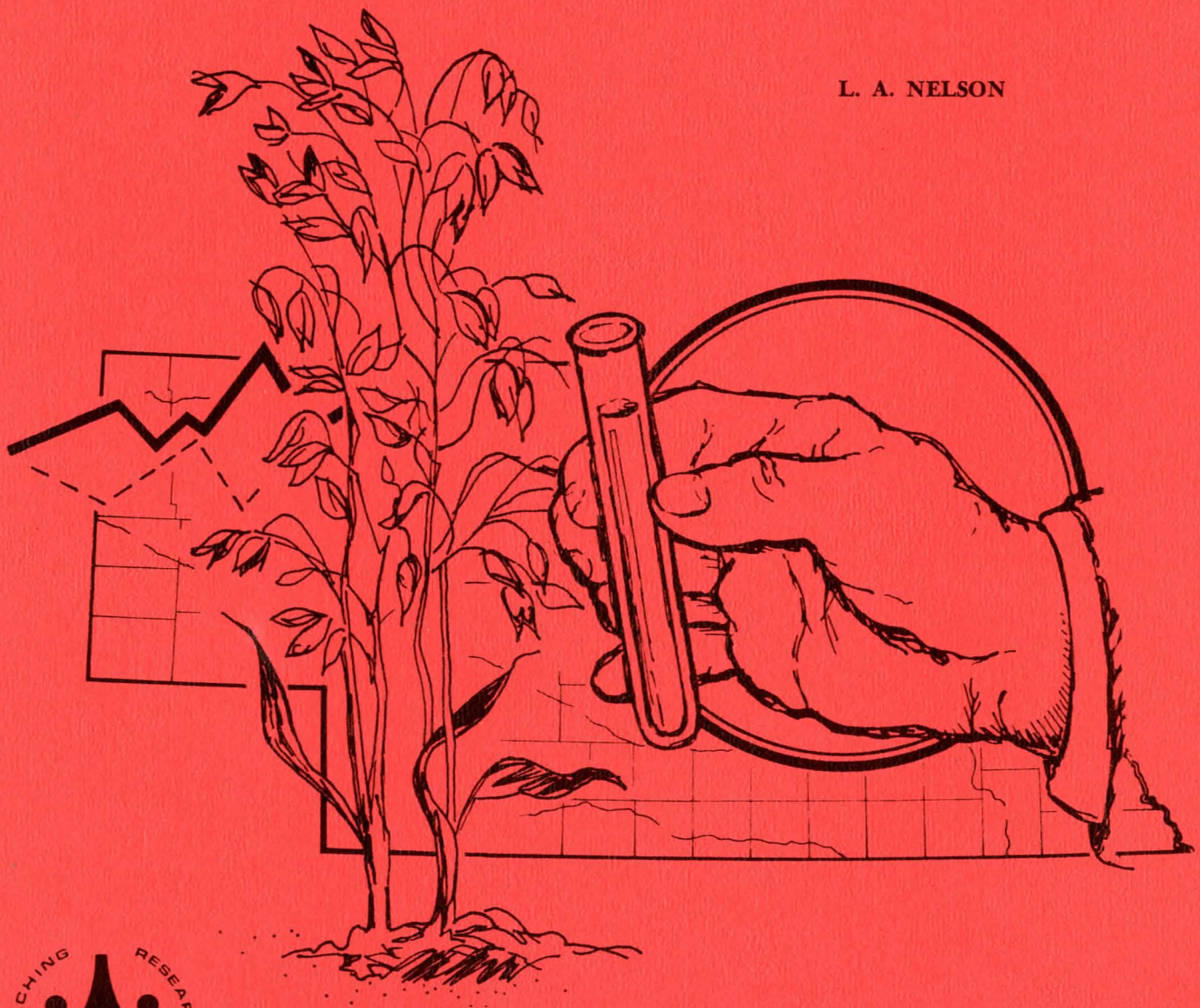
FEBRUARY 1981 NEBRASKA COOPERATIVE EXTENSION SERVICE—E.C. 81-107

PROSO VARIETY TESTS 1980

L. A. NELSON



Institute of Agriculture and Natural Resources

Extension work in "Agriculture, Home Economics and subjects relating thereto," The Cooperative Extension Service, Institute of Agriculture and Natural Resources, University of Nebraska–Lincoln, Cooperating with the Counties and the U.S. Department of Agriculture
Leo E. Lucas, Director

EXTENSION CIRCULAR 81-107

February 1981

FOREWORD

This circular is a progress report of proso variety trials conducted by the Panhandle Station, High Plains Agricultural Laboratory, and Northwest Agricultural Laboratory. These Extension Circulars replace the Outstate Testing Series. Conduct of experiments and publication of results is a joint effort of the Agricultural Experiment Station and the Cooperative Extension Service.

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PROSO VARIETY TRIALS

1980

L. A. NELSON[1/]

The amount of proso grown in Nebraska has shown a slow but steady increase in the last few years until 1980 which had a sharp drop[2/]:

Year	Yield lb/A	Yield (kg/ha)	Area acres	Area (hectares)
1976	1,250	(1401)	34,000	(13 770)
1977	1,470	(1650)	47,000	(19 845)
1978	1,200	(1345)	50,000	(20 250)
1979	1,360	(1525)	63,000	(25 515)
1980	1,400	(1568)	38,000	(15 380)

'White Proso' remains the most widely grown variety with 46% of the acreage. 'Dawn' with 24% is up; 'Panhandle' with 9% is up, while 'Cope', 'Minco', 'Abarr', and others each have less than 5%. The yields in 1980 were quite good for a dry year.

This year the yield trial contained six check varieties and 16 experimental lines. Two of the lines were from the Minnesota breeding program and 14 were crosses with Dawn made at the Panhandle Station. All of the Dawn crosses were F4, F5, and F6 selections made from head rows grown in 1978. Selections were based on height, vigor, and maturity as an attempt to retain the Dawn type while increasing height and yield.

The following is a description of the six varieties included as check varieties. All are available from their state of origin if they are not available locally.

Abarr is a 1974 release from Colorado. It is a white seeded variety with good yield potential. It is similar to Panhandle with improved seed type.

Cerise is a 1974 release from Nebraska. It is the only red seeded variety included in this years yield trial. It is about one day earlier than Turghai, the variety it replaced, and has a yield and height similar to Panhandle. Cerise is probably a better forage than the other varieties. There is some demand for red seed in the bird seed trade but it generally is easier to keep pure if raised outside the normal white proso producing areas.

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

Dawn is a 1976 Nebraska release. It is shatter resistant and ripens uniformly to make it suitable for direct combining. It has 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.

[1/] Associate Professor of Agronomy, Panhandle Station, Scottsbluff, Nebraska.

[2/] Nebraska Crop & Livestock Reporting Service.

Its yield potential is good when fertilizer and moisture are favorable.

Minco is a joint Minnesota-Colorado release. It is slightly taller and later than Panhandle. It has a good white seed color and good yield potential.

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 record and has white seeded grain. It has set the yield standard for many years.

A seventh variety is included but is not considered a check variety. It is Minsum which is a 1980 release from Minnesota. It is medium height, early and has a very loose head type which is different from any other variety. It has fair yield potential and may work well under late planting.

Six proso variety trials were planted in 1980 and all six were harvested. The six trials included early black fallow, late black fallow and early eco-fallow at High Plains Ag. Lab. (Sidney) and black fallow, eco-fallow and irrigated at Northwest Ag. Lab. (Alliance). All plots at HPAL were treated with atrazine pre-emergence for weed control. Weeds at Northwest Ag Lab were controlled with 2,4-D.

Plots were seeded with a 6-row double disc drill, each plot was 22 feet (7m) long. Fifteen feet (5m) were harvested from each plot with a 4' (125 cm) self propelled combine when the variety was mature. Four replications of each plot were planted at each location.

All of the experimental numbers listed are crosses having Dawn in their parentage. Eight of these crosses are better than the highest check varieties (Minco and Panhandle). The highest yield in 1980 was by a Dawn X Panhandle cross (76010-10). While the highest 2 year average was by a Dawn X Minn. 402 cross (76004-3). Both of these crosses are 7 - 8 inches (18-20 cm) taller than Dawn. A Dawn X Abarr cross (76003-9) had a good yield, excellent seed size, 9 inch (23 cm) height advantage on Dawn, and was five days later than Dawn. All three of these will be increased for possible release.

THE METRIC SYSTEM

Data in this circular are given in commonly used U. S. units followed by metric units in parentheses ( ). Some equivalents and conversions used were as follows:

1 centimeter (cm) = 0.394 inches	cm = inches x 2.54
1 hectare (ha) = 2.471 acres	ha = acres x 0.405
1 kilogram (kg) = 2.205 pounds	kg = pounds x 0.454
1 kilogram/hectare (kg/ha) = 0.892 pounds per acre	kg/ha = lb/A x 1.121
1 kilogram/hectare (kg/ha) = 0.892 pounds per acre	kg/ha = cwt/A x 112.1

Table 1. List of 1980 locations and conditions.

Location	Designation	Planting date	Stand	Weed control	Av. yield cwt/A (kg/ha)
HPAL (Sidney)	Early (black)	May 23	Good	Good	12 (1350)
HPAL (Sidney)	Ecofallow	June 4	Low	Good	16 (1790)
HPAL (Sidney)	Late (black)	June 12	Good	Good	22 (2470)
NWAL (Alliance)	Black Fallow	May 29	Exc.	Fair	17 (1910)
NWAL (Alliance)	Ecofallow	June 3	Good	Good	6 (670)
NWAL (Alliance)	Irrigated	May 29	Exc.	Good	21 (2350)

Table 2. Five Year average yield of check varieties.

	Yield, cwt/A (kg/ha)				
Variety	1980	1979	1978	1977	1976
Abarr	15 (1680)	11 (1230)	14 (1570)	----	8 (900)
Cerise	11 (1230)	13 (1460)	13 (1460)	22 (2470)	9 (1010)
Cope	14 (1570)	16 (1790)	14 (1570)	20 (2240)	10 (1120)
Dawn	14 (1570)	14 (1570)	15 (1680)	14 (1570)	17 (1910)
Minco	16 (1790)	14 (1570)	16 (1790)	17 (1910)	9 (1010)
Panhandle	16 (1790)	11 (1230)	15 (1680)	16 (1790)	11 (1230)

Table 3. Characteristics of varieties and lines entered in the 1980 proso variety trials.

Variety or line (parentage)	Seed color	Height	Straw strength	Maturity
Abarr	White	Tall	Weak	Med.
Cerise	Lt. red	Medium	Fair	Early
Cope	White	Tall	Good	Late
Dawn	White	Short	Good	V. early
Minco	White	Med. tall	Fair	Med.
Panhandle	White	Medium	Weak	Early
Minsum (Minn. 55)	White	Short	Weak	Early
Dawn X Abarr 76003-9-6	White	Med. short	Fair	Late
Dawn X Common White 76001-21-7	White	Medium	Fair	Early
Dawn X Common White 76001-7-1	White	Med. tall	Fair	Med.
Dawn X Panhandle 76010-5-10	White	Short	Good	V. early
Dawn X Panhandle 76010-10-8	White	Med. short	Fair	Med.
Dawn X Panhandle 76010-6-3	White	Med. short	Good	Med.
Dawn X Minn 402 76004-3-8	White	Med. short	Good	Med.
75070-5-4	White	Medium	Good	Med.
75074-3-8	White	Medium	Fair	V. early
Dawn X Panhandle 76010-16-8	White	Med. short	Fair	Early
Dawn X Akron 29 76006-5-6	White	Short	Fair	V. early
Dawn X Minn 402 76004-19-1	White	Medium	Fair	V. late
Dawn X Common White 76001-7-6	White	Medium	Fair	Early
Dawn X Abarr 76003-18-6	White	Medium	Fair	Late
Dawn X Common White 76001-10-7	White	Med. short	Fair	Late

Table 4. Proso yields from six trials. 1980.

Variety	HPAL early	HPAL-Eco.	HPAL Late	NWAL Black	NWAL Eco.	NWAL Irr.	Total
	Yield, cwt/A (kg/ha)						
Abarr	13.4 (1500)	15.3 (1710)	15.9 (1780)	9.0 (1010)	6.7 (750)	21.1 (2370)	15.3 (1710)
Cerise	7.2 (810)	13.1 (1470)	19.4 (2170)	12.5 (1400)	5.1 (600)	9.6 (1080)	11.2 (1250)
Cope	6.3 (710)	17.0 (1900)	17.9 (2000)	18.2 (2040)	6.9 (770)	20.0 (2240)	14.4 (1610)
Dawn	10.4 (1160)	10.4 (1160)	22.6 (2530)	13.7 (1530)	1.5 (170)	22.1 (2480)	13.6 (1520)
Minco	11.4 (1280)	15.4 (1720)	17.4 (1950)	19.3 (2160)	7.6 (850)	24.2 (2710)	15.9 (1760)
Minsum (Minn. 55)	10.6 (1190)	15.5 (1740)	20.5 (2300)	16.1 (1800)	5.6 (630)	16.8 (1880)	14.2 (1590)
Panhandle	13.9 (1560)	15.4 (1720)	19.0 (2130)	17.9 (2000)	6.6 (740)	22.0 (2460)	15.8 (1770)
75050	11.9 (1330)	16.6 (1860)	21.7 (2430)	18.4 (2060)	6.6 (740)	17.2 (1930)	15.4 (1720)
75074	8.3 (930)	12.8 (1430)	21.0 (2350)	14.7 (1650)	5.2 (580)	19.6 (2200)	13.6 (1520)
76001-10	10.4 (1160)	18.6 (2080)	27.1 (3040)	20.6 (2310)	8.2 (920)	21.8 (2440)	17.8 (1990)
76001-21	10.4 (1160)	17.8 (1990)	22.1 (2480)	15.0 (1680)	6.6 (740)	18.3 (2050)	15.1 (1690)
76001-71	13.4 (1500)	16.1 (1800)	19.6 (2200)	6.0 (1790)	7.4 (830)	18.5 (2070)	15.2 (1700)
76001-76	10.5 (1180)	17.6 (1970)	22.2 (2490)	6.0 (1790)	7.4 (830)	21.0 (2350)	15.8 (1770)
76003-18	8.1 (910)	17.2 (1930)	22.8 (2550)	15.6 (1750)	7.4 (830)	20.6 (2310)	15.3 (1710)
76003-9	16.0 (1790)	17.2 (1930)	23.7 (2650)	16.3 (1830)	7.5 (840)	26.1 (2920)	17.8 (1990)
76004-19	13.9 (1560)	21.3 (2350)	21.6 (2420)	16.8 (1880)	8.1 (900)	26.2 (2930)	8.0 (2020)
76004-3	15.1 (1690)	16.7 (1870)	24.7 (2770)	20.0 (2240)	7.5 (840)	27.1 (3040)	18.5 (2070)
76006	12.7 (1420)	12.5 (1400)	22.8 (2550)	14.5 (1630)	3.1 (350)	16.5 (1850)	13.7 (1530)
76010-10	14.5 (1620)	15.5 (1740)	28.9 (3240)	22.3 (2500)	7.7 (860)	27.8 (3110)	19.4 (2170)
76010-16	12.8 (1430)	14.1 (1580)	27.8 (3110)	16.5 (1850)	6.2 (690)	21.7 (2430)	16.5 (1850)
76010-5	16.3 (1830)	12.9 (1440)	22.6 (2530)	18.6 (2080)	5.4 (600)	23.4 (2620)	16.5 (1850)
76010-6	14.0 (1570)	18.1 (2030)	24.8 (2780)	18.8 (2110)	7.2 (810)	23.8 (2670)	17.8 (1990)
Average	11.9 (1330)	15.8 (1770)	22.1 (2480)	17.1 (1920)	6.4 (720)	21.2 (2370)	15.7 (1760)
L.S.D.(0.5)	N.S. N.S.	4.0 (450)	5.2 (580)	3.3 (370)	0.2 (20)	5.6 (630)	3.1 (350)

Table 5. Heading date, height, test weight and seed weight data.

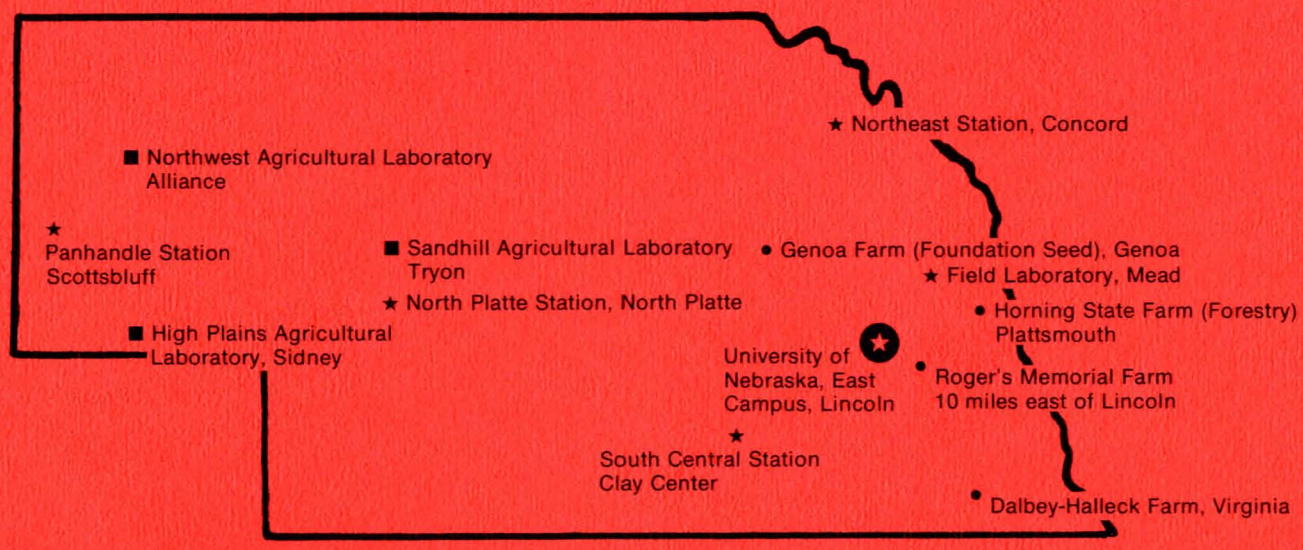
Variety	Heading date (after July 1)	Height Inches	(cm)	Test Wt. lb/bu	kg/hl	Seed Wt. Seeds/5g
Abarr	22.2	36.7	(93)	54.0	(69.5)	751
Cerise	19.3	29.6	(75)	55.8	(71.8)	896
Cope	24.5	35.8	(91)	52.7	(67.8)	795
Dawn	18.3	22.3	(57)	54.6	(70.3)	825
Minco	22.1	33.8	(86)	54.7	(70.5)	817
Minsum	20.3	30.3	(77)	54.8	(70.5)	758
Panhandle	20.1	34.6	(88)	54.7	(70.4)	787
75070	21.1	33.3	(85)	55.9	(71.9)	810
75074	17.9	30.2	(77)	54.5	(70.1)	784
76001-10	24.1	29.0	(74)	53.7	(69.1)	842
76001-21	20.2	33.3	(85)	54.2	(69.8)	781
76001-71	22.1	35.7	(91)	54.2	(69.8)	770
76001-76	20.3	32.7	(83)	52.4	(67.4)	771
76003-18	25.3	30.8	(78)	51.9	(66.8)	774
76003-9	23.6	31.7	(81)	52.1	(67.1)	739
76004-19	26.1	32.8	(83)	54.2	(69.8)	845
76004-3	21.1	28.6	(71)	54.6	(70.3)	850
76006	18.8	25.8	(66)	54.8	(70.5)	859
76010-10	21.7	30.6	(78)	55.1	(70.9)	780
76010-16	20.6	27.5	(70)	53.2	(68.5)	812
76010-5	18.1	28.6	(73)	54.6	(70.3)	770
76010-6	21.3	29.8	(76)	54.3	(69.9)	741
Average	21.3	31.1	(79)	53.8	(69.2)	798
LSD .05	2.1	2.7	6.9	2.1	2.7	16.0

Table 6. Influence of location and fallow condition on proso.

Condition or Location	Yield		Heading date	Test wt.	
	cwt/A	(kg/ha)	after July 1	lb/bu	(kg/hl)
HPAL (Sidney)	16.6	(1860)	19.9	55.4	71.3
NWAL (Alliance)	14.9	(1670)	22.7	52.3	67.3
Black fallow	17.0	(1900)	19.9	54.0	69.5
Eco-fallow	11.1	(1240)	24.0	53.6	69.0
Irrigated	21.2	(2370)	20.2	53.7	69.1

Some varieties performed better under fallow or irrigated conditions than under eco-fallow. The short early varieties such as Dawn are not recommended under eco-fallow but respond better to fertilizer and water than many other varieties. It is important to assess moisture, fertility, and other conditions before choosing a variety.

Agricultural Research for All of Nebraska



The agricultural research division of the Institute of Agriculture and Natural Resources is the Nebraska Agricultural Experiment Station. The Experiment Station relies on its research centers and field laboratories to provide applied knowledge for development of Nebraska's largest industry—agriculture. In addition, many Nebraska farmers cooperate by furnishing land and other facilities for research projects. This provides information from areas not well represented by stations.

The Cooperative Extension Service transmits data to users through District and County Extension Offices. Area and County Extension Agents are available to provide additional interpretation and more specific recommendations.

Nebraska is a large state and has great variation due to topography and the continental type of climate. The elevation ranges from 1,000 feet to near a mile high in the northwest portion of the state, rainfall varies from 14 to 40 inches per year, and the soil types vary from sands to heavy clays. The research program thus is broad in subject matter and geography, resulting in the need for various stations and satellite locations.

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