PERFORMANCE of CEREAL CROPS in the TANANA RIVER VALLEY of ALASKA 1985

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Circular 57

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Introduction

This is the seventh publication of grain performance trials in the Tanana River Valley. The first, published 6 years ago, included the results of spring cereal-variety tests conducted at Fairbanks and Delta Junction during the 1978 and 1979 growing seasons. Beginning in 1980, the variety-test results were annual publications. The length and content of this report is much less than for previous years. This is the result of a cost-saving measure to help cope with a shrinking budget.

Tanana Valley Weather Summary

The farming area near Delta Junction had a cool, wet growing season in 1985 (table 1). For the period May through September, the weather station recorded 11.38 inches of precipitation compared to 9.04 inches for the long-term average. Precipiation for June, August, and September was above normal. May was the only dry month with just 0.06 inch being recorded. However, heavy winter snowfall provided high soil moisture levels throughout most of May. The 5.42 inches of rainfall received during June was more than double the normal amount. A high frequency of rainfall during August and September delayed ripening and caused major problems with the harvest. Drying costs for 1985 were well above average for the area.

Table 1. Climatic Data for Delta Junction during the 1985 Growing Season.[1]

	May	June	July	August	September
Temp. (°F)					
daily max.	54.0 (−3.1)[2]	61.6 (−5.5)	68.3 (−0.8)	62.0 (−2.0)	50.1 (−0.7)
daily min.	34.9 (−2.0)	45.0 (−2.1)	51.2 (+1.1)	44.9 (−0.7)	36.0 (+0.7)
daily mean	44.5 (−2.5)	53.3 (−3.8)	59.8 (+0.2)	53.5 (−1.3)	43.1 (0)
Precip. (in.)	0.06 (−0.80)	5.42 (+3.16)	1.79 (−0.89)	2.17 (+0.17)	1.94 (+0.70)

[1]Weather station is 14 miles from test site

[2]Values in parentheses represent deviations from a 24-year average.

Daily maximum temperatures at Delta Junction were cooler than normal throughout the growing season. June showed the greatest abnormality, with daily maximum temperatures averaging 5.5 degrees below the long-term average. Early in the growing season, the cool temperatures caused slower vegetative growth, particularly for wheat, and delayed the emergence of grain heads for some crop varieties as much as 2 weeks. During the last half of the growing season, the maturity of all grain crops was delayed.

Even the earliest of wheat varieties did not ripen fully before a killing frost ended the growing season. Test weights for all wheat varieties were well below the standard of 60 pounds per bushel. Most barley varieties ripened fully and produced satisfactory yields and test weights. The cool growing season particularly favored those barleys in the very early to early maturity classes. All oat varieties reached maturity, but just barely. The cool, wet growing season resulted in record high oat yields at the Delta Junction test site.

Total precipitation for the 1985 growing season, May through September, was slightly above normal at the Fairbanks recording station (table 2). Fairbanks received 8.96 inches compared with 8.18 inches for the long-term average. However, moisture deficits occurred in 3 out of 5 months, with only June and September showing a surplus. Excellent soil moisture supplies at the start of the growing season, and timely rains in June provided sufficient water for high levels of crop productivity. The last 20 days

Table 2. Climatic Data for Fairbanks during the 1984 Growing Season.[1]

	May	June	July	August	September
Temp (°F)					
daily max.	58.7 (−1.5)[2]	69.3 (−2.4)	73.7 (+1.0)	65.6 (−1.7)	50.9 (−4.5)
daily min.	33.4 (−0.2)	47.4 (+3.3)	49.8 (+3.0)	45.0 (+2.0)	35.3 (+1.7)
daily mean	46.1 (−0.8)	58.4 (+0.5)	61.8 (+2.0)	55.3 (+0.1)	43.1 (−1.4)
Precip. (in.)	0.45 (−0.35)	2.42 (+0.94)	1.08 (−1.02)	1.91 (−0.53)	3.10 (+1.74)

[1]Weather station is 400 yards from test site.

[2]Values in parentheses represent deviations from a 34-year average.

of August and all of September were cloudy and wet, with only a few days that were sunny and free of recorded precipitation. These conditions caused a difficult harvest with higher than normal drying costs.

Daily maximum temperatures at Fairbanks for 1985 were cooler than normal for 4 out of the 5 months. A hot July was the only factor that prevented the failure of late-maturing varieties of wheat and oats. Maturity dates for most grain crops were about 10 days later than long-term averages.

Standard Varieties

Standard varieties, as defind for this report, are varieties that have performed well consistently in tests conducted in at least two Tanana Valley locations over a period of several years. Standard varieties are used as a means for evaluating new entries in the variety trials each year. Comparisons are made with regard to yield, maturity, quality, and growth measurements. Table 3 shows the long-term performance of barley, oat, and wheat standard varieties grown at test sites located near Fairbanks and Delta Junction.

Datal, Galt, Otal, Otra, and *Weal* are the standard barley varieties for the Tanana Valley. These are all 6-row barleys, and the grain is grown primarily for use as a feed. Weal is a hooded barley which can also be used as an annual forage crop. Otal matures the earliest of the standards, with Datal, Otra, Weal, and Galt maturing 1, 3, 7, and 12 days later, respectively.

Athabasca, Cascade, Nip, and *Toral* are the standard oat varieties. Nip is a black-hulled oat while the other three varieties are yellow in color. Nip and Athabasca mature at about the same time and are the earliest of the oat standards. Toral and Cascade mature 5 and 10 days later, respectively, than Nip and Athabasca.

Table 3. Long-Term Average and Range of Yields for Barley, Oat, and Wheat Standard Varieties Grown at Fairbanks and Delta Junction (bu/acre).

Crop Variety	Fairbanks			Delta Junction		
	Average Yield	Range of Yields	Years of Testing	Average Yield	Range of Yields	Years of Testing
Barley						
Datal	78	56-97	7	76	33-105	7
Galt	95	59-127	14	70	28-101	14
Otal	72	49-95	7	77	39-97	7
Otra	82	50-100	14	79	33-123	14
Weal	80	43-125	14	64	31-96	14
Oat						
Athabasca	126	113-149	6	136	58-172	7
Cascade	145	114-172	5	154	49-203	5
Nip	123	52-159	14	111	45-183	14
Toral	134	67-204	14	122	52-197	14
Wheat						
Chena	73	46-87	13	46	14-80	13
Gasser	55	33-75	14	38	12-69	14
Ingal	57	18-74	9	40	6-64	8
Nogal	61	48-69	5	44	5-73	5
Park	60	25-76	14	34	9-57	14

Chena, Gasser, Ingal, Nogal, and *Park,* are the standard wheat varieties. These are all hard red spring wheats, which is the only class of wheat having very early maturity, a characteristic that is essential for successful wheat production in Alaska. Ingal matures the earliest of the standards, with Nogal, Gasser, Chena, and Park maturing 1, 6, 7, and 10 days later, respectively.

Methods

The Fairbanks test site was situated on a Tanana Silt loam soil (pH 7.0) which had been cleared and in production for about 57 years. The land was planted to oats the previous year, and the stubble received a fall tillage. The Delta Junction test site was situated on a Nenana silt loam soil (pH 5.8) which had been cleared for 5 years. The land was fallowed the previous summer. At both sites, fertilizers were applied in the spring with a gravity-flow broadcast spreader and tilled into the soil during seedbed preparation. Plant nutrients were supplied at a rate of 90 lbs N/acre, 60 lbs P_2O_5/acre, 60 lbs K_2O/acre, 10 lbs S/acre, and 0.5 lb B/acre.

Prior to planting, barley and wheat seeds were treated with Vitavax fungicide. Oats received no seed treatment. All grains were planted in rows 7 inches wide, at a depth of 1.5 inches, with a V-belt seeder equipped with a press wheel. Barley was planted at a seeding rate of 72 lbs/acre, wheat at 90 lbs/acre, and oats at 100 lbs/acre. The Delta Junction trials were planted on May 14, and the Fairbanks trials were planted on May 20. Weeds were controlled with a postemergence application of Brominal.

1985 Test Results and Variety Descriptions

Table 4 gives the results of barley, oat, and wheat variety trials conducted at Fairbanks and Delta Junction during the 1985 growing season. Overall, grain yields and quality were much better than expected in view of the unfavorable climatic conditions experienced in 1985. One disappointment for the testing program was the failure of wheat to mature fully at Delta Junction. A killing frost stopped kernel development before maximum dry weight was attained. This caused very low test weights and shriveled kernels. However, several results form the Delta Junction test site were encouraging. The 222-bushel yield of *Calibre* oats is a record high for these trials. Calibre is a new oat variety from Saskatchewan. *Datal, Otal,* and *Thual* barleys also gave outstanding performances. Datal produced the highest barley yield (105 bu/acre), and Otal was third highest (96 bu/acre). The 79-bushel yield produced by Thual is quite high for a hulless barley. In general, hulless barleys yield about 25 percent less than the traditional hulled types. All three of these barleys were developed by the USDA plant-breeding program at Palmer, Alaska.

The growing season at Fairbanks was adequate for all grains to mature. Barley and wheat yields were slightly higher than long-term averages. Oat yields were somewhat lower than normal due to an infection by a bacterial disease.

The origin and some selected characteristics of grain varieties included in the 1985 testing program are presented in Table 5. A more detailed description for most of these varieties can be found in Circular 52, published by the Alaska Agricultural and Forestry Experiment Station. Two varieties tested for the first time in 1985, *Tupper* hulless barley and *Clark* oats, will be more fully described in future issues of this publication, as will other varieties new to the testing program, as results warrant.

Appended to this report of results for the 1985 growing season are complete listings for all spring barley, oat, and wheat varieties tested since 1971 at Fairbanks and Delta Junction by the Agricultural and Forestry Experiment Station (Appendix tables A-1,2, and 3).

Table 4. Grain Variety Trials Conducted at Delta Junction and Fairbanks During the 1985 Growing Season.

Variety or Experimental Line	Delta Junction University Research Farm		Fairbanks University Farm	
	Yield	Test weight[2]	Yield	Test weight[2]
	(bu/acre)	(lbs/bu)	(bu/acre)	(lbs/bu)
Barley				
Abee	60	43	117	52
ACA 2561 M268	70	44	85	42
ACA 2562 P693	66	41	83	40
ACA 2563 H349-204	69	48	88	46
ACA 2564 H349-220	92	47	97	44
ACA 2565 H349-347	78	48	83	45
ACA 2566 H349-348	92	49	108	46
BT 521	65	39	100	47
Datal[1]	105	47	89	43
Empress	79	44	89	44
Galt[1]	76	45	112	46
Hankkija's Eero	104	45	75	42
Hankkija's Pokko	72	43	102	42
Jokioinen 1103	86	48	92	41
Jokioinen 1184	79	49	96	45
Jokioinen 1315	83	50	93	45
Otal[1]	96	49	76	46
Otra[1]	78	46	80	39
Paavo	87	45	89	42
Thual (hulless)	79	59[3]	53	55[3]
Tupper (hulless)	51	53[3]	78	58[3]
Weal[1]	75	40	88	36
Average	79	46[3]	90	44[3]
Oat				
ACA 2575-9063 Voll/Selma	180	35	100	38
Athabasca[1]	141	35	114	39
Calibre	222	37	139	39
Cascade[1]	203	37	124	37
Clark	173	33	107	38
Fidler	181	33	136	34
Nip[1]	183	37	100	36
OAC Woodstock	169	32	117	38
Pol	139	30	90	33
Toral[1]	197	37	101	38
Average	179	35	113	37
Wheat				
ACA 2569 MS57-8	57	45	103	63
ACA 2570 MS57-144	54	38	105	61
ACA 2571 MS273-150	55	43	92	60
Chena[1]	58	41	81	57
Fortuna	49	44	93	62
Gasser[1]	46	49	67	54
Ingal[1]	47	52	73	58
Nogal[1]	50	48	68	57
Park[1]	45	46	75	62
Taava	65	40	87	59
Tapio	53	39	100	61
Ulla	57	41	89	59
Average	53	44	86	59

[1]Standard variety.
[2]The standard test weights for the above crops are as follows: barley, 48 lbs/bu; oats, 32 lbs/bu; and wheat, 60 lbs/bu.
[3]Test weights for hulless barleys were not included in the average.

Table 5. Origin and Characteristics of Grain Varieties Tested in 1985 at Fairbanks and Delta.

Crop variety	Origin	Maturity class	Resistance to lodging	Description
Barley				
Abee	Alberta	medium	good	2-row
ACA 2561 M268	Norway	early	fair	6-row
ACA 2562 P693	Norway	medium	fair	6-row
ACA 2563 H349-204	Norway	early	fair	6-row
ACA 2564 H349-220	Norway	early	excellent	6-row
ACA 2565 H349-347	Norway	early	fair	6-row
ACA 2566 H349-348	Norway	early	fair	6-row
BT 521	Alberta	late	excellent	6-row
Datal	Alaska	very early	fair	6-row
Empress	Alberta	medium	fair	6-row
Galt	Alberta	medium	good	6-row
Hankkija's Eero	Finland	early	good	6-row, semidwarf
Hankkija's Pokko	Finland	medium	good	6-row
Jokioinen 1103	Finland	very early	fair	6-row
Jokioinen 1184	Finland	very early	fair	6-row
Jokioinen 1315	Finland	very early	good	6-row
Otal	Alaska	very early	fair	6-row
Otra	Finland	very early	fair	6-row
Paavo	Finland	early	fair	6-row
Thual	Alaska	medium	fair	6-row, hulless
Tupper	Saskatchewan	medium	good	6-row, hulless
Weal	Alaska	early	good	6-row, hooded
Oat				
ACA 2575-9063 Voll/Selma	Norway	very early	excellent	yellow, short
Athabasca	Alberta	very early	excellent	yellow, short
Calibre	Saskatchewan	late	excellent	yellow, med. ht.
Cascade	Alberta	medium	excellent	yellow, med. ht.
Clark	Oregon	late	good	yellow, tall
Fidler	Saskatchewan	late	excellent	yellow, med. ht.
Nip	Sweden	very early	good	black, med. ht.
OAC Woodstock	Ontario	late	excellent	yellow, tall
Pol	Sweden	very early	good	yellow, short
Toral	Alaska	early	good	yellow, med. ht.
Wheat				
ACA 2569 MS57-8	Norway	medium	excellent	short
ACA 2570 MS57-144	Norway	medium	excellent	short
ACA 2571 MS273-150	Norway	early	excellent	short
Chena	Finland	early	fair	med. ht.
Fortuna	Montana	medium	poor	med. ht.
Gasser	Alaska	early	poor	med. ht.
Ingal	Alaska	very early	fair	short
Nogal	Alaska	very early	fair	med. ht.
Park	Alberta	early	good	med. ht.
Taava	Finland	late	excellent	med. ht.
Tapio	Finland	late	excellent	med. ht.
Ulla	Finland	medium	excellent	med. ht.

Appendix

Table A-1. Barley Varieties Tested at Fairbanks and Delta Junction, 1971-1985.

Variety or Experimental Line	Years of testing	
	Fairbanks	Delta Junction
Abee	2	2
ACA 2561 M 268	2	2
ACA 2562 P 693	2	2
ACA 2563 H 349-204	2	2
ACA 2564 H 349-220	2	2
ACA 2565 H 349-347	2	2
ACA 2566 H 349-348	2	2
Advance	1	1
Amy	1	1
Argyl	1	1
Balder	3	2
Beacon	1	1
Bedford	1	1
Belle	1	1
Betzes	6	5
Bode	1	1
Bonanza	3	3
Bonus	2	3
Brock	2	0
Br 6505-5	2	0
Br 6505-21	2	0
Br 6505-31-1	2	0
BT 334 (Johnston)	2	2
BT 521	2	2
Carlsberg II	1	1
Cathy	1	1
Centennial	1	2
Conquest	2	0
Cree	1	1
Datal	7	7
Diamond	1	1
Dickson	1	0
Dolores	1	1
Early Carlsberg II	1	1
Early Freja	1	1
Early Hannchen	1	1
Edda	8	7
Elrose	1	1
Empress	2	2
Erbet	1	1
Ershabet	2	2
Etu	1	1
Exp HV No.9	1	1
Exp HV No. 14	1	1
Fairfield	3	4
Fergus	2	0
Firlbecks III	2	1
Freja	1	1
Frontier	1	0
Galt	15	14
Gateway 63	5	5
Hankkija's 72802	2	2
Hankkija 673	1	2
Hankkija's Aappo	1	1
Hankkija's Eero	7	8
Hankkija's Pokko	4	4
Hannchen	1	1
Harrington	1	1
Herta	1	0
Hiland	1	0
HV #52	1	1
Hyproly	1	0
Hyproly Normal	1	0
Jokioinen 1103	4	4
Jokioinen 1184	4	4
Jokioinen 1315	4	4
Jubilee	4	4

Variety or Experimental Line	Years of testing	
	Fairbanks	Delta Junction
Karl	1	1
Klondike	1	2
Larker	1	1
Lidal	11	10
Leduc	1	1
Lot EX1-N	1	1
Lud	2	2
Mari	2	2
Massey	1	1
Melvin	4	5
Mingo	1	1
Moravian III	1	1
Norbert	1	1
Nova	1	1
NRGB 79-2	1	1
Olli	7	6
Onda	1	1
Otis	2	0
Otal	7	7
Otra	11	13
Paavo	7	8
Palliser	4	2
Paragon	2	0
Parkland	2	0
Piroline	3	2
Poco	1	1
Polaris	4	4
Prilar	1	0
Primus II	2	1
Rovaniemi Sel. 70-B (Finnaska)	6	5
Scout hulless	2	2
Shabet	5	6
Stanka	3	1
Steptoe	3	3
Strom	1	1
Summit	2	3
Thual hulless	3	3
Tibet hulless	5	3
Trebi	1	0
Triumph	3	3
Trophy	1	0
Tupper hulless	1	1
Unitan	1	0
Vale 70	1	1
Weal	15	14
Weal Selection	1	1
Windsor	2	3
62 II-62-2-378-411	3	3
66 II-62-1-209-204	1	1
66 II-62-2-174-191	3	3
66 II-62-3-9-9	2	2
66 II-62-3-12-12	1	1
67-38	1	1
67-488-999	3	3
67-942-241	2	2
68-3	1	1
70-1591-14-11	1	0
71-584-58	1	0
71-991-63	1	0
71 II-67-18-1	1	0
71 II-67-19-91	1	0
71 II-67-21-111	1	0
71 II-67-22-6	1	0
71 II-67-22-18	1	0
71 II-67-22-125	1	0
71 II-67-22-149	1	0
74 Ab 4302	1	1

Appendix

Table A-2. Oat Varieties Tested at Fairbanks and Delta Junction, 1971-1985.

Variety or Experimental Line	Years of testing	
	Fairbanks	Delta Junction
ACA 2575-9063 Voll/Selma	2	2
Astro	1	1
Athabasca	6	7
Calibre	2	2
Cascade	5	5
Cavell	6	5
Cayuse	6	5
Ceal	6	5
Cherokee	1	0
Chief	1	1
Clark	1	1
Cody II	1	0
Dumont	2	2
Eagle	3	3
Fidler	2	2
Foothill	2	3
Frazer	5	5
Garry	2	1
Gemini	0	1
Glen	5	4
Golden Rain	3	2
Grizzly	4	4
Harmon	6	5
Hinoat	0	1
Hudson	4	3
Kelsey	4	3
Larry	1	1
Laurent	2	2
Markton	1	0
Nip	15	14
OAC Woodstock	2	2
Ogle	1	1
Orbit	2	2
Pendek	12	12
Pol	4	4
Puhti	1	1
Random	6	5
Rapida	1	0
Rodney	13	12
Rovaniemi Sel. (Orion)	2	2
Russell	2	1
Sioux	4	3
Spear	1	1
Terra	1	2
Toral	15	14
Valko	1	1
Vicland	1	0
Victory	5	5
Vouti	1	1
61 II-55-21-25-8	1	1
61 II-55-21-58-14	1	1
61 II-55-21-15-5	6	5
65 II-58-10-4-3	1	1
65 X-58-26-3-2	1	1
65 X-58-33-2-2	1	1

Appendix

Table A-3. Wheat Varieties Tested at Fairbanks and Delta Junction, 1971-1985.

Variety or Experimental Line	Years of testing	
	Fairbanks	Delta Junction
ACA 2569 MS 57-8	2	2
ACA 2570 MS 57-144	2	2
ACA 2571 MS 273-150	2	2
Anza	1	0
Arabian	1	1
Butte	1	1
Canthatch	6	4
Capa	1	0
Carpo	1	0
Colano	2	1
Columbus	1	1
Crim	2	0
Dundas	2	2
ECM 316	1	0
Fletcher	1	0
Fortuna	2	1
Garnet	1	0
Gasser	15	15
Glenlea	0	1
Idaed	1	0
Ingal	9	9
Kharkov (spr.)	2	1
Kitt	1	0
Leader	1	1
Lemhi 66	1	0
Macoun	1	1
Manitou	4	2
Mexipak	2	1
MN 7083	1	0
MN 70113	1	0
MT 676 (Isoline)	1	0
MT 671 (Isoline)	1	0
MT 677 (Isoline)	1	0
MT 6711 (Isoline)	1	0
MT 6717 (Isoline)	1	1
MT 6721 (Isoline)	1	0
MT 6722 (Isoline)	1	0
MT 6723 (Isoline)	1	0
MT 6725 (Isoline)	1	0
MT 6727 (Isoline)	1	0
MT 6728 (Isoline)	4	4
Napayo	0	1
Neepawa	4	5
Nogal	5	5
Norana	1	1
Opal	1	0
Pac. Triple Dwarf	1	0
Park	15	15
Peak 72	0	1
Pitic 62	7	5
Polk	1	1
Rovaniemi Se. 70-W (Chena)	13	13
Ruso	8	6
Saunders	7	6
Selkrik	2	1
Sheridan	2	0
Siberian Bearded	3	2
Siberian Beardless	3	2
Sinton	2	2
Sonora 64	1	0
Springfield	0	1
Taava	4	4
Tapio	4	4
Thatcher	7	6
Thatcher (insens.)	1	0
Ulla	4	4
Vernon	2	2
Wakooma	1	1
Wascana	1	1
WS 1502	1	0
6WA 637	3	2
6WA 666	1	0
6WA 675	1	0
6WA 679	1	0
6WA 688	1	0
6WA 693	1	0
6WA 699	2	1
6WA 701	1	0
6WA 725	1	0
6WA 735	2	1
6WA 746	5	3
6WA 748	1	0
5560 II-53-1-45-2	4	4