ALASKA PLANT MATERIALS CENTER

ANNUAL REPORT

1975

DEPARTMENT OF NATURAL RESOURCES

Division of Agriculture

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INTRODUCTION

Introduction

The development of Alaska's resources has increased substantially in recent years and with it has grown an awareness of the need for environmental protection. The impact upon the environment of the trans-Alaska pipeline, the accelerated highway construction program, urban and industrial expansion, the growing population's demand for gardens and landscaping--essentially all man's activities which change the environment--requires a concomitant effort to prevent or reduce damage to ecological systems or, to restore or replace them when they are damaged. Vegetation is a basic tool of this effort. The development of new plant materials and provision for their propagation and distribution to the public for use in environmental protection has been recognized as one of Alaska's requisite needs.

Representative Jalmar Kerttula of Palmer (now Senator) submitted House Bill 8 to the 1972 Legislature to establish a Plant Materials Center for the purpose of developing "... plant materials needed in soil and water conservation, agriculture and industry...." The bill was passed and signed into law (Chapter 138 SLA 1972 AS 03.22) by Governor William A. Egan on June 20, 1972. Responsibility for the operations of the Center were given to the Department of Natural Resources under Commissioner Charles F. Herbert and through the Department's Division of Agriculture, William G. Lewis, Director. Operations were to be conducted cooperatively by a formal Memorandum of Understanding signed in December, 1972 between the Department, the

University of Alaska Institute of Agricultural Sciences, and the USDA Soil Conservation Service. Commissioner Herbert appointed a seven-man Advisory Board to advise on policy for the PMC operations. The Board members were:

Commissioner Herbert
Director Lewis, Chairman
Dr. Donald H. Dinkel, University of Alaska
Dr. Roscoe L. Taylor, USDA Agricultural Research Service
Weymeth E. Long, USDA Soil Conservation Service
Byron J. Hollembaek, Alaska Crop Improvement Association
Doyle McCombs, Alaska Association of Soil Conservation Subdistricts

The objectives of the PMC and the scope of its activities are extensive. Initially, it will assemble, evaluate, select and increase both native and introduced species of grasses, legumes, forbs, shrubs, and trees. The more promising material will be tested throughout the State for adaptability and applicability to the environmental problems encountered. Genetically pure stocks of seed and propagules will be maintained, including agricultural seeds. Plant materials will be cooperatively released to the public by the Department, the Institute, and the SCS. These new plants, and others presently available to the consumer, will form the foundation of Alaska's developing seed and nursery production industry. Cooperation with many state, federal, local, research, and private agencies will be necessary to successfully accomplish these objectives.

This report covers the technical operations and accomplishments for the 1975 calendar year including plant collections assembled, seed production studies initiated, production of Foundation grains, physical improvements to land and buildings, purchases of equipment,

and a brief discussion of weather conditions and how they affected operations. Also included is a report on the 1975 fiscal year operations and expenditures.

Weather

Weather during the crop year January 1 through December 31 was characterized by average winter temperatures, below normal spring and early summer temperatures, average precipitation, normal wet harvest season, and crop damaging winds.

January began with a cold snap. The average temperature for the first 16 days was -22°F. The lowest temperature for the year occurred on January 4th, when the thermometer dipped to -54°F. The remainder of the winter was characterized by intermittent warm, damp, southeast Chinook winds, resulting in a general two-week warm trend, followed by clear skies and cold temperatures.

When a Chinook arrives, it is common for temperatures to rise as much as 45°F in a 24-hour period. These warm winds also present a problem in that snow cover melts off at a rapid rate and freezes, leaving a sheet of ice on the ground. This glaciering effect results in high mortality on the perennial grass production plots.

Below normal temperatures continued through the spring and into early summer. The mild daytime temperatures were offset by below freezing temperatures at night. Field planting began on May 17th as compared to May 2nd of the previous year. The frost-free period started on the 23rd of May and continued until the 28th of August, for a total of 95 frost-free days.

Summer temperatures for the most part were below normal. The years high temperature was 84°F, occurring on July 12th.

A light frost in low lying areas near the PMC occurred on August 4th. Some produce damage was evident in the area. Seven inches of precipitation fell from April through August. The irrigation system was used only once on the grain crops to establish even emergence. The harvest season was characterized by normal cloudy rainy days.

High winds on September 17th severely shattered the grain and timothy crops. The moderate autumn temperatures of September and October ended on October 30th, when clear skies and cold temperatures prevailed, resulting in 19 days of below zero readings. December also began with 15 days of below zero readings, followed by a Chinook that continued to years end. The December low was -36°F and the high was 50°F, a spread of 86 degrees.

No snow cover remained at years end.

Jesse G. Werner

TABLE 1. Weather Data. Mean monthly temperatures, monthly precipitation, and wind movement at the Alaska Plant Materials Center.[1/]

Month	Temperature			Precipitation*				Wind Velocity-mph				
	Max	Min	Ave	Rain	Snow Depth	Melted	Days Precip. Fell	0-5	6-10	11-25	26-50	51 & Over
	°F	°F	°F	acre/in.	in.	acre/in.		(Days per month)				
January	44	-54	-1	.0	3.05	.55	7	20	7	2	1	1
February	45	-25	13	.40	7.00	.84	12	20	1	2	5	0
March	45	-5	20	.0	5.40	.46	8	27	0	2	2	0
April	51	8	33	.50	6.00	1.52	11	19	1	8	2	0
May	68	24	45	.22	0	0	7	21	1	8	1	0
June	75	33	51	2.67	0	0	13	25	1	2	1	0
July	84	39	56	2.35	0	0	19	26	4	1	0	0
August	74	27	54	.96	0	0	10	22	5	3	1	0
September	63	29	48	2.60	0	0	17	22	2	1	4	1
October	56	-18	33	.48	0	0	7	22	4	2	3	0
November	46	-16	6	.02	0	0	2	29	0	0	1	0
December	50	-36	5	.95	7.85	1.02	8	24	2	1	3	1
Total				11.15	29.30	4.29	121					
Average	58	6	36	*Total melted precip. 15.44								

1/ Data is recorded at 6:00 p.m. daily
Beginning November 1, 1974 the National Weather Service designated the PMC the official weather station for the Butte area.
In addition to standard temperature recordings the PMC also records snowfall, wind speed, and soil temperatures and moisture content at 5 depths from 3- to 38-inches.
Last freezing date in spring, May 23.
First freezing date in autumn, August 28.
A total of 95 frost-free days.
Maximum temperature 84°F.
Minimum temperature -54°F.

DAILY TEMPERATURES AND PRECIPITATION 1/

1975

JANUARY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	18	-1	-25	-39	-40	-36	-18	-18	-35	-35	0	5	10	5	12	20	40	43	44	34	40	42	30	32	28	44	40	31	33	20	17
Minimum	-6	-37	-48	-54	-52	-49	-46	-43	-45	-45	-39	-7	-14	-20	-22	-10	20	35	31	25	18	24	21	13	17	18	16	22	15	-8	-12
Precipitation	0	0	0	0	0	0	0	0	0	0	0	0	T	T	.05	0	0	0	0	.37	0	0	0	0	0	0	.13	T	T	0	0

FEBRUARY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Maximum	0	3	2	0	-1	1	5	12	12	18	14	8	3	4	7	13	18	40	29	20	42	40	36	27	40	45	42	39
Minimum	-15	-17	-20	-21	-21	-20	-15	-12	-18	-17	-20	-25	-20	-18	-5	-10	3	10	11	-11	10	30	20	-11	-5	35	28	17
Precipitation	0	0	0	0	0	0	0	0	0	0	0	0	T	0	.10	T	0	T	.29	T	T	.13	T	.13	.14	0	0	.05

MARCH

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	38	28	26	24	30	31	15	32	30	36	38	36	42	43	38	38	44	35	30	27	20	22	22	29	30	40	41	44	45	33	39
Minimum	5	1	0	3	17	5	1	0	0	-5	24	9	16	5	8	6	9	9	11	3	6	1	1	4	-1	6	22	28	32	23	25
Precipitation	0	0	0	0	T	0	0	0	0	0	0	0	0	0	0	0	0	0	.06	.02	.13	.02	.03	T	0	0	0	.20	T	0

APRIL

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Maximum	43	29	36	33	31	37	45	45	42	44	43	49	43	42	42	47	40	38	32	37	43	43	48	49	51	44	45	47	47	48
Minimum	26	13	8	10	20	25	29	23	27	36	29	31	25	29	31	32	31	23	12	18	21	22	23	24	36	34	29	29	33	34
Precipitation	.06	.10	0	0	.10	.06	0	0	T	0	0	T	0	.10	.30	0	.60	.20	0	0	0	0	0	0	T	0	0	0	0	0

MAY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	47	55	60	49	49	50	49	52	58	56	68	64	56	58	62	64	52	52	60	61	56	54	47	62	60	60	61	58	61	61	61
Minimum	31	40	27	32	32	29	31	24	38	40	44	42	38	26	36	35	39	37	28	41	36	35	27	33	42	45	46	40	39	42	36
Precipitation	0	0	0	0	.07	0	0	0	T	0	0	0	.07	0	0	0	0	0	0	0	.02	.02	.10	0	0	0	0	0	0	.04	0

JUNE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Maximum	72	65	53	59	50	62	55	64	62	60	62	62	60	62	60	69	71	57	63	53	58	64	59	55	63	60	69	73	75	66
Minimum	45	44	42	42	33	43	43	46	45	41	45	33	36	43	46	38	47	44	47	42	45	45	49	45	45	47	36	40	50	49
Precipitation	0	.43	.36	.38	.20	0	.05	.01	0	0	0	0	0	0	0	0	0	0	0	.80	0	.16	.09	.05	.02	.02	0	0	0	.10

JULY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	59	60	73	71	60	72	78	77	81	84	82	80	57	62	70	55	69	72	71	60	52	60	69	65	67	64	65	71	69	63	62
Minimum	48	47	40	49	43	42	44	47	48	47	44	50	49	46	47	41	41	44	52	48	48	46	43	50	46	47	43	47	39	47	44
Precipitation	.03	.01	0	.03	.08	.01	0	0	0	0	0	.29	.06	.02	T	.47	T	0	.20	.30	.24	0	0	0	.02	.21	0	.02	0	.14	.02

AUGUST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	67	69	74	70	73	68	69	63	68	68	69	69	70	72	67	70	68	65	67	65	68	62	60	60	60	66	65	65	69	51	56
Minimum	47	48	40	34	50	41	41	51	42	43	51	50	55	53	49	43	47	46	45	46	38	47	49	49	45	45	47	27	34	33	43
Precipitation	.03	.09	T	0	.13	T	0	.17	0	0	.13	0	0	0	0	0	0	0	0	0	0	0	0	.02	0	0	.29	0	0	0	.10

SEPTEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Maximum	62	63	61	60	58	52	54	51	55	56	59	58	59	55	57	56	57	60	56	63	55	58	62	56	53	65	58	56	51	48
Minimum	41	41	32	37	47	47	39	31	41	46	46	42	29	36	42	41	50	48	41	49	38	41	30	29	39	42	38	38	37	37
Precipitation	0	0	0	.07	T	T	.48	.07	.30	.02	.79	0	0	.04	.30	0	.20	.06	.07	0	.11	.06	.01	0	0	.09	0	0	0	0

OCTOBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	56	52	56	48	45	50	50	47	42	42	52	54	51	51	50	49	48	39	39	39	39	46	47	47	41	38	39	24	25	18	12
Minimum	34	25	34	34	40	28	20	19	19	25	41	38	42	38	27	31	27	25	15	14	26	22	42	40	17	25	8	8	3	-3	-18
Precipitation	.10	0	0	0	.02	0	0	.01	0	.18	0	.01	0	0	0	0	0	0	0	0	.15	.01	0	0	0	0	0	0	0	0	0

NOVEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Maximum	8	7	9	12	10	16	13	12	15	13	15	8	14	9	8	-8	9	21	46	46	23	21	22	23	26	26	26	18	10	10
Minimum	-14	-15	-16	-13	-13	-8	-8	-11	-6	-9	-9	-9	-9	-11	-8	-16	-14	6	24	15	5	7	5	8	4	7	8	4	-4	-14
Precipitation	0	0	0	0	0	0	0	0	.02	0	T	0	T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DECEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Maximum	-5	-3	-9	-13	-14	-16	-14	-20	-19	-10	-3	-3	28	20	19	42	47	39	34	31	15	42	43	15	43	50	40	44	25	39	37
Minimum	-21	-25	-25	-29	-29	-34	-35	-35	-35	-36	-20	-16	18	-11	-9	9	31	25	29	-2	-7	2	9	3	8	19	20	20	11	-2	12
Precipitation	0	0	0	0	0	0	0	0	0	0	.02	0	0	.40	.05	.95	0	0	.60	0	0	0	0	0	0	0	0	0	0	0	T

1/ rain and/or melted snow

INITIAL EVALUATIONS

Initial Evaluation of Herbaceous Plants

Two hundred twenty-eight accessions of grasses, legumes, and forbs were seeded in the spring of 1974. The planting contained 131 native collections, 83 foreign introductions, mostly from Siberian Russia and the Scandinavian countries, and 14 accessions from cooperating agencies in the lower 48. Forty-five species of grasses, 34 legumes, and 19 forbs were represented.

The grasses were seeded May 15, 1974 and the legumes and forbs May 16, 1974. The area had been summer fallowed the previous year and no fertilizer was applied during the 1974 growing season. Each accession was seeded in a 20-foot row and the rows were spaced three feet apart.

Weeds were controlled by mechanical cultivation, wheel hoeing, hand weeding, and by two applications of .75 lbs/acre of 2,4-D to the grass species on June 16 and July 1. Control of insects was attempted, with marginal results, by spraying Diazanon at 16 oz/100 gallons and 67 gal/acre. The plots were fall fertilized on September 16 with 18-18-9 at a rate of 390 lbs/acre. The planting was not irrigated during 1975 due to above average rainfall. The soil in the evaluation area is a Niklason silt loam, moderately deep, well-drained, strongly acid and 15 to 27 inches deep over gravelly material.

Results

The winter of 1974-75 and the following summer were demanding tests on the initial evaluation plantings. The average temperature

for two weeks in January was -28°F, with a low of -54°F. However, within the same month the thermometer soared to +50°F, which eventually resulted in severe glaciering conditions throughout the plot. Summer was two weeks later than the previous year and was characterized by above average rainfall and just too many cloudy days.

Grass species had a 3.6% loss before the end of the 1974 growing season and another 11.6% were victims of winterkill. Insects created seed production problems mainly in the *Poa* and *Festuca* species. These genera were also plagued by powdery mildew.

All of the annual legumes were allowed to mature and shatter in 1974, but failed to produce stands in 1975. The perennial *Astragalus*, *Oxytropis*, and *Trifolium* species were apparent victims of winterkill. Of the remaining perennial legumes, 70% survived through the 1975 growing season.

Forbs suffered no complete winterkill, but 44% of the accessions failed to emerge in 1974 or 1975 and have been consequently abandoned.

Accessions demonstrating outstanding performance upon completion of the second year of evaluation are described below in Table 1.

Alopecurus arundinaceus. 'Garrison' creeping foxtail, received from Bridger, Montana, demonstrated remarkable spring recovery, foliage production, ground cover, and seed production. The first cutting, on June 15, yielded prime quality, highly palatable hay.

Alopecurus pratensis, PI-371702, PI-372659, meadow foxtail. Both of these Alaskan accessions showed excellent spring recovery and

foliage production. Cutting recovery was good, indicating that this species has possible forage potential.

Bromus inermis X *pumpellianus*, bromegrass. 'Polar' brome, developed by the Agricultural Experiment Station, and PI-371704, a collection from Copper Center, have proven to be excellent in foliage production, ground cover, spring recovery, and seed production. This cross has, for many years, demonstrated its excellent forage production and its inherent ability to outgrow and subsequently eliminate its competition.

Elymus arenarius, PI-294636, European dune wildrye. This species, one of 17 accessions, was collected in Norway. It showed excellent forage production, ground cover, spring recovery, and seed production. This plant exhibits definite potential as a soil stabilizer on dry and gravelly sites.

Elymus sibiricus, PI-325315, PI-345599, PI-345600, Siberian wildrye. These accessions, three out of 16, demonstrated all of the desirable characteristics as did *E. arenarius*, except that they appeared to be somewhat slower in spring recovery. All were of Russian origin and demonstrated a blue-green color common among Scandinavian accessions, but lacking in native species.

Poa pratensis, 'Nugget' Kentucky bluegrass. Nugget bluegrass, developed at the Agricultural Experiment Station in Palmer from a single plant collection in 1957, is Alaska's leading turf grass. This species shows more tolerance to powdery mildew than other *Poa*'s. Seed production, however, was poor this year in all *Poa* and *Fescue* species due to insect damage and Nugget was no exception.

Lupinus nootkatensis, R-32, nootka lupine. This native lupine, collected near Kenai, demonstrated excellent foliage production and spring recovery and good ground cover. Out of 12 accessions, this individual has the highest potential for ornamental and conservational utilization.

Artemesia tillesii, R-33, wormwood or sagebrush. This aromatic plant showed excellent foliage production, ground cover, spring recovery, and seed production. It may be adapted to dry harsh sites composed of gravelly or sandy soils.

Atriplex hortensis, PI-323313, garden orach. Originating from Russia, this annual forb demonstrated excellent seedling vigor, foliage production, ground cover, and seed production. It could, possibly, be weedy, but control is not difficult. A. *hortensis* is reputed to be of value for waterfowl food and is considered edible for humans.

Polygonum persicaria, PI-372749, spotted ladysthumb. *P. persicaria*, a native, was accidently rototilled early in June. The plant promptly came back with excellent seedling vigor, ground cover, cutting recovery, and seed production. This species is definitely weedy and offers control problems throughout the Matanuska Valley, but is excellent waterfowl food.

Patrick T. Mulligan

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Grasses															
Agropyron boreale	R-5	Ak	95	1	5	1	5	-	3	5	6/20	7/7	25	42	5% insect damage
A. macrourum	L-56	Ak	100	1	5	1	5	-	1	3	6/30	7/7	50	40	dk grn color
A. spicatum	372641	Ak	0	-	-	-	-	-	-	-	-	-	-	-	100% winterkill
A. spicatum	372642	Ak	0	-	-	-	-	-	-	-	-	-	-	-	" "
A. subsecundum	371698	Ak	100	3	5	1	5	-	5	3	6/20	7/7	25	34	
A. tractycaulum	371692	Ak	100	1	5	3	5	-	1	3	6/20	7/7	50	41	
A. tractycaulum	371694	Ak	90	3	3	3	7	-	3	7	6/20	7/16	50	43	
A. tractycaulum	371695	Ak	90	3	5	3	5	-	3	5	6/20	7/16	50	48	
A. tractycaulum	372644	Ak	95	1	5	1	3	-	3	5	6/20	7/16	75	37	
A. tractycaulum	372650	Ak	100	1	5	3	5	-	3	5	6/20	7/16	75	33	
A. violaceum	L-47	Ak	100	1	5	1	1	-	3	3	6/30	7/7	5	36	
A. violaceum	236673	Can	T	7	-	9	-	-	9	5	-	-	-	-	
A. violaceum	236674	Can	T	7	-	9	9	-	3	-	-	-	-	-	
A. violaceum	236675	Can	70	5	5	5	5	-	3	5	7/7	7/31	5	37	
A. violaceum	276712	USSR	50	5	-	7	7	-	5	-	6/16	-	5	26	25% winterkill
A. yukonense	R-12	Ak	100	1	5	1	3	-	1	1	6/16	7/7	50	35	
A. yukonense	372655	Ak	0	-	-	-	-	-	-	-	-	-	-	-	no stand in '74
Agrostis sp.	371700	Ak	T	7	-	7	9	-	-	5	6/16	-	-	-	70% winterkill
Alopecurus aequalis	236730	Can	50	3	3	3	5	-	5	3	6/20	6/30	-	22	
A. aequalis	236731	Can	40	7	-	7	7	-	5	5	6/20	6/30	-	20	some insect damage

1/ See footnote at end of table on page 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Grasses															
Alopecurus aequalis	236732	Can	50	5	-	3	5	-	5	5	6/20	6/30	-	20	some insect damage
A. aequalis	371701	Ak	100	1	-	1	3	-	1	3	6/16	6/20	-	19	appears more bl-grn than CAN acc's.
A. arundinaceus	Garrison	Mont	100	1	-	1	3	3	1	1	6/5	6/16	-	-	
A. arundinaceus	P-14762	Wash	100	3	-	1	3	5	1	1	6/5	6/16	-	-	
A. pratensis	P-5903	Wash	100	3	-	1	1	5	1	-	6/5	6/16	10	-	
A. pratensis	P-15619	Ore	35	1	-	1	5	3	1	-	6/5	6/16	-	-	some early insect dam.
A. pratensis	P-156195	Ore	95	1	-	1	1	5	1	-	6/5	6/16	-	-	
A. pratensis	371702	Ak	95	1	-	1	1	3	1	-	6/5	6/16	-	-	
A. pratensis	372659	Ak	100	1	-	1	1	3	1	-	6/5	6/16	-	-	some wind dam.
Arctagrostis latifolia	L-49	Ak	0	-	-	-	-	-	-	-	-	-	-	100%	winterkill
Beckmannia erucaeformis	R-2	Ak	95	1	-	1	5	-	3	1	6/20	6/30	100%		powdery mildew
Bromus inermis	Manchar	Wash	100	5	-	5	3	-	5	3	6/16	7/30	10	41	
B. inermis	372669	Ak	100	3	-	1	3	-	5	5	6/16	7/30	75	40	
B. inermis X *pumpellianus*	Polar	Ak	100	1	-	1	1	-	1	3	6/16	7/30	-	42	
B. inermis X *pumpellianus*	371404	Ak	100	1	-	1	1	-	1	-	6/16	7/30	-	42	

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand	Foliage Production[1]	Ability to Spread[1]	Ground Cover[1]	Spring Recovery[1]	Cut. Recovery[1]	Plant Uniformity[1]	Seed Production[1]	Date Head	Date Bloom	Lodging	Ht.	Remarks
			%										%	in.	
Grasses															
Calamagrostis inexpansa	372682	Ak	5	-	-	-	5	-	-	-	6/20	7/16	-	-	some insect damage
C. nutkaensis	372683	Ak	20	7	-	7	7	-	7	-	6/16	7/16			
C. purpurescens	R-13	Ak	-	-	-	-	-	-	-	-	-	-	no stand from '74		
Deschampsia beringensis	R-21	Ak	85	3	-	1	3	-	1	3	6/20	7/30	frost or insect dam.		
D. caespitosa	314562	USSR	60	5	-	5	3	-	3	1	6/20	7/30			
D. beringensis	372690	Ak	60	3	-	3	5	-	5	3	6/20	-	sp. determined to be *beringensis*		
Elymus arenarius	L-20	Ak	50	5	-	5	1	-	5	-	6/30	7/7	-	-	
Elymus arenarius	R-25	Ak	70	3	-	3	3	-	3	7	6/30	7/7	-	-	
Elymus arenarius	R-39	Ak	60	3	-	3	3	-	3	5	6/30	7/7	-	-	
Elymus arenarius	R-40	Ak	60	5	-	5	5	-	5	5	6/30	7/7	-	-	
Elymus arenarius	R-44	Ak	5	9	-	9	9	-	9	-	-	-	-	-	
Elymus arenarius	R-46	Ak	10	9	-	9	7	-	9	9	-	-	-	-	
Elymus arenarius	R-47	Ak	40	5	-	5	3	-	5	7	6/20	6/30	-	-	
Elymus arenarius	272126	USSR	20	7	-	7	7	-	7	9	6/30	-	-	-	
E. arenarius	294582	Sweden	75	5	-	5	5	-	5	3	6/30	7/7	-	-	
E. arenarius	294583	Sweden	85	3	-	3	5	-	3	9	7/7	-	-	-	
E. arenarius	294584	Sweden	90	1	-	1	5	-	1	-	6/20	7/7	-	-	
E. arenarius	294585	Sweden	90	3	-	3	5	-	3	-	6/30	7/7	-	-	
E. arenarius	294636	Norway	85	1	-	1	1	-	1	1	6/30	7/16	-	-	
E. arenarius	297345	Norway	85	3	-	3	3	-	3	-	6/30	7/7	-	-	
E. arenarius	316233	USSR	10	9	-	9	9	-	9	-	6/30	7/7	-	-	

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand	Foliage Production[1]	Ability to Spread[1]	Ground Cover[1]	Spring Recovery[1]	Cut. Recovery	Plant Uniformity[1]	Seed Production[1]	Date Head	Date Bloom	Lodging	Ht.	Remarks
			%										%	in.	
Grasses															
Elymus arenarius	372694	Ak	90	1	-	1	1	-	3	-	6/20	7/7	-	-	
E. arenarius	372695	Ak	60	5	-	5	5	-	5	-	6/30	-	-	-	
E. arvalensis	314663	USSR	-	-	-	-	9	-	-	-	-	-	-	-	
E. innovatus	236818	Can	5	9	-	9	9	-	9	9	6/20	7/7	-	-	
E. innovatus	236819	Can	-	-	-	9	-	-	-	-	-	-	-	-	no stand from '74
E. innovatus	236820	Can	-	-	-	-	-	-	-	-	-	-	-	-	no stand from '74
E. karatoriensis	314677	USSR	5	9	-	9	9	-	9	-	-	-	-	-	
E. sibiricus	L-2	Ak	40	7	-	7	3	-	9	-	-	-	-	-	20% winterkill
E. sibiricus	R-15	Ak	20	7	-	7	7	-	7	-	-	-	-	-	70% "
E. sibiricus	R-16	Ak	15	7	-	7	7	-	7	-	7/7	-	-	-	70% "
E. sibiricus	R-18	Ak	15	7	-	7	7	-	7	-	7/7	-	-	-	60% winterkill
E. sibiricus	314619	USSR	10	9	-	9	9	-	9	-	6/30	-	-	-	70% "
E. sibiricus	315427	USSR	40	5	-	5	9	-	7	-	6/30	-	-	-	50% "
E. sibiricus	315428	USSR	40	7	-	7	9	-	7	-	7/7	-	-	40	50% "
E. sibiricus	315429	USSR	75	5	-	5	5	-	7	-	6/30	-	-	-	30% "
E. sibiricus	325315	USSR	95	1	-	1	3	-	1	-	7/7	-	25	39	trace winterkill
E. sibiricus	326266	USSR	85	3	-	3	5	-	3	-	7/7	-	-	40	50% "
E. sibiricus	326267	USSR	70	3	-	3	3	-	5	-	7/7	-	5	41	30% "
E. sibiricus	326268	USSR	85	3	-	3	5	-	5	-	7/7	-	5	42	40% "
E. sibiricus	345599	USSR	90	1	-	1	3	-	1	-	7/7	-	5	39	20% " trace of smut

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand	Foliage Production[1]	Ability to Spread[1]	Ground Cover[1]	Spring Recovery[1]	Cut. Recovery[1]	Plant Uniformity[1]	Seed Production[1]	Date Head	Date Bloom	Lodging	Ht.	Remarks
			%										%	in.	
Grasses															
Elymus sibiricus	345600	USSR	90	1	-	1	3	-	1	-	7/7	-	-	38	15% winterkill
E. sibiricus	362191	USSR	85	3	-	3	3	-	3	-	6/30	-	10	34	5% " trace of wind dam.
Festuca altaica	R-8	Ak	5	7	-	7	7	-	5	-	5/16	6/16	-	-	100% insect d.
Festuca altaica	R-14	Ak	5	5	-	5	7	-	5	-	5/25	6/16	-	-	trace mildew 100% insect damage
Festuca altaica	R-17	Ak	5	7	-	7	7	-	5	-	5/23	6/20			100% powdery mildew 50% insect damage
Festuca altaica	372705	Ak	5	5	-	5	7	-	5	-	5/23	6/16	-	-	50% powdery mild. 50% insect dam.
Festuca rubra	Arctared	Ak	100	1	-	3	1	-	5	-	6/5	7/7	-	-	75% insect dam.
Festuca rubra	Boreal	Can	75	3	-	5	5	-	3	-	6/16	7/16	-	-	5% insect dam. appears more resistant than Arctared
Glyceria grandis	R-3	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no stand from '74
Hordeum brachyantherum	371744	Ak	100	1	-	3	3	-	1	1	6/30	-	-	-	
H. vulgare	Steptoe	Wash	-	-	-	-	-	-	-	-	- -	-	-	-	no stand in '75
Poa alpina	235491	Switz	40	1	-	3	3	-	3	-	6/5	6/30	-	-	100 insect dam. 100% powd. mild.
Poa alpina	235492	Switz	30	1	-	3	5	-	3	-	6/5	6/30	-	-	90% insect dam. 90% powd. mild.

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Grasses															
Poa alpina	236892	Can	40	5	-	5	7	-	5	-	6/5	6/30	-	-	20% winterkill 95% insect dam. 5% powd. mild.
Poa alpina	236893	Can	10	5	-	5	7	-	7	-	6/5	6/30	-	-	100% insect dam. 30% winterkill 5% powd.mild.
Poa alpina	236894	Can	5	7	-	7	9	-	7	-	6/5	6/30	-	-	100% ins. dam. 80% winterkill
Poa alpina	236895	Can	5	5	-	5	9	-	3	-	6/5	6/30	-	-	100% ins. dam. 30% winterkill 5% powd.mild.
Poa alpina	236896	Can	5	3	-	3	7	-	5	-	6/5	6/30	-	-	30% winterkill 100% ins. dam. 50% powd.mild.
Poa alpina	236897	Can	5	-	-	-	9	-	-	-	6/5	6/30	-	-	75% winterkill 100% ins. dam. 75% powd.mild.
Poa alpina	372730	Ak	5	-	-	-	9	-	-	-	6/15	-	-	-	50% winterkill
Poa arctica	236901	Can	5	7	-	7	9	-	7	-	5/23	-	-	-	40% winterkill 100% ins. dam. 100% powd.mild.
Poa brachyanthera	371755	Ak	40	5	0	5	3	-	5	-	5/30	7/7	-	-	20% winterkill 100% ins. dam. 100% powd.mild.
Poa canbyi	236903	Can	30	3	-	3	1	-	5	-	6/16	7/7	-	-	100% ins. dam. 100% powd.mild.

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Grasses															
Poa canbyi	236904	Can	20	7	-	7	3	-	3	-	6/16	7/7	-	- 25%	insect dam.
Poa canbyi	236905	Can	30	5	-	5	-	-	7	1	6/6	7/7	-	- 50%	" "
Poa compressa	182792	Can	5	-	-	-	9	-	-	-	6/20	-	-	- 90%	winterkill
Poa compressa	182793	Can	5	5	-	5	7	-	5	-	6/20	7/7	-	- 95%	" "
Poa compressa	182794	Can	-	-	-	-	-	-	-	-	-	-	-	-100%	winterkill
Poa compressa	236906	Can	-	-	-	-	-	-	-	-	-	-	-	-100%	winterkill
Poa compressa	236907	Can	-	-	-	-	-	-	-	-	-	-	-	-100%	" "
Poa compressa	297363	Norway	-	-	-	-	-	-	-	-	-	-	-	-100%	" "
Poa epigena	R-48	Ak	90	3	3	3	1	-	5	-	6/16	7/7	-	- 75%	insect dam.
Poa glauca	L-31	Ak	-	-	-	-	-	-	-	-	-	-	-	-100%	winterkill
Poa glauca	R-23	Ak	-	-	-	-	-	-	-	-	-	-	-	-100%	winterkill
Poa glauca	R-34	Ak	-	-	-	-	-	-	-	-	-	-	-	-100%	" "
Poa glauca	236908	Can	-	-	-	-	-	-	-	-	-	-	-	-100%	" "
Poa glauca	371758	Ak	-	-	-	-	-	-	-	-	-	-	-	-100%	" "
Poa glauca	372732	Ak	5	7	-	7	9	-	7	-	6/16	-	-	- 50%	" "
Poa interior	372733	Ak	-	-	-	-	-	-	-	-	-	-	-	-100%	winterkill
Poa lanata	372734	Ak	20	5	-	7	5	-	5	-	5/30	7/7	-	- 60%	" "
														5%	insect dam.
Poa nemoralis	284840	USSR	5	5	-	5	9	-	5	-	6/5	-	-	- 60%	winterkill
Poa nemoralis	297364	Norway	5	7	-	7	9	-	7	-	6/5	7/7	-	- 60%	" "
														100%	insect dam.
Poa nemoralis	314933	USSR	-	-	-	-	-	-	-	-	-	-	-	-100%	winterkill

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging	Ht.	Remarks
			%										%	in.	
Grasses															
Poa nemoralis	325464	USSR	5	7	-	7	9	-	7	-	6/20	-	-	-	90% winterkill
Poa nevskii	314308	USSR	10	7	-	7	7	-	3	-	6/16	-	-	-	
Poa palustris	236912	Can	-	-	-	-	-	-	-	-	-	-	-	-	100% winterkill
Poa palustris	236913	Can	5	-	-	-	7	-	-	-	-	-	-	-	75% " "
Poa palustris	236914	Can	-	-	-	-	-	-	-	-	-	-	-	-	100% " "
Poa palustris	272124	Poland	40	5	-	5	7	-	5	-	-	-	-	-	75% winterkill
Poa palustris	274644	Poland	10	3	-	3	3	-	5	-	6/16	-	-	-	
Poa palustris	369296	USSR	5	-	7	7	9	-	7	-	6/16	7/17	-	-	90% winterkill
Poa palustris	369297	USSR	-	-	-	-	-	-	-	-	-	-	-	-	100% " "
Poa pratensis	Nugget	Ak	100	1	-	1	1	-	3	-	6/16	6/30	10	-	75% insect dam. 25% powd. mild.
Poa pratensis	L-48	Ak	5	7	-	7	9	-	7	-	5/30	6/30	-	-	100% insect dam.
Poa pratensis	371760	Ak	10	7	7	-	7	-	7	-	-	-	-	-	
Poa pratensis	371763	Ak	60	3	-	3	3	-	3	-	6/16	7/7	-	-	10% insect dam. 25% powd. mild.
Poa pratensis	371764	Ak	10	7	-	7	9	-	7	-	6/5	6/30	-	-	
Poa pratensis	371766	Ak	5	7	7	7	9	-	7	-	6/20	6/30			
Poa pratensis	371767	Ak	40	5	-	5	5	-	5	-	6/16	7/7	-	-	75% insect dam.
Poa rupicola	371777	Ak	5	5	-	5	5	-	5	-	6/5	6/30	-	-	100% insect dam.
Poa stenantha	236922	Can	15	7	-	7	-	-	7	-	5/30	6/16	-	-	90% insect dam.

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Legumes															
Astragalus aboriginum	236740	Can	-	-	-	-	-	-	-	-	-	-	-	-	No stand in '74
A. americanus	L-26	Ak	-	-	-	-	-	-	-	-	-	-	-	-	" "
A. eucosmus	R-7	Ak	-	-	-	-	-	-	-	-	-	-	-	-	" "
A. Williamsii	L-12	Ak	-	-	-	-	-	-	-	-	-	-	-	-	" "
A. species	L-6	Ak	-	-	-	-	-	-	-	-	-	-	-	-	" "
Dalea alopecuroides	NDL-51	N. Dak.	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Dalea alopecuroides	231728	Iowa	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Dalea alopecuroides	315689	Mich	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Dalea alopecuroides	315690	Iowa	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Galega officinalis	296361	Afghan.	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Hedysarum species	L-3	Ak	-	5	-	5	1	-	5	-	5/30	6/16	-	-	
Hedysarum species	L-27	Ak	-	-	-	-	-	-	-	-	-	-	-	-	98% winterkill
Hedysarum species	L-59	Ak	30	7	-	7	3	-	7	-	6/5	6/16	-	-	
Lathyrus cicera	174236	Turkey	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74

1/ See footnot at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Legumes															
Lathyrus maritimus	R-6	Ak	5	3	5	3	3	-	5	-	6/16	6/20	-	-	
L. maritimus	R-45	Ak	-	5	5	5	5	-	7	-	6/16	-	-	-	
L. palustris	R-35	Ak	25	5	-	3	5	-	7	-	-	-	-	-	
L. palustris	R-36	Ak	35	5	-	3	3	-	5	-	6/16	-	-	-	
L. palustris	R-42	Ak	5	5	-	5	5	-	7	-	6/16	6/23	-	-	
L. sativus	170477	Turkey	-	-	-	-	-	-	-	-	-	-	-	-	no stand in '74
L. sativus	206891	Turkey	-	-	-	-	-	-	-	-	-	-	-	-	" "
L. sativus	283547	France	-	-	-	-	-	-	-	-	-	-	-	-	" "
L. sativus	283556	USSR	-	-	-	-	-	-	-	-	-	-	-	-	
L. palustris	L-19	Ak	5	7	-	7	5	7	7	-	6/16	-	-	-	
Lotus ornithopodioides	310413	USSR	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Lupinus arcticus	371751	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Lupinus luteus	289173	Hungary	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
L. noothatensis	L-13	Ak	5	5	-	5	7	-	7	-	-	-	-	-	
L. noothatensis	L-15	Ak	10	3	-	5	5	-	5	5	6/5	6/15	-	-	
L. noothatensis	L-21	Ak	10	1	-	3	5	-	5	-	6/5	6/15	-	-	
L. noothatensis	R-20	Ak	5	5	-	5	5	-	5	-	6/5	6/15	-	-	
L. noothatensis	R-29	Ak	5	5	-	5	5	-	5	-	6/23	-	-	-	
L. noothatensis	R-30	Ak	5	3	-	5	7	-	5	-	6/23	-	-	-	

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annauls and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production[1]	Ability to Spread[1]	Ground Cover[1]	Spring Recovery[1]	Cut. Recovery[1]	Plant Uniformity[1]	Seed Production[1]	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Legumes															
Lupinus nootkatensis	R-31	Ak	10	3	-	5	5	-	5	-	6/5	6/16	-	-	
L. nootkatensis	R-32	Ak	60	1	-	3	1	-	3	-	6/5	6/16	-	-	
L. nootkatensis	R-37	Ak	5	5	-	5	-	-	5	-	6/23	-	-	-	
L. nootkatensis	L-33	Ak	5	3	-	3	3	-	3	-	5/23	5/30	-	-	
L. nootkatensis	L-65	Ak	5	5	-	3	7	-	3	-	5/30	6/5	-	-	
Lupinus species	R-52	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no stand in '74
Oxytropis campestris	R-4	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. campestris	372726	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. campestris	372726	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. deflexa	372728	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. gracilis	371752	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. Maydelliana	L-10	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. nigrescens	372729	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. serica	L-32	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand %	Foliage Production 1/	Ability to Spread 1/	Ground Cover 1/	Spring Recovery 1/	Cut. Recovery 1/	Plant Uniformity 1/	Seed Production 1/	Date Head	Date Bloom	Lodging %	Ht. in.	Remarks
Legumes															
Oxytropis species	L-4	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. species	L-57	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. species	L-58	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. species	L-60	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
O. species	L-66	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Psoralea bituminosa	319083	USSR	-	-	-	-	-	-	-	-	-	-	-	-	no stand
Tetragonobolus purpureus	238359	Can	-	-	-	-	-	-	-	-	-	-	-	-	no stand
T. requieni	244701	France	-	-	-	-	-	-	-	-	-	-	-	-	no stand
Trifolium arvense	244322	Spain	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
T. hybridum	372758	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no stand
T. repens	R-28	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74
Unknown	R-19	Ak	-	-	-	-	-	-	-	-	-	-	-	-	did not mature in '74

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand	Foliage Production[1]	Ability to Spread[1]	Ground Cover[1]	Spring Recovery[1]	Cut. Recovery[1]	Plant Uniformity[1]	Seed Production[1]	Date Head	Date Bloom	Lodging	Ht.	Remarks
			%										%	in.	
Legumes															
Vicia cracca	371785	Ak	10	5	-	5	5	-	5	-	-	-	-	-	
V. dasycarpa	Lana	Calif	-	-	-	-	-	-	-	-	-	-	-	-	no stand
V. pannonica	Hyslop	Ore	-	-	-	-	-	-	-	-	-	-	-	-	no stand
V. pannonica	317906	Czech	-	-	-	-	-	-	-	-	-	-	-	-	no stand
Forbs															
Achillea borealis	371687	Ak	10	1	-	1	3	-	5	-	6/16	7/7	-	-	
A. lanulosa	372637	Ak	5	5	-	5	3	-	5	-	6/16	6/22	-	-	
A. millefolium	372639	Ak	10	5	-	5	5	-	3	-	7/7	-	-	-	
A. sibiricus	372640	Ak	5	-	-	-	3	-	-	-	-	-	-	-	
Artemesia Tilesii	R-33	Ak	50	1	-	1	1	-	1	-	5/30	-	-	-	
A. Tilesii	R-38	Ak	15	5	-	5	3	-	5	-	-	-	-	-	
Aster sibiricus	L-62	Ak	T	5	-	5	-	-	5	-	7/7	-	-	-	
Atriplex hortensis	310383	USSR	75	1	-	1	1	-	5	1	-	-	-	-	excellent seeding vigor
A. hortensis	323313	Poland	-	-	-	-	-	-	-	-	-	-	-	-	no stand
Carex Gmeleni	R-27	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
Compositae species	L-5	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
Conioselinum chinense	R-26	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence in '74

1/ See footnote at end of table, p. 28.

TABLE 1. Performance of 228 accessions of herbaceous annuals and perennials established May 15 and 16, 1974. Cont'd.

Species	Acc.or PI No.	Origin	Stand	Foliage Production[1]	Ability to Spread[1]	Ground Cover[1]	Spring Recovery[1]	Cut. Recovery[1]	Plant Uniformity[1]	Seed Production[1]	Date Head	Date Bloom	Lodging	Ht.	Remarks
			%										%	in.	
Forbs															
Geranium species	R-9	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
Iris species	R-50	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
Juncus species	L-17	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
Juncus species	L-18	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
Ligusticum scoticum	R-41	Ak	75	1	-	1	3	-	5	-	7/7	7/16			
Polemonium species	371778	Ak	45	3	-	5	3	-	5	-	5/23	5/30			
Polygonum persicaria	372749	Ak	100	1	1	1	1	1	1	1	8/1	8/20	-	36	excellent seeding vigor
Potentilla biennis	372750	Ak	25	3	7	5	5	-	1	-	7/7	-	-	-	
Potentilla multifida	L-11	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no stand
P. multifida	371779	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no stand
Sanguisorba officinalis	R-11	Ak	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
S. officinalis	237218	France	-	-	-	-	-	-	-	-	-	-	-	-	no stand
S. officinalis	242496	Germany	-	-	-	-	-	-	-	-	-	-	-	-	no emergence
S. officinalis	249861	Greece	-	-	-	-	-	-	-	-	-	-	-	-	no stand
S. officinalis	P-14822	Ore	75	1	-	1	3	-	3	-	7/16	8/13	-	48	

1/ Ratings are 1, 3, 5, 7, 9, with 1 best.

Initial Evaluation of Woody Plants

The woody plant program at Palmer includes the evaluation of woody plant materials heretofore unobserved in Alaska for winter hardiness and growth performance in an objective manner. The evaluation process begins with the screening of those plant materials that will survive the Alaskan environment from those that will not; a phase that takes a minimum of five to 10 years to complete. During this time, measurements and ratings are made for winter survival, winter injury, spring recovery, transplant recovery, and annual growth and observational notes kept whenever possible on foliage/flower/fruit development, propagation, insect/disease damage, and others.

Once hardiness and growth performance have been satisfactorily determined in Palmer, new plantings of promising accessions are established in other state locations for a secondary phase of evaluation to more closely scrutinize their geographic range and potential use in conservation, agriculture, and industry. Such needs as soil stabilization, surface regeneration, reforestation, and ornamental landscaping are of the highest priority. Wind control too, through the use of windbreaks, is a primary concern in Alaska, especially for crop protection and home energy conservation. In the future, woody evaluations may even provide research materials for the selection of a superior growing tree for Alaska's timber industry.

The first evaluation plantings were made at the PMC in 1974.

Seventy-nine accessions were assembled and planted in Field 1B that year, mostly bareroot seedlings from outside Alaska, including 13 hardy rose accessions from Beaverlodge, Alberta, Canada. The roses were donated by the Alaska Rose Society to establish a demonstration planting for people interested in rose gardening. All plants were fertilized with approximately 25 gms of Mag Amp (7-40-6) when planted and cultivated by hand the entire growing season.

In 1975 a 10-acre plot was prepared for permanent initial evaluation plantings from a brome-'Engmo' timothy hay field in 4A. Fall plowing in 1974 and spring spraying with Roundup herbicide the following year proved effective in controlling regrowth of any sod species. One hundred sixty accessions were planted in 1975; twenty-three were from the 1974 planting in Field 1B. Those 1974 accessions with less than 10 plants were kept at 1B for further increase.

The new 10-acre evaluation field has been divided into 10 planting blocks (A-J) with 20 rows in each. Accessions are assigned to a particular block by its suspected size at maturity, i.e., trees are planted to tree blocks A through C, shrubs to shrub blocks D through G, and low growing woody plants to ground cover blocks H through J. Plant spacings within the rows are 16 feet, 12 feet, and six feet, respectively, and 16 feet between all rows. Closer spacings within the rows are used occasionally when extra plant material is available and plant growth suspected to be slow. Some four feet wide solid strip plantings are also

planned for the ground cover blocks. The minimum number of plants of any accession planted in the initial evaluation field is 10 and only in cases where further increase is impractical will an exception for less be made. Parent plants providing seeds or cuttings for evaluation increase will be planted as landscaping around the PMC buildings and yard.

Collection and Assembly

Woody plant materials were collected from both inside and outside Alaska this year, and from several foreign countries (see Table 2). Special interest was given to collecting some of the State's 130 native species, especially willows because of the great diversity in willow species and ease of propagation. Unfortunately, willows are difficult to identify without flowers and most accessions remain unnamed until flowers are available. Primary contributors to the 1975 woody plant assemblage at the PMC, besides staff collections, are listed below.

Alaska Forestry Section, Division of Lands, Anchorage, Alaska
Americus Plant Materials Center, Soil Conservation Service, Americus, Georgia
Bridger Plant Materials Center, Soil Conservation Service, Bridger, Montana
Institute of Agricultural Sciences, Alaska University, Palmer, Alaska
Institute of Northern Forestry, U.S. Forest Service, Fairbanks, Alaska
North Central Regional Plant Introduction Station, Agricultural Research Service, Ames, Iowa
U.S. National Arboretum, Washington, D.C.

Materials and Methods

Once the plant material is collected it is increased, if less than the minimum 10 plants for evaluation planting, by seed or

cutting in the greenhouse, and grown there for at least one growing season before planting in the field. Direct field seeding was tried in the fall of 1974, but proved disastrous because of poor weed control and dry field conditions. In the greenhouse, seeds and cuttings can be grown in a sterilized medium and watered on a more frequent basis. Bareroot materials arriving in early spring are heeled-in a headhouse sawdust pit until planting time, which is usually the month of May.

Weed control within the plant row has been all by hand these first two evaluation years, and between the rows and field perimeter by tractor and disc. Next year Casoron G-4 herbicide will be applied to all second year plantings. Water was applied twice last year through the PMC wheel irrigation system at approximately two inches of water per setting.

Fertilizer was not applied in 1975 to any evaluation plantings except for that carried over in potting soils with transplants. A complete fertilizer, 8-32-16, will be broadcast early this spring in the plant row just before the herbicide application.

Results

This has been the first full year of woody plant observations at the Palmer Plant Materials Center. Hardiness and growth performance should be considered speculative at best, especially since most of the first full year plantings were transplanted again in 1975. As mentioned before, those 1974 plantings not transplanted to Field 4 remained for increase. It can be said, however, with few exceptions, that the native willows and Balsam

poplar accessions planted in 1974 proved to be the most vigorous and hardiest growers of all accessions planted that year, native or exotic. Unlike most native species, *Salix* transplant recovery was excellent and growth response both prompt and extensive. The prostrate willow collections are being looked at with particular interest because of their promising value as low-growing ground cover on highway slopes and other disturbed areas. Cuttings are easily rooted in moist sand without hormones in usually four to eight weeks. Research is needed to establish the most economical means of planting the cutting to the field. Planting unrooted cuttings with a hydromulcher has been suggested. Other easily rooted native plant materials planted this year for evaluation were *Viburnum edule*, highbush cranberry, and *Cornus stolonifera*, redosier dogwood. Both had a slow recovery after being transplanted to the field.

One exotic accession showing good growth performance during the first year was *Prunus padus commutata*, SD-131. Commonly known as European birdcherry or May Day tree, this accession was received from the Bismarck PMC last year as 2-0 bareroot seedlings. It has shown to be the hardiest and most vigorous grower of all the exotics planted in 1974. Shoots averaged 17 inches (43 cm) of new growth the first summer, but sustained an average of 5 inches (13 cm) damage the following winter. Net growth in height the first full evaluation year was 23 inches (58 cm). Plant growth appears strong and the dark green summer foliage rough textured and dense with prompt, extensive recovery in the spring and after transplant.

The May Day tree is considered to be an attractive shrubby tree in the northern plains with showy white, fragrant flowers and valued as a hardy ornamental. The Bismarck accession did not flower the first year. In Alaska, M. F. Babb[1] has reported *P. padus* to be hardy north to the Tanana Valley. The PMC accession shows 100 percent winter survival the first year.

Other 1974 plantings worth creditable mention for first year hardiness and growth performance are listed below.

Amelanchier alnifolia 'Success'
Cornus stolonifera coloradensis A64205
Lonicera olgae A7218
Potentilla fruticosa 'Manleys' A7237
Potentilla fruticosa 'Hallmans Dwarf' A7058
Rosa sp. 'Suzanne' A49383
Salix alba vitellina A73126
Sheperdia argentea A64825
Syringa oblata 'Cheyenne' A32348

Joseph L. Stehlik

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[1]M.F. Babb, "Ornamental Trees and Shrubs for Alaska", Alaska Agricultural Experiment Station Bulletin 24, 1959, University of Alaska.

TABLE 2. Woody plant materials assembled at the Alaska PMC for initial evaluation in 1975.

Species	Accession No.	Source	Origin	Material[1/]	Amount	
					Plants	Seeds
Acer tataricum	NA33959	Nat. Arboretum	Sarajena, Bosnia and H., Yug.	brs	1	
Acer tataricum		NC Reg. Plant Intro. Station	Ames, Iowa	brs	3	
Alnus sinnata	L241	Palmer, Alaska	Palmer, Alaska	s		
Amorpha fruticosa	AM2718	Americus PMC	Gainsville, Texas	brt	25	
Amelanchier alnifolia	L272	Palmer, Alaska	Palmer, Alaska	s		1 gm.
Ampelopsis brevipedunculata	AM2402	Americus PMC	Chapel Hill, NC	brt	25	
Buxus suffruticosa	G17880	NE Reg. Plant Intro. Station	Oakville, Ontario Canada	brt	13	
Buxus suffruticosa	G17881	NE Reg. Plant Intro. Station	Oakville, Ontario Canada	brt	1	
Campsis radicans	AM284	Americus PMC	Raleigh, NC	brt	25	
Castanea dentata	L279	AK State Forestry	Wisconsin	s		410 gms.
Ceanothus americanus	AM2138	Americus PMC	Raleigh, NC	brt	10	
Cotoneaster sp.	L234	Inst. Ag. Sciences Palmer, Alaska		s		
Crataegus arnoldiana	ND430	Bridger PMC		brs	5	
Crataegus sp.	L233	Inst. Ag. Sciences Palmer, Alaska		s		25 gms.
Elaegnus umbellata	Mixed lot	Americus PMC	Virginia	brt	25	

See footnote 1 at end of table, p. 38.

TABLE 2. Woody plant materials assembled at the Alaska PMC for initial evaluation in 1975. Continued.

Species	Accession No.	Source	Origin	Material[1/]	Amount	
					Plants	Seeds
Enonymus bungeanus	AM2598	Americus PMC	Kansas	brt	10	
Enonymus europaeus	NA35118	Nat. Arboretum	Krapina, Croatia, Yug.	brs	1	
Enonymus europaeus	NA35119	Nat. Arboretum	Gornjivakuf, Bosnia and H., Yug.	brs	1	
Fraxinus excelsior	PI377816	NC Reg. Plant Intro. Station	Yugoslavia (central)	brs	6	
Hamamelis virginiana		NC Reg. Plant Intro. Station		brt	10	
Juniperus communis	PI377822	NC Reg. Plant Intro. Station	Yugoslavia	brs	10	
Larix sibirica		NC Reg. Plant Intro. Station		brs	3	
Ligustrum vulgare	PI170630	Bridger PMC		c	30	
Lonicera maaki	AM1538	Americus PMC		brt	25	
Parthenocissus quinquefolia	AM3041	Americus PMC	Brooksville, Fla.	brt	25	
Picea glauca	L366	AK State Forestry	Talkeetna, Alaska	s		202 gms.
Picea glauca	L274	AK State Forestry	Fairbanks, Alaska	s		3762 gms.
Picea glauca	L276	AK State Forestry	Kenai, Alaska	s		274 gms.
Picea glauca x *sitchensis*	L267	AK State Forestry	Tyonek, Alaska	s		255 gms.
Picea pungens	M847	Bridger PMC			29	

See footnote 1 at end of table, p. 38.

TABLE 2. Woody plant materials assembled at the Alaska PMC for initial evaluation in 1975. Continued.

Species	Accession No.	Source	Origin	Material[1/]	Amount	
					Plants	Seeds
Picea sitchensis	L269	Homer, Alaska	Homer, Alaska	s		22 gms.
Picea sitchensis	L270	Homer, Alaska	Homer, Alaska	s		20 gms.
Picea sitchensis	L271	Homer, Alaska	Homer, Alaska	s		2 gms.
Picea sitchensis	L277	AK State Forestry	Kenai, Alaska	s		211 gms.
Picea sitchensis	L278	USFS, Afognak Is.	Afognak Is., Alaska	s		109 gms.
Pinus contorta	L242	AK State Forestry	Hayilton, B.C., Canada	brs	19	
Pinus contorta	L236	Inst. Northern Forestry	Whitehorse, Y.T., Canada	s		581 gms.
Pinus mugo	NA35150	Nat. Arboretum	Mt. Maglic, Bosnia and H., Yug.		5	
Pinus resinosa	L243	AK State Forestry		brs	10	
Populus deltoides	'Siouxland'	Bridger PMC		c	30	
Populus deltoides	'Robusta'	Bridger PMC		c	30	
Populus tremuloides	L239	Palmer, Alaska	Palmer, Alaska	s		9 gms.
Populus tremuloides	L240	Palmer, Alaska	Palmer, Alaska	s		5 gms.
Populus trichocarpa	L275	Inst. Northern Forestry	Talkeetna, Alaska	s		
Prunus cerasifera	'Thundercloud'	NC Reg. Plant Intro. Station		brt	8	
Prunus japonica	ND3	Bridger PMC		brs	30	
Prunus serotina	L235	Allegheny Nat. Forest, USFS		s		15 gms.

See footnote 1 at end of table, p. 38.

TABLE 2. Woody plant materials assembled at the Alaska PMC for initial evaluation in 1975. Continued.

Species	Accession No.	Source	Origin	Material 1/	Amount	
					Plants	Seeds
Prunus tenella	ND283	Bridger PMC		brs	30	
Ribes hudsomanum	L262	Palmer, Alaska	Palmer, Alaska	c	36	
Ribes triste	L258	Palmer, Alaska	Palmer, Alaska	c	28	
Ribes triste	L259	Palmer, Alaska	Palmer, Alaska	c	49	
Ribes sativum	L244	Inst. Ag. Sciences Palmer, Alaska		c	34	
Rubus idaeus	L260	Palmer, Alaska	Palmer, Alaska	c	25	
Rubus idaeus	L261	Palmer, Alaska	Palmer, Alaska	c	81	
Salix sp.	L237	Palmer, Alaska	Palmer, Alaska	c	80	
Salix sp.	L238	Palmer, Alaska	Palmer, Alaska	c	54	
Sambucus callicarpa	L264	Tyonek, Alaska	Tyonek, Alaska	s		15 gms.
Spirea beauverdiana	L265	Tyonek, Alaska	Tyonek, Alaska	s		1 gm.
Sorbus scopulina	L273	Palmer, Alaska	Palmer, Alaska	s		1 gm.
Tsuga mertensiana	L268	AK State Forestry	Tyonek, Alaska	s		49 gms.
Vaccinium ovalifolium	L263	Tyonek, Alaska	Tyonek, Alaska	s		1 gm.
Viburnum opulus	NA35167	Nat. Arboretum	Gospic, Croatia, Yug.	brs	1	

1/ Code of plant materials assembled in 1975 is defined as follows:
- brs -- bareroot seedlings
- brt -- bareroot transplants
- c -- cutting material
- s -- seed

APPENDIX TABLE 1. Woody plants under field observations in 1975.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Abies lasiocarpa	L214	Skagway, AK	9/74 s	300	79	-	-	-	Dry field conditions
Acer tataricum	-	Ames, IA	6/75 brs	3	3	-	86 X 17	3	NC-7 accession
Aesculus sp.	M960	Bridger, MT	9/74 s	72	ng	-	-	-	Dry field conditions
Amelanchier alnifolia	'Success'	Bismarck, ND	5/74 brs	125	125	2	53 X 60	2	Good winter survival but some dieback. 10 transplanted to Field 4
Amorpha fruticosa	AM2718	Americus, GA	5/75 brs	10	9	-	25 X 19	5	Slow transpl. recov. Subject to frost dam.
Ampelopsis brevipedunculata	AM2402	Americus, GA	5/75 br	10	8	-	15 X 17	4	
Artemisia abrotanum nanum	A5088	Cheyenne, WY	5/75 rc	10	10	-	60 X 93	1	Attractive sage fragrant foliage
Artemisia frigida	L93	Palmer, AK	7/75 btp	10	9	-	7 X 24	2	
Betula papyrifera	L44	Fairbanks, AK	5/75 sdlg	10	10	-	11 X 10	4	
Buxus suffruticosa	G17880	Geneva, NY	6/75 br	10	10	-	31 X 30	5	No shoot growth
Buxus suffruticosa	G17881	Geneva, NY	6/75 br	1	1	-	64 X 46	5	No shoot growth
Campsis radicans	AM3097	Americus, GA	5/75 br	19	17	-	18 X 19	4	
Caragana arborescens	L84	Fairbanks, AK	5/75 sdlg	10	10	-	27 X 5	4	

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Caragana microphylla	A51348	Cheyenne, WY	5/75 rc	10	4	-	27 X 20	4	
Caryopteris sp.	'Azure'	Cheyenne, WY	5/74 br	1	0	6	-	-	Winterkilled
Ceanothus americanus	AM2138	Americus, GA	5/75 br	10	8	-	35 X 20	4	
Chamaecyparis nootkatensis	L213	Petersburg, AK	9/74 s	360	10	-	6 X 5	2	Transpl. to grnhs.
Cornus amomum	Mich 765	Rose Lake, MI	5/74 brs	25	5	4	42 X 30	4	Winterkilled
Cornus stolonifera coloradensis	A64205	Cheyenne, WY	5/74 br	2	2	1	85 X 131	2	
Cornus stolonifera	L191	Palmer, AK	5/75 rc	10	10	-	65 X 41	3	
Cotoneaster acutifolia	AB368	Bridger, MT	9/74 s	128	ng	-	-	-	Dry field conditions
Cotoneaster racemiflora desfontain	A7285	Cheyenne, WY	5/74 br	3	0	6	-	-	Winterkilled
Cotoneaster racemiflora	ND279	Bridger, MT	9/74 s	20	ng	-	-	-	Dry field conditions
Cotoneaster sp.	ND170	Bridger, MT	9/74 s	71	ng	-	-	-	Dry field conditions
Crataegus ambigua	A31709	Cheyenne, WY	5/74 brs	2	2	3	-	4	Poor spring recovery
Crataegus arnoldiana	ND20	Bridger, MT	5/75 sdlg	10	2	-	34 X 15	3	Poor transpl. recov.
Crataegus lauta on *C. intricata*	A36313	Cheyenne, WY	5/74 br	2	1	4	38 X 13	4	

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Elaeagnus angustifolia	C143	Bridger, MT	9/74 s	20	ng	-	-	-	Dry field conditions
Elaeagnus angustifolia	WY160	Bismarck, ND	5/74 brs	25	3	4	63 X 46	5	22/25 winterkilled
Elaeagnus angustifolia orientalis	A71106	Cheyenne, WY	5/75 rc	10	1	-	36 X 38	5	Poor transpl. recov.
Elaeagnus commutata	L103	Matanuska, AK	5/75 sdlg	10	10	-	24 X 17	3	
Elaeagnus commutata	L198	Palmer, AK	5/75 sdlg	10	9	-	25 X 14	5	Planting location at seedhouse-east wall
Elaeagnus umbellata	'Cardinal'	Big Flats, NY	5/74 brs	25	0	6	-	-	Winterkilled
Elaeagnus umbellata	'Cardinal'	Rose Lake, MI	5/74 brs	25	0	6	-	-	Winterkilled
Elaeagnus umbellata	Mich 777	Rose Lake, MI	5/74 brs	25	0	6	-	-	Winterkilled
Elaeagnus umbellata	A7030	Cheyenne, WY	5/74 brs	1	0	6	-	-	Winterkilled
Elaeagnus umbellata	Mixed lot	Americus, GA	5/75 br	10	10	-	44 X 56	2	
Euonymus americanus	A49468	Cheyenne, WY	5/75 rc	10	8	-	22 X 12	4	Slow transpl. recov.
Euonymus bungeanus	AM2598	Americus, GA	5/75 br	10	10	-	59 X 46	3	
Euonymus yedoensis	A729	Cheyenne, WY	5/74 br	2	0	6	-	-	Winterkilled

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Fraxinus excelsior	PI377816	Ames, IA	5/75 brs	6	3	-	19 X 23	5	NC-7 accession. 3 trees killed by tractor disc.
Hamamelis virginia	-	Ames, IA	5/75 br	10	1	-	48 X 13	5	Poor transpl. recov. NC-7 accession
Juglans mandshurica	ND548	Bismarck, ND	5/74 brs	25	0	6	-	-	Winterkilled
Juniperus communis	PI377822	Ames, IA	5/75 br	10	0	-	-	-	NC-7 accession Plants dried out before planting
Juniperus horizontalis	'Bar Harbor'	Fresno, CA	5/75 rc	19	18	-	10 X 21	3	
Juniperus horizontalis	'Wiltoni'	Fresno, CA	5/75 rc	19	15	-	10 X 10	5	
Larix sibirica	-	Bottineau, ND	6/75 brs	3	3	-	64 X 24	3	NC-7 accession
Larix sibirica	L147	Maisala, Finland	9/74 s	683	36	-	4 X 4	1	Surviving sdlgs transpl. to grnhs.
Ligustrum vulgare	A72150	Cheyenne, WY	5/74 br	2	2	3	29 X 34	3	
Ligustrum vulgare	PI170630	Bridger, MT	5/75 rc	10	8	-	12 X 6	4	
Lonicera alpigena	A3398	Cheyenne, WY	5/74 br	2	0	6	-	-	Winterkilled
Lonicera coerulea	A48455	Cheyenne, WY	5/74 br	2	2	-	-	3	

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Lonicera demissa	A7216	Cheyenne, WY	5/74 br	2	1	-	84 X 76	3	Poor spring recov.
Lonicera maacki	AM1538	Americus, GA	5/75 br	10	10	-	47 X 58	1	
Lonicera myrtilloides	A7217	Cheyenne, WY	5/74 br	1	1	-	-	1	
Lonicera olgae	A7218	Cheyenne, WY	5/74 br	2	2	1	56 X 90	1	
Lonicera prolifera	A5295	Cheyenne, WY	5/74 br	2	0	6	-	-	Winterkilled
Lonicera tatarica	'Carlton'	Cheyenne, WY	5/74 br	5	3	3	41 X 50	3	3/5 winterkilled New planting made in 4A
Lonicera tatarica sibirica	WY162	Bridger, MT	9/74 s	63	ng	-	-	-	Dry field cond.
Lonicera sp.	'Cardinal'	Cheyenne, WY	5/75 rc	10	9	-	51 X 27	2	
Malus baccata mandshurica	'Midwest'	Bismarck, ND	5/74 brs	25	10	3	87 X 72	1	11/25 winterkilled Consid. dieback 10 transpl. to 4A
Malus diversifolia	L221	Hollis, AK	9/74 s	400	ng	-	-	-	Dry field cond.
Malus hupehensis	ND246	Bridger, MT	7/74 s	34	ng	-	-	-	Dry field cond.
Malus zumi	Mich 1340	Rose Lake, MI	5/74 brs	22	9	2	44 X 27	2	13/22 winterkilled 10 transpl. to 4A
Parthenocissus quinquefolia	AM3041	Americus, GA	5/75 br	19	9	-	-	5	Slow transpl. recov.

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Philadelphus lewisi	L153	Palmer, AK	5/74 btp	1	1	3	84 X 102	3	
Physocarpus sp.	L1932	df Cheyenne, WY	5/74 br	2	0	6	-	-	Winterkilled
Picea glauca	R10	M.P. 1321 AK. Hwy., AK	5/75 brs	10	7	-	12 X 6	4	
Picea sitchensis	L187	Juneau, AK	5/75 brs	10	10	-	19 X 20	2	
Picea sitchensis	L212	Auke Bay, AK	9/74 s	-	61	-	4 X 4	2	36 sdlgs transpl. from field to grnhs.
Pinus banksiana	L151	Matanuska, AK	5/74 btp	1	0	6	-	-	Poor transpl. recov.
Pinus contorta contorta	L218	Juneau, AK	9/74 s	500	ng	-	-	-	Dry field cond.
Pinus contorta latifolia	L219	Haines, AK	9/74 s	300	15	-	7 X 7	2	12 sdlgs transpl. from field to grnhs.
Pinus contorta	L242	Hayilton, B.C.	5/75 brs	19	16	-	19 X 11	4	
Pinus resinosa	L243	Hayilton, B.C.	5/75 brs	10	10	-	26 X 17	5	Poor recovery No fall bud set
Pinus resinosa	L152	Matanuska, AK	5/74 btp	2	2	3	41 X 24	5	Very little shoot growth
Pinus sylvestris	'Mänty'	Rovaniemi, Finland	9/74 s	600	31	-	4 X 4	3	31 sdlgs transpl. from field to grnhs.
Populus balsamifera	L120	Palmer, AK	6/74 rc	16	16	1	114 X 60	1	10 transpl. to 4A
Populus balsamifera	L136	Fairbanks, AK	6/74 rc	18	18	1	-	-	Disced under by mistake
Populus balsamifera	L182	Meier, AK	6/75 rc	16	0	-	-	5	No transpl. recov.

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Populus canadensis eugenia	Mich 88	Bismarck, ND	5/74 br	25	18	3	92 X 74	2	30-46 cm winter dieback but good summer recov. 10 transpl. to 4A
Populus nigra	A3061	Cheyenne, WY	5/75 rc	10	10	-	119 X 61	1	
Populus petrowskyana	A49333	Cheyenne, WY	5/75 rc	10	10	-	102 X 74	1	
Populus simoni	Mich 857	Rose Lake, MI	5/74 brc	25	16	4	75 X 45	3	10 transpl. to 4A Consid. winter dieback but no winterkill
Potentilla fruticosa	L8	M.P. 108 Rich. Hwy., AK	5/75 sdlg	10	10	-	36 X 24	2	
Potentilla fruticosa	'Manleys'	Cheyenne, WY	5/74 brd	4	3	2	53 X 54	3	
Potentilla fruticosa dahurica	A32742	Cheyenne, WY	5/75 rc	10	10	-	31 X 49	1	profuse blooms, white flowers
Potentilla fruticosa frederichseni	A48462	Cheyenne, WY	5/75 rc	10	10	-	43 X 53	1	profuse blooms, yellow flowers
Potentilla fruticosa	'Hallman's Dwarf'	Cheyenne, WY	5/75 br	3	3	1	-	3 4A	10 new plants in Field from cuttings of A7058
Prunus armeniaca	'Morden'	Bismarck, ND	5/74 br	25	13	3	70 X 60	2	8/25 winterkilled 10 transpl. to 4A consid. winter dieback

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Prunus cerasifera	'Thunder- bird'	Ames, IA	5/75 br	8	8	-	156 X 44	3	NC-7 accession Purple foliage
Prunus japonica	ND3	Nridger, MT	9/74 s	55	ng	-	-	-	Dry field conditions
Prunus padus commutata	SD131	Bismarck, ND	5/74 br	25	25	1	88 X 54	1	10 transpl. to 4A Excellent transpl. recov.
Prunus sp.	L146	Fairbanks, AK	5/74 rc	10	10	-	42 X 24	1	
Prunus tomentosa	39-3	Cheyenne, WY	5/74 br	3	0	6	-	-	Winterkilled, 1939 Large fruited Cheyenne selection
Prunus virginiana melanocarpa	L205	Palmer, AK	5/75 rc	10	8	-	8 X 1	5	Cultives 'Shubert' Large fruited Cheyenne selection
Quercus macrocarpa	M959	Bridger, MT	5/75 sdlg	10	0	-	-	-	No transpl. recov.
Rhus canadensis	C96	Bridger, MT	9/74 s	400	ng	-	-	-	Dry field conditions
Rhus trilobata	T152	Bridger, MT	9/74 s	160	3	-	-	-	Sdlgs. transpl. to grnhs.
Robinia fertilis	'Arnot'	Big Flats, NY	5/74 brs	20	0	6	-	-	Winterkilled
Robinia fertilis	'Arnot'	Rose Lake, MI	5/74 brs	25	0	6	-	-	Winterkilled
Rosa sp.		Beaverlodge, Alberta, CAN	6/74 br	2	2	3	57 X 69	-	Cane dieback
Rosa sp.	'Assiniloine'	Beaverlodge, Alberta, CAN	6/74 br	2	1	3	46 X 46	-	Cane dieback
Rosa sp.	'Betty Bugnet'	Beaverlodge, Alberta, CAN	6/74 br	2	2	3	122 X 85	-	Complete cane dieback
Rosa sp.	'Cumberland'	Beaverlodge, Alberta, CAN	6/74 br	2	1	3	-	-	Complete cane dieback

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Rosa sp. 'Lac Mayea'		Beaverlodge, Alberta, CAN	6/74 br	1	1	3	89 X 74	-	White flowers Complete cane dieback
Rosa sp. 'Lac LaNoune'		Beaverlodge, Alberta, CAN	6/74 br	3	3	3	79 X 88	-	Complete cane dieback
Rosa sp. 'Louise Bugnet'		Beaverlodge, Alberta, CAN	6/74 br	2	2	3	42 X 58	-	Red flowers Complete cane dieback
Rosa sp. 'Marie Bugnet'		Beaverlodge, Alberta, CAN	6/74 br	2	2	3	53 X 83	-	White flowers Complete cane dieback
Rosa sp. 'Mrs. Anthony Waterer'		Beaverlodge, Alberta, CAN	6/74 br	2	2	3	61 X 103	-	Complete cane dieback
Rosa sp. 'Perfuma Ae La Hug'		Beaverlodge, Alberta, CAN	6/74 br	1	1	3	61 X 86	-	Complete cane dieback
Rosa sp. 'Perfuma Ae La Gay'		Beaverlodge, Alberta, CAN	6/74 br	1	1	3	-	-	Complete cane dieback
Rosa sp. 'Prairie Youth'		Beaverlodge, Alberta, CAN	6/74 br	2	2	3	43 X 48	-	Complete cane dieback
Rosa sp. 'Suzanne'		Cheyenne, WY	5/74 br	2	2	2	61 X 89	1	Pink flowers Some cane dieback
Rosa sp. 'Tetonhaha'		Beaverlodge, Alberta, CAN	6/74 br	2	2	3	-	-	Complete cane dieback
Salix alba vitellina	A73126	Cheyenne, WY	5/74 br	2	2	2	-	3	
Salix alba vitellina	M961	Bridger, MT	5/74 urc	25	15	3	92 X 94	1	Planted directly to field unrooted. 10 moved to 4A

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Salix barclayi	L131	Juneau, AK	6/74 rc	12	11	1	90 X 76	1	10 transpl. to 4A
Salix depressa	L143	Palmer, AK	6/75 rc	10	9	-	82 X 57	1	
Salix glauca	L89	Fairbanks, AK	9/74 s	2750	ng	-	-	-	Dry field conditions
Salix glauca	L90	Fairbanks, AK	9/74 s	1650	ng	-	-	-	Dry field conditions
Salix glauca	L91	Fairbanks, AK	9/74 s	2750	ng	-	-	-	Dry field conditions
Salix purpurea nana	Mich 520	Rose Lake, MI	5/74 brc	25	0	6	54 X 91	2	22/25 winterkilled
Salix sp.	L76	Nome, AK	6/74 rc	4	4	1	-	-	
Salix sp.	L78	Nome, AK	6/74 rc	3	3	1	-	-	
Salix sp.	L79	Nome, AK	6/74 rc	2	2	1	-	-	
Salix sp.	L80	Nome, AK	6/74 rc	3	3	1	-	-	
Salix sp.	L95	Kodiak Is., AK	6/74 rc	12	12	1	62 X 109	1	10 transpl. to 4A
Salix sp.	K96	Kodiak Is., AK	6/74 rc	12	12	1	67 X 96	1	10 transpl. to 4A
Salix sp.	L104	Matanuska, AK	6/74 rc	12	12	1	84 X 90	1	10 transpl. to 4A
								Evaluation	from accession planted in E11
Salix sp.	L105	Matanuska, AK	6/74 rc	9	7	1	-	-	
Salix sp.	L107	Matanuska, AK	6/74 rc	12	12	1	97 X 112	1	10 transpl. to 4A
								Evalaution	from accession planted in E9
Salix sp.	L111	Matanuska, AK	6/74 rc	12	11	1	74 X 94	1	10 transpl. to 4A
Salix sp.	L112	Matanuska, AK	6/74 rc	12	4	1	-	-	
Salix sp.	L113	Matanuska, AK	6/74 rc	12	11	1	99 X 84	1	10 transpl. to 4A

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Salix sp.	L130	Juneau, AK	6/74 rc	12	11	1	84 X 76	1	10 transpl. to 4A
Salix sp.	L138	Fairbanks, AK	6/74 rc	12	12	1	86 X 49	1	10 transpl. to 4A
Salix sp.	L145	Palmer, AK	6/75 rc	10	9	-	59 X 90	1	
Salix sp.	L156	Palmer, AK	6/75 rc	10	10	-	73 X 56	1	
Salix sp.	L157	Kenai, AK	6/75 rc	10	10	-	45 X 79	1	Evaluation from accession planted in G14
Salix sp.	L158	Kenai, AK	6/75 rc	10	10	-	66 X 60	1	
Salix sp.	L160	Palmer, AK	6/75 rc	10	9	-	43 X 37	2	
Salix sp.	L161	Palmer, AK	5/75 rc	10	10	-	85 X 64	1	
Salix sp.	L162	Palmer, AK	6/75 rc	10	9	-	68 X 67	1	
Salix sp.	L163	Palmer, AK	6/75 rc	10	10	-	97 X 58	1	
Salix sp.	L164	Palmer, AK	5/75 rc	10	10	-	30 X 57	1	Evaluation from accession planted in F16
Salix sp.	L165	Palmer, AK	5/75 rc	10	10	-	70 X 70	2	
Salix sp.	L167	Palmer, AK	6/75 rc	10	10	-	72 X 51	1	
Salix sp.	L168	Palmer, AK	6/75 rc	10	10	-	43 X 61	2	
Salix sp.	L171	Palmer, AK	6/75 rc	10	10	-	67 X 60	1	Evaluation from accession planted in F13
Salix sp.	L174	Denali Hwy., AK	6/75 rc	10	10	-	9 X 11	3	
Salix sp.	L175	Denali Hwy., AK	6/75 rc	10	10	-	43 X 61	2	
Salix sp.	L176	Denali Hwy., AK	5/75 rc	10	9	-	34 X 34	2	
Salix sp.	L179	Denali Hwy., AK	5/75 rc	10	9	-	18 X 32	4	
Salix sp.	L180	Denali Hwy., AK	5/75 rc	10	6	-	-	4	

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Salix sp.	L181	Denali Hwy., AK	5/75 rc	10	6	-	20 X 30	3	Slow recovery
Salix sp.	L186	Whittier, AK	5/75 rc	10	9	-	-	3	
Sambucus racemosa	R43	Sterling Hwy., AK	5/75 sdlg	10	10	-	29 X 31	5	
Sambucus racemosa	L223A	Juneau, AK	9/74 s	700	8	-	15 X 17	1	Sdlgs transpl. to grnhs.
Sheperdia argentea	A64825	Cheyenne, WY	5/74 br	3	3	1	59 X 50	2	
Sorbus acuparia	L220	Juneau, AK	9/74 s	600	12	-	17 X 17	1	Sdlgs transpl. to grnhs.
Sorbus sitchensis	L222	Haines, AK	9/74 s	60	ng	-	-	-	Dry field conditions
Spirea macrothyrsa	A7233	Cheyenne, WY	5/75 rc	10	10	-	59 X 68	1	Pink flowers
Spirea nipponica	A56160	Cheyenne, WY	5/75 rc	10	10	-	30 X 55	2	
Syringa oblata	'Cheyenne'	Cheyenne, WY	5/74 br	2	2	2	-	5	
Syringa palibinana	A7186	Cheyenne, WY	5/75 rc	10	10	-	19 X 14	2	
Syringa wolfii	A7034	Cheyenne, WY	5/74 rc	1	1	3	53 X 33	1	
Tamarix pentandra rubra	A49394	Cheyenne, WY	5/74 br	1	0	6	-	2	Winterkilled
Thuja plicata	L216	Thurne Bay, AK	9/74 s	400	ng	-	-	-	Dry field conditions
Tsuga heterophylla	L215	Anice Bay, AK	9/74 s	600	9	-	4 X 4	4	Sdlgs transpl. to grnhs.

See footnotes 1, 2, 3, 4, and 5 at end of table, pp. 51 and 52.

APPENDIX TABLE 1. Woody plants under field observations in 1975. Continued.

Species	Acc. No.	Source	Date Planted[1]	No. Planted	No. Survived[2]	Winter Injury[3]	Size[4]	Summer Growth Performance[5]	Comments
Tsuga mertensiana	L217	Juneau, AK	9/74 s	600	ng	-	-	-	Dry field conditions
Viburnum dilatatum	A7044	Cheyenne, WY	5/74 br	1	0	6	-	-	Winterkilled
Viburnum edule	L114	Eklutna, AK	5/75 rc	10	10	-	16 X 11	5	Little shoot growth Sparse foliage
Viburnum orientale	A7146	Cheyenne, WY	5/74 br	2	2	-	-	2	

1/ Codes used after the planting date refer to the type of plant material planted to the field at that date and are defined as follows:
br = bareroot
brc = bareroot cutting
brd = bareroot division
brs = bareroot seedling
btp = balled transplant
rc = rooted cutting
s = seed
sdlg = seedling
urc = unrooted cutting

2/ Number of plants alive as of October, 1975.
ng = no germination

3/ Injury rating refers to precent area affected on surviving plants. Ratings taken May, 1975.
1 = 0-19%
2 = 20-39%
3 = 40-59%
4 = 60-79%
5 = 80-99%
6 = 100% (dead)

4/ Measurements refer to average height and average width of accession plants as of October, 1975.

5/ The summer growth performance rating is an attempt to consolidate growth rate, spring recovery, and transplant recovery into one subjective evaluation this first year since spring recovery was impossible to separate from transplant recovery in 1974 accessions. The rating is for the 1975 growing season only and ranges numerically from 1 to 5, 1 being best.

1 (excellent) = very strong growth with abundant foliage and healthy color. Recovery prompt and extensive.

2 (good) = strong growth, but with only moderate to abundant foliage and a slow to prompt recovery.

3 (medium) = moderate growth and foliage on most stems. Recovery slow with most shoot growth later in the season.

4 (fair) = moderate to little growth with moderate to sparse foliage development. Recovery slow to poor.

5 (poor) = little to no plant growth, sparse foliage, and poor recovery with little or no shoot growth.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Abies lasiocarpa[1/]	L214	For. Sci. Lab. Juneau, AK	Skagway, AK	9/11/74	2
Acer ginnala[1/]	A3316	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	8[3/]
Acer ginnala[1/]	A49341	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	1[3/]
Acer tataricum[1/]	A30285	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	8[3/]
Acer tataricum[1/]	A53217	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	7[3/]
Amelanchier alnifolia	L272	Palmer PMC Palmer, AK	Palmer, AK	9/29/74[2/]	6[3/]
Amorpha canescens	A322473	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	4
Amorpha fragrans	A4912	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	10
Amorpha nana	A50166	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	8
Amorpha virgata	A52336	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	4
Arctostaphylos uva-ursi	L37	Palmer PMC Palmer, AK	MP 10.5 Steese Hwy., AK	9/11/73[2/]	4
Betula papyrifera[1/]	L44	Palmer PMC Palmer, AK	MP 72.5 Steese Hwy., AK	9/11/73[2/]	1

See footnotes 1, 2, and 3 at end of table, p. 64.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Betula papyrifera[1]	L68	Palmer PMC Palmer, AK	MP 152 Parks Hwy., AK	9/12/73[2]	1
Caragana aborescens[1]	L84	AK Dept. Hwys. Fairbanks, AK	Fairbanks, AK	2/15/74	116
Caragana decorticans[1]	A32935	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	5
Caragana pekinensis[1]	A32342	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	6
Castanea dentata	L279	AK State Forestry Anchorage, AK	Wisconsin	11/18/75	410
Cercocarpus douglasi[1]	A331467	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	1[3]
Chamaecyparis nootkatensis[1]	L213	For. Sci. Lab. Juneau, AK	Petersburg, AK	9/11/74	1
Colutea istria	A5120	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	14
Colutea orientalis	A5946	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	6
Cornus candensis[1]	L39	Palmer PMC Palmer, AK	MP 20 Steese Hwy., AK	9/11/73	2
Cornus candensis[1]	L67	Palmer PMC Palmer, AK	MP 152 Parks Hwy., AK	9/12/73	1
Cotoneaster acutifolia[1]	AB368	Bridger PMC Bridger, MT	-	5/11/74	4

See footnotes 1, 2, and 3 at end of table, p. 64.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Cotoneaster acutifolia[1/]	A31179	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	8
Cotoneaster hupehensis	A3773	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	7[3/]
Cotoneaster ignava[1/]	A50154	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	14[3/]
Cotoneaster integerrima	A32902	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	7[3/]
Cotoneaster lucida[1/]	A32665	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	13
Cotoneaster lucida	A51152	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	4
Cotoneaster moupinensis[1/]	A36367	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	15[3/]
Cotoneaster multiflora[1/]	A41111	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	9
Cotoneaster obtusata[1/]	A36368	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	7[3/]
Cotoneaster racemiflora	A34645	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	17[3/]
Cotoneaster sp.	ND170	Bridger PMC Bridger, MT	-	5/11/74	1
Cotoneaster sp.	A51340	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	4

See footnotes 1 and 3 at end of table, p. 64.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Cotoneaster sp.[1]	L234	Ag. Experiment Sta. Palmer, AK	Palmer, AK	1/23/75	2
Crataegus ambigua[1]	A31709	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	6
Crataegus arnoldiana[1]	ND20	Bridger PMC Bridger, MT	-	12/28/73	4
Crataegus doddsii[1]	A321967	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	3
Crataegus doddsii[1]	A322179	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	9[3]
Crataegus durobrivensis[1]	A51343	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	5
Crataegus hystricina[1]	A35278	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	12+
Crataegus intricata[1]	A57261	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	7[3]
Crataegus pentagyna[1]	A36112	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	11[3]
Crataegus sp.	A331385	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	5[3]
Crataegus sp.[1]	L233	Ag. Experiment Sta. Palmer, AK	Palmer, AK	1/23/75	26
Dryas drummondii[1]	L14	Palmer PMC Palmer, AK	MP 44 Rich. Hwy., AK	8/14/73[2]	3
Dryas drummondii	L210	Palmer PMC Palmer, AK	Palmer, AK	6/22/74[2]	8

See footnotes 1, 2, and 3 at end of table, p. 64.

APPENDIX
TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Dryas octopetala[1]	L50	Palmer PMC Palmer, AK	MP 107 Steese Hwy., AK	9/11/73[2]	1
Elaeagnus angustifolia[1]	WQ160	Bridger PMC Bridger, MT	-	5/11/74	42
Elaeagnus commutata[1]	L103	Palmer PMC Palmer, AK	Palmer, AK	4/03/74[2]	25
Empetrum nigrum[1]	L46	Palmer PMC Palmer, AK	MP 85 Steese Hwy., AK	9/11/73	3
Euonymus europaeus[1]	A5688	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	19[3]
Euonymus europaeus[1]	A36374	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	2
Genista sp.[1]	A51346	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	1
Gleditsia sp.[1]	L230	No. Great Plns. Res. Lab. Mandon, ND	-	4/17/74[2]	28
Larix sibirica[4]	L147	Research Institute Maisala, Finland	Finland	5/15/74	50
Lonicera maackie	A51331	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	1
Lonicera prolifera	A5295	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	2
Malus diversifolia[1]	L221	For. Sci. Lab. Juneau, AK	Hollis, AK	9/11/74	2

See footnotes 1, 2, 3, and 4 at end of table, p. 64.

APPENDIX
TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Malus hupehensis[1]	ND246	Bridger PMC Bridger, MT	-	5/11/74	3
Malus sp. 'Rescue'	L211	Chuck Logsdon Palmer, AK	Palmer, AK	9/06/74[2]	1
Physocarpus intermedius	A41923	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	1
Picea glauca[1]	L9	Palmer PMC Palmer, AK	MP 108.6 Rich. Hwy., AK	8/14/73[2]	1
Picea glauca[1]	R10	Palmer PMC Palmer, AK	Tok, AK	8/14/73[2]	6
Picea glauca[1]	L69	Palmer PMC Palmer, AK	MP 152 Parks Hwy., AK	9/12/73[2]	1
Picea glauca[4]	L224	AK State Forestry Anchorage, AK	Kenai, AK	11/21/74	268
Picea glauca[4]	L226	Inst. No. Forestry Fairbanks, AK	Fairbanks, AK	10/09/74	12
Picea glauca	L266	AK State Forestry Anchorage, AK	Chena River Talkeetna, AK	9/03/75[2]	200
Picea glauca	L274	AK State Forestry Anchorage, AK	Fairbanks, AK	9/01/75[2]	3760
Picea glauca	L276	AK State Forestry Anchorage, AK	Kenai, AK	9/22/75[2]	272
Picea lutzii	L267	AK State Forestry Anchorage, AK	Tyonek, AK	9/11/75	253

See footnotes 1, 2, and 4 at end of table, p. 64.

APPENDIX
TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Picea sitchensis[1]	L23	Palmer PMC Palmer, AK	MP 4.6 Rich. Hwy., AK	8/15/73	1
Picea sitchensis[1]	L212	For. Sci. Lab. Juneau, AK	Auke Bay, AK	9/11/74	1
Picea sitchensis[4]	L223	AK State Forestry Anchorage, AK	Haines, AK	11/21/74	273
Picea sitchensis	L228	AK State Forestry Anchorage, AK	Seward, AK (Moose Pass)	8/74[2]	5
Picea sitchensis	L269	SCS Subdistrict Homer, AK	Homer, AK	9/10/75	22
Picea sitchensis	L270	SCS Subdistrict Homer, AK	Homer, AK	9/10/75	20
Picea sitchensis	L271	SCS Subdistrict Homer, AK	Homer, AK	9/10/75	2
Picea sitchensis	L277	AK State Forestry Anchorage, AK	Kenai, AK	10/08/75	209
Picea sitchensis	L278	USFS Afognak Is., AK	Afognak Is., AK (Portage Lake)	10/22/75	107
Pinus contorta contorta[1]	L218	For. Sci. Lab. Juneau, AK	Douglas Is., AK	9/11/74	2
Pinus contorta latifolia[1]	L219	For. Sci. Lab. Juneau, AK	Haines, AK	9/11/74	1
Pinus contorta latifolia[4]	L236	Inst. No. Forestry Fairbanks, AK	Whitehorse, Y. T.	2/20/75	219

See footnotes 1, 2, and 4 at end of table, p. 64.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Pinus sp.	L135	Bismarck PMC Bismarck, ND	-	4/18/74[2]	1
Pinus silvestris[4]	L88	AK State Forestry Anchorage, AK	Rovaniemi, Finland	3/05/74	180
Populus balsamifera x *trichocarpa*[1]	L196	Palmer PMC Palmer, AK	MP 40.5 Sterling Hwy., AK	7/19/74[2]	22
Populus tremuloides[1]	L239	Palmer PMC Palmer, AK	Palmer, AK (Butte)	5/09/75[2]	4
Populus tremuloides[1]	L240	Palmer PMC Palmer, AK	Palmer, AK	5/09/75[2]	1
Populus trichocarpa[4]	L275	Inst. No. Forestry Fairbanks, AK	Talkeetna, AK	6/26/74[2]	45
Potentilla fruticosa[1]	L8	Palmer PMC Palmer, AK	MP 108.6 Rich. Hwy., AK	8/14/73[2]	1
Potentilla fruticosa[1]	L42	Palmer PMC Palmer, AK	MP 57 Steese Hwy., AK	9/11/73[2]	1
Prunus japonica[1]	ND3	Bridger PMC Bridger, MT	-	5/09/74[2]	2
Prunus pumila[1]	M843	Bridger PMC Bridger, MT	-	5/11/74	1
Prunus sp.	L232	Ann Hanson Palmer, AK	Great Falls, MT	10/14/74	5
Prunus sargenti[1]	L227	So. Cen. Timber Anchorage, AK	Hokaido, Japan Saghanien	12/04/74	68

See footnotes 1, 2, and 4 at end of table, p. 64.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Prunus serotina[1]	L235	USFS Allegh. Nat. For. Warren, PA	Warren, PA	2/18/75	15
Prunus tenella[1]	ND283	Bridger PMC Bridger, MT	-	5/11/74	1
Ptelea baldwini	A40575	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	6
Ptelea isophylla[1]	A5077	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	1
Ptelea orophylla	A36389	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	3
Ptelea tomentosa	A39453	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	12[3]
Ptelea trifoliata[1]	A56136	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	4[3]
Quercus macrocarpa[1]	M959	Bridger PMC Bridger, MT	Bridger, MT	10/01/73	117
Rhus canadensis[1]	C96	Bridger PMC Bridger, MT	-	5/11/74	2
Rhus trilobata[1]	T152	Bridger PMC Bridger, MT	-	5/11/74	2
Robinia fertilis[1]	'Arnot'	Big Flats PMC Big Flats, NY	-	5/15/74	76
Rosa acicularis[1]	L92	Palmer PMC Palmer, AK	Palmer, AK	3/24/74[2]	3
Rosa sp.[1]	L41	Palmer PMC Palmer, AK	MP 49 Steese Hwy., AK	9/11/73[2]	8

See footnotes 1, 2, and 3 at end of table, p. 64.

APPENDIX
TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Rosa sp.[1]	L43	Palmer PMC Palmer, AK	MP 57 Steese Hwy., AK	9/11/73[2]	4
Salix glauca[1]	L89	Inst. No. Forestry Fairbanks, AK	Fairbanks, AK	3/18/74	1
Salix glauca[1]	L90	Inst. No. Forestry Fairbanks, AK	Fairbanks, AK	3/18/74	1
Sambucus coerulea[1]	A52295	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	1
Sambucus nigra[1]	A56294	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	3
Sambucus pubens[1]	A56395	Hi. Plns. Grasslds. RS Cheyenne, WY	-	11/19/74	2
Sambucus racemosa	L264	Palmer PMC Palmer, AK	Tyonek, AK	9/04/75[2]	16
Sambucus racemosa	R22	Palmer PMC Palmer, AK	MP 72 Seward Hwy., AK	9/19/73[2]	14
Sambucus racemosa[1]	R43	Palmer PMC Palmer, AK	Sterling Hwy., AK	9/20/73[2]	6
Sambucus racemosa[1]	L223A	For. Sci. Lab. Juneau, AK	Juneau, AK.	9/11/74	4
Sorbus acuparia[1]	L220	For. Sci. Lab. Juneau, AK	Haines, AK	9/11/74	3
Sorbus scorpulina	L273	Palmer PMC Palmer, AK	Palmer, AK	9/29/75[2]	2
Sorbus sitchensis[1]	L222	For. Sci. Lab. Juneau, AK	Haines, AK	9/05/69[2]	1

See footnotes 1 and 2 at end of table, p. 64.

APPENDIX
TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Sorbus sp.[1]	L72	Palmer PMC Palmer, AK	Palmer, AK	9/73[2]	1
Spirea beauverdiana	L265	Palmer PMC Palmer, AK	Tyonek, AK	9/04/75[2]	1
Thuja orientalis	L231A	Joe Stehlik, Sr. Juneau, AK	Fresno, CA	8/74[2]	1
Thuja plicata[1]	L216	For. Sci. Lab. Juneau, AK	Thurne Bay, AK	9/11/74	1
Tsuga heterophylla[1]	L215	For. Sci. Lab. Juneau, AK	Anice Bay, AK	9/11/74	3
Tsuga mertensiana[1]	L217	For. Sci. Lab. Juneau, AK	Juneau, AK	9/11/74	2
Tsuga mertensiana	L268	AK State Forestry Anchorage, AK	Tyonek, AK	9/11/75[2]	47
Vaccinium ovalifolium	L263	AK State Forestry Anchorage, AK	Tyonek, AK	9/04/75[2]	1
Vaccinium vitis-idaea[1]	L40	Palmer PMC Palmer, AK	MP 20 Sterling Hwy., AK	9/11/73[2]	1
Viburnum burejaeticum	A5127	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	15
Viburnum carlesi	A56301	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	17[3]
Viburnum edule	R24	Palmer PMC Palmer, AK	MP 4 Hope Hwy., AK	9/19/73[2]	1

See footnotes 1, 2, and 3 at end of table, p. 64.

APPENDIX

TABLE 2. Inventory of woody plant seeds in storage at the Alaska PMC as of January 1, 1976. Continued.

Species	Accession No.	Source	Origin	Date Received	Storage Amount (gms.)
Viburnum lantana	A56298	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	19
Viburnum opulus	A51147	Hi. Plns. Grassld. RS Cheyenne, WY	-	11/19/74	4

1/ Seed from this accession planted for initial evaluation.
2/ Collection date.
3/ Uncleaned seed.
4/ Seed from this accession planted for containerized seedling production.

SECONDARY EVALUATIONS

Development of Bluejoint (*CALAMAGROSTIS CANADENSIS*) Seed Production Potential

Bluejoint (*Calamagrostis canadensis*) is a perennial, rhizomatous grass native to Alaska and widely distributed throughout the state. The history of its use as a pasture and hay plant dates back to the Russian settlers in the late 1700's. It has been evaluated by the Alaska Agricultural Experiment Stations since the early 1900's.

Although its value as a forage and conservation plant is well established, its actual use for these purposes has been limited to native stands. Commercial production of seed for establishment of new plantings and extension of usable acreages has not been pursued because of a lack of knowledge of large scale seed production techniques and requirements for germination. The seed is extremely small, numbering approximately 3.7 million per pound. There are no official standards for either purity or germination analyses accepted by the Association of Official Seed Analysts. Thus, the species cannot be produced under certification should a variety be released.

The seeds are surrounded by a ring of callus hairs making them extremely difficult to harvest with present farm machinery. The smallness of size and the lightness accentuated by the "parachute"-like callus hairs causes much seed to be lost to wind as well as improperly adjusted machinery.

The development of purity and germination standards, and a solution to the harvesting and processing difficulties, could provide the needed impetus to release a variety of this valuable species.

The Soil Conservation Service (SCS) and the Plant Materials Center (PMC) agreed, in April of 1975, to undertake the Development of Bluejoint Seed Production Study. The basic provisions of the contract were that SCS would extend funding and the PMC would provide the personnel, equipment, and supplies. Two primary objectives will be pursued in this Study, (1) development of seed germination and purity standards that will be acceptable for certification purposes for commercially produced seed. These standards need to be reviewed by the Association of Official Seed Certifying Agencies (AOSCA) and the Association of Official Seed Analysts (AOSA). These agencies authorize the acceptance of new or revised standards. And (2) evaluate seed harvest techniques that can be applied with commercial size farm machinery. These techniques, preferably, will require no additional equipment to that currently used for seed production of other grass species. Modifications of procedures, equipment adjustment, timing of harvest, and possibly management of stands will be evaluated.

Procedures to be followed are:

1. Determine the optimum sample size to be used for purity analysis which will provide a 95% confidence level that the analysis is within official tolerances.
2. Determine the optimum temperature and light regimes, substratum, and pretreatment for maximum seed germination in the laboratory.
3. Determine the phenology of Bluejoint, specifically, seed development in a native stand which has been selected

for use in item 4.

4. Evaluate mechanical seed harvest techniques on a pre-selected native stand of Bluejoint.
   a. direct combine
      (1) cylinder speed and spacing
      (2) sieve adjustments
      (3) air adjustments
      (4) ground/reel speeds
   b. swath/combine
      (1) date of swathing
      (2) combine adjustments as in a, above.

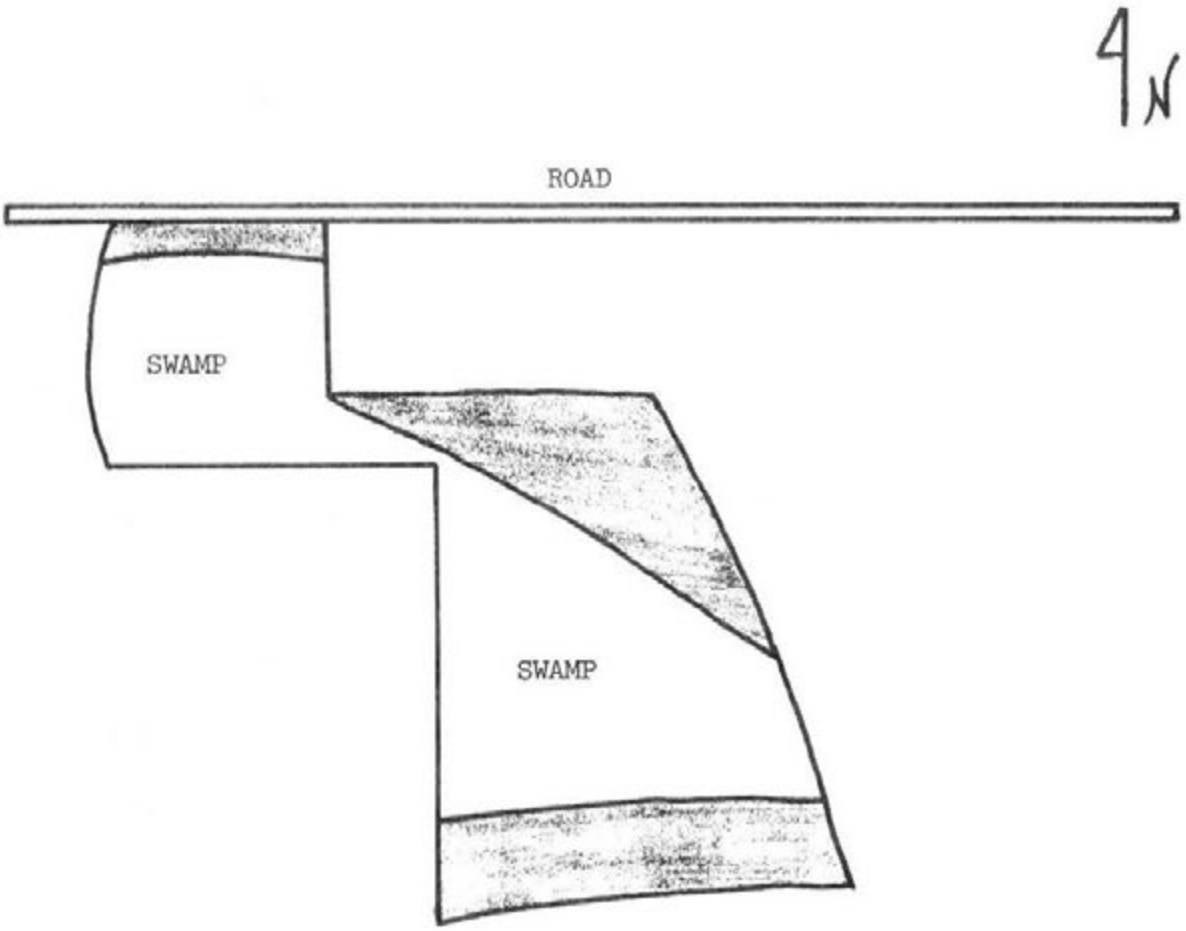
Phenology Study

This phenology study will provide the PMC and SCS personnel needed information on seed maturity to organize a mechanical harvesting program for this study site in 1976.

Materials and Methods

A native stand of Bluejoint was located on the O.H.M. farm in the Clearwater area near Delta Junction. The study site is a peat bog, approximately fifteen acres in size. Standing water covers less than an acre, with between five and ten acres suitable for mechanical harvest; the remainder being subject to periodic standing water from rainfall during the growing season (Fig. 1).

The area is level with some debris from burn piles located around the fringes. A three-foot deep drainage parallels the road on the north side of the field. This area was located on June 10



Areas shaded are best producing and most readily adaptable to mechanical harvest of Bluejoint seed.

Scale 1" = 300'

Figure 1. *Calamagrostis* study site on O.H.M. Farm near Delta Junction.

by Jim Stroh and Burt Clifford.

A series of photographs, consisting of 4" x 5" black and white, and 35mm color slides were made. The 4 x 5 photos were taken periodically and the 35mm slides were taken weekly. Photographs were taken from June 10 to August 27 standing on the back of the vehicle, at the same spot, and facing south.

Associations will be made between Season Growing Degree Days (SGDD) and the phenological growth stage. This data will be used as an aid to forecast seed development for the 1976 harvest season.

The figures on SGDD were obtained from the Crop Weather Report issued by the Agricultural Statistician, USDA Statistical Reporting Service (SRS), in Palmer. Season growing degree days are computed by subtracting 40°F from the weekly average temperature and multiplying it by 7, for the number of days per week.

Herbarium collections of panicles were made on a weekly basis as was determination of the phenological stage of seed development.

Results

July 3 The start of weekly trips began with Jim Stroh and Burt Clifford locating the study site for Pat Mulligan, who would carry out the field work on the phenology study. Heading was well under way. There had been a total of 391 SGDD (Fig. 2) since the June 10 trip. The weather was hot, in the 80's, and dry.

July 9 A majority of the field showed little or no anther

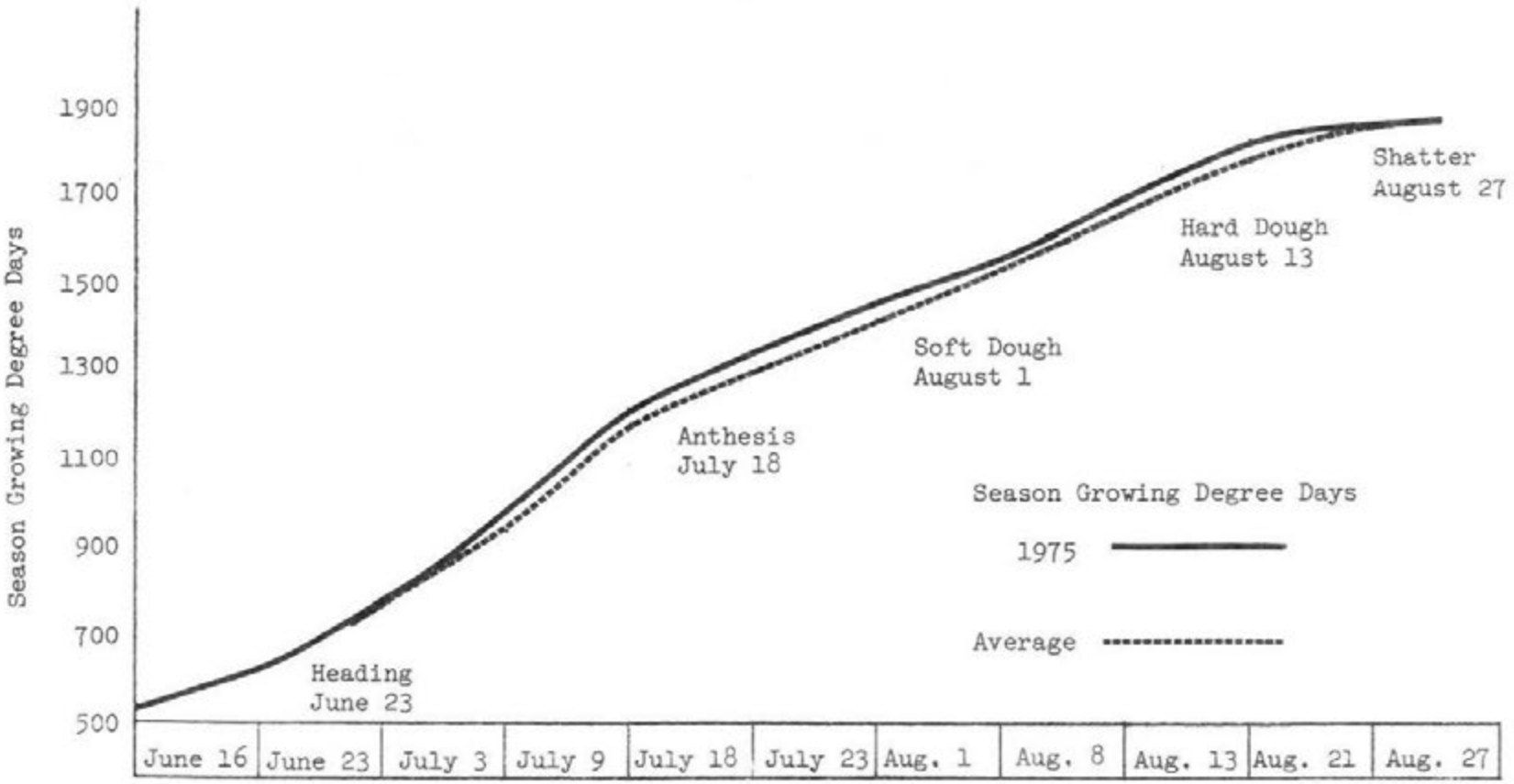


Figure 2. Season Growing Degree Days for 1975 and 32 year average in Delta Junction.

extension. Some plants along the edges of the road had anthers exposed. Panicles remained tight and closed. The study site was roughly paced out and mapped. Wet and otherwise untillable areas were noted. The weather remained hot and dry.

July 18 Full anthesis had begun. Anthers were exposed on 90% of the stand. Panicles were loose and open. The total SGDD which had occurred since heading was 588, which is 47 degree days higher than average. Hot and dry weather persisted.

July 23 Plants were past anthesis and the beginning of seed development could be noted in the form of some early milk stage. Color change could be noted on roadside plants as the panicle took on a brownish tinge. Periods of heavy rain had occurred within the past week (Fig. 3). No lodging was observed. Some portions of the field, previously dry, now held surface water. The ditch along the edge of the field also held water.

August 1 Further seed development could not be observed. Seasonal degree days have been less than earlier in the season but continue above normal. Rainfall to date was 2.6 inches above average. Some slight lodging was observed.

August 8 Seed development reached early soft dough stage. Browning of the field, in general, was becoming more evident.

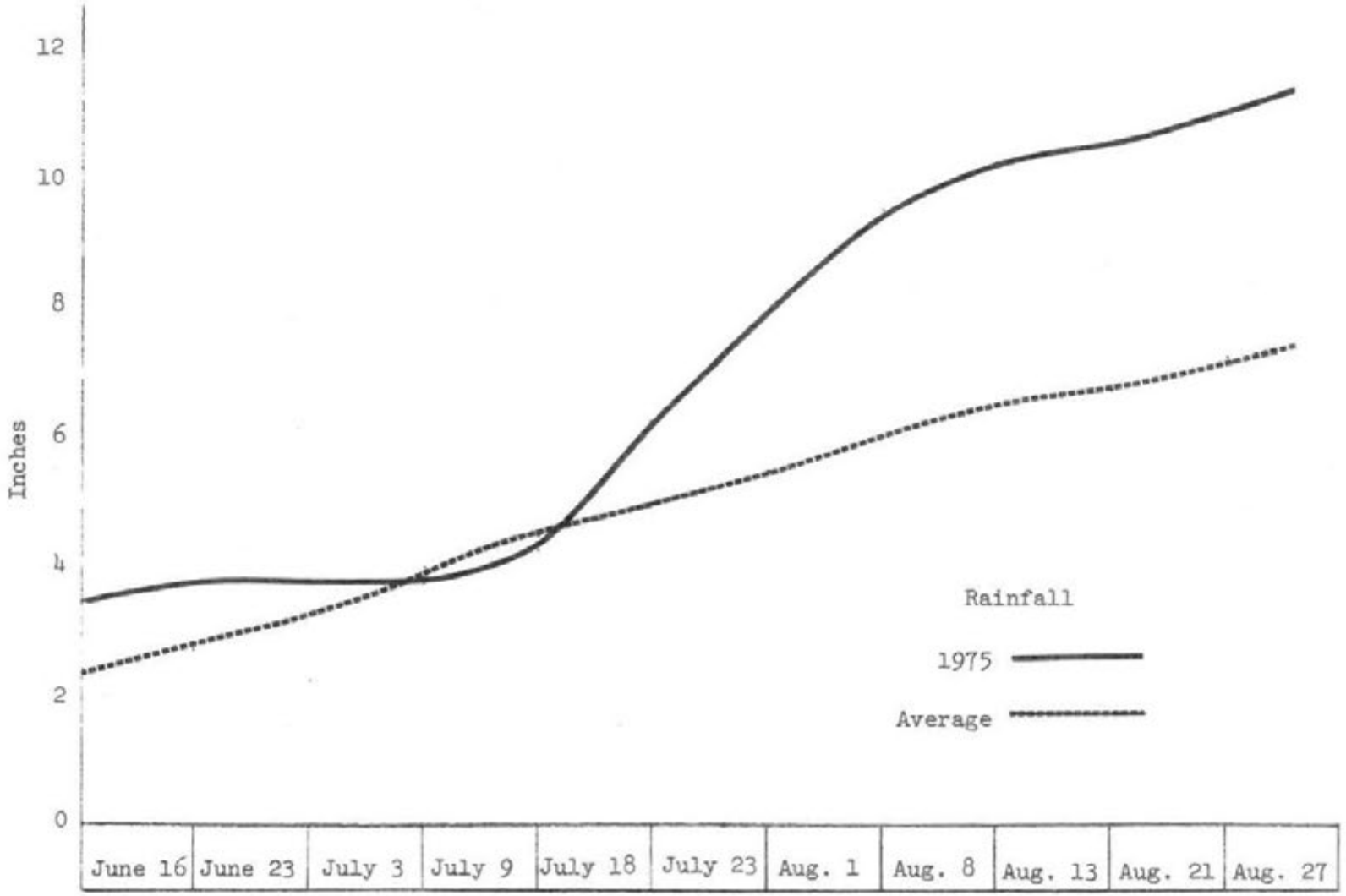


Figure 3. Weekly accumulation of rainfall for the 1975 growing season and the average rainfall for the Big Delta area.

Jim Harding was contacted about possible burning or cutting and baling of the stand this season. Harding wanted state personnel to do the burning if that was the action decided upon.

August 13 Change in seed development was not noticeable from August 8. Cool, rainy weather predominated. Local residents stated there had only been two days without rain in the last week. Surface moisture was abundant on previously wet areas. The ditch around the perimeter continued to hold water.

August 21 Glumes had opened to reveal lemma, palea, and callus hairs. Some seed was observed on the road. Artificial stimulation had to be excessively violent in order to get individuals to shed seed. Seed was in hard dough and possibly ready for machine harvest. The main body of the field was not yet ready to shatter.

August 27 Jesse Werner, Farm Foreman, went along to evaluate the field for combining. Winds of 30 to 40 mph had shattered 50% of the seed crop. Grass exhibited strong lodging resistance. Jim Harding was contacted and asked to cut and bale the field this fall. He stated this operation would have to be done in between his normal farm work. If it is not cut this fall, the field will have to be burned in the spring of 1976.

Heading was observed on June 23 after 636 SGDD. Anthesis was noted July 18 with 1224 days accumulated and 588 days since heading. Soft dough was first recorded on August 1 with a total of 1476 SGDD, 252 days since anthesis. The first trace of hard dough was observed on August 13 with a total of 1686 degree days, an increase of 210 since soft dough. Shatter occurred two weeks later, on August 27, with 189 SGDD since first observation of hard dough. Shatter was approximately 50% and was initiated by a severe wind storm (Fig. 4).

The 1975 growing season was subjected to an abnormal amount of rainfall. Below average precipitation occurred prior to mid-July. The rest of July and up to August 27 had above average rainfall. Accumulation up to August 27 was 3.88 inches above normal.

Conclusion

Bluejoint maintained the best growth on the drier sites (Fig. 1) where it achieved a height of 5.5 feet. Wetter areas produced less vigorous stands under three feet tall.

The 1975 accumulated SGDD was only slightly above the average, which has been computed using records compiled over 32 years. Therefore, we are assuming that the 1975 season was average for degree days in the Delta-Clearwater area.

The results of this study are based on a single seasons observation of the phenological stages for this *Calamagrostis* stand. Further data would have to be obtained before a definite relationship between SGDD and phenological stages can be accepted. However, due to the lack of this data, a single season of phenological

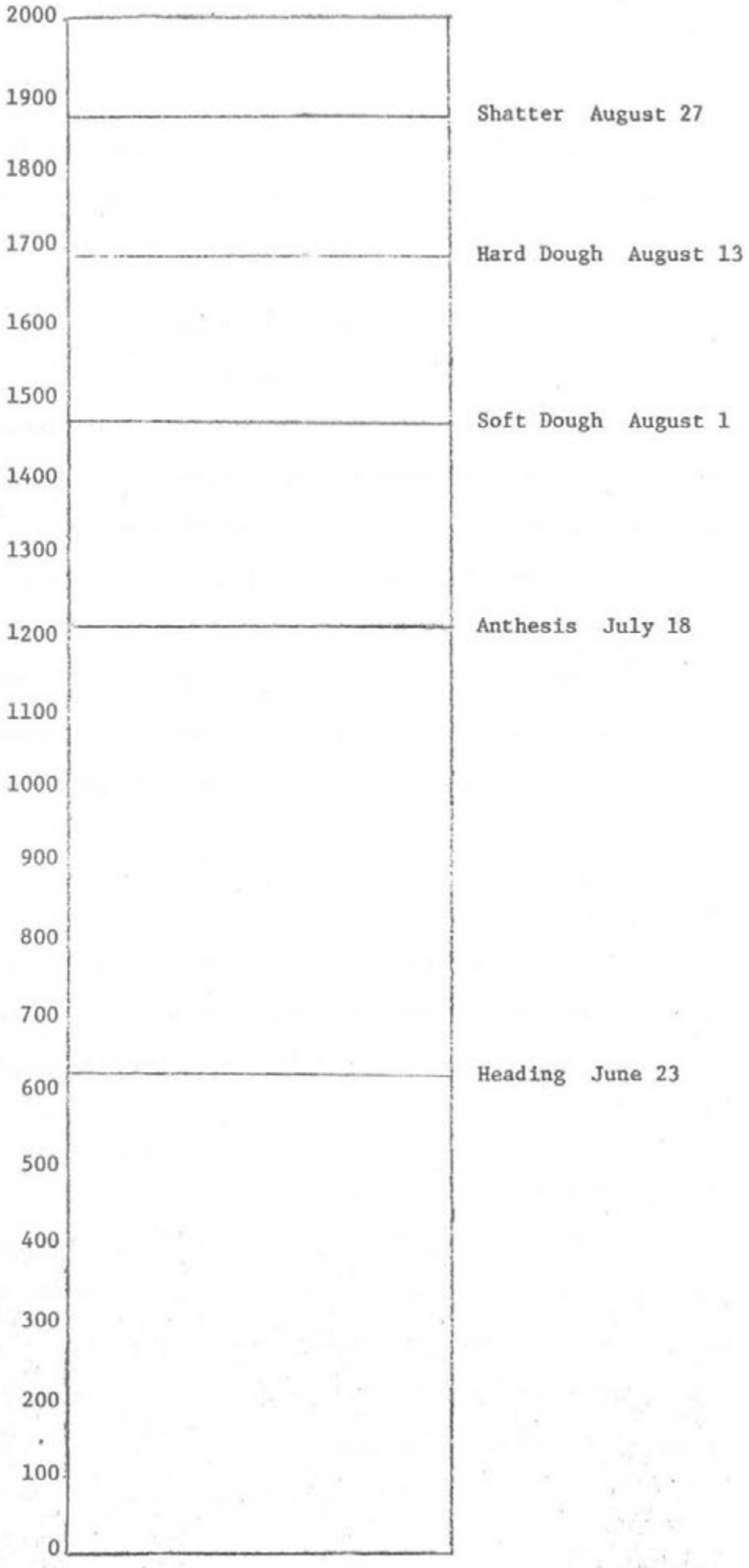


Figure 4.

Season growing degree days accumulated and associated phenological stages for *Calamagrostis* stand.

Delta Junction
-1975-

observations, together with overall average and weekly SGDD from 1975, we will attempt to forecast seed development and a possible harvest date for 1976.

Establishment of Purity and Germination Standards

The establishment of purity and germination standards is essential in the development of new commercial uses for plants. Before a type of seed can enter the certification program these standards must have been adopted by the Association of Official Seed Analysts (AOSA). The development of these standards is a two-fold operation: one, for the optimum germination conditions; and another for establishing the size of the working sample in purity analysis. These two operations are described, separately, below.

Germination

The germination standard establishment program demands that the optimum temperature, light duration, light intensity, moisture, medium, and pretreatment be employed so that the ultimate germinability of the seed lot is known.

Materials and Methods

A temperature gradient table was used, through the cooperation of the Alaska Agricultural Experimental Station to evaluate a large number of seeds at a wide range of temperatures. This table allows for a temperature gradient to be established across the table at, almost any preselected temperature range.

The first trial consisted of placing 20 rows of 300 seeds

(100/rep) on three layers of premoistened blotter paper for a duration of 21 days. Temperature was monitored by daily readings on thermometers placed under the blotters at approximately every other row of seeds. The second trial involved a five-day prechill period at 4 - 5°C, plus treatment with a .2% potassium nitrate solution (KNO_3). This test was conducted with eight rows of petri dishes containing 100 seeds/dish. Each row, which represented a different temperature, contained 800 seeds (100 seeds/rep). Four reps were treated with KNO_3 and four with water. Temperature was monitored by a chart recorder at one-hour intervals. A thermister was placed inside each petri dish at the head of each row. Both sides of the table were monitored to check on the reliability of the temperature gradient. Counting in both tests was commenced when germination began and continued at frequent intervals throughout the 21 days.

A seedling was considered germinated and normal under the following criteria:

1. Well developed primary root, usually with root hairs,
2. Well developed green plumule which has usually broken through the coleoptile by the end of the test period,
3. Slight fungi infection.

Abnormal seedlings are those demonstrating the following abnormalities:

1. No root,
2. A weak, stubby, or spindly root, associated with a decayed seed,
3. No plumule, with short thick coleoptile only,

4. Short plumule, one-half distance up through the coleoptile,
5. Spindly plumule (pale and watery),
6. A shattered or longitudinally split plumule with or without splitting of the coleoptile,
7. Decayed plumules.

The following schedule will be applied upon determination of a consistent high germination temperature:

A. Prechill at 5°C,
  B. With KNO_3 (.2% solution),
    C. Constant 25°C temperature with over 16 hours of light at or over 100 foot-candles,
    CC. Alternating temperatures of 15°C for 16 hours without light and 20°C for 8 hours with light at or over 100 foot-candles per 24-hour period,
  BB. Without KNO_3 (.2% solution),
    C. Constant 25°C temperature with over 16 hours of light at or over 100 foot-candles,
    CC. Alternating temperatures of 15°C for 16 hours without light and 20°C for 8 hours with light at or over 100 foot-candles per 24-hour period,
AA. No prechill,
  B. (same as B above),
    C. (same as C above),
    CC. (same as CC above)
  BB. (same as BB above)
    C. (same as C above),
    CC. (same as CC above).

Results

Duration of the germination period was set at 21 days with a seven-day first count, to establish seedling vigor. The germination medium was petri dishes with the seeds placed upon two layers of blotter paper. Determination of the medium and duration was made by adoption of existing techniques for germination of small-seeded, cool season grasses.

Germination data for Trials 1 and 2 were evaluated through randomized complete block and split block designs, respectively. Temperature data for both Trials was analyzed with a linear regression. Results for Trials 1 and 2 appear in Tables 1 and 2.

Trial 1 indicated that germination was statistically equal from 10.5°C to 30°C. Likewise, Trial 2 demonstrated the same statistical equality from 17.28°C to 28.11°C. No significant differences were noted between KNO_3 and H_2O treatments. Therefore, on the basis of this data 25°C was set as the optimum high temperature for Bluejoint germination. The same temperature is commonly used for such cool season grasses as 'Nugget' Kentucky bluegrass (*Poa pratensis*) and 'Arctared' red fescue (*Festuca rubra*).

Temperature data for Trials 1 and 2 is plotted in Fig. 5 and Fig. 6. The regression of temperature against the location on the gradient table was highly significant ($P = > .01\%$) with $r = .93$ and .99 for Trials 1 and 2, respectively. A difference of recorder temperature and measured thermometer temperature was noted in Trial 2. This difference may be due to a microenvironmental climate

TABLE 1. Average germination at various temperatures and results of Duncan's Multiple Range Test for bluejoint on a temperature gradient table. (Trial 1).

Row	Average Temperature[1]	Average Temperature[2]	Duncan's Multiple Range Test Ranking[3]			
	°C	%				
1	13.45	18.2			C	
2	-	23.7			C	
3	-	40.3	A	B		
4	21.67	49.2	A			
5	-	55.1	A			
6	24.65	41.3	A	B		
7	-	51.0	A			
8	26.03	53.1	A			
9	--	51.1	A			
10	31.28	28.5		B	C	
11	-	3.3				D
12	34.75	0				
13	-	0				
14	36.73	0				
15	-	0				
16	-	0				
17	40.75	0				
18	-	0				
19	-	0				
20	48.35	0				

1/ Over a 21-day test period.
2/ Average of three reps.
3/ Duncan's Multiple Range Test @ P = < .05%, C.V. = 21%.

TABLE 2. Average germination temperature, average germination with KNO_3, H_2O, and that combination, and results of Duncan's Multiple Range Test for Bluejoint in petri dishes on a temperature gradient table. (Trial 2).

Row	Average temperature	Average germination		Total germination[1/]	Duncan's Test[2/]		
	°C	%		%			
		KNO_3	H_2O				
1	10.42	0	2.25	-[3/]	-		
2	13.69	15.25	9	12.1			C
3	17.28	38.00	31.00	34.50	A		
4	20.19	36.67	38.00	37.50	A		
5	22.97	43.75	33.50	38.6	A		
6	26.08	35.00	36.75	35.9	A		
7	28.11	42.25	36.00	39.1	A		
8	34.50	31.33	24.67	22.5		B	

1/ KNO_3 and H_2O treatments were combined because no statistical variation existed between them.
2/ Duncan's Multiple Range Test @ P = .05%, CV = 21.7% for the whole plot and 41.17% for the split plot.
3/ The first row was eliminated because it contained zeros which would not fit into the statistical analysis.

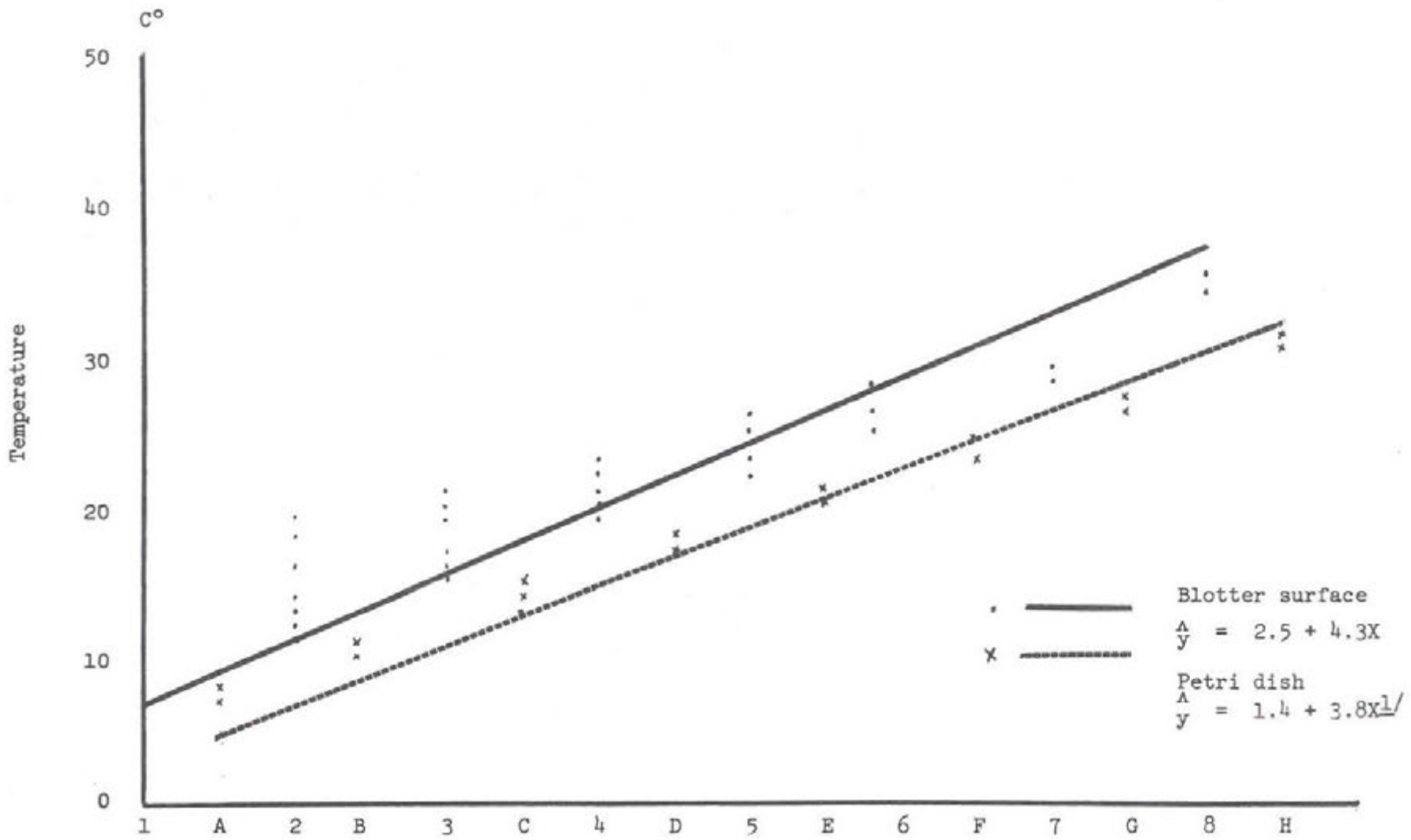


Figure 5. Temperatures on the surface of blotter paper and inside petri dishes on a temperature gradient table. Gradient table stations; numerals, blotter surface; letters, petri dish. Trial 2.

1/ Based on hourly reading for 4 days.

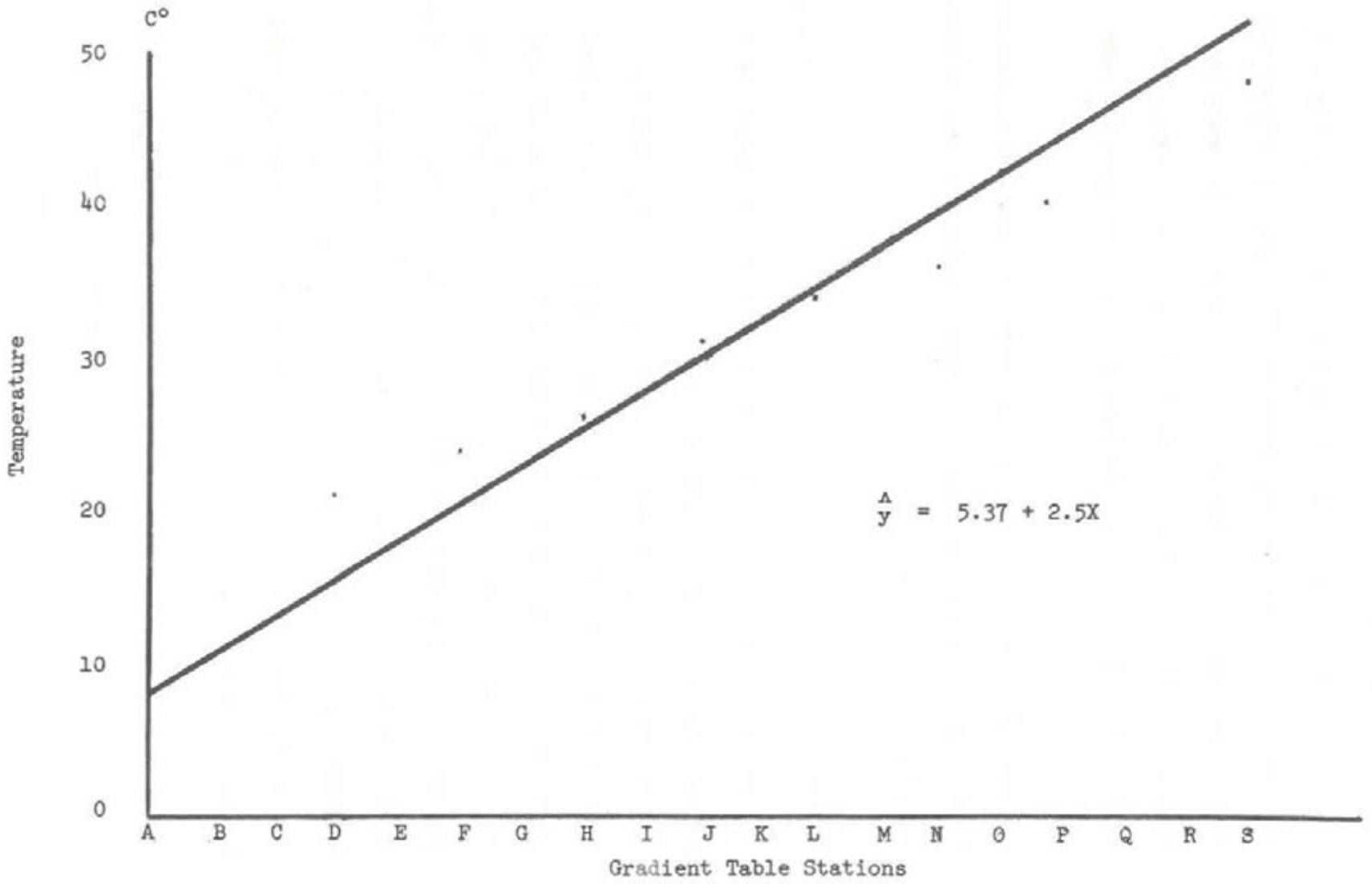


Figure 6. Temperatures on the surface of blotter paper at various stations along a temperature gradient table. Trial 1.

within the petri dishes.

A severe infection of seed-borne fungi was noted on the seed lot used in these germination analyses. The fungi, mostly of the *Penicilium* genera, is a seed-borne organism which is common in natural ecosystems. Total percent germination was severely influenced by this fungus but the data obtained indicates the same basic trends.

The remainder of the germination standard formation project is continuing presently, and will be completed before the end of this fiscal year.

Purity

Investigations into determining the size of the sample for a purity analysis has not as yet begun.

The AOSA rules state that a purity working sample must be based on 2000 seeds, therefore, by making seed counts, estimates of the weight of 2000 seeds can be realized. The amount of seed for a noxious weed seed examination is determined by multiplying the working portion weight by ten. The Association has set 0.25 gram as the smallest working portion to test and 500 grams as the maximum size for a noxious weed seed examination.

Purity standards, like those for germination, should be ready by July 1, 1976.

Patrick T. Mulligan

James R. Stroh

An Evaluation of 16 Grass and Legume Species for Seed Production in the Matanuska Valley

Certain grass and legume species used in conservation and forage production plantings in Alaska are recommended in an interagency publication M7-N-22612 "A Vegetative Guide for Alaska". Few of the 20-odd species listed are being grown for seed in the State. Most are either imported from outside or are not commercially available anywhere.

The purpose of this study is to determine the seed production potential of 16 commercial species recommended for Alaska. Seed production of each species must be high enough to return a profit to the producer at prices that are competitive with imported seed of the same species and variety.

Materials and Methods

The study was planted June 21, 1973 in Field 1D on the Plant Materials Center. Each entry was seeded in four rows spaced three feet apart in plots 12 X 30 feet and replicated three times in a randomized complete block design. Seeding rates were approximately 10 lbs/acre. The legumes were inoculated with the appropriate rhizobia.

Weeds were controlled by mechanical cultivation and mowing. Insect control was attempted through the use of Diazanon at 16 oz/100 gallons and 67 gal/acre. The plot was fall fertilized on September 16 with 18-18-9 at a rate of 390 lbs/acre.

Seed was harvested in the hard dough stage. Sixty square feet were cut from the center two rows of each crop. Most species were

cut with a Jari sicklebar mower, gathered into sheaves, and placed in burlap bags for drying. The *Poa* and *Fescue* species were harvested by hand, cutting only the panicles, and stored in paper bags. Threshing was begun November 14 on a Vogle thresher. Seed was then cleaned to certified quality on a clipper air screen.

Analysis of variance was based on a randomized complete block design. Coefficient of variation and Duncan's Multiple Range Test were employed to evaluate methods and results, respectively.

The soil in the study area is a Susitna silt loam, a Typic Cryofluvent, coarse loamy, mixed and acid.

Entries in this study are:

Agropyron dasystachyum, thickspike wheatgrass 'Critana'

Agropyron desertorum, desert wheatgrass 'Nordan'

Agropyron riparium, streambank wheatgrass 'Sodar'

Agropyron sibiricum, Siberian wheatgrass P-27

Alopecurus arundinaceus, creeping foxtail 'Garrison'

Astragalus cicer, cicer milkvetch 'Lutana'

Bromus inermis, smooth brome 'Manchar'

Bromus inermis X *pumpellianus*, brome 'Polar'

Festuca o. duriuscula, hard fescue 'Durar'

Festuca rubra, red fescue 'Arctared'

Festuca rubra, red fescue 'Boreal'

Medicago falcata, sicklepod alfalfa P-14488

Phleum pratense, timothy 'Engmo'

Poa glaucantha, upland bluegrass 'Draylar'

Poa pratensis, kentucky bluegrass 'Newport'

Poa pratensis, kentucky bluegrass 'Nugget'

Trifolium hybridum, alsike clover 'Aurora'

Trifolium pratense, red clover 'Alaskland'

Results

Adequate rainfall, evenly spaced throughout the growing season, eliminated the need for irrigation in 1975. Most of the species represented were cool season grasses and therefore grew well despite this season's cool and frequently rainy days.

Persistence by insects and weeds created problems throughout the test site. The insects, which appeared to crimp the peduncle and stop the vital flow of nutrients up to the panicle, were sprayed with Diazanon. No further insect damage was noted, however the initial damage was considerable. Lack of proper cultivation equipment allowed weeds to flourish. Selective herbicides could not be used because of the combination of grasses and legumes. Some cultivation and mowing was done with existing equipment, but their effects were negligible. Equipment has been ordered and proper weed control will be practiced in 1976.

All grasses, except for Siberian wheatgrass (P-27) and Durar hard fescue, were harvested in 1975. The only surviving legume, sicklepod alfalfa (P-14488), bloomed, but due to poor spring recovery did not mature early enough to produce seed. Aurora alsike clover and Alaskland red clover will be replanted in 1976 to try and make a seed crop from these two clovers, which failed in 1974. (See Table 3.)

Boreal red fescue, Engmo timothy, and Arctared red fescue were the only grasses to produce seed at an economically feasible rate (based on 175-200 lbs/acre, being the economic breaking point).

TABLE 3. Spring recovery, percent stand, harvest date, and seed production of 18 grass and legume varieties grown at Palmer, Alaska. Averages of 3 reps - 1975.

Variety	1975 Spring Recovery	Percent Stand 1973	1974	1975	1975 Harvest Date	Seed Production lbs/acre 1974	1975	
Boreal red fescue	Fair	91	30	75	8/11	-	366.3	A
Engmo timothy	Good	17	20	60	8/29	-	196.6	B
Arctared red fescue	Exc.	90	90	95	8/11	106	188.7	BC
Garrison creeping foxtail	Exc.	73	90	100	8/04	71	114.9	C
Nugget kentucky bluegrass	Good	97	100	95	7/28	219	114.8	C
Polar brome	Exc.	93	100	100	8/29	-	103.2	CD
Sodar streambank wheatgrass	Good	93	95	75	9/10	-	75.0	CD
Manchar smooth brome	Exc.	100	100	70	8/29	-	62.9	CD
Critana thickspike wheatgrass	Poor	98	100	35	9/10	-	29.1 1/	D
P-27 siberian wheatgrass	Fair	99	60	70	-	-	-	
P-14488 sicklepod alfalfa	Poor	83	85	45	-	-	-	
Nordan desert wheatgrass	Poor	83	5	0	-	-	-	
Durar hard fescue	Exc.	8	10	35	-	-	-	
Lutana cicer milkvetch	-	99	0	0	-	-	-	
Draylar upland bluegrass	-	7	0	0	0	0	0	
Newport kentucky bluegrass	-	78	T	0	-	-	-	
Alaskland red clover	-	95	0	0	-	-	-	
Aurora alsike clover	-	18	0	0	0	0	0	

1/ Duncan's Multiple Range Test @ P = >.05 CV = 29.0%

Boreal produced almost twice as much seed as did Arctared, mainly because it demonstrated a definite resistance to the insects which severely depleted seed production in other *Fescue* and *Poa* species. Engmo timothy and Garrison creeping foxtail lost 25-50% of their seed crop to shatter in early August.

A high coefficient of variation (29%) was explained by insect damage, shattering, harvest loss, and further seed lost in storage, threshing, and cleaning.

Patrick T. Mulligan

Containerized Seedling Project

The containerized seedling project is a cooperative effort between the Alaska Plant Materials Center and the Division of Lands, Forestry section to establish greenhouse production methods for forest tree seedlings in Alaska. The objective is to compare new containerized production methods with the more conventional bareroot production techniques used today. Production costs and seedling quality are deciding factors.

This years nursery complex included a 24 X 62 foot double film plastic greenhouse and a remodeled headhouse. The greenhouse has been equipped with two 200,000 BTU propane heaters, an air circulation fan for ventilation, and a timed bank of flourescent/incandescent lights on either side of the greenhouse to prevent dormancy before seedlings are at full maturity.

Containers were seeded by hand this year and arranged on wooden benches in the greenhouse where they were watered and fertilized by hand. A fertilizer injector was used to charge the irrigation water on a weekly schedule. Soil samples were analyzed weekly to monitor soil nutrient levels for optimum plant growth control.

Table 4 summarizes the various accessions planted this season in a number of different containers and speculates on the amount of seedlings anticipated next spring. A total of 55,300 seedlings were placed into storage this fall.

Containers were of three types, Rootrainer, Ray Leach, and styroblock. The Rootrainer is a Spencer-Lemaire product from

TABLE 4. Seed accessions planted in the 1975 containerized seedling project at the Alaska PMC nursery.

Species	Accession No.	Container	Model	No./seeded containers		Anticipated seedlings
Pinus contorta	L236	Rootrainer	'ferdinands'	56		5040
Lodgepole pine		Leach single cell	'pine'	25		5000
Whitehorse, Y.T.		Leach single cell	'fir'	2		400
		Styroblock	#2	26		4992
		Styroblock	#4	19		3040
		Styroblock	#8	6		480
color code: green					Total	18,952
Picea glauca	L224	Rootrainer	'ferdinands'	56		5040
White spruce		Leach single cell	'pine'	25		5000
Kenai, Alaska		Leach single cell	'fir'	3		600
		Styroblock	#2	14		2688
		Styroblock	#4	25		4000
		Styroblock	#8	2		160
color code: blue					Total	17,488
Picea glauca	L226	Rootrainer	'ferdinands'	20		1800
White spruce		Leach single cell	'pine'	7		1400
Fairbanks, Alaska		Leach single cell	'fir'	3		600
(Chena River)		Styroblock	#2	3		576
		Styroblock	#4	8		1280
		Styroblock	#8	3		240
color code: black					Total	5,896

TABLE 4. Seed accession planted in the 1975 containerized seedling project at the Alaska PMC nursery. (Con't.)

Species	Accession No.	Container	Model	No./seeded containers		Anticipated seedlings
Picea glauca	L225	Rootrainer	'ferdinands'	6		540
White spruce		Leach single cell	'pine'	2		400
Fairbanks, Alaska		Leach single cell	'fir'	1		200
(Bonanza Creek)		Leach single cell	'large'	1		98
		Styroblock	#2	6		1152
		Styroblock	#2A	2		480
		Styroblock	#4	10		1600
		Styroblock	#8	3		240
color code: red and green					Total	4,710
Larix siberica	L147	Leach single cell	'pine'	2		400
Siberian larch		Styroblock	#2	2		384
Finland		Styroblock	#2A	1		240
		Styroblock	#4	1		160
color code: black and green					Total	1,184
Picea sitchensis	L223	Rootrainer	'ferdinands'	10		900
Sitka spruce		Leach single cell	'pine'	12		2400
Haines, Alaska		Styroblock	#2	6		1152
		Styroblock	#4	5		800
		Styroblock	#8	3		240
color code: red					Total	5,492
Pinus sylvestris	L88	Rootrainer	'ferdinands'	6		540
Manty Scotch pine		Leach single cell	'pine'	2		400
Finland		Leach single cell	'fir'	2		400
		Styroblock	#4	1		160
		Styroblock	#8	1		80
color code: red and black					Total	1,580
					TOTAL	55,302

Canada that is best described perhaps as a folding book. The molded container arrives flat, but bends together like the pages of a book and locks to form an inexpensive container with six cavities, or less, depending upon the model. Rootrainers are grouped together in plastic flats during use and discarded after the seedlings are planted.

The Ray Leach single cells are round, independent cavities of molded flexible plastic that are grouped together in plastic racks of 200. An advantage of this container is its ability to be consolidated when seeded cavities fail to germinate or seedlings die. The bad cavities can be removed from the rack and replaced with good seedlings to utilize as much greenhouse square footage as possible. Single cells have been used by other nurseries for as long as three years, but also cost three to four time more than the Rootrainer and are bulky to freight.

The styroblock container was the first attempt by producers to develop large volume containers for containerized seedlings and are still favored by some because of their adaptability to mechanical handling. Prices range from $2.50 to $5.00 a container, depending on volume purchased. It has been our experience this year that styroblocks are easily damaged during shipment and planting if not treated carefully. Average use of styroblocks by other growers has been about two years. Final container evaluations will not be completed until they have been subjected to a winters storage and field planting conditions.

Seedlings were grown for 6-1/2 months in the greenhouse this year before heat was completely turned off. Eight weeks of this

time was used to prepare the plants for dormancy. Seedlings were then stored in the greenhouse for the winter by burying them under snow. Tables 5, 6, and 7 are maturity ratings prepared for State Forestry that recommend those seedlings mature enough after 6-1/2 months of growth for spring (1976) planting, those that are not mature enough to plant until later this summer, and those that should remain at the nursery for one more growing season, respectively. Maturity was determined by the seedlings ability to be extracted from the container cavity, plug firmness (indicating root development), seedling height, and a root mass rating from visual examination.

Results this year indicate that within some accessions there was as much growth variation because of seed differences as there was because of container types. It is the writer's opinion that 6-1/2 months was not enough growing time to develop clear cut differences. An 8-month growing period appears to be necessary for producing a mature seedling. Calculated production cost of seedlings this year was 21 cents apiece. Costs can be reduced by planting earlier to save on heat consumption.

Joseph L. Stehlik

TABLE 5. Maturity data of containerized seedlings recommended for 1976 spring planting. Rated 12/31/75.

Seedling	Container	No. Planted Containers		Anticipated Seedlings	Ability to Extract[1]	Plug Firmness[2]	Av. Height	Root Mass[3]
							inches	
Lodgepole pine	Leach single cell p	25		5000	4.00	3.25	3.7	3.75
Whitehorse, Y.T.	Leach single cell f	2		400	4.50	3.63	2.8	3.50
	Styroblock #2	26		4992	4.50	3.50	4.4	4.75
	Styroblock #8	6		480	4.75	3.75	5.8	5.00
			Total	10,872				
White spruce	Leach single cell f	3		600	4.00	3.00	1.8	3.00
Kenai, Alaska			Total	600				
White spruce	Styroblock #2	3		576	4.50	4.00	1.7	3.75
Chena River, Alaska			Total	576				
White spruce	Styroblock #2	6		1152	4.50	4.25	1.9	4.50
Bonanza Creek,	Styroblock #2A	2		480	4.50	4.25	2.4	4.50
Alaska	Styroblock #8	3		240	5.00	3.75	3.1	4.63
			Total	1,872				
Scotch pine	Leach single cell p	2		400	4.25	3.75	3.2	4.00
Finland	Styroblock #4	1		160	4.50	4.50	4.0	5.00
			Total	560				
Siberian larch	Leach single cell p	2		400	4.50	4.50	2.7	4.25
Finland	Styroblock #2	2		384	4.25	4.50	2.5	4.50
	Styroblock #2A	1		240	5.00	4.50	3.6	5.00
	Styroblock #4	1		160	5.00	4.50	3.3	4.75
			Total	1,184				

See footnotes 1, 2, and 3 at end of table, p. 97.

TABLE 5. Maturity data of containerized seedlings recommended for 1976 spring planting. Rated 12/31/75. (Con't.)

Seedling	Container	No. Planted Containers	Anticipated Seedlings	Ability to Extract[1]	Plug Firmness[2]	Av. Height	Root Mass[3]
						inches	
Sitka spruce	Leach single cell p	12	2400	4.00	3.25	5.1	4.00
Haines, Alaska	Styroblock #4	5	800	4.00	4.25	6.5	3.50
	Styroblock #8	3	240	4.50	4.25	7.3	3.50
		Total	3,440				
		TOTAL	19,104				

1/ Ability to extract - rated 1 to 5; 1 indicates no plug extraction possible; 5 indicates plug easily pulled from container cavity without breaking any roots or stems. Ratings between 1 and 5 reflect percent of broken stems and/or roots during extraction.

2/ Plug firmness - rated 1 to 5; 1 indicates no plug form at all, soil mass crumbles suggesting little or no root development; 5 indicates solid plug form suggesting good to very good root development. Plugs rated less than 3.50 are considered a poor shipping risk once extracted.

3/ Root mass - rated 1 to 5; 1 indicates a root volume of 20% or less than a standard rating of 5 for that species; 5 indicates a root mass of 80-100% of standard. Evaluations were made from extracted plugs after washing roots.

TABLE 6. Maturity data of containerized seedlings recommended for 1976 summer planting. Rated 12/31/75.

Seedling	Container	No. Planted Containers		Anticipated Seedlings	Ability to Extract[1]	Plug Firmness[2]	Av. Height	Root Mass[3]
							inches	
Lodgepole pine	Rootrainer f	56		5040	3.00	2.88	3.8	2.00
Whitehorse, Y.T.	Styroblock #4	19		3040	3.00	3.00	3.9	2.75
			Total	8,080				
White spruce	Styroblock #8	2		160	3.50	2.63	2.8	3.75
Kenai, Alaska			Total	160				
White spruce	Leach single cell p	7		1400	3.50	2.50	2.1	3.75
Chena River,	Leach single cell f	3		600	3.75	3.00	1.9	3.75
Alaska			Total	2,000				
White spruce	Styroblock #4	10		1600	3.75	3.50	2.3	3.75
Bonanza Creek, Alaska			Total	1600				
Scotch pine	Rootrainer f	6		540	3.75	3.25	3.1	3.25
Finland			Total	540				
Sitka spruce	Styroblock #2	6		1152	3.75	3.75	5.4	4.00
			Total	1152				
			TOTAL	13,532				

1/ Ability to extract - rated 1 to 5; 1 indicates no plug extraction possible; 5 indicates plug easily pulled from container cavity without breaking any roots or stems. Ratings between 1 and 5 reflect percent of broken stems and/or roots during extraction.

2/ Plug firmness - rated 1 to 5; 1 indicates no plug form at all, soil mass crumbles suggesting little or no root development; 5 indicates solid plug form suggesting good to very good root development. Plugs rated less than 3.50 are considered a poor shipping risk once extracted.

3/ Root mass - rated 1 to 5; 1 indicates a root volume of 20% or less than a standard rating of 5 for that species; 5 indicates a root mass of 80-100% of standard. Evaluations were made from extracted plugs after washing roots.

TABLE 7. Maturity data of containerized seedlings recommended for 1977 spring planting. Rated 12/31/75.

Seedling	Container	No. Planted Containers		Anticipated Seedlings	Ability to Extract[1/]	Plug Firmness[2/]	Av. Height	Root Mass[3/]
							inches	
White spruce	Rootrainer f	56		5040	2.25	2.75	2.3	2.25
Kenai, Alaska	Leach single cell p	25		5000	1.50	1.25	1.7	2.25
	Styroblock #2	14		2688	2.75	2.50	3.0	2.00
	Styroblock #4	25		4000	1.25	2.75	2.9	2.50
			Total	16,728				
White spruce	Rootrainer f	20		1800	1.50	1.25	2.0	2.00
Chena River,	Styroblock #4	8		1280	2.00	2.75	2.8	3.00
Alaska	Styroblock #8	3		240	2.00	2.00	2.8	3.00
			Total	3,320				
White spruce	Rootrainer f	6		540	1.75	2.50	2.0	2.00
Bonanza Creek,	Leach single cell p	2		400	1.75	1.00	2.0	2.75
Alaska	Leach single cell f	1		200	1.50	1.25	1.6	2.00
	Leach single cell l	1		98	1.00	1.00	1.8	1.50
			Total	1,238				
Scotch pine	Leach single cell f	2		400	2.75	2.00	2.5	2.75
Finland	Styroblock #8	1		80	2.00	4.75	5.7	3.25
			Total	480				
Sitka spruce	Rootrainer f	10		900	1.75	1.25	5.2	2.75
Haines, Alaska			Total	900				
			TOTAL	22,666				

1/ Ability to extract - rated 1 to 5; 1 indicates no plug extraction possible; 5 indicates plug easily

pulled from container cavity without breaking any roots or stems. Ratings between 1 and 5 reflect percent of broken stems and/or roots during extraction.

2/ Plug firmness - rated 1 to 5; 1 indicates no plug form at all, soil mass crumbles suggesting little or no root development; 5 indicates solid plug form suggesting good to very good root development. Plugs rated less than 3.50 are considered a poor shipping risk once extracted.

3/ Root mass - rated 1 to 5; 1 indicates a root volume of 20% or less than a standard rating of 5 for that species; 5 indicates a root mass of 80-100% of standard. Evaluations were made from extracted plugs after washing roots.

APPENDIX TABLE 1. Germination data (percent) for *Calamagrostis canadensis* on blotter paper on a temperature gradient table. Trial 1.

	Replication		
	1	2	3
Row			
1	12.9	19.3	22.4
2	12.5	26.7	31.9
3	46.4	34.4	40.0
4	46.6	51.9	49.2
5	40.0	54.4	60.7
6	51.9	32.7	39.3
7	60.3	50.7	41.9
8	37.7	64.5	57.1
9	49.2	46.6	57.5
10	31.9	21.3	32.4
11	3.0	3.0	4.0
12	0.0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

APPENDIX TABLE 2. Temperature data, recorded by thermometers and read daily, at each row of *Calamagrostis canadensis* germinating on blotter paper on a temperature gradient table. Trial 1. Degrees Centigrade.

Row	1	4	6	8	10	12	14	17	20
Day									
1	14.0	21.5	24.5	28.0	32.0	35.5	39.5	47.3	56.5
2	15.0	22.0	25.0	28.0	33.0	35.0	37.0	40.2	49.5
3	15.0	22.0	25.0	28.0	32.0	35.0	36.5	40.2	47.0
4	14.5	22.0	25.0	28.0	32.0	35.0	37.5	39.5	46.0
5	15.0	22.0	25.0	28.0	32.0	36.5	40.0	45.7	47.5
6	15.0	22.0	25.0	28.0	32.0	36.0	37.5	39.6	42.5
7	15.0	22.0	25.0	28.0	32.5	36.0	39.0	42.9	53.0
8	15.0	22.0	25.0	25.5	32.0	36.0	38.0	40.7	47.0
9	15.0	22.0	25.0	25.5	32.0	36.0	37.5	42.4	44.5
10	14.5	21.5	25.0	25.5	32.0	36.0	38.5	40.2	46.5
11	14.0	21.0	24.5	25.0	32.0	35.5	38.5	43.2	50.0
12	13.5	21.0	24.0	25.5	31.5	34.5	37.0	42.9	52.0
13	13.5	21.0	24.0	25.0	31.0	35.0	37.5	42.9	52.0
14	14.0	21.5	25.0	25.0	32.0	35.0	35.0	37.4	46.0
15	14.0	21.5	25.0	25.0	30.0	33.0	35.0	37.4	49.0
16	13.0	21.0	24.0	25.0	29.5	32.0	33.5	37.4	49.0
17	13.0	20.5	24.0	24.0	29.0	33.0	33.0	37.4	46.0
18	14.0	21.0	24.5	24.5	30.0	34.0	34.0	39.6	47.0
19	13.5	21.0	24.0	24.5	29.5	32.0	34.0	37.7	47.0
20[1/]									
21	13.5	25.0	24.5	24.5	29.0	34.0	36.0	40.7	49.0

1/ Day 20 missed.

APPENDIX TABLE 3. Germination data (percent) for *Calamagrostis canadensis* in petri dishes at eight temperature stations on a temperature gradient table. Trial 2.

	Rep. I		Rep. II		Rep. III		Rep. IV	
	KNO_3	H_2O	KNO_3	H_2O	KNO_3	H_2O	KNO_3	H_2O
Row								
1[1/]								
2	16.0	12.0	11.0	9.0	15.0	7.0	19.0	8.0
3	36.0	27.0	35.0	31.0	34.0	35.0	47.0	31.0
4	28.0	23.0	38.0	36.0	53.0	40.0	44.0	38.0
5	46.0	33.0	41.0	33.0	47.0	36.0	41.0	32.0
6	38.0	34.0	34.0	41.0	26.0	35.0	42.0	37.0
7	40.0	39.0	39.0	27.0	48.0	35.0	42.0	43.0
8	32.0	20.0	30.0	1.0	11.0	29.0	32.0	25.0

1/ Eliminated because zero values will not fit into analysis.

APPENDIX TABLE 4. Average of hourly temperature readings, from probes placed inside petri dishes and recorded on a Grant Recorder, of eight rows of petri dishes containing *Calamagrostis canadensis* on a temperature gradient table. Trial 2.

Day	1	2	3	4
Row				
1	8.4	8.0	7.3	8.0
2	13.0	10.0	10.1	10.6
3	15.0	13.0	13.1	14.0
4	18.0	17.0	16.8	17.0
5	21.0	20.0	19.8	20.0
6	24.0	24.0	23.3	23.6
7	27.0	26.8	26.2	26.7
8	31.5	30.5	30.1	29.8

APPENDIX TABLE 5. Temperature data from thermometers placed at each row, and read daily, of *Calamagrostis canadensis* on blotter paper on a temperature gradient table. Trial 2.

Row	1	2	3	4	5	6	7	8
Day								
1	15.0	18.5	20.5	23.0	24.5	26.5	28.0	34.5
2	14.0	18.0	20.5	23.0	24.0	27.0	28.0	34.5
3	13.5	18.0	19.5	22.0	25.0	27.5	29.5	35.0
4	12.0	16.0	18.5	21.0	24.0	27.0	29.0	35.0
5	10.0	14.0	17.0	20.0	23.0	26.5	28.0	35.0
6	10.0	14.0	17.0	20.0	23.5	26.5	28.5	35.0
7	10.0	12.5	16.5	20.0	23.0	26.0	28.0	34.5
8	10.0	12.0	16.5	19.0	22.5	25.5	27.5	34.5
9[1/]								
10	9.0	12.5	16.5	20.0	23.5	26.0	28.5	34.5
11	9.5	13.0	17.0	20.0	24.0	26.0	29.0	34.5
12	9.5	13.0	17.5	20.0	24.0	26.5	29.0	35.0
13	9.5	13.0	17.0	20.0	23.0	26.0	27.5	34.0
14	9.5	12.0	17.0	19.0	22.0	25.5	27.0	34.0
15	9.5	12.0	17.0	20.0	23.5	26.0	28.5	34.5
16[1/]								
17	9.5	12.0	16.5	19.0	22.0	25.5	27.5	34.0
18	9.0	12.0	16.5	19.5	22.0	25.5	27.5	34.5
19[1/]								
20	9.0	12.0	15.0	19.0	21.5	25.0	27.5	34.0
21	9.0	12.0	15.0	19.0	21.5	25.0	27.5	34.0
Ave. germ.	10.4	13.7	17.3	20.2	23.0	26.1	28.1	34.5

1/ Day 9, 16, and 19 were missed.

SEED AND PLANT INCREASE

Seed and Plant Increase

Introduction

Foundation seed and plant production until now has been the burdensome task of the University of Alaska Institute of Plant Sciences requiring more time and greater acreages each year. The Legislature made seed production one of the PMC's responsibilities directing it to increase as well as maintain basic grain and grass seed supplies of recommended Alaskan varieties. Hopefully, this seed production program will encourage the State's young seed industry to grow and meet the ever increasing demand for certified seed both in and out of Alaska by making Foundation seed available to more seed growers in commercial quantities. All released grain and grass varieties in the State will eventually be grown, processed, and maintained annually for Foundation seed stock by the Plant Materials Center and distributed through the Alaska Crop Improvement Association.

The maintenance and production of plant propagules, cuttings, and seedlings will also be carried out at the Plant Materials Center. Released varieties of fruits, ornamentals, and trees require the same base of foundation stock as do grains and grasses. Breeder stock supplied by cooperating agencies, as well as those developed at the Center, will be increased and distributed through the Alaska Crop Improvement Association.

Foundation Grain Production

Two varieties of barley, two of oats, and one of wheat were planted, for a total of 19.35 acres, in Field 3 at the Plant Materials Center in 1975.

Planting began on May 15, two weeks later than last year. Seeding rates appear in Table 1. Fertilizer was applied during planting at 390 lbs/acre of 18-18-9. Equipment malfunction prevented drilling and fertilizing in the same operation and some skips could be observed when the stands were established. Uniform emergence was encouraged by an application of two acre inches of water immediately following planting. Gasser wheat was first to emerge on May 26 and within a week all grains had sprouted.

Fields were sprayed with a "Pre-merge" and 2,4-D mixture on June 16 at rates of 3/4 quart of "Pre-merge" and 1/2 pint of 2,4-D in 67 gallons of water per acre. Weed control was generally good, except in areas where the grain was not established enough to out-compete the ever present weed crop.

Weather conditions were not the best for grain production in the Matanuska Valley in 1975. Long periods of cool and rainy conditions persisted throughout the growing season. Finally, in spite of the poor growing conditions, the grain reached anthesis and soon began to fill seed. However, winds in excess of 50 mph, accompanied by heavy rainfall, shattered the grain, which was now between soft and hard dough, to the extent of 75% in Gasser wheat up to 95% in Lidal barley. All varieties suffered at least 75% shatter.

Rainy conditions postponed harvest until September 23, when Toral oats were combined, in spite of a 30% moisture content. The grain dryer ceased to operate after the first load of oats and subsequent drying took place in hay lofts, barn floors, and truck beds. Nip oats was the final crop to be harvested on October 13. As a result of improper drying, some grain was lost to molding and heating. The entire lot of

TABLE 1. Seed production and quality of 6 grain and grass crops grown under irrigation at the Alaska PMC in 1975.

Crop	Acres	Seeding rate	Yield[1/]	Purity	Germination	Test weight
		lb/acre	bu/acre	%	%	lb/bu
Gasser wheat	3.66	70.0	13.36	100.00	12.25	54.90
Weal barley	5.14	102.2	29.11	99.90	73.75	46.80
Nip oats -- Lot 1	4.60	102.7	34.38	99.76	49.00	38.00
-- Lot 2	-	-	-	99.89	36.25	43.30
-- Lot 3	-	-	-	99.90	43.00	38.00
Toral oats -- Lot 1	4.49	102.7	32.55	99.84	33.00	47.20
-- Lot 2	-	-	-	99.95	30.00	50.86
-- Lot 3	-	-	-	99.90	43.00	38.00
-- Lot 4	-	-	-	99.82	26.50	50.60
Engmo timothy	13.00	-	140.00[1/]	99.68	64.50	47.30

1/ Based on 60, 48, and 32 lb/bu for wheat, barley, and oats, respectively.
2/ lb/acre.

Lidal barley, which amounted to 2000 pounds of uncleaned seed, was completely destroyed and had to be discarded.

Extremely low yields are due to poor weather conditions, which prevailed throughout the growing season, causing grain to mature slowly and moving harvest later into the fall. Harvest was one month later than last year and all crops were subjected to fall winds, which took a devastating toll through shattering.

Grass Seed Production

A 13-acre field of Engmo timothy, which was established prior to the purchase of the PMC, was managed for seed production in 1975. The field was fall fertilized in 1974 with 18-18-9 at a rate of 400 lbs/acre. Weed control consisted of spraying, with 2,4-D at one pint per acre, in the middle of June. Adverse weather conditions accounted for 75% shatter. The only seed retained was on those portions of the field which lodged before the high winds occurred. Harvest was in early October and weather conditions prohibited straw removal and will force spring (1976) rather than fall (1975) fertilization. Seed production results appear in Table 1.

Two small fields of foundation Arctared red fescue and Polar brome, seeded in 1974, had to be abandoned and plowed due to an infestation of weeds, mostly Quackgrass (*Agropyron repens*), in June, 1975.

A 0.96-acre field of foundation Arctared red fescue was planted on June 23, 1975 in Field 1E, which had been fallowed two years in a row. One pint of 2,4-D per acre was applied on September 2. Banvel D was used, mainly for the control of Pineapple weed

(*Matricaria matricarioides*). Results of the herbicide applications were good, and, when combined with proper cultivation, should provide adequate weed control. Stand establishment was excellent and a seed crop should be harvested in 1976.

Strawberry Production

Three hybrid varieties of strawberries, (*Fragaria* species) Alaska Pioneer, 6652-6, and 6652-7 were received from Don Dinkel, at the University of Alaska, in Fairbanks, for plant increase at the Plant Materials Center. Twelve plants each of the numbered varieties and 15 Alaska Pioneer were transplanted on June 17, 1974 in Field 1B. Twenty-five grams of MagAmp were incorporated into a 12-inch diameter area surrounding the strawberries when they were planted. Irrigation was provided, as needed, throughout the summer at 1/2 acre-inch per set. Straw mulch was applied in October following a light application of 8-32-16 in late September. Rate of production for all varieties was 25 new plants from each original or parent plant.

Transplanting began in early May after a severe winter, which left one to three inches of ice over the entire plot. Difficulty was encountered in removing the straw, much of which remained frozen and prevented the underlying soil from thawing. None of the numbered varieties survived the winter, however 61 Alaska Pioneer plants were separated, potted, and placed in the greenhouse for temporary storage.

Two beds (70' X 4' X 1') were formed in Field 1A on ground that had been spring fertilized with 400 lbs/acre of 18-18-9. The beds

were formed by first discing, then rototilling, to raise up the bed, and finally leveling, compacting, and shaping with a blade. Each bed was angled two to five degrees toward the south to increase drainage and exposure. Final transplanting began on July 14. Plants were taken from the greenhouse and, upon removal from the pots, placed in the beds. Flowers were pinched off in order to encourage stolon production. The rate of production was maintained at 1:25 in 1975. Stolons spread out evenly over the four foot wide beds, but due to crusty soil conditions, which was detrimental to root penetration, winter survival of new plants may be poor.

Tenoran was applied at a rate of eight pounds of wettable powder per acre in 35 gallons of water. Fairly good control of annual grasses and broadleaf weeds was achieved.

A survey designed to determine present and long-range demand for strawberry foundation stock, by commercial nurseries, was developed by Ed Kern, Marketing Specialist at the Division of Agriculture in Palmer. Results appear in Table 2. Indications of this report are that future demands for Alaska Pioneer are high and desire for new varieties, which produce more and larger fruit, were expressed. The Plant Materials Center Board of Directors placed a price of $1.00 per plant on foundation strawberry nursery stock.

Patrick T. Mulligan

TABLE 2. Annual Strawberry Plant Sales and Alaska Pioneer Foundation Stock Demand as of March, 1975.

Annual Strawberry Plant Sales

Commercial Nurseries	Units	Range
12	27,148	24-10,000

Alaska Pioneer Foundation Stock Desired

Commercial Nurseries	Units	Range
8	2,148	48-1,000

Scotch Pine Production

Mänty Scotch pine, *Pinus sylvestris*, was seeded on the Plant Materials Center in 1974 at the request of Division of Lands, Forestry section. The purpose of the planting was to supply 2-1 and 2-2 bareroot seedlings to private landowners interested in land improvement and reforestation. Distribution of the seedlings will be through the Forestry Incentive Management and American Tree Farm programs, both administered by Forestry. Some seedlings will also be used for field test plantings and landscaping of State buildings. The seed is a selection of Scotch pine from Rovaniemi, Finland and supplied to us through Forestry by the Institute of Northern Forestry, Fairbanks, Alaska.

Materials and Methods

Seedbed

The seedbed was prepared first by rototilling a 5' X 100' area and then fumigating with a "Vorlex"[1] drench at a 15 fluid oz/100 sq. ft. rate. The Vorlex concentrate was applied by hand with a sprinkler can and watered into the soil with approximately one-half inch of water. Immediately after the water application, a plastic film tarp was drawn over the treatment area, weighted with soil, and left for seven days to fumigate. (Although the manufacturer recommends injection of Vorlex for maximum results, this broadcast/water-in

[1]Active ingredients in Vorlex formulation include 80% 1, 2-dichloropropane; 1, 3-dichloropropene; and related compounds and 20% methyl isothiocyanate.

technique is used by at least one local grower with reasonable success. The technique is limited, however, to small areas such as seedbeds.) After seven days the plastic was removed to aerate the soil for three weeks and the seedbed disced twice during the aeration period to dispel all traces of fumigant.

Soil type of the seedbed area is a Niklason silt loam, a common soil on the PMC, with 20 to 30 inches of stratified silt and sand over a very gravelly sand base.

Seeding

The seed was planted on June 28, 1974, unstratified, with a 3-point hitch, tractor-mounted Brillion grass seeder five feet in width. Rice hulls, one-third of a pound, were mixed with the pine seed as a filler to improve seed distribution at a 0.66 lbs/1000 sq. ft. rate. Exactly 7.6 ounces of pine seed were planted by the seeder -- the equivalent of 77 seeds/sq. ft. An emergence count six weeks later showed a seedling density of 35/sq. ft. or roughly 17,500 seedlings in total. After seeding, the seedbed was covered completely with a woven plastic shadecloth rated at 55% shade to protect the young seedlings from hot sun and such predators as mice, shrews, and birds, until late October. The shading cloth was replaced in the spring for the 1975 growing season.

Weed Control

Hand weeding in 1974, it is estimated, was cut 80% because of the fumigation treatment before planting. Pineapple weed and prostrate pigweed were not controlled and continued to be the two biggest weed problems the entire first growing season. In 1975, liverwort thrived under the moist, shaded seedbed conditions and choked out

most weed problems, although hand weeding was still necessary twice during the season. Because the pine seedlings did not appear to be affected by the liverwort, it was left to grow in the seedbed throughout the season.

Irrigation

Water was applied as needed during both growing years with an oscillating sprinkler, 3/4 to 1 inch of water at each setting.

Fertilization

The seedlings were fertilized once in 1974. A fall application of 9-45-15, a high-phosphate, water-soluble fertilizer, was made to boost root development during the remainder of the year without causing a flush of new foliage just before winter frosts. This first year application was broadcast by hand with a sprinkler can at a 0.66 lbs/10 gal/100 sq. ft. rate -- the equivalent of 21 lbs N, 56 lbs P, and 36 lbs K per acre. A more effective method of adding phosphorus to the seedbed would have been to mix superphosphate or treble superphosphate into the seedbed before seeding.

In the spring of 1975, MagAmp was broadcast onto the bed surface at 7 lbs/100 sq. ft. and worked into the top two inches of soil with a hand cultivator.

Mulching

A mulch covering is considered especially important here in the Matanuska Valley area because of scant snow covering that occurs during most winters and because of drying winds, especially in the spring, that dehydrate both plant tissue and soil surface if not

protected. An insulating mulch cover is also important to stabilize soil temperatures through the winter period. Fluctuating soil temperatures can cause considerable root damage through ground heaving and, in early spring, during extended warm periods, cause spring buds to break before the danger of frost is over.

A perlite mulch was applied for winter/spring protection after the shade was removed in October 1974. Perlite is an expensive ($2.60/cu. ft.), but excellent, mulch insulator. Three inches were spread over the seedbed, covering the seedling tops with an inch of material, and weighted down with the plastic shade material. Once moist, the perlite mulch particles freeze together to form a solid insulating blanket. The mulch was removed the following spring with an industrial vacuum cleaner.

In the fall of 1975, wheat straw mulch was used instead of perlite to mulch the one-year-old seedlings. Half of the seedbed was covered 12 inches deep with straw, the other half left exposed for hardiness evaluations. Surviving seedlings will be transplanted into nursery-rows in the spring of 1976. See Table 3.

Joseph L. Stehlik

TABLE 3. 10 sample averages of Mänty Scotch pine seedlings for height, spread, and density at the end of the 1974 and 1975 growing seasons on the Alaska PMC.

Evaluation Date	Average Seedling Height	Average Seedling Spread	Average Seedling Density
	in.	in.	sq. ft.
Oct. 1974	2.0	-	34.6
Oct. 1975	3.7	4.2	17.3[1/]

1/ Drop in number of seedlings/sq. ft. caused by dehydration of approximately 50% of seedlings during late spring winds in May and June 1975 after bed mulch was removed.

Raspberry Production

The Plant Materials Center was requested in 1974 by the Institute of Agricultural Sciences to increase and maintain two unreleased raspberry varieties for further field testing and to supply propagules of these varieties, if released, to nurserymen requesting plant materials for commercial reproduction. It was agreed that all plant materials, whether root cuttings, spring suckers, or one-year-old plants, if released, would be distributed through the Alaska Crop Improvement Association and a $1.00 fee per plant charged.

Both raspberry varieties under increase and maintenance operations now are crosses with *Rubus idaeus* var. *strigosus*, a hardy red raspberry native to Alaska, but comparatively low in yields to cultivated varieties.

In June, 1974, five rooted cuttings of each variety, #9 and #35, were supplied from Fairbanks by Dr. Don Dinkel and planted into Field 1B at the Plant Materials Center. The planting area was prepared by discing and each planting hole fertilized with 25 gms. of 7-40-6 MagAmp slow-release fertilizer. Straw mulch was applied in October after the ground surface had frozen to conserve moisture and to help stabilize fluctuating soil temperatures during the winter period. During the last three months before 1975 spring breakup, ice, two to four inches thick, glazed over the entire planting area. Drying spring winds prevailed in May and June. All 10 raspberry plants survived in good condition, but canes exposed above the mulch line were killed.

In July 1975 rooted spring suckers were transplanted to a permanent location in field 4A. Suckers of each variety were transplanted to respective 200-foot water-filled furrows with suckers spaced two feet apart to establish a solid hedgerow planting. This type of row will require no trellis, is easily maintained, and lends itself readily to the production of spring suckers. All suckers were cut back to 12 inches immediately after planting and watered again thoroughly. A warm Knik wind prevailed during the entire planting period.

Weed control in the plant row was by hand this year. Tenoran 50 WP herbicide was applied to one-half of variety #9 at a rate of 8 lbs/acre. directly over the plant row with a Solo backpack sprayer and found to be effective against lambsquarter, shepherds purse, and wild mustard in a young seedling stage, but slightly phytotoxic to raspberry foliage. Tenoran is the trademark name of CIBA-Geigy for chloroxuron and is not registered for raspberries. All weed control between the rows was by discing. No fertilizer was applied in 1975. An application of 8-32-16 at a rate of 1000 lbs/acre will be made this coming spring.

One-half of both rows were mulched in October 1975 after freeze-up with 12 inches of wheat straw three feet on either side of the row. The mulch will be removed in spring 1976 as soon as soil temperatures begin to rise.

The project intent now is to maintain present plot size and supply plant materials as demanded for field testing for each of the next three years. If, after three years, either variety has not been

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The project intent now is to maintain present plot size and supply plant materials as demanded for field testing for each of the next three years. If, after three years, either variety has not been

released for commercial reproduction that variety will be discontinued. Increase and maintenance of additional raspberry stocks are anticipated in the future.

Requests for spring suckers should be made by May 1 for setting in late summer. One-year-old cover must be made one year in advance. Year-old plants provide a better root system for early spring planting but must be removed from the field before fall freeze-up and stored for early spring distribution.

Joseph L. Stehlik

Currant Production

The Plant Materials Center was requested in 1975 by the Institute of Agricultural Sciences to increase and maintain 'Long Bunch Holland' currant, a promising red currant variety for Alaska. The project intent will be to increase and maintain this variety, and others anticipated for the future, for further field testing by the Institute of Agricultural Sciences, and others, and to supply currant propagules to qualified nurserymen requesting these stocks for commercial reproduction.

Like raspberries, all propagation materials and rooted layers will be distributed through the Alaska Crop Improvement Association with a fee charged.

In June 1975 Dr. Don Dinkel supplied the PMC with greenwood cutting material from Wasilla. Thirty-four, 5-inch cuttings were prepared and rooted in sand under mist. After approximately six weeks all 34 cuttings were rooted and transplanted to 3-inch peat pots with a 1:1:1 peat, field sand, and perlite potting mix. MagAmp, a commercial 7-46-6 slow-release fertilizer, was added to the potting mix at 6 lbs/yd^3.

In late August the 3-inch peat pots were planted into one-gallon containers with the same growing medium and left to overwinter in our unheated plastic greenhouse. Water is added to the soil whenever greenhouse temperatures allow the soil to thaw enough to absorb moisture.

No other winter protection has been provided, although burying

the containers with snow is a recommended practice in an unheated greenhouse when snow is available. Snow is an excellent soil insulator and helps maintain moisture levels during dry frozen winters.

Currant stocks will be set out into a stool bed next spring in field 4A for one season of undisturbed growth and will serve as mother plants for layered stocks produced the following year.

Joseph L. Stehlik

TABLE 4. Alaska Plant Materials Center Woody Plant seed distribution in 1975.

Order Number	Species	Accession Number	Amount	Destination
6-75	*Picea sitchensis*	L-223	1 gm	John Sturgeon Anchorage, AK
9-75	*Picea sitchensis*	L-223	1 oz	John Sturgeon Anchorage, AK
	Picea glauca	L-225	1 oz	John Sturgeon Anchorage, AK
	Pinus contorta latifolia	L-236	1 oz	T. I. Kala Daytona Beach, FL
	Pinus contorta latifolia	L-236	1/2 oz	Frank Hunt Fairbanks, AK
17-75	*Picea sitchensis*	L-223	2 gm	John Zasada Fairbanks, AK
	Picea glauca	L-224	2 gm	John Zasada Fairbanks, AK
	Picea glauca	L-226	2 gm	John Zasada Fairbanks, AK
	Picea glauca	L-266	2 gm	John Zasada Fairbanks, AK
	Picea lutzii	L-267	2 gm	John Zasada Fairbanks, AK
	Tsuga mertensiana	L-268	2 gm	John Zasada Fairbanks, AK
	Picea glauca	L-274	2 gm	John Zasada Fairbanks, AK
	Picea glauca	L-276	2 gm	John Zasada Fairbanks, AK
	Picea sitchensis	L-277	2 gm	John Zasada Fairbanks, AK
	Picea sitchensis	L-278	2 gm	John Zasada Fairbanks, AK

TABLE 4. Alaska Plant Materials Center Woody Plant seed distribution in 1975. Cont'd.

Order Number	Species	Accession Number	Amount	Destination
18-75	*Picea sitchensis*	L-223	2 gm	Pat Cooper Beaver, OR
19-75	*Picea sitchensis*	L-223	1/4 gm	Anne Paul Scotch Plains, NJ
20-75	*Picea sitchensis*	L-223	1/4 gm	Don Griffin Harwich, MA
21-75	*Picea sitchensis*	L-223	1/4 gm	Barry Hemeon Harwich, MA
22-75	*Picea sitchensis*	L-223	1/4 gm	Haden Greenhalgh Harwich, MA

ALASKA SEED TESTING LABORATORY

Alaska Seed Testing Laboratory

A major duty of the Plant Materials Center was to establish, staff, and maintain a seed testing laboratory. Acting Director of Agriculture, Fred Honsinger, declared in April of 1975 that the Plant Materials Center would be the official seed testing laboratory in Alaska. In June, the laboratory was recognized by the Association of Official Seed Analysts (AOSA) and the International Seed Testing Association (ISTA).

The function of the seed testing laboratory is to analyze all types of seeds which are grown and sold in the State of Alaska. Before any seed is sold it must bear a label which includes the results of the purity and germination analysis. Seed imported into Alaska should also be tested to protect buyers against fraudulent or incorrectly labeled packages.

Purity analysis consists of individually examining the seeds and separating them into pure seed, other crop seed, weed seed, and inert matter, such as chaff, broken seed, and other foreign impurities. Percent of each component, by weight, is then determined and recorded.

Germination analysis requires 400 pure seeds. Many crops are prechilled and treated with potassium nitrate to break dormancy. The seeds are then placed in a special germination chamber. The chamber is adjusted for a predetermined temperature, light intensity, and duration. The length of time for the analysis ranges from seven to 28 days, with intermediate counts to determine seed vitality. Upon completion, an average percent of normal seedlings, abnormal

seedlings, and dead seeds is computed and recorded. A special chemical technique for germination, Tetrizolium analysis, can be used, for some seeds, to yield comparable results in 24 hours. A complete report of the purity and germination analysis is mailed to the grower and a sample of the seed lot is kept for three years at the laboratory.

Many Alaskan native plants are developing high economic interest. Before a certain variety can be certified, purity and germination standards must be established with the AOSA. The seed laboratory, in cooperation with the Soil Conservation Service, is engaged in such a study using Bluejoint (*Calamagrostis canadensis*).

Three stop sale orders were issued through the Division of Agriculture upon recommendation of the seed lab. Violations were for an outdated label, lack of germination, and the presence of a noxious weed in a seed sample. Results of purity and germination analyses are presented in Tables 1 and 2.

Generally speaking, most grain and grass seed samples received were of a very high quality and, hopefully, Alaskan seed growers will maintain this fine record.

Patrick T. Mulligan

TABLE 1. Results of purity and germination analysis at the Alaska Seed Testing Laboratory in 1975.

Type of Seed	Number of Tests		Germ. Range	Av. Germ.	Pure Seed Range	Av. Purity	Av. Inert Matter	Av. Weed	Av. Crop
	Standard	Tetrizolium							
Hordeum vulgare (Barley)	20	3	26-97.25	77.67	98.54-100	99.62	0.23	0.03	0.17
Avena sativa (Oats)	10	4	49.5-96.25	84.43	95.24-99.78	98.78	0.11	Trace	1.11
Triticum aestivum (Wheat)	2	0	63.75-79.75	71.75	95.51-99.28	99.4	0.43	-	0.18
Poa pratensis (Kentucky bluegrass)	11	0	59-94.5	87.18	99.66-99.91	99.82	0.17	0.02	-
Festuca rubra (Red fescue)	9	0	84-97.5	93.36	88.2-99.6	97.11	2.57	0.01	0.31
Phleum pratense (Timothy)	4	0	80-86.25	84.00	96.75-99.74	98.53	1.33	0.14	-
Alopecurus arundinaceus (Creeping foxtail)	2	0	54.5-65	59.75	88.93	88.93	11.07	-	-
Lotus corniculatus (Birdsfoot trefoil)	1	0	45.5	-	-	-	-	-	-
Vegetables	11	0	0-97.7	80.82	-	-	-	-	-
Trees and woody shrubs	6	0	36-77.78	54.35	-	-	-	-	-

TABLE 2. Weeds occurring in purity samples at the Alaska Seed Testing Laboratory.

Scientific Name	Common Name	Number of Samples
Polygonum convolvulus	Wild Buckwheat	10
Spergula arvensis	Corn Spurry	5
Chenopodium album	Lambsquarter	4
Stellaria media	Chickweed	4
Brassica spp.	Mustard	3
Galeopsis bifida	Hempnettle	2
Polygonum aviculare	Knotweed	2
Agropyron repens[1/]	Quackgrass	1
Compositae spp.	Composites	1
Polygonum lapathifolium	Ladysthumb	1
Hordeum brachyantherum	Wild Barley	1

1/ Noxious weed

PHYSICAL IMPROVEMENTS

Physical Improvements

The Plant Materials Center consists of 285-1/2 acres of land with three original and two new buildings on the headquarters site. Improvements made during the year were extensive, due mostly to the addition of 12 Comprehensive Employment Training Act (CETA) employees provided under a $175,000 grant from the USDA Soil Conservation Service beginning in July, 1975.

Land

Disposal of the stump piles in Field 7 (Fig. 1) proceeded rapidly during the fall and early winter months. One complete stump row was removed and two others 50% cleaned up. It is planned to have this field completely cleared, rototilled, and ready for planting by spring 1976.

Twenty-five acres of bromegrass and quackgrass was plowed in Field 4 in preparation for expanded tree evaluation and production plantings. The quackgrass was treated with 2 lbs/acre of "Roundup" (N - phosphonomethyl glycine) in 30 gallons of water when regrowth appeared after plowing. The field was disced and harrowed continuously the rest of the season so evaluation of the Roundup was not possible. Previous experience with this chemical showed excellent results, however.

Improvement of 3,500 feet of the main north-south roadway across the farm was completed in September. The original dirt road was straightened, graded to a .26% grade, and a 6" to 10" fill of pit-run gravel laid down. An open pit was established on the PMC to

PMC Land Use Map
1975

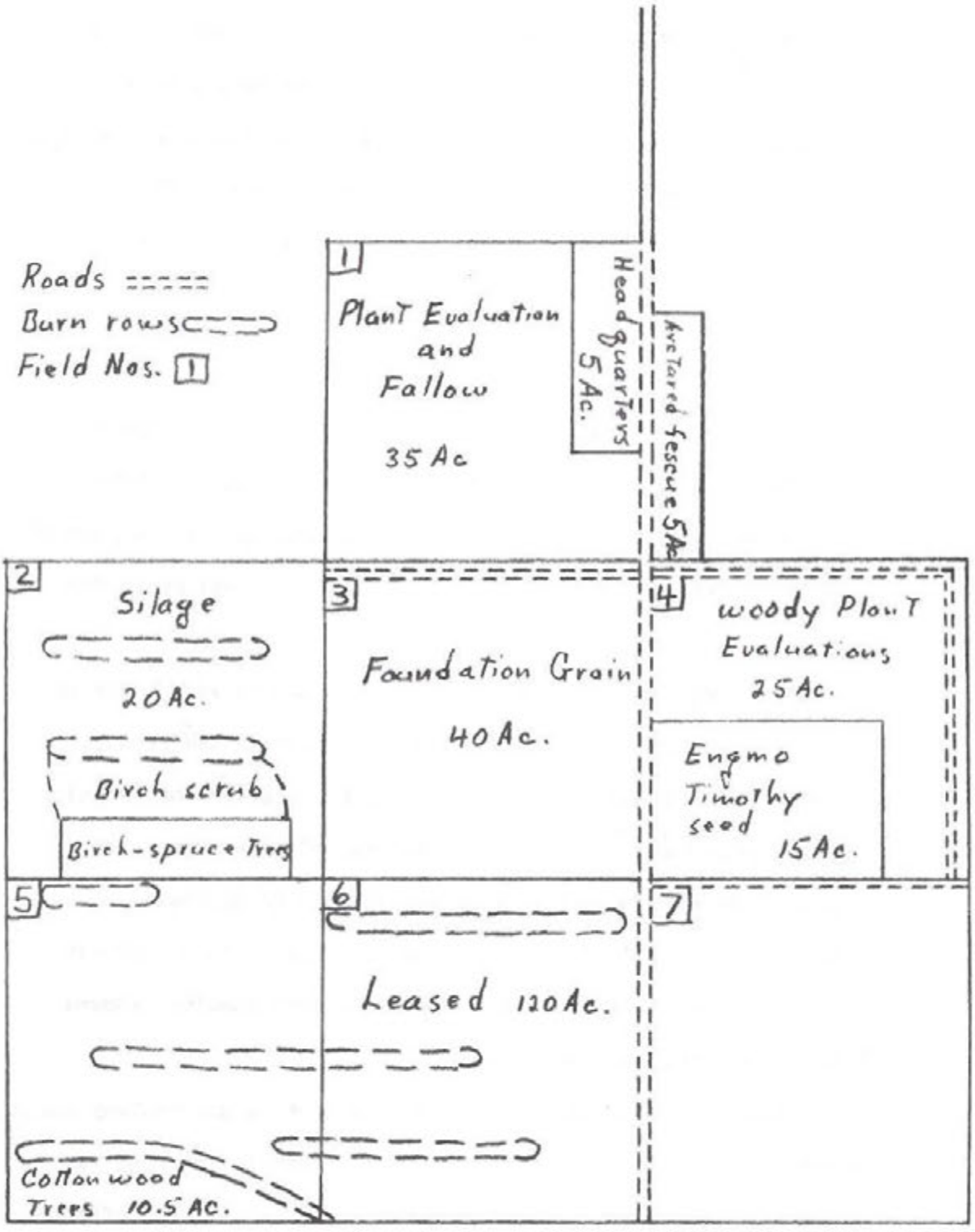

Figure 1.

provide the gravel for this and numerous other projects. The improved road now provides all-weather access to five of the seven 40-acre fields.

Buildings

Seed cleaning equipment was installed in the new seed cleaning building during the fall and winter months. Design of the electrical installation and hookup to the machines was contracted through the Division of Buildings to Creedon Engineering Co. of Anchorage. The electrical work should be completed by spring 1976. Construction of the steel surge bins will continue throughout the winter 1975/76.

Specifications for the new laboratory/office building were completed in December. The design and equipment needed for the laboratory was prepared by Van Waters and Rogers company at no cost to the PMC. Bid for construction will be let in spring 1976 and actual construction could start by June 15.

The greenhouse purchased in FY 75 and scheduled for erection during the summer of 1975 met with considerable delays. The foundation site was cleared and backfilled with gravel, but cold weather precluded pouring the foundation. Construction will begin in the spring of 1976.

The existing irrigation pumphouse was dangerously rotted out and collapse was imminent. The pump was removed for overhauling and the building destroyed. A ten-foot extension of the casing was installed, raising the top of the casing to ground level. The ten-foot deep open well was then backfilled with gravel. Winter weather halted the construction of the new pumphouse which will be done in

the spring of 1976.

A new plywood floor was laid in the loft of the barn and the joints sealed for seed storage. The small shop area in the barn was enlarged to 20 by 60 feet to accommodate both a carpentry and machine shop.

A cyclone fence was installed around the weather station to protect the instruments from stray animals.

A considerable amount of finished carpentry was accomplished by the CETA employees. They made screen cabinets, headhouse benches, carpentry cabinets, laboratory tables, picnic tables and benches, etc. In addition, the old milkhouse was renovated for a lunchroom including installation of heating, lavatory, and shower facilities.

The Division of Lands - Forestry section erected a wood frame and plastic covered greenhouse at the PMC to evaluate the production of containerized tree seedlings. This project is discussed in more detail on page 91.

James R. Stroh

FISCAL EXPENDITURES - 1975

Fiscal Expenditures - 1975

The legislature appropriated $124,300 in operating funds for the PMC in FY 75. An additional $13,182 appropriation was made during the year to cover increased salary and per diem costs. Intra-departmental transfers to the PMC amounted to $6,000. Participation in the Public Employment Program (PEP) with three temporary employees was covered by a grant of $5,422 through the Governor's office. A balance of $6,026.04 (4.1%) remained in operating funds at the end of the year.

A grant of $4,640 from the Soil Conservation Service - USDA to conduct seed production and analysis studies on the native bluejoint grass was received late in the year. These funds were placed in a continuing account and will be expended during FY 76.

Two capital projects amounting to $125,000 were appropriated. The seed cleaning building ($75,000) was completed during the year. The greenhouse and its equipment were purchased, but winter temperatures prevented its being erected.

James R. Stroh

TABLE 1. Allocations and Expenditures for FY 1975.

Object Code and Name	Allocation	Expenditure	Percent of Total Allocation
	Operations		
100 Personal Services	$76,870		
111 Regular compensation		$63,637.26	
112 Overtime compensation		157.08	
120 Benefits		9,373.15	
Total	76,870	73,167.49	52.3
100 Personal Services (PEP)	5,422		
111 Regular compensation		4,920.95	
112 Overtime compensation		108.75	
120 Benefits		357.57	
Total	5,422	5,387.27	3.7
200 Travel	3,312		
211 Instate transportation		563.30	
212 Instate per diem		486.50	
213 Outside transportation		548.54	
214 Outside per diem		400.00	
221 Instate transportation		48.80	
222 Instate per diem		60.00	
Total	3,312	2,107.14	2.3

TABLE 1. Allocations and Expenditures for FY 1975. Continued.

Object Code and Name	Allocation	Expenditure	Percent of Total Allocation
300 Contractual Services	$41,200		
310 Communication services		$575.25	
310 Long distance telephone		634.76	
314 Postage		325.59	
320 Printing and advertising		38.40	
321 Photo processing		36.10	
325 Advertising		203.60	
330 Rents and utilities		56.30	
335 Heat, light, and water		1,600.00	
340 Repair, etc.		354.03	
345 Janitorial services		2,418.25	
350 Transportation of things		128.19	
360 Equipment rental		441.18	
361 Equipment rental - highways		5,627.72	
380 Professional fees		27,888.49	
388 Vista train pre service		25.00	
390 Other fees and services		794.96	
Total	41,200	41,147.82	28.0
400 Commodities	15,000		
440 Fuel, non-vehicular		2,261.15	
451 Materials, construction		1,721.61	
452 Lumber		103.92	
453 Signs and preservatives		16.55	
455 Road materials		32.00	

TABLE 1. Allocations and Expenditures for FY 1975. Continued.

Object Code and Name	Allocation	Expenditure	Percent of Total Allocation
400 Commodities (con't.)			
456 Other materials and hardware		1,078.72	
459 Other maintenance material		1,072.78	
460 Equipment parts		44.49	
461 Diesel fuel, vehicular		293.85	
462 Gas fuel, vehicular		326.69	
463 Lubricants		129.87	
464 Liquid petroleum		69.09	
465 Miscellaneous parts and supplies		262.18	
470 Professional scientific supplies		459.57	
474 Books, library and reference		157.86	
480 Office supplies		169.48	
490 Other supplies		6,495.94	
Total	15,000	14,695.75	10.2
500 Equipment	5,200		
520 Furniture		260.00	
530 Special equipment		3,083.00	
590 Other equipment		1,129.49	
Total	5,200	4,472.49	3.5
Total Operations	147,004	140,977.96	

TABLE 1. Allocations and Expenditures for FY 1975. Continued.

Object Code and Name	Allocation	Expenditure	Percent of Total Allocation
		Capital	
Greenhouse	$50,000		
380 Professional fees		$20,000.00	
Total	50,000	20,000.00	40%
Seed Cleaning Building	75,000		
341 Building		63,675.00	
380 Professional fees		11,325.00	
Total	75,000	75,000.00	60%
Total Capital	125,000	95,000.00	
		Grants	
Soil Conservation Service	4,640		
300 Contractual Services		0.00	
Total	4,640	0.00	
Total Grants	4,640	0.00	100%