

## APPENDIX B

### SEED COLLECTION AND PREPARATION DATA

Tables B-1 through B-3 list seed collected on the North Slope during 1989 through 1991, respectively. Table B-4 lists seed collected during 1991 in Russia. The tables include species collected, location, the collection date, grams of cleaned seedlot per collection and the estimated percent chaff still present in the cleaned seedlot. For the 1990 and 1991 collections, the relative size of the bulk field collection is also given (small bag, large bag, film canister, plus number of bags, canisters, etc.). The comments section provides insight on yield, effort required in cleaning seed, seed maturity, etc.

Table B-1. Species, locations, dates and data on threshing and cleaning of seed collected during 1989

Species	Collection Location	Collection Date	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot*	Comments
GRASSES:					
Agropyron boreale	BP Put River No. 1	24 Aug 89	12.500		
Agropyron boreale	Kuparuk River Bridge	25 Aug 89	167.010		
Alopecurus alpinus	B.P. Put River No. 1	24 Sep 89	13.510	30	Very hard to clean seed
Alopecurus alpinus	Pump Station No. 1	27 Sep 89	1.703	30	Very hard to clean seed
Alopecurus alpinus	Van Cleave's Plots	26 Sep 89	10.435	30	Very hard to clean seed
Arctagrostis latifolia	M.P. 31 Dalton Highway	19 Sep 89	15.810		
Arctagrostis latifolia	Pump Station No. 1	27 Sep 89	5.960		
Arctagrostis latifolia	Sag. River E. of Airport	27/28 Sep 89	37.500		
Arctagrostis latifolia	IBP Plots	26 Aug 89	27.580		
Arctagrostis latifolia	72 Haul Road (introduced)	26 Sep 89	7.700		
Bromus pumellianus	Kuparuk River Bridge	25 Aug 89	20.090		Seed 90% immature
Deschampsia beringensis	IBP Plots	26 Aug 89	0.000		Seeds are immature
Deschampsia caespitosa	1972 Haul Road	29 Aug 89	20.270		Fair yield
Deschampsia caespitosa	Kup. Haul Rd/N. ARCO Store Pad	29 Aug 89	34.600		
Deschampsia caespitosa	Kuparuk River Bridge	25 Aug 89	55.210		Fair yield
Deschampsia caespitosa	Sohio-Kuparuk Reserve Pit	29 Aug 89	20.080		
Dupontia fisheri	Pump Station No. 1	27 Sep 89	5.392		Poor yield
Elymus arenarius mollis	East Dock Dunes	25 Sep 89	122.900		
Festuca brachyphylla	Sohio-Kuparuk Reserve Pit	29 Aug 89	14.988		
Festuca brachyphylla	IBP Plots	26 Aug 89	22.420		
Festuca ovina	East Dock Dunes	25 Sep 89	10.050		
Festuca rubra	Kuparuk River Bridge	25 Aug 89	7.646		Poor yield, very few with any seed inside
Festuca rubra	IBP Plots	26 Aug 89	6.390		Poor yield, very few with any seed inside
Festuca 'vivipara'	B.P. Put River No. 1	24 Aug 89	26.220	90	
Poa arctica	East Dock Dunes	25 Sep 89	36.720		
Poa glauca	IBP Plots	26 Aug 89	63.800		
Poa glauca	72 Haul Road	29 Aug 89	176.400		
Poa pratensis	IBP Plots	26 Aug 89	34.860		
Puccinellia langeana	B.P. Put River No. 1	24 Aug 89	209.530		Good yield
Puccinellia langeana	IBP Plots	26 Aug 89	253.650		Good yield
Trisetum spicatum	B.P. Put River No. 1	24 Aug 89	60.290		Tough to thresh
Trisetum spicatum	IBP Plots	26 Aug 89	41.180		Tough to thresh

Table B-1. (Cont.) Species, locations, dates and data on threshing and cleaning of seed collected during 1989

Species	Collection Location	Collection Date	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot*	Comments
<b>GRASSLIKE:</b>					
Carex maritima	Winter Haul Road, DS-2	31 Aug 89	8.278		
Carex maritima	B.P. Put River No. 1	27 Aug 89	2.037		
Carex maritima	Sohio-Kuparuk Reserve Pit	29 Aug 89	23.870		
Luzula arctica	Arco State #1	30 Aug 89	1.811		Some contamination
<b>FORBS:</b>					
Androsace chamaejasme	Winter Haul Road, DS-2	31 Aug 89	0.259		Very small sample
Armeria maritima	Arco Discovery Well Site	7 Sep 89	5.503		
Armeria maritima	Haul Road at Little Put River	31 Aug 89	0.829		Seed immature and very small
Artemisia arctica	Kuparuk River Bridge	25 Aug 89	14.946		
Artemisia arctica	M.P. 40 Dalton/Franklin Bluffs	19 Sep 89	14.100		
Artemisia borealis	Kuparuk River Bridge	25 Aug 89	6.061		
Artemisia glomerata	Kuparuk River Bridge	25 Aug 89	16.010		Good yield
Artemisia tilesi	Kuparuk River Bridge	25 Aug 89	0.256		Only a trace of seed
Aster sibericus	Sag. River E. of Airport	28 Sep 89	8.392		
Braya pilosa & purpurascens	Put R. #27 Gravel Pit	27 Aug 89	71.490		Topsoil stockpile, seed mixed
Cerastium beeringianum	72 Haul Road, DS-2	26 Sep 89	2.992		
Chrysanthemum bipinnatum	Kuparuk River Bridge	25 Aug 89	0.000		No apparent seed, but saved chaff
Descurainia sophioides	Sohio-Kuparuk Reserve Pit	29 Aug 89	18.800		
Draba spp.	B.P. Put River No. 1	27 Aug 89	11.444		White-flowered species
Epilobium latifolium	B.P. Put River No. 1	24 Aug 89	3.500		
Epilobium latifolium	Put River #27 Gravel Pit	27 Aug 89	7.540		
Eutrema edwardsii	Arco State No. 1	30 Aug 89	32.840		
Eutrema edwardsii	B.P. Put River No. 1	27 Aug 89	3.370		
Melandrium apetalum	Winter Haul Road, DS-2	31 Aug 89	11.250		
Parrya nudicaulis	Sag. River E. of Airport	27 Sep 89	0.989		
Pedicularis sudetica	Winter Haul Road, DS-2	31 Aug 89	0.219		
Polemonium boreale	BP Put River No. 1	24 Aug 89	0.691		

Table B-1. (Cont.) Species, locations, dates and data on threshing and cleaning of seed collected during 1989

Species	Collection Location	Collection Date	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot*	Comments
<b>FORBS (Cont.):</b>					
Primula borealis	Winter Haul Road, DS-2	31 Aug 89	0.011		
Sedum rosea	Big Skookum	20 Sep 89	21.453		
Senecio congestus	M.P. 40 Dalton/Franklin Bluffs	19 Sep 89	4.390		
Silene acaulis	Arco State No. 1	30 Aug 89	20.103		
<b>SHRUBS:</b>					
Salix arctica	Winter Haul Road, DS-2	31 Aug 89	0.098		Very small sample

\* In 1989, there was no concerted effort to estimate percent trash or purity of the seedlots.

Summary of North Slope Native Seed Collection for 1989

Gramnoids = 19 species in 37 bulk field collections  
 Forbs = 23 species in 26 bulk field collections  
 Shrubs = 1 species in 1 bulk field collection

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Total = 43 species in 64 bulk field collections

Table B-2. Species, locations, dates and data on threshing and cleaning of seed collected during 1990

Species	Collection Location	Collection Date	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>GRASSES:</b>						Seedlots placed in freezer 18 Jan 1991.
<i>Agropyron boreale</i>	Kuparuk River Bridge	14 Sep 90	1 Lg. Bag	51.23	10%	No comments.
<i>Alopecurus alpinus</i>	1972 Haul Road	10 Sep 90	1 Sm. Bag	33.46	50%	Did not run through blower, too fuzzy and light.
<i>Alopecurus alpinus</i>	East Dock Dunes	8 Sep 90	1 Lg. Bag	29.10	50%	Did not run through blower, too fuzzy and light.
<i>Arctagrostis latifolia</i>	Kuparuk River Bridge	14 Sep 90	1 Lg. Bag	10.91	65%	Appears to have very few mature, viable seeds in relation to the number of seedheads.
<i>Arctagrostis latifolia</i>	Pump Station No. 1	11 Sep 90	1 Lg. Bag	13.59	35%	Appears to have small amount of mature seed.
<i>Arctagrostis latifolia</i>	Sag. River E. of Airport	18 Sep 90	2 Lg. Bags	28.74	15%	Fair percent of seed from sample.
<i>Arctophila fulva</i>	Lonnie Lake East	26 Sep 90	1 Lg. Bag	12.48	2%	Very high percent of seed retained in seedheads.
<i>Arctophila fulva</i>	Pump Station No. 1	11 Sep 90	1 Lg. Bag	11.19	5%	No comments.
<i>Bromus pumpellianus</i>	Endicott Rd-S. Big Skookum	13 Sep 90	1 Lg. Bag	0.00	100%	Found no mature seeds, all are in flower stage.
<i>Bromus pumpellianus</i>	Kuparuk River Bridge	14 Sep 90	1 Lg. Bag	19.53	99%	Appears to have very few mature seeds, perhaps one-dozen in the seedlot.
<i>Bromus pumpellianus</i>	M.P. 365 Dalton Highway	06 Aug 90	1 U.S. Bag	62.00	5%	Good yield, Seeds are shriveled - may be immature.
<i>Calamagrostis inexpansa</i>	Kuparuk River Bridge	14 Sep 90	Very Sm. Bag	1.35	98%	Appears to be no mature seed by visual examination.
<i>Deschampsia caespitosa</i>	1972 Haul Road	10 Sep 90	1 Lg. Bag	17.40	15%	Seed screened four times, then once through blower.
<i>Deschampsia caespitosa</i>	End. Rd-West Caribou Ramp	13 Sep 90	1 Lg. Bag	5.21	85%	Same treatment as above, poor seed yield.
<i>Deschampsia caespitosa</i>	Kuparuk River Bridge	14 Sep 90	2 Lg. Bags	32.73	20%	Seed screened four times, then once through blower.
<i>Deschampsia caespitosa</i>	Pump Station No. 1	11 Sep 90	2 Lg. Bags	15.62	35%	Seed screened four times, then once through blower.
<i>Deschampsia caespitosa</i>	Sag. River E. of Airport	18 Sep 90	2 Lg. Bags	27.88	5%	Seed screened four times, then once through blower. Good clean seed.
<i>Dupontia fisheri</i>	Pump Station No. 1	11 Sep 90	1 Lg. Bag	37.36	2%	Appears to be good clean seed.
<i>Elymus arenarius mollis</i>	East Dock Dunes	14 Jul 90	1 Sm. Bag	27.12	10%	1989 seedcrop, but collected in 1990. Good yield.
<i>Elymus arenarius mollis</i>	East Dock Dunes	07 Sep 90	2 Lg. Bags	248.00	10%	Good Yield, 2 large jars of seed.
<i>Elymus innovatus</i>	M.P. 365 Dalton Highway	06 Aug 90	1 U.S. Bag	32.49	10%	Poor yield, considerable immature seed blown away.
<i>Festuca baffinensis</i>	1972 Haul Road	10 Sep 90	1 Sm. Bag	12.65	15%	Good yield.
<i>Festuca baffinensis</i>	Endicott Road-S. of Big Skookum	13 Sep 90	1 Lg. Bag	25.32	15%	Fair yield.
<i>Festuca ovina</i>	East Dock Dunes	08 Sep 90	1 Lg. Bag	5.14	45%	Very poor yield.
<i>Festuca rubra</i>	Endicott Rd-S. Big Skookum	13 Sep 90	1 Lg. Bag	5.33	95%	Very poor yield.
<i>Festuca rubra</i>	Kuparuk River Bridge	14 Sep 90	1 Sm. Bag	6.19	98%	Very poor yield, found no seeds by inspection.
<i>Festuca 'vivipara'</i>	1972 Haul Road	10 Sep 90	1 Lg. Bag	22.38	95%	Unable to find any viable seed by inspection.
<i>Festuca 'vivipara'</i>	East Dock	29 Aug 90	1 Lg. Bag	30.90	95%	Unable to find any viable seed by inspection.
<i>Poa arctica</i>	East Dock Dunes	07 Sep 90	1 Lg. Bag	23.45	25%	Fuzzy seed, hard to clean.
<i>Poa arctica</i>	Endicott Rd-S. Big Skookum	13 Sep 90	1 Lg. Bag	6.61	45%	Fuzzy seed, hard to clean. Poor yield.

Table B-2. (Cont.) Species, locations, dates and data on threshing and cleaning of seeds collected during 1990

Species	Collection Location	Collection Date	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>GRASSES (Cont.):</b>						Seedlots placed in freezer 18 Jan 1991.
<i>Poa glauca</i>	1972 Haul Road	10 Sep 90	2 Lg. Bags	11.34	90%	Very poor yield, observed only a few seeds.
<i>Poa glauca</i>	Endicott Road-1 mile W of W Caribou Ramp	13 Sep 90	2 Lg. Bags	43.98	25%	Fair yield.
<i>Puccinellia lankeana</i>	East Dock	29 Sep 90	4 Lg. Bags	39.30	25%	Poor yield from large sample collected.
<i>Poa pratensis</i>	1972 Haul Road	10 Sep 90	1 Lg. Bag	20.64	90%	All seeds appear immature. Seed in two small jars. (Mitchell Introduction - Canada Bluegrass?)
<i>Trisetum spicatum</i>	1972 Haul Road	10 Sep 90	1 Lg. Bag	8.87	65%	Seed very light, unable to remove chaff
<i>Trisetum spicatum</i>	Kuparuk River Bridge	14 Sep 90	#8 P Sack	1.15	95%	Seed very light, unable to remove chaff saved entire sample.
<i>Trisetum spicatum</i>	M.P. 354.5 Dalton Hwy M.P. 62 TAPS-dry ridge	16 Jul 90	1 Sm. Bag	0.84	80%	Lots of chaff, seeds larger and better filled than seed collected at Prudhoe.
<b>GRASSLIKE:</b>						
<i>Carex maritima</i>	East Dock	09 Sep 90	1 Lg. Bag	29.17	5%	Great yield.
<i>Carex maritima</i>	East Dock Dunes	08 Sep 90	1 Sm. Bag	24.78	5%	Great yield.
<i>Carex ursina</i>	East Dock	10 Sep 90	1 Sm. Bag	71.08 (2 jars)	5%	Seed harvested with vacuum; Sample was a slurry of mud, seed, and goose feces. Dried in oven at 30 degrees C and screened. Some seed-size sand grains.
<b>FORBS:</b>						
<i>Androsace chamaejasme</i>	72 Haul Road	26 Aug 90	1 Sm. Bag	3.00	5%	Seed easy to clean.
<i>Androsace chamaejasme</i>	East Dock Dunes	09 Sep 90	1 Sm. Bag	3.50	1%	Seed easy to clean.
<i>Androsace chamaejasme</i>	M.P. 405 Dalton Hwy	05 Aug 90	#4 P Sack	1.49	10%	Seed easy to clean. Some dirt with seed.
<i>Arabis arenicola</i>	M.P. 405 Dalton Hwy	05 Aug 90	#4 P Sack	4.19	1%	No comments.
<i>Armeria maritima</i>	East Dock Dunes	09 Sep 90	1 Sm. Bag	5.14	15%	Seed light and fluffy, not sure of quality.
<i>Armeria maritima</i>	Kuparuk River Bridge	14 Sep 90	#8 P Sack	0.96	15%	Seed light and fluffy, not sure of quality.
<i>Armeria maritima</i>	M.P. 405 Dalton Hwy	05 Aug 90	#4 P Sack	18.87	15%	Seed light and fluffy, not sure of quality.
<i>Armeria maritima</i>	Sag. R. E. of Airport	18 Sep 90	1 Sm. Bag	3.54	15%	Seed light and fluffy, not sure of quality.
<i>Artemisia arctica</i>	East Dock Dunes	09 Sep 90	1 Sm. Bag	7.00	1%	Seed cleans up well.
<i>Artemisia arctica</i>	Kuparuk River Bridge	14 Sep 90	#8 P Sack	0.41	1%	Seed cleans up well, small sample.
<i>Artemisia arctica</i>	M.P. 377.5 Dalton Hwy Franklin Bluffs Camp	17 Sep 90	1 Lg. Bag	28.23	1%	Seed cleans up well.
<i>Artemisia borealis</i>	Kuparuk River Bridge	14 Sep 90	#8 P Sack	0.31	5%	Small sample.
<i>Artemisia borealis</i>	Put #23 Gravel Mine Pit	19 Sep 90	1 Sm. Bag	0.23	5%	Poor yield of seed, most blown away before harvest.
<i>Artemisia glomerata</i>	Kuparuk River Bridge	14 Sep 90	1 Sm. Bag	5.46	15%	Poor yield; Collection extremely dusty and dirty, some dirt still in seed.
<i>Artemisia glomerata</i>	M.P. 405 Dalton Hwy	05 Aug 90	#8 P Sack	1.97	1%	Fair yield.

Table B-2. (Cont.) Species, locations, dates and data on threshing and cleaning of seeds collected during 1990

Species	Collection Location	Collection Date	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
FORBS (Cont.):						Seedlots placed in freezer 18 Jan 1991.
<i>Artemisia tilesii</i>	Kuparuk River Bridge	14 Sep 90	#8 P Sack	0.15	1X	A very small sample, only a few seeds.
<i>Aster sibericus</i>	Sag. R.-E. of Airport	18 Sep 90	Very Sm. Bag	0.84	2X	Small sample.
<i>Astragalus aboriginum</i>	M.P. 399 Dalton Hwy	05 Aug 90	#8 P Sack	3.85	0X	Small amount of seed.
<i>Astragalus alpinus</i>	M.P. 405 Dalton Hwy	05 Aug 90	1 Lg. Bag	37.44	1X	Seeds green in color, good amount.
<i>Astragalus alpinus</i>	M.P. 405 Dalton Hwy	16 Aug 90	1 Sm. Bag	25.61	0X	Seeds green in color, good amount.
<i>Astragalus alpinus</i>	M.P. 399 Dalton Hwy	05 Aug 90	#8 P Sack	5.23	0X	Seed greenish in color and larger than <i>A. eucoismus</i> . (Seed was initially mixed with <i>A. eucoismus</i> below, but seeds are different, allowing for separation.)
" "	" "	" "	" "	" "	" "	" "
<i>Astragalus eucoismus</i>	M.P. 399 Dalton Hwy	05 Aug 90	#8 P Sack	17.34	0X	Seed brownish and smaller than <i>A. alpinus</i> above.
<i>Astragalus nutzotinensis</i>	M.P. 395.9 Dalton Hwy	17 Aug 90	1 Lg. Bag	13.86	0X	No comments.
<i>Astragalus nutzotinensis</i>	M.P. 405 Dalton Hwy	05 Aug 90	#2 P Sack	2.76	0X	Seeds from both 5, 8 August collections combined into one seedlot
<i>Astragalus nutzotinensis</i>	M.P. 405 Dalton Hwy	08 Aug 90	#2 P Sack			
<i>Castilleja elegans</i>	M.P. 395.9 Dalton Hwy	17 Aug 90	1 Sm. Bag	3.85	5X	Seeds need scrubbing 2-3 times to remove from white tissue.
" "	M.P. 21.5 TAPS-Spur Dike	"	"	"	"	"
<i>Castilleja elegans</i>	M.P. 405 Dalton Hwy	05 Aug 90	#8 P Sack	0.15	5X	Seeds need scrubbing 2-3 times to remove from white tissue. Seeds may be immature, still green.
" "	" "	" "	" "	" "	" "	" "
<i>Cerastium beeringianum</i>	72 Haul Road	10 Sep 90	1 Lg. Bag	9.33	5X	Tiny seeds.
<i>Chrysanthemum bipinnatum</i>	Kuparuk River Bridge	14 Sep 90	1 Lg. Bag	23.00	90X	Seeds do not appear to be mature.
<i>Descurainia sophioides</i>	M.P. 398.7 Dalton Hwy	17 Aug 90	1 Sm. Bag	170.30	2X	Combined both into 1 seedlot, lg. bag not threshed.
<i>Descurainia sophioides</i>	M.P. 398.7 Dalton Hwy	17 Aug 90	1 Lg. Bag	"	"	Static electricity is problem in cleaning seedlot.
<i>Draba corymbosa</i>	72 Haul Road	26 Aug 90	Very Sm. Bag	0.52	1X	Small sample.
<i>Epilobium latifolium</i>	M.P. 395.9 Dalton Hwy	17 Aug 90	2 lg. Bags	17.59	10X	Problem cleaning, saved fluff.
" "	M.P. 21.5 TAPS-Spur Dike	"	"	"	"	"
<i>Epilobium latifolium</i>	M.P. 405 Dalton Hwy	05 Aug 90	1 Lg. Bag	19.93	10X	Problem cleaning, saved fluff.
<i>Epilobium latifolium</i>	Dalton Hwy-395.9 & 405	"	"	2.95	5X	Fluff from both seedlots above combined and run through Fuzzbuster (delinter).
" "	" "	" "	" "	" "	" "	" "
<i>Eutrema edwardsii</i>	72 Haul Road	26 Aug 90	Very Sm. Bag	5.06	1X	Good yield for small sample.
<i>Hedysarum mackenzii</i>	M.P. 369.25 Dalton Hwy	06 Aug 90	3 U.S. Bags	467.20	2X	Seeds still in pods, stored in U.S. Bag
" "	" "	" "	" "	14.46	5X	Naked Seeds, stored in small jar.
<i>Hedysarum mackenzii</i>	M.P. 405 Dalton Hwy	06 Aug 90	1 U.S. Bag	127.57	2X	Seeds still in pods, stored in quart jar.
" "	" "	" "	" "	3.14	5X	Naked Seeds, stored in small jar.
<i>Hedysarum mackenzii</i>	M.P. 405 Dalton Hwy	16 Aug 90	1 Lg. Bag	73.65	2X	Seeds still in pods, stored in quart jar.
" "	" "	" "	" "	2.46	2X	Naked Seeds, stored in small jar.
<i>Minuartia arctica</i>	Arco State No. 1	15 Sep 90	Very Sm. Bag	0.05	1X	Maybe 20 seeds total

Table B-2. (Cont.) Species, locations, dates and data on threshing and cleaning of seeds collected during 1990

Species	Collection Location	Collection Date	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
FORBS (Cont.):						Seedlots placed in freezer 18 Jan 1991.
Minuartia obtusiloba	M.P. 354.5 Dalton Hwy-	17 Sep 90	1 Sm. Bag	0.37	20%	Very tiny seeds.
"	M.P. 62 TAPS-Dry Ridge					
Minuartia obtusiloba	M.P. 365 Dalton Hwy	06 Aug 90	#4 P Sack	0.71	30%	Very tiny seeds.
Oxytropis borealis	M.P. 405 Dalton Hwy	08 Aug 90	1 Lg. Bag	132.48	5%	Seed stored in 2 Jars.
Oxytropis borealis	M.P. 405 Dalton Hwy	16 Aug 90	1 Lg. Bag	68.45	2%	Seed cleans well.
Oxytropis nigrescens	Dunes between Endicott	07 Aug 90	1 Sm. Bag	19.90	0%	Seed cleans well.
"	Pipeline and E-2 Pond					
Oxytropis nigrescens	Dunes between Endicott	09 Aug 90	1 U.S. Bag	75.61	0%	Seed cleans well.
"	Pipeline and E-2 Pond					
Oxytropis nigrescens	Dunes West of E-2 Pond	09 Aug 90	3 U.S. Bags	209.03	0%	Seed cleans well.
Oxytropis nigrescens	Dunes West of E-2 Pond	22 Aug 90	1 Sm. Bag	8.39	0%	Seed cleans well.
Oxytropis nigrescens	Dunes E. Endicott Pipe	08 Aug 90	1 Sm. Bag	9.04	0%	Seed cleans well.
"	-2nd Caribou Ramp					
Pedicularis capitata	M.P. 405 Dalton Hwy	05 Aug 90	#2 P Sack	0.80	15%	Seeds appear shrivelled.
Pedicularis labradorica	M.P. 405 Dalton Hwy	05 Aug 90	#8 P Sack	1.41	15%	No comments.
Pedicularis lanata kanei	M.P. 405 Dalton Hwy	05 Aug 90	Large P Sack	30.60	10%	About half the seeds have pods still around them.
Polymonium boreale	East Dock Dunes	08 Aug 90	Very Sm. bag	4.00	2%	No comments.
Potentilla hookeriana	Big Skookum	13 Sep 90	1 Lg. Bag	3.99	1%	Very tiny seeds; poor yield for size of collection.
Primula borealis	Endicott Coastal	03 Aug 90	Letter Envelope	0.23	40%	Difficult to determine if seed is mature.
Saxifraga oppositifolia	Arco State No. 1	15 Sep 90	#4 P Sack	0.16	40%	No comments.
Saxifraga oppositifolia	Haul Road SE D.S. #5	19 Sep 90	Very Sm. Bag	0.18	40%	No comments.
Saxifraga tricuspidata	M.P. 354.5 Dalton Hwy	17 Sep 90	1 Sm. Bag	1.91	5%	Very, very tiny seeds.
"	M.P. 62 TAPS-Dry Ridge					
Sedum rosea	East Dock	09 Sep 90	1 Lg. Bag	15.28	1%	Good yield.
Sedum rosea	Big Skookum	13 Sep 90	2 Lg. Bags	8.92	20%	Fair yield.
Senecio congestus	M.P. 377.5 Dalton Hwy	17 Sep 90	1 Lg. Bag	12.15	50%	Difficult to determine between seed and chaff.
"	Franklin Bluffs Camp					
Silene acaulis	Arco State No. 1	15 Sep 90	1 Sm. Bag	3.88	15%	No comments.
Silene wahlbergella	1972 Haul Road	26 Aug 90	1 Sm. Bag	4.03	5%	No comments.
Wilhelmsia physoides	M.P. 401/405 Dalton Hwy.	05 Aug 90	#4 P Sack	0.91	5%	No comments.



Table B-2. (Cont.) Species, locations, dates and data on threshing and cleaning of seeds collected during 1990

Species	Collection Location	Collection Date	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>SHRUBS:</b>						Seedlots placed in freezer 28 Jan 1991
Dryas integrifolia	East Dock Dunes	09 Sep 90	1 Lg. Bag	16.63	40X	Difficult to separate seed from fluff; used Fuzzbuster (delinter).
Dryas integrifolia	Endicott Road-Mid Caribou Ramp	21 Aug 90	1 Sm. Bag	1.71	40X	Difficult to separate seed from fluff; used Fuzzbuster.
Dryas integrifolia	Endicott Road-Mid Caribou Ramp	13 Sep 90	2 Lg. Bags	33.17	40X	Difficult to separate seed from fluff; Fuzzbuster utilized. Salix arctica seed accidentally mixed in seedlot and then screened out, a few seeds may
Dryas octopetala	M.P. 354.5 Dalton Hwy M.P. 62 TAPS-Dry Ridge	17 Sep 90	Very Sm. Bag	1.67	100X	No viable seed detected.
Salix arctica	1972 Haul Road	10 Sep 90	1 Sm. Bag	1.36	35X	Difficult to separate seed from fluff; used Fuzzbuster.
Salix arctica	Endicott Road at West Caribou Ramp (End Terr)	13 Sep 90	1 Lg. Bag	2.78	5X	Seedlot accidentally mixed with Dryas integrifolia. Screened to separate seeds, a few Dryas seeds are still mixed with this seedlot. Used Fuzzbuster.
Salix ovalifolia	Dunes West of E-2 Pond	22 Aug 90	#12 P Sack	5.82	35X	Difficult to separate seed from fluff; used Fuzzbuster.
Salix ovalifolia	East Dock Dunes	08 Sep 90	1 Sm. Bag	2.78	45X	Extremely difficult to separate seed from fluff; maybe 50% removed. Used Fuzzbuster.
Salix ovalifolia	M.P. 405 Dalton Hwy	05 Aug 90	#4 P Sack	4.03	10X	Difficult to separate seed from fluff; used Fuzzbuster (delinter).

## Summary of North Slope Native Seed Collection in 1990

Graminoids = 21 species in 40 bulk field collections  
 Forbs = 37 species in 62 bulk field collections  
 Shrubs = 4 species in 9 bulk field collections

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Totals = 62 species in 111 bulk field collections

Table B-3. Species, locations, dates and data on threshing and cleaning of seed collected during 1991

Species	Collection Location	Collection 4/6/92	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>GRASSES:</b>						
Agropyron boreale	Lisburne - NPRA	7/23/91	1 Sm. Bag	64.540	15%	Good yield
Agropyron boreale	M.P. 334.4 Dalton Highway	8/11/91	1/3 Lg. Bag	18.790	15%	Good yield
" "	Happy Valley Airstrip					
Agropyron boreale	Kuparuk River Bridge	9/3/91	1/2 Lg. Bag	3.907	90%	Very poor yield, 10% seed
Alopecurus alpinus	BP Put River No. 1	9/3/91	1 Sm. Bag	11.700	50%	Estimated 50% seed
Arctagrostis latifolia	Sag. River E. of Airport	9/15/91	2 Lg. Bags	1.596	50%	Few mature seeds, est. 90% chaff was blown off.
" "				0.632	?	Separate jar of enlarged seeds, possibly with Ergot kept with screened off trash.
Bromus pumpellianus	M.P. 334.4 Dalton Highway	8/11/91	1/10 Sm. Bag	0.000	100%	Immature, no seed in this seedlot
" "	-Happy Valley Airstrip					
Bromus pumpellianus	Mix from: M.P. 354.4	8/31/91	1/10 Sm. Bag	0.678	10%	Very few seeds, 90% pure
" "	(m.p. 62) & M.P. 324.6	9/1/91				
" "	(ice cut) Dalton Highway					
Bromus pumpellianus	Kuparuk River Bridge	9/3/91	1/3 Sm. Bag	0.000	100%	Immature, no seed at all - examined thoroughly
Calamagrostis canadensis	M.P. 334.4 Dalton Highway	8/11/91	1/10 Sm. Bag	0.000	100%	Immature, no seed
" "	-Happy Valley Airstrip					
Calamagrostis lapponica	M.P. 354.4 (m.p. 62) and	8/31/91	1 Lg. Bag	9.750	100%	No seed found, appears to be trash. Saved chaff that was not blown off.
" "	M.P. 352.8 (m.p. 64) D.H.					
Calamagrostis purpurascens	M.P. 354.4 Dalton Highway	8/31/91	1/2 Sm. Bag	3.398	80%	Poor yield, appears to have approximately 20% viable seed.
Calamagrostis purpurascens and lapponica	Mixed from: M.P. 354.4 Dalton Highway	8/31/91	1/10 Sm. Bag	0.664	75%	Very small sample, mostly immature
Deschampsia caespitosa	Kuparuk River Bridge	9/3/91	2 Lg. Bags	14.280	100%	All is immature, 100% trash
Deschampsia caespitosa	M.P. 405 Dalton Highway	9/5/91	1 Lg. Bag	6.840	95%	Mostly trash, few seeds found by visual inspection
Elymus arenarius mollis	East Dock Dunes	9/15/91	1/3 Lg. Bag	11.190	90%	Most of seedlot is immature
Elymus innovatus	Franklin Bluffs on squirrel mound	8/10/91	1/3 Lg. Bag	2.392	100%	No seed but saved chaff sample
" "						
Elymus innovatus	M.P. 365 Dalton Highway on squirrel mound	8/30/91	2/3 Lg. Bag	9.900	100%	No seed but saved chaff sample
" "						
Elymus innovatus	M.P. 324.6 Dalton Highway (Turnoff at Ice Cut Sign)	9/1/91	1/2 Lg. Bag	50.070	10%	Good yield, appears to be good quality seed
" "						
Elymus innovatus	M.P. 334.4 Dalton Highway Happy Valley Airstrip	9/1/91	1 Sm. Bag	24.880	20%	Good yield, appears to be good quality seed
" "						
Festuca altaica	M.P. 334.4 Dalton Highway	8/11/91	1/10 Sm. Bag	1.531	10%	Fair yield, appears mature
" "	Happy Valley Gravelbar					
Festuca altaica	M.P. 324.6 Dalton Highway (Turnoff at Ice Cut Sign)	9/1/91	1/3 Sm. Bag	1.928	10%	Fair yield, appears mature
" "						
Festuca baffinensis	BP Put River No. 1	9/3/91	1 Sm. Bag	7.423	30%	30% Trash or immature seed

Table B-3. (Cont.) Species, locations, dates and data on threshing and cleaning of seed collected during 1991

Species	Collection Location	Collection 4/6/92	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>GRASSES (Cont.):</b>						
<i>Festuca ovina</i>	East Dock Dunes	9/4/91	1 Sm. Bag	1.848	95%	2 mature seeds found in visual inspection of 40
<i>Festuca rubra</i>	M.P. 334.4 Dalton Highway	8/11/91	1/3 Lg. Bag	6.567	40%	Some seeds appear green and shriveled, immature
" "	Happy Valley Gravelbar					
<i>Festuca rubra</i>	M.P. 334.4 Dalton Highway	9/1/91	1/3 Sm. Bag	5.591	10%	Good yield, appears to be mature seed
" "	Happy Valley Gravelbar					
<i>Festuca rubra</i>	Kuparuk River Bridge	9/3/91	1 Sm. Bag	1.093	75%	Mostly immature seed
<i>Festuca 'vivipara'</i>	BP Put River No. 1	9/3/91	2 Lg. Bags	43.320	50%	Impossible to visually determine quality of seed
<i>Hierochloa alpina</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	0.074	20%	Very small sample, only a few seeds, appears mature
<i>Hierochloa alpina</i>	M.P. 354.4 (m.p. 62) and	8/31/91	1/2 Lg. Bag	5.540	20%	Poor yield, mostly shattered prior to harvest
" "	M.P. 352.8 (m.p. 64) D.H.					
<i>Poa alpigena</i>	Kuparuk River Bridge	9/3/91	1/2 Sm. Bag	4.920	100%	No seed, all appears immature
<i>Poa arctica</i>	East Dock Dunes	9/4/91	1 Lg. Bag	6.466	100%	No seed, all appears immature
<i>Poa glauca</i>	Franklin Bluffs	8/10/91	2/3 Lg. Bag	4.116	100%	No seed, all appears immature
" "	on squirrel mounds					
<i>Poa glauca</i>	M.P. 354.4 Dalton Highway	8/31/91	1/2 Lg. Bag	6.831	5%	Poor yield, appears mature and of good quality
<i>Poa glauca</i>	BP Put River No. 1	9/3/91	1 Sm. Bag	2.100	99%	No seed, appears immature
<i>Poa glauca</i>	Kuparuk River Bridge	9/3/91	1 Sm. Bag	2.496	100%	No seed, appears immature
<i>Poa glauca</i>	Endicott Road - 1/2 mile	9/4/91	1 Lg. Bag	13.340	95%	Unable to identify any mature or viable seed
" "	East of Duck Island Gravel					
" "	Pit on squirrel mounds					
<i>Puccinellia langetana</i>	BP Put River No. 1	9/3/91	2 Lg. Bags	50.190	20%	Fair yield, maturity varies, some seed is small
<i>Trisetum spicatum</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	1.437	50%	Some seed is green, may be immature
<i>Trisetum spicatum</i>	M.P. 352.8 Dalton Highway	8/31/91	1/10 Sm. Bag	0.633	25%	Appears mature
" "	(Rocky Ridge at m.p. 64)					
<i>Trisetum spicatum</i>	BP Put River No. 1	9/3/91	1/2 Lg. Bag	6.720	50%	Poor yield, mostly immature
<b>FORBS:</b>						
<i>Arnica alpina</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	0.024		42 seeds total
<i>Artemisia arctica</i>	M.P. 346.4 Dalton Highway	9/1/91	1 Sm. Bag	17.932	2%	Fair yield, seed appears mature
" "	collection site N. 1.2 mi.					
" "	along pipeline to Sag. R.					
<i>Artemisia arctica</i>	Between E2-NA Pond and	9/4/91	1 Sm. Bag	1.281	30%	Very poor yield, mostly immature
" "	Endicott Road					
<i>Artemisia arctica</i>	M.P. 405 Dalton Highway	9/5/91	1/2 Lg. Bag	7.225	100%	Poor yield
<i>Artemisia arctica</i>	M.P. 377.5 Dalton Highway	9/11/91	1/3 Lg. Bag	11.373	1%	Fair yield
" "	Franklin Bluffs Camp					
<i>Artemisia borealis</i>	Put #23 Gravel Mine Pit	9/4/91	2 Lg. Bags	83.810	1%	Good yield
<i>Artemisia borealis</i>	M.P. 405 Dalton Highway	9/5/91	1/2 Lg. Bag	11.265	25%	Fair yield

Table B-3. (Cont.) Species, locations, dates and data on threshing and cleaning of seed collected during 1991

Species	Collection Location	Collection 4/6/92	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>FORBS (Cont.):</b>						
<i>Artemisia glomerata</i>	Kuparuk River Bridge	9/3/91	1 Sm. Bag	2.712	5X	Poor yield, some dirt in seed sample
<i>Artemisia tilesii</i>	M.P. 334.4 Dalton Highway	9/1/91	1/10 Sm. Bag	0.370	99X	20-30 seeds found, may be immature
" "	Happy Valley Gravel Bar					
<i>Artemisia tilesii</i>	Kuparuk River Bridge	9/3/91	1/10 Sm. Bag	0.000		No seed, no sample saved
<i>Aster sibericus</i>	M.P. 346.4 Dalton Highway	9/1/91	1/2 Sm. Bag	6.956	60X	Difficult to clean, somewhat immature
" "	collection site N. 1.2 mi. along pipeline to Sag. R.					
<i>Aster sibericus</i>	M.P. 334.4 Dalton Highway	8/11/91	1/10 Sm. Bag	1.418	70X	Seed appears mostly immature
" "	Happy Valley gravel bar					
<i>Astragalus aboriginum</i>	M.P. 395.9 Dalton Highway	8/9/91	1 Sm. Bag	7.564	2X	Green seeds, appear immature
" "	(M.P. 21.5 TAPS Spur Dike)					
<i>Astragalus alpinus</i>	M.P. 395.9 Dalton Highway	8/9/91	1/3 Sm. Bag	5.415	40X	Green seeds, poor yield
" "	(M.P. 21.5 TAPS Spur Dike)					
<i>Astragalus alpinus</i>	M.P. 395.9 Dalton Highway	9/5/91	1/4 Sm. Bag	5.115	20X	Green seeds, poor yield
" "	(M.P. 21.5 TAPS Spur Dike)					
<i>Astragalus nutzotiniensis</i>	M.P. 395.9 Dalton Highway	8/9/91	1/3 Sm. Bag	6.839	15X	Seed not uniform, odd shapes and sizes
" "	(M.P. 21.5 TAPS Spur Dike)					
<i>Astragalus nutzotiniensis</i>	M.P. 395.9 Dalton Highway	9/5/91	1/4 Sm. Bag	6.709	15X	Odd shapes, sizes, and color of seed. Some sand.
" "	(M.P. 21.5 TAPS Spur Dike)					
<i>Castilleja elegans</i>	M.P. 334.4 Dalton Highway	9/1/91	1 Sm. Bag (full)	14.900	50X	Hard to clean out trash
" "	Happy Valley Gravel Bar					
<i>Cerastium beeringianum</i>	BP Put River No. 1	9/3/91	1/2 Sm. Bag	1.682	1X	Appears to be good seed
<i>Epilobium latifolium</i>	M.P. 334.4 Dalton Highway	8/11/91	1 Lg. Bag (full)	12.808	2X	Appears good, fair yield
" "	Happy Valley Gravel Bar					
<i>Eriophorum scheuchzeri</i>	BP Put River No. 1	9/3/91	1 Lg. Bag	10.455	10X	Appears mature, fair yield
<i>Geum glaciale</i>	Franklin Bluffs	8/10/91	1/2 Sm. Bag	1.161	100X	No seed
<i>Hedysarum mackenzii</i>	M.P. 334.4 Dalton Highway	8/11/91	1/2 Lg. Bag	11.611	23X	Appears mature, green seed
" "	Happy Valley Gravel Bar					
<i>Hedysarum mackenzii</i>	M.P. 334.4 Dalton Highway	9/1/91	1/3 Sm. Bag	9.343	5X	Appears mature, fair yield. Seed stripped from plants
" "	Happy Valley Gravel Bar					
<i>Lagotis glauca</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	0.617	90X	Very few seeds, perhaps a dozen
<i>Lupinus arcticus</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	0.119	0X	12-15 seedpods, 20 seeds
<i>Minuartia obtusiloba</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	0.253	100X	No seed
<i>Minuartia obtusiloba</i>	M.P. 354.5 Dalton Highway	8/31/91	1/3 Sm. Bag	0.901	20X	Poor yield, may have shattered prior to collection
" "	Dry Tundra Ridge					

Table B-3. (Cont.) Species, locations, dates and data on threshing and cleaning of seed collected during 1991

Species	Collection Location	Collection 4/6/92	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>FORBS (Cont.):</b>						
<i>Oxytropis borealis</i>	M.P. 405 Dalton Highway	9/5/91	1 Sm. Bag	9.160	43%	Poor yield, lots of trash and dirt
<i>Oxytropis campestris</i> " "	M.P. 324.6 Dalton Highway (Turnoff at Ice Cut Sign)	9/1/91	1 Sm. Bag	16.069	1%	Fairly pure seed, fair yield
<i>Pedicularis capitata</i>	M.P. 405 Dalton Highway	8/9/91	1/10 Sm. Bag	4.043	40%	May be immature
<i>Pedicularis verticillata</i> " "	M.P. 324.6 Dalton Highway (Turnoff at Ice Cut Sign)	9/1/91	1 Sm. Bag	10.416	5%	Seed appears mature, good yield
<i>Polygonum bistorta</i> <i>Polygonum bistorta</i> " "	M.P. 354.5 Dalton Highway Along low bluff between M.P. 364.7 & 365 Dalton Hwy.	8/30/91 8/30/91	1/3 Sm. Bag 1/3 Sm. Bag	8.937 10.382	7% 9%	Seed appears mature good yield Seed appears mature good yield
<i>Potentilla biflora</i>	Franklin Bluffs	8/10/91	1/10 Sm. Bag	0.314	0%	Only a few green colored seeds
<i>Saussurea angustifolia</i> " "	Along low bluff between M.P. 364.7 & 365 Dalton Hwy.	8/30/91	1 Lg. Bag	25.500	40%	Very difficult to clean, some seeds appear to be broken by use of the fuzzbuster
<i>Saxifraga bronchialis</i>	Franklin Bluffs	8/10/91	1/3 Sm. Bag	0.305	80%	Very tiny green seed, all appear to be immature
<i>Saxifraga tricuspidata</i> " "	M.P. 354.5 Dalton Highway Dry Tundra Ridge	8/31/91	1/2 Sm. Bag	1.469	20%	Very small seeds
<i>Senecio congestus</i> " "	M.P. 377.5 Dalton Highway Franklin Bluffs Camp	9/11/91	1/2 Lg. Bag	8.413	43%	Hard to clean, appears mature
<i>Zygadenus elegans</i> " "	M.P. 324.6 Dalton Highway (Turnoff at Ice Cut Sign)	9/1/91	1/3 Lg. Bag	12.720	5%	Appears mature
<b>SHRUBS:</b>						
<i>Cassiope tetragona</i>	Franklin Bluffs	8/10/91	1/3 Sm. Bag	0.000		No seed, sample saved
<i>Dryas octopetala</i>	Franklin Bluffs	8/10/91	1/2 Sm. Bag	4.688	30%	Seed appears mature
<i>Empetrum nigrum</i> (in Bear Feces)	M.P. 324.6 Dalton Highway (Turnoff at Ice Cut Sign)	9/11/91	1 Lg. Bag (frozen)	1.930	2%	Contained some hullless Sheperdia seed, below
<i>Salix glauca</i> " "	M.P. 334.4 Dalton Highway Happy Valley Gravel Bar	8/11/91	1 Sm. Bag	14.320	5%	Seed well-formed and ppears mature
<i>Salix ovalifolia</i>	East Dock Dunes	9/4/91	1/4 Sm. Bag	1.141	35%	Seed appears mature
<i>Salix ovalifolia</i>	M.P. 405 Dalton Highway	9/5/91	1/2 Sm. Bag	4.588	20%	Good seed
<i>Salix pulchra</i>	Inigok TW #1 - NPRA	7/18/91	1/3 Sm. Bag	0.674	5%	Small sample

Table B-3. (Cont.) Species, locations, dates and data on threshing and cleaning of seed collected during 1991

Species	Collection Location	Collection 4/6/92	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
-----						
SHRUBS (Cont.):						
Shepherdia canadensis	M.P. 324.6 Dalton Highway	9/11/91	1/10 Sm. Bag	4.122	0X	Recovered all seed
" "	(Turnoff at Ice Cut Sign)					
Shepherdia canadensis	M.P. 324.6 Dalton Highway	9/11/91	1 Lg. Bag	150.960	0X	Seed appears good, mixed with Empetrum seed, above
(in Bear Feces)	(Turnoff at Ice Cut Sign)		(frozen)			
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Summary of North Slope Native Seed Collection for 1991

Grasses = 21 species in 40 bulk field collections  
 Forbs = 29 species in 40 bulk field collections  
 Shrubs = 7 species in 9 bulk field collections

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 Total = 57 species in 89 bulk field collections

Table B-4. Species, location, date, and data on threshing and cleaning of seed collected in Russia during 1991

Species	Collection Location	Collection Date	Bulk Field Collection	Grams Cleaned Seedlot	Est. % Chaff in Cleaned Seedlot	Comments
<b>GRASSES:</b>						
<i>Alopecurus</i>	Yamal Peninsula	8/20/91	Full film Canister	4.290	0%	Species not designated.
<i>Deschampsia</i>	Yamburg	8/24/91	Small sample	4.210	0%	Species not designated; mixed with Pubescent Red Fescue from Navy Post Plots.
<i>Festuca rubra?</i>	Yamburg	8/19/91	Full film canister	2.461	5%	Not sure of species.
<i>Festuca</i> (Pubescent Red Fescue)	Navy Post Plots	8/20/91	Small sample	1.440	0%	Species not designated; mixed with <i>Deschampsia</i> from Yamburg.
<b>FORBS:</b>						
<i>Artemisia tilesii</i>	Yamburg	8/24/91	Small sample	13.332	1%	Good yield, a few <i>Senecio</i> seed mixed in, left
<i>Hedysarum alpinum</i>	Yamburg	8/17/91	1/4 Film Canister	0.581	1%	Probably immature.
<i>Hedysarum alpinum</i>	Yamburg	8/18/91	Medium Glass Jar	4.640	1%	
<i>Senecio congestus</i>	Yamburg	8/24/91	Small sample			A few seed mixed with <i>Artemisia tilesii</i> sample
<i>Tanacetum bipinnatum</i>	Yamburg	8/19/91	Medium Glass Jar	7.470	35%	Same plant as <i>Chrysanthemum bipinnatum</i> (Welsh p. 170)
<i>Tripleurospermum phaeocephalum</i>	Nadym	8/15/91	1/2 Film Canister	1.222	20%	Wild Camomile

Summary of native seeds collected in Russia during 1991

Grasses = 4 species in 4 field collections  
 Forbs = 5 species in 6 field collections  
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 Total = 9 species in 10 field collections

## APPENDIX C

### GERMINATION DATA

Tables C-1 and C-2 list the results of germination tests for seed collected in 1989 and 1990, respectively. By counting out a specific number of seeds (300 in 1989 and 320 in 1990) and weighing them, then dividing the number by the weight, the number of seeds per gram was determined. The germination rate was derived from the mean of the three replicates (100 seeds tested per replicate). The seedlots consist of species by collection location and date since both can effect the viability of seeds. Harvested seed was placed in the deep freeze for at least 2 weeks after being threshed and cleaned. Seeds selected for germination trials were treated with clorox bleach for 5 minutes, rinsed with water and placed in a refrigerator for 6 days prior to being put in the germinator. Seeds were watered with a captan solution (1/2 g per quart) to control molds. The germinator was set for 16 hours of light at a temperature of 20 °C and 8 hours of darkness at a temperature of 13 °C. Seeds were monitored daily during the germination trials so rate of germination could be determined. Germination tests were also run on different sized seeds from selected species/collections and for different seed treatments.



Table C-1. Germination record for North Slope native seeds collected in 1989

Species	Collection Location	Collection Date	Seeds/ Germ. Test	Grams/ Germ. Test	No. Seeds/ Gram	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								REP I	REP II	REP III	
GRASSES:											
Agropyron boreale	B.P. Put River No. 1	8/24/89	300	1.259	238	5/21/90	5/28 - 6/14	98	96	92	95.3
Agropyron boreale	Kuparuk River Bridge	8/25/89	300	1.068	281	5/21/90	5/28 - 6/14	99	99	99	99.0
Alopecurus alpinus	B.P. Put River No. 1	8/24/89	300	0.258	1163	5/16/90	5/22 - 6/14	95	92	92	93.0
Alopecurus alpinus	Pump Station No. 1	9/27/89	300	0.1	2083	5/31/90	6/6 - 6/19	30	23	32	28.3
Alopecurus alpinus	IBP Plots	8/26/89	300	0.258	1163	5/3/90	5/9 - 5/29	88	89	93	90.0
Arctagrostis latifolia	M.P. 31 Dalton Highway	9/19/89	300	0.081	3704	5/11/90	5/17 - 5/30	79	80	81	80.0
Arctagrostis latifolia	Pump Station No. 1	9/27/89	300	0.075	4000	5/7/90	5/13 - 5/26	73	64	69	68.7
Arctagrostis latifolia	Sag. River E. of Airport	9/27/89	300	0.092	3261	5/3/90	5/9 - 5/23	99	97	98	98.0
Arctagrostis latifolia	IBP Plots	8/26/89	300	0.071	4225	5/3/90	5/9 - 5/23	60	50	55	55.0
Arctagrostis latifolia	72 Haul Road-introduced	9/26/89	300	0.082	3659	5/7/90	5/13 - 5/30	89	86	90	88.3
Bromus pumpellianus	Kuparuk River Bridge	8/25/89	300	1.149	261	5/3/90	5/9 - 5/29	91	93	91	91.7
Deschampsia beringensis	IBP Plots-introduced	8/26/89	300	0.064	4688	6/11/90	6/17 - 7/16	2	1	0	1.0
Deschampsia caespitosa	1972 Haul Road	8/29/89	300	0.098	3061	5/7/90	5/13 - 5/26	93	96	97	95.3
Deschampsia caespitosa	Kuparuk Haul Road North of Arco Storage Pad	8/29/89	300	0.096	3125	5/11/90	5/17 - 5/30	96	89	91	92.0
Deschampsia caespitosa	Kuparuk River Bridge	8/25/89	300	0.098	3061	5/11/90	5/17 - 5/30	95	96	91	94.0
Deschampsia caespitosa	Sohio-Kuparuk Reserve Pit	8/29/89	300	0.100	3000	5/3/90	5/9 - 5/23	97	92	95	94.7
Dupontia fisheri	Pump Station No. 1	9/27/89	300	0.274	1095	5/16/90	5/22 - 6/14	87	84	92	87.7
Elymus arenarius mollis	East Dock Dunes	9/25/89	300	1.824	164	5/31/90	6/6 - 6/19	100	99	93	97.3
Festuca brachyphylla	Sohio-Kuparuk Reserve Pit	8/29/89	300	0.169	1775	5/3/90	5/9 - 5/28	89	89	89	89.0
Festuca brachyphylla	IBP Plots	8/26/89	300	0.180	1667	5/16/90	5/22 - 6/14	83	91	92	88.7
Festuca ovina	East Dock Dunes	9/25/89	300	0.287	1045	5/16/90	5/22 - 6/12	87	87	86	86.7
Festuca rubra	Kuparuk River Bridge	8/25/89	300	0.2	1370	5/21/90	5/28 - 6/19	57	73	55	61.7
Festuca rubra	IBP Plots-introduced	8/26/89	300	0.2	1546	5/21/90	5/28 - 6/19	57	60	66	61.0
Festuca 'vivipara'	B.P. Put River No. 1	8/24/89	300	1.004	299	5/11/90	5/17 - 6/8	72	81	83	78.7
Poa arctica	East Dock Dunes	9/25/89	300	0.138	2174	5/7/90	5/13 - 5/29	86	88	87	87.0
Poa glauca	1972 Haul Road	8/29/89	300	0.106	2830	5/11/90	5/17 - 5/31	94	97	97	96.0
Poa glauca	IBP Plots	8/26/89	300	0.098	3061	5/11/90	5/17 - 5/30	93	88	94	91.7
Poa pratensis	IBP Plots-introduced	8/26/89	300	0.107	2804	5/7/90	5/13 - 6/2	95	92	86	91.0
Puccinellia langeana	B.P. Put River No. 1	8/24/89	300	0.045	6667	5/3/90	5/9 - 5/23	97	96	97	96.7
Puccinellia langeana	IBP Plots	8/26/89	300	0.045	6667	5/7/90	5/13 - 5/24	96	98	98	97.3

Table C-1. (Cont.) Germination record for North Slope native seeds collected in 1989

Species	Collection Location	Collection Date	No. Seed in Germ. Test	Grams/ Germ. Test	No. Seeds/ Gram	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								REP I	REP II	REP III	
<b>GRASSES (Cont.):</b>											
Trisetum spicatum *1	B.P. Put River No. 1	8/24/89	300	0.100	3000	5/3/90	5/9 - 5/29	84	84	96	88.0
Trisetum spicatum	IBP Plots	8/26/89									
<b>GRASSLIKE:</b>											
Carex maritima	72 Haul Road	8/31/89	300	0.270	1111	5/7/90	5/13 - 6/7	94	93	98	95.0
Carex maritima	B.P. Put River No. 1	8/27/89	300	0.203	1478	5/21/90	5/28 - 6/19	96	96	96	96.0
Carex maritima	Sohio-Kuparuk Reserve Pit	8/29/89	300	0.236	1271	5/31/90	6/6 - 7/6	95	96	92	94.3
Luzula arctica	Arco State No. 1	8/30/89	150	0.033	4545	6/11/90	6/17 - 7/16	1	5	1	4.7
<b>FORBS:</b>											
Androsace chamaejasme	72 Haul Road	8/31/89	150	0.099	1515	6/11/90	6/17 - 7/16	0	0	0	0.0
Armeria maritima	Arco Discovery Well Site	9/7/89	300	0.388	773	5/16/90	5/22 - 6/11	57	67	55	59.7
Armeria maritima	72 Haul Road and L. Put R.	8/31/89	150	0.191	785	5/21/90	5/28 - 6/14	40	44	49	88.7
Artemisia arctica	Kuparuk River Bridge	8/25/89	300	0.157	1911	5/31/90	6/6 - 6/12	99	100	100	99.7
Artemisia arctica	M.P. 40 Dalton Highway	9/19/89	300	0.136	2206	5/31/90	6/6 - 6/19	77	81	80	79.3
Artemisia borealis	Kuparuk River Bridge	8/25/89	300	0.149	2013	5/31/90	6/6 - 6/13	99	96	97	97.3
Artemisia glomerata	Kuparuk River Bridge	8/25/89	300	0.121	2479	5/16/90	5/22 - 6/7	93	95	100	96.0
Artemisia tilesii	Kuparuk River Bridge	8/25/89	150	0.051	2941	6/11/90	6/17 - 7/6	41	40	38	79.3
Aster sibericus	Sag. River E. of Airport	9/28/89	300	0.084	3571	5/16/90	5/22 - 7/6	43	42	57	47.3
Braya pilosa & purpurascens	Put R. #27 Gravel Pit	8/27/89	300	0.039	7692	5/7/90	5/13 - 6/7	6	12	14	10.7
Braya pilosa & purpurascens	72 Haul Road	8/28/89	300	0.063	4762	6/11/90	6/17 - 7/30	23	24	21	22.7
Cerastium beeringianum	72 Haul Road	9/26/89	300	0.037	8108	6/11/90	6/17 - 7/2	95	93	94	94.0
Chrysanthemum bipinnatum *2	Kuparuk River Bridge	8/25/89	300			6/11/90	6/17 - 7/16	0	3	2	1.7
Descurainia sophioides	Sohio-Kuparuk Reserve Pit	8/29/89	300	0.021	14286	5/31/90	6/6 - 6/19	45	73	83	67.0
Draba spp. (White-Flowered)	B.P. Put River No. 1	8/27/89	300	0.046	6522	5/31/90	6/6 - 6/19	11	5	11	9.0
Epilobium latifolium	B.P. Put River No. 1	8/27/89	300	0.042	7143	5/21/90	5/28 - 6/14	91	91	91	91.0
Epilobium latifolium	Put River #27 Gravel Pit	8/27/89	300	0.043	6977	5/31/90	6/6 - 6/19	87	91	86	88.0

\*1 Trisetum seedlots were mixed together because of their close proximity and similar harvest dates.

\*2 Seeds were immature, lots were not weighed

Table C-1. (Cont.) Germination record for North Slope native seeds collected in 1989

Species	Collection Location	Collection Date	No. Seed in Germ. Test	Grams/ Germ. Test	No. Seeds/ Gram	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								REP I	REP II	REP III	
FORBS (Cont.):											
<i>Eutrema edwardsii</i>	Arco State No. 1	8/30/89	300	0.150	2000	5/21/90	5/28 - 6/16	23	41	32	32.0
<i>Eutrema edwardsii</i>	B.P. Put River No. 1	8/27/89	300	0.184	1630	5/16/90	5/22 - 6/12	0	0	0	0.0
<i>Melandrium apetalum</i>	72 Haul Road	8/31/89	300	0.097	3093	5/3/90	5/9 - 5/29	3	3	4	3.3
<i>Parrya nudicaulis</i>	Sag. River E. of Airport	9/27/89	300	0.989	303	5/11/90	5/17 - 6/8	0	2	3	1.7
<i>Pedicularis sudetica</i>	72 Haul Road	8/31/89	150	0.117	1282	6/11/90	6/17 - 7/16	0	2	1	2.0
<i>Polymonium boreale</i>	B.P. Put River No. 1	8/24/89	150	0.320	469	6/11/90	6/17 - 7/30	38	26	23	58.0
<i>Sedum rosea</i>	Big Skookum	9/20/89	300	0.045	6667	5/11/90	5/17 - 5/30	77	84	80	80.3
<i>Senecio congestus</i>	M.P. 40 Dalton Highway	9/19/89	300	0.046	6522	5/21/90	5/28 - 6/14	68	71	71	70.0
<i>Silene acaulis</i>	Arco State No. 1	8/30/89	300	0.135	2222	5/7/90	5/13 - 6/7	1	0	4	1.7

Summary of germination tests on seeds collected in 1989

Graminoids	= 19 species in 36 seedlots
Forbs	= 22 species in 26 seedlots
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Totals	= 41 species in 66 seedlots

Average Germ. Graminoids 81.5  
Average Germ. Forbs 49.2

Table C-2. North Slope native seed germination record for seeds collected during 1990

Species	Collection Location	Collection Date	No. Seeds in Test	Grams/320 Seeds	Seeds/Gram Tested	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								Rep I	Rep II	Rep III	
GRASSES:											
<i>Agropyron boreale</i>	Kuparuk River Bridge	14 Sep 90	320	0.679	471	14 Feb 91	02/20 - 03/16	59	55	57	57.0%
<i>Alopecurus alpinus</i>	1972 Haul Road	10 Sep 90	320	0.054	5926	14 Feb 91	02/20 - 03/06	5	2	9	5.3%
<i>Alopecurus alpinus</i>	East Dock Dunes	08 Sep 90	320	0.119	2689	14 Feb 91	02/20 - 03/07	22	27	23	24.0%
<i>Arctagrostis latifolia</i>	Kuparuk River Bridge	14 Sep 90	320	0.060	5333	14 Feb 91	02/20 - 03/07	22	24	18	21.3%
<i>Arctagrostis latifolia</i>	Pump Station No. 1	11 Sep 90	320	0.057	5614	14 Feb 91	02/20 - 03/09	47	41	52	46.7%
<i>Arctagrostis latifolia</i>	Sag. River E. of Airport	18 Sep 90	320	0.070	4571	14 Feb 91	02/20 - 03/09	73	78	83	78.0%
<i>Arctophila fulva</i>	Lonnie Lake East	26 Sep 90	320	0.086	3721	14 Feb 91	02/20 - 03/06	95	89	95	93.0%
<i>Arctophila fulva</i>	Pump Station No. 1	11 Sep 90	320	0.088	3636	14 Feb 91	02/20 - 03/06	68	70	63	67.0%
<i>Bromus pumpellianus</i>	End Rd-S. of B.S.	13 Sep 90	320	0.434	737	14 Feb 91	02/20 - 03/04	0	0	0	0.0%
<i>Bromus pumpellianus</i>	Kuparuk River Bridge	14 Sep 90	320	0.625	512	14 Feb 91	02/20 - 03/04	0	0	0	0.0%
<i>Bromus pumpellianus</i>	M.P. 365 Dalton Highway	06 Aug 90	320	1.160	276	14 Feb 91	02/20 - 03/04	93	93	93	93.0%
<i>Calamagrostis inexpansa</i>	Kuparuk River Bridge	14 Sep 90	320	0.042	7619	14 Feb 91	02/20 - 03/04	0	0	0	0.0%
<i>Deschampsia caespitosa</i>	1972 Haul Road	10 Sep 90	320	0.062	5161	23 Feb 91	03/01 - 03/16	43	38	49	43.3%
<i>Deschampsia caespitosa</i>	End. Rd-W. Caribou Ramp	13 Sep 90	320	0.042	7619	23 Feb 91	03/01 - 03/16	5	2	8	5.0%
<i>Deschampsia caespitosa</i>	Kuparuk River Bridge	14 Sep 90	320	0.060	5333	23 Feb 91	03/01 - 03/16	41	45	43	43.0%
<i>Deschampsia caespitosa</i>	Pump Station No. 1	11 Sep 90	320	0.072	4444	23 Feb 91	03/01 - 03/16	60	54	61	58.3%
<i>Deschampsia caespitosa</i>	Sag. River E. of Airport	18 Sep 90	320	0.073	4384	23 Feb 91	03/01 - 03/16	87	91	87	88.3%
<i>Dupontia fisheri</i>	Pump Station No. 1	11 Sep 90	320	0.200	1600	23 Feb 91	03/01 - 03/16	87	87	78	84.0%
<i>Elymus arenarius mollis</i> *1	East Dock Dunes	14 Jul 90	320	2.010	159	23 Feb 91	03/01 - 03/16	85	90	82	85.7%
<i>Elymus arenarius mollis</i>	East Dock Dunes	07 Sep 90	320	2.032	157	23 Feb 91	03/01 - 03/25	79	76	75	76.7%
<i>Elymus innovatus</i>	M.P. 365 Dalton Highway	06 Aug 90	320	1.467	218	23 Feb 91	03/01 - 03/25	74	82	75	77.0%
<i>Festuca baffinensis</i>	1972 Haul Road	10 Sep 90	320	0.186	1720	23 Feb 91	03/01 - 03/29	86	69	77	77.3%
<i>Festuca baffinensis</i>	End Rd-S. of B.S.	13 Sep 90	320	0.132	2424	23 Feb 91	03/01 - 04/03	24	42	24	30.0%
<i>Festuca ovina</i>	East Dock Dunes	08 Sep 90	320	0.176	1818	23 Feb 91	03/01 - 03/29	10	6	13	9.7%
<i>Festuca rubra</i>	End Rd-S. of B.S.	13 Sep 90	320	0.142	2254	23 Feb 91	03/01 - 03/27	1	2	1	1.3%
<i>Festuca rubra</i>	Kuparuk River Bridge	14 Sep 90	320	0.156	2051	23 Feb 91	03/01 - 03/27	1	0	0	0.3%
<i>Festuca 'vivipara'</i>	1972 Haul Road	10 Sep 90	320	0.139	2302	01 Mar 91	03/07 - 04/03	8	14	11	11.0%
<i>Festuca 'vivipara'</i>	East Dock	29 Aug 90	320	0.158	2025	01 Mar 91	03/07 - 04/03	14	7	7	9.3%
<i>Poa arctica</i>	East Dock Dunes	07 Sep 90	320	0.126	2540	01 Mar 91	03/07 - 04/01	61	58	41	53.3%
<i>Poa arctica</i>	End Rd-S. of B.S.	13 Sep 90	320	0.076	4211	01 Mar 91	03/07 - 03/27	20	25	13	19.3%

\*1 1989 seedcrop collected in 1990

Table C-2. (Cont.) North Slope native seed germination record for seeds collected during 1990

Species	Collection Location	Collection Date	No. Seeds in Test	Grams/320 Seeds	Seeds/Gram Tested	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								Rep I	Rep II	Rep III	
GRASSES (Cont.):											
<i>Poa glauca</i>	1972 Haul Road	10 Sep 90	320	0.078	4103	01 Mar 91	03/07 - 03/27	3	0	3	2.0%
<i>Poa glauca</i>	1 mile W-W Caribou Ramp	13 Sep 90	320	0.063	5079	01 Mar 91	03/07 - 04/01	56	50	61	55.7%
<i>Poa pratensis</i>	1972 Haul Road-introduced	10 Sep 90	320	0.057	5614	20 Mar 91	03/26 - 04/12	4	5	2	3.7%
<i>Puccinellia lankeana</i>	East Dock	29 Sep 90	320	0.061	5246	01 Mar 91	03/07 - 04/01	48	50	55	51.0%
<i>Trisetum spicatum</i>	1972 Haul Road	10 Sep 90	320	0.079	4051	01 Mar 91	03/07 - 04/10	53	59	56	56.0%
<i>Trisetum spicatum</i>	Kuparuk River Bridge	14 Sep 90	320	0.104	3077	20 Mar 91	03/26 - 05/02	54	49	53	52.0%
<i>Trisetum spicatum</i> *2	M.P. 62 TAPS-dry ridge	16 Jul 90	118	0.073	1616	20 Mar 91	03/26 - 04/24	30			25.4%
GRASSLIKE:											
<i>Carex maritima</i>	East Dock	09 Sep 90	320	0.200	1600	20 Mar 91	03/26 - 05/06	26	22	23	23.7%
<i>Carex maritima</i>	East Dock Dunes	08 Sep 90	320	0.214	1495	20 Mar 91	03/26 - 05/04	89	83	87	86.3%
<i>Carex ursina</i>	East Dock	10 Sep 90	320	0.141	2270	20 Mar 91	03/26 - 05/29	79	72	59	70.0%
FORBS:											
<i>Androsace chamaejasme</i>	72 Haul Road	26 Aug 90	320	0.180	1778	20 Mar 91	03/26 - 04/17	1	0	0	0.3%
<i>Androsace chamaejasme</i>	East Dock Dunes	09 Sep 90	320	0.110	2909	20 Mar 91	03/26 - 04/17	0	0	0	0.0%
<i>Androsace chamaejasme</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.151	2119	20 Mar 91	03/26 - 04/17	1	1	3	1.7%
<i>Arabis arenicola</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.027	11852	20 Mar 91	03/26 - 04/06	53	61	61	58.3%
<i>Armeria maritima</i>	East Dock Dunes	09 Sep 90	320	0.287	1115	20 Mar 91	03/26 - 04/06	22	23	18	21.0%
<i>Armeria maritima</i>	Kuparuk River Bridge	14 Sep 90	320	0.315	1016	20 Mar 91	03/26 - 04/06	59	58	57	58.0%
<i>Armeria maritima</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.328	976	20 Mar 91	03/26 - 04/06	36	50	46	44.0%
<i>Armeria maritima</i>	Sag. R. E. of Airport	18 Sep 90	320	0.332	964	20 Mar 91	03/26 - 04/06	72	66	66	68.0%
<i>Artemisia arctica</i>	East Dock Dunes	09 Sep 90	320	0.109	2936	20 Mar 91	03/26 - 04/05	96	97	99	97.3%
<i>Artemisia arctica</i>	Kuparuk River Bridge	14 Sep 90	320	0.121	2645	20 Mar 91	03/26 - 04/04	100	100	98	99.3%
<i>Artemisia arctica</i>	Franklin Bluffs Camp	17 Sep 90	320	0.122	2623	20 Mar 91	03/26 - 04/04	99	97	100	98.7%
<i>Artemisia borealis</i> *2	Kuparuk River Bridge	14 Sep 90	60	0.023	2609	29 Mar 91	04/04 - 04/10	56			93.3%
<i>Artemisia borealis</i>	Put #23 Gravel Mine Pit	19 Sep 90	150	0.063	2381	29 Mar 91	04/04 - 04/10	38	42	37	78.0%
<i>Artemisia glomerata</i>	Kuparuk River Bridge	14 Sep 90	320	0.131	2443	29 Mar 91	04/04 - 04/17	94	96	90	93.3%
<i>Artemisia glomerata</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.135	2370	29 Mar 91	04/04 - 04/24	96	98	93	95.7%
<i>Artemisia tilesii</i> *3	Kuparuk River Bridge	14 Sep 90	320	0.045	7111	29 Mar 91	04/04 - 04/12	0	0	0	0.0%

\*2 Only enough seed for 1 replicate

\*3 Seeds molded

Table C-2. (Cont.) North Slope native seed germination record for seeds collected during 1990

Species	Collection Location	Collection Date	No. Seeds In Test	Grams/ 320 Seeds	Seeds/ Gram Tested	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								Rep I	Rep II	Rep III	
FORBS (Cont.):											
<i>Aster sibericus</i>	Sag. R.-E. of Airport	18 Sep 90	320	0.075	4267	29 Mar 91	04/04 - 05/06	18	22	13	17.7%
<i>Astragalus aboriginum</i>	M.P. 399 Dalton Hwy	05 Aug 90	320	1.066	300	29 Mar 91	04/04 - 05/11	7	3	9	6.3%
<i>Astragalus alpinus</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.556	576	29 Mar 91	04/04 - 04/14	19	25	17	20.3%
<i>Astragalus alpinus</i>	M.P. 405 Dalton Hwy	16 Aug 90	320	0.601	532	29 Mar 91	04/04 - 04/14	17	23	19	19.7%
<i>Astragalus alpinus</i>	M.P. 399 Dalton Hwy	05 Aug 90	320	0.540	593	29 Mar 91	04/04 - 04/14	22	25	28	25.0%
<i>Astragalus euocosmus</i>	M.P. 399 Dalton Hwy	05 Aug 90	320	0.343	933	29 Mar 91	04/04 - 04/29	5	4	3	4.0%
<i>Astragalus nutzotinensis</i>	M.P. 395.9 Dalton Hwy	17 Aug 90	320	0.762	420	29 Mar 91	04/04 - 04/29	4	7	6	5.7%
<i>Astragalus nutzotinensis</i>	M.P. 405 Dalton Hwy	5,8 Aug 90	150	0.378	397	29 Mar 91	04/04 - 04/29	6	2	2	6.7%
<i>Castilleja elegans</i>	M.P. 395.9 Dalton Hwy	17 Aug 90	320	0.043	7442	29 Mar 91	04/04 - 04/22	32	28	34	31.3%
<i>Castilleja elegans</i>	M.P. 405 Dalton Hwy	05 Aug 90	150	0.026	5769	29 Mar 91	04/04 - 04/22	22	19	18	39.3%
<i>Cerastium beeringianum</i>	72 Haul Road	10 Sep 90	320	0.036	8889	4/11/91	04/17 - 05/04	87	86	75	82.7%
<i>Chrysanthemum bipinnatum</i>	Kuparuk River Bridge	14 Sep 90	320	0.080	4000	4/11/91	04/17 - 04/29	0	0	0	0.0%
<i>Descurainia sophioides</i> *4	M.P. 398.7 Dalton Hwy	17 Aug 90	320	0.039	8205	4/11/91	04/17 - 05/06	67	60	76	67.7%
<i>Descurainia sophioides</i> *5	M.P. 398.7 Dalton Hwy	17 Aug 90	320	0.039	8205	4/11/91	04/17 - 04/29	92	86	91	89.7%
<i>Draba corymbosa</i>	72 Haul Road	26 Aug 90	320	0.046	6957	4/11/91	04/17 - 05/11	0	3	2	1.7%
<i>Epilobium latifolium</i>	M.P. 21.5 TAPS-Spur Dike	17 Aug 90	320	0.050	6400	4/11/91	04/17 - 05/06	81	78	82	80.3%
<i>Epilobium latifolium</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.045	7111	4/11/91	04/17 - 05/06	69	69	83	73.7%
<i>Eutrema edwardsii</i> *6	72 Haul Road	26 Aug 90	320	0.038	8421	4/11/91	04/17 - 05/11	40	32	38	36.7%
<i>Eutrema edwardsii</i> *7	72 Haul Road	26 Aug 90	150	0.070	2143	4/11/91	04/17 - 05/11	6	8	11	16.7%
<i>Hedysarum mackenzii</i> *8	M.P. 369.25 Dalton Hwy	06 Aug 90	320	0.536	597	4/11/91	04/17 - 05/11	7	5	6	6.0%
<i>Hedysarum mackenzii</i> *9	M.P. 369.25 Dalton Hwy	06 Aug 90	320	1.745	183	4/11/91	04/17 - 05/06	5	3	7	5.0%
<i>Hedysarum mackenzii</i> *8	M.P. 405 Dalton Hwy	05 Aug 90	320	0.350	914	4/11/91	04/17 - 05/06	2	2	1	1.7%
<i>Hedysarum mackenzii</i> *9	M.P. 405 Dalton Hwy	05 Aug 90	320	1.700	188	4/11/91	04/17 - 05/06	3	0	2	1.7%
<i>Hedysarum mackenzii</i> *8	M.P. 405 Dalton Hwy	16 Aug 90	320	0.429	746	4/11/91	04/17 - 05/14	14	8	10	10.7%
<i>Hedysarum mackenzii</i> *9	M.P. 405 Dalton Hwy	16 Aug 90	320	1.533	209	4/11/91	04/17 - 05/14	9	7	16	10.7%
<i>Minuartia obtusiloba</i>	M.P. 62 TAPS	17 Sep 90	320	0.062	5161	4/11/91	04/17 - 05/11	76	80	78	78.0%
<i>Minuartia obtusiloba</i>	M.P. 365 Dalton Hwy	06 Aug 90	320	0.087	3678	4/11/91	04/17 - 05/11	13	12	16	13.7%
<i>Oxytropis borealis</i>	M.P. 405 Dalton Hwy	08 Aug 90	320	0.350	914	4/11/91	04/17 - 05/14	14	23	19	18.7%
<i>Oxytropis borealis</i>	M.P. 405 Dalton Hwy	16 Aug 90	320	0.469	682	4/11/91	04/17 - 05/14	28	23	21	24.0%

\*4 Chlorox treatment  
\*5 No treatment

\*6 Small seeds  
\*7 Large seeds

\*8 Hull removed from seeds  
\*9 Hull still on seed

Table C-2. (Cont.) North Slope native seed germination record for seeds collected during 1990

Species	Collection Location	Collection Date	No. Seeds in Test	Grams/320 Seeds	Seeds/Gram Tested	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								Rep I	Rep II	Rep III	
FORBS (Cont.):											
<i>Oxytropis nigrescens</i>	Dunes-Pipeline and E-2	07 Aug 90	320	0.915	350	5/6/91	05/11 - 05/29	15	24	14	17.7%
<i>Oxytropis nigrescens</i>	Dunes-Pipeline and E-2	09 Aug 90	320	0.882	363	5/6/91	05/11 - 05/29	21	28	24	24.3%
<i>Oxytropis nigrescens</i>	Dunes West of E-2 Pond	09 Aug 90	320	0.940	340	5/6/91	05/11 - 05/29	22	14	30	22.0%
<i>Oxytropis nigrescens</i>	Dunes West of E-2 Pond	22 Aug 90	320	0.948	338	5/6/91	05/11 - 05/29	12	13	15	13.3%
<i>Oxytropis nigrescens</i>	Dunes-Mid Caribou Ramp End.	08 Aug 90	320	0.765	418	5/6/91	05/11 - 05/29	9	11	6	8.7%
<i>Pedicularis capitata</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.181	1768	5/6/91	05/11 - 05/29	0	0	0	0.0%
<i>Pedicularis labradorica</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.113	2832	5/6/91	05/11 - 05/29	0	0	2	0.7%
<i>Pedicularis lanata</i>	M.P. 405 Dalton Hwy	05 Aug 90	320	0.130	2462	5/6/91	05/11 - 05/29	8	10	16	11.3%
<i>Polymonium boreale</i>	East Dock Dunes	08 Sep 90	320	0.486	658	5/6/91	05/11 - 06/10	48	58	48	51.3%
<i>Potentilla hookeriana</i>	Big Skookum	13 Sep 90	320	0.041	7805	5/6/91	05/11 - 06/06	20	17	28	21.7%
<i>Primula borealis</i> *2	Endicott Coastal	03 Aug 90	30	0.018	1667	5/6/91	05/11 - 05/22	0			0.0%
<i>Saxifraga oppositifolia</i> *2	Arco State No. 1	15 Sep 90	60	0.009	6667	5/6/91	05/11 - 05/22	0			0.0%
<i>Saxifraga oppositifolia</i>	Haul Road SE of D.S.-5	19 Sep 90	320	0.036	8889	5/6/91	05/11 - 05/29	0	0	0	0.0%
<i>Saxifraga tricuspidata</i>	M.P. 62 TAPS-Dry Ridge	17 Sep 90	320	0.011	29091	5/6/91	05/11 - 05/29	0	0	0	0.0%
<i>Sedum rosea</i>	East Dock	09 Sep 90	320	0.045	7111	5/6/91	05/11 - 05/22	92	84	84	86.7%
<i>Sedum rosea</i>	Big Skookum	13 Sep 90	320	0.035	9143	5/6/91	05/11 - 05/22	45	32	58	45.0%
<i>Senecio congestus</i>	Franklin Bluffs Camp	17 Sep 90	320	0.024	13333	5/6/91	05/11 - 05/29	7	7	16	10.0%
<i>Silene acaulis</i>	Arco State No. 1	15 Sep 90	320	0.096	3333	5/6/91	05/11 - 05/29	9	6	9	8.0%
<i>Silene wahlbergella</i>	1972 Haul Road	26 Aug 90	320	0.105	3048	5/6/91	05/11 - 05/29	61	72	50	61.0%
<i>Wilhelmsia physoides</i>	M.P. 401/405 Dalton Hwy.	05 Aug 90	320	0.147	2177	5/6/91	05/11 - 05/29	58	62	67	62.3%
SHRUBS:											
<i>Dryas integrifolia</i>	East Dock Dunes	09 Sep 90	320	0.082	3902	5/16/91	05/23 - 06/06	36	34	32	34.0%
<i>Dryas integrifolia</i>	End. Mid Caribou Ramp	21 Aug 90	320	0.082	3902	5/16/91	05/23 - 06/06	35	37	32	34.7%
<i>Dryas integrifolia</i>	End. Mid Caribou Ramp	13 Sep 90	320	0.065	4923	5/16/91	05/23 - 06/06	16	11	14	13.7%
<i>Dryas octopetala</i>	M.P. 62 TAPS-Dry Ridge	17 Sep 90	320	0.011	29091	5/16/91	05/23 - 06/03	0	0	0	0.0%
<i>Salix arctica</i>	1972 Haul Road	10 Sep 90	320	0.061	5246	5/16/91	05/23 - 06/03	96	98	100	98.0%
<i>Salix arctica</i>	End. West Caribou Ramp	13 Sep 90	320	0.064	5000	5/16/91	05/23 - 06/03	97	94	96	95.7%

\*2 Only enough seed for 1 replicate

Table C-2. (Cont.) North Slope native seed germination record for seeds collected during 1990

Species	Collection Location	Collection Date	No. Seeds in Test	Grams/320 Seeds	Seeds/Gram Tested	Date in Refrig.	Monitoring Dates in Germinator	No. Seeds Germinated			Average Percent Germ.
								Rep I	Rep II	Rep III	
SHRUBS (Cont.):											
Salix ovalifolia	Dunes West of E-2 Pond	22 Aug 90	320	0.059	5424	5/16/91	05/23 - 06/06	62	57	66	61.7%
Salix ovalifolia	East Dock Dunes	08 Sep 90	320	0.069	4638	5/16/91	05/23 - 06/06	92	94	91	92.3%
Salix ovalifolia	M.P. 405 Dalton Hwy	05 Aug 90	320	0.053	6038	5/16/91	05/23 - 06/06	36	39	35	36.7%

Summary of germination tests on seeds collected in 1990

Graminoids	= 21 species in 40 seedlots
Forbs	= 36 species in 60 seedlots
Shrubs	= 4 species in 9 seedlots
Totals	= 61 species in 109 seedlots

1990 Gramnoid mean germination rate	42.1
1990 Forb mean germination rate	33.0
1990 Shrub mean germination rate	51.9



## APPENDIX D

### BOTANICAL GARDEN PLANTINGS

Tables D-1 and D-2 list the species planted in the Botanical Garden at the BP Put River No. 1 gravel pad in 1990 and 1991, respectively. The row number, species, collection location and collection date are given. For 1991, the planting rates were determined and are listed.

Table D-1. Species planted at the BP Put River No. 1 gravel pad, 27 June 1990

Row No.*	Species	Location	Collection Date
GRASSES:			
1E	<i>Agropyron boreale</i>	Kuparuk River Bridge	8/25/89
1W	<i>Agropyron boreale</i>	BP Put River No. 1	8/24/89
2	<i>Alopecurus alpinus</i> **	BP Put River No. 1	8/24/89
	<i>Alopecurus alpinus</i>	Pump Station No. 1	9/27/89
	<i>Alopecurus alpinus</i>	IBP Plots	8/26/89
3	<i>Arctagrostis latifolia</i> **	1972 Haul Road	9/26/89
	<i>Arctagrostis latifolia</i>	M.P. 31 Dalton Highway	9/19/89
	<i>Arctagrostis latifolia</i>	Pump Station No. 1	9/27/89
	<i>Arctagrostis latifolia</i>	Sag. River E. of Airport	9/27/89
	<i>Arctagrostis latifolia</i>	IBP Plots	8/26/89
4	<i>Bromus pumpellianus</i>	Kuparuk River Bridge	8/25/89
5	<i>Deschampsia caespitosa</i> **	1972 Haul Road	8/29/89
	<i>Deschampsia caespitosa</i>	Kuparuk Haul Road	8/29/89
	<i>Deschampsia caespitosa</i>	Kuparuk River Bridge	8/25/89
	<i>Deschampsia caespitosa</i>	Sohio-Kuparuk Reserve Pit	8/29/89
6	<i>Dupontia fischeri</i>	Pump Station No. 1	9/27/89
7	<i>Elymus arenarius mollis</i>	East Dock Dunes	9/25/89
8	<i>Festuca brachyphylla</i> **	Sohio-Kuparuk Reserve Pit	8/29/89
	<i>Festuca brachyphylla</i>	IBP Plots	8/26/89
9	<i>Festuca ovina</i>	East Dock Dunes	9/25/89
10	<i>Festuca 'vivipara'</i>	BP Put River No. 1	8/24/89
11	<i>Poa arctica</i>	East Dock Dunes	9/25/89
12E	<i>Poa glauca</i>	IBP Plots	8/26/89
12W	<i>Poa glauca</i>	1972 Haul Road	8/29/89
13E	<i>Puccinellia langeana</i>	BP Put River No. 1	8/24/89
13W	<i>Puccinellia langeana</i>	IBP Plots	8/26/89
14	<i>Trisetum spicatum</i> **	BP Put River No. 1	8/24/89
	<i>Trisetum spicatum</i>	IBP Plots	8/26/89
15E	<i>Festuca rubra</i>	Kuparuk River Bridge	8/25/89
15W	<i>Festuca rubra</i>	IBP Plots	8/26/89

Table D-1. (Cont.) Species planted at the BP Put River No. 1 gravel pad,  
27 June 1990

Row No.*	Species	Location	Collection Date
<b>GRASSLIKE:</b>			
16	<i>Carex maritima</i> **	1972 Haul Road	8/31/89
	<i>Carex maritima</i>	BP Put River No. 1	8/27/89
	<i>Carex maritima</i>	Sohio-Kuparuk Reserve Pit	8/29/89
17	<i>Luzula arctica</i>	Arco State No. 1	8/30/89
<b>FORBS:</b>			
18E	<i>Armeria maritima</i> **	Little Put R. & 72 Haul Rd.	8/31/89
18W	<i>Armeria maritima</i>	Arco State No. 1	9/7/89
19	<i>Artemisia arctica</i> **	Kuparuk River Bridge	8/25/89
	<i>Artemisia arctica</i>	M.P. 40 Dalton Highway	9/19/89
20	<i>Artemisia borealis</i>	Kuparuk River Bridge	8/25/89
21	<i>Artemisia glomerata</i>	Kuparuk River Bridge	8/25/89
22	<i>Aster sibericus</i>	Sag. River E. of Airport	9/28/89
23	<i>Braya pilosa</i> & <i>purpurascens</i>	Put R. No. 27 Gravel Pit	8/27/89
24	<i>Cerastium beeringianum</i>	1972 Haul Road	9/26/89
25	<i>Descurainia sopheroides</i>	Sohio-Kuparuk Reserve Pit	8/29/89
26	<i>Draba</i> spp. (white-flowered)	BP Put River No. 1	8/27/89
27	<i>Epilobium latifolium</i> **	BP Put River No. 1	8/27/89
	<i>Epilobium latifolium</i>	Put River No. 27 Gravel Pit	8/27/89
28	<i>Eutrema edwardsii</i> **	Arco State No. 1	8/30/89
	<i>Eutrema edwardsii</i>	BP Put River No. 1	8/27/89
29	<i>Melandrium apetalum</i>	1972 Haul Road	8/31/89
30	<i>Parrya nudicaulis</i>	Sag. River E. of Airport	9/27/89
31	<i>Sedum rosea</i>	Big Skookum - Endicott	9/20/89
32	<i>Senecio congestus</i>	M.P. 40 Dalton Highway	9/19/89
33	<i>Silene acaulis</i>	Arco State No. 1	8/30/89

\* Nursery Rows are 31 feet long - Row 1 is in Southeast corner

\*\* Seeds from different locations were mixed before planting

Table D-2. Species planted at the BP Put River No. 1 gravel pad botanical garden on 27 June 1991

Row No.	Species	Location	Collection Date	Length (Feet)	Purity	Germ.	Wt. 320 Seeds	Required Number PLS #1	Required Number Seeds	Required G Seed	G Seed Used #2
GRASSES:											
34E	<i>Arctophila fulva</i>	Lonnie Lake East	9/26/90	15.5	0.98	0.930	0.086	744	816.3	0.219	
34W	<i>Arctophila fulva</i>	Pump Station No 1	9/11/90	15.5	0.95	0.670	0.088	744	1168.9	0.321	
35W	<i>Elymus innovatus</i>	M.P. 365 Dalton Highway	8/6/90	15.5	0.90	0.770	1.467	744	1073.6	4.922	0.647
36E	<i>Festuca baffinensis</i>	1972 Haul Road	9/10/90	15.5	0.85	0.733	0.186	744	1194.1	0.694	
36W	<i>Festuca baffinensis</i>	Endicott Rd.-S. Big Skookum	9/13/90	15.5	0.85	0.700	0.132	744	1250.4	0.516	
GRASSLIKE:											
37	<i>Carex ursina</i>	East Dock	9/10/90	31.0	0.95	0.700	0.141	1488	2237.6	0.986	
FORBS:											
38E	<i>Androsace chamaejasme</i> *3	1972 Haul Road	8/26/90	15.5	0.95	0.003	0.180	744	261052.6	146.842	0.328
38W	<i>Androsace chamaejasme</i> *3	East Dock Dunes	9/9/90	15.5	0.99	0.000	0.110	744			0.378
39	<i>Arabis arenicola</i>	M.P. 405 Dalton Highway	8/5/90	31.0	0.99	0.583	0.027	1488	2578.1	0.218	
40	<i>Astragalus aboriginum</i> *3	M.P. 399 Dalton Highway	8/5/90	31.0	1.00	0.063	1.066	1488	23619.0	78.681	2.000
41	<i>Astragalus alpinus</i>	M.P. 399 Dalton Highway	8/5/90	31.0	1.00	0.250	0.540	1488	5952.0	10.044	3.750
42	<i>Astragalus eucosmus</i>	M.P. 399 Dalton Highway	8/5/90	31.0	1.00	0.790	0.343	1488	1883.5	2.019	0.838
43	<i>Astragalus Nutzotinensis</i>	M.P. 405 Dalton Highway	5,8 Aug 90	31.0	1.00	0.067	0.756	1488	22209.0	52.469	1.150
44	<i>Castilleja elegans</i>	M.P. 395.9 Dalton Highway	8/17/90	31.0	0.95	0.313	0.043	1488	5004.2	0.672	
45	<i>Chrysanthemum bipinnatum</i>	Kuparuk River Bridge	9/14/90	31.0	0.90	0.000	0.080	1488			1.000
46	<i>Draba corymbosa</i>	1972 Haul Road	8/26/90	31.0	0.99	0.017	0.046	1488	88413.5	12.709	0.350
47E	<i>Hedysarum Mackenzii</i>	M.P. 369 Dalton Highway	8/6/90	15.5	0.95	0.060	0.536	744	13052.6	21.863	8.000
47W	<i>Hedysarum Mackenzii</i>	M.P. 405 Dalton Highway	8/16/90	15.5	0.98	0.107	0.429	744	7095.2	9.512	1.300
48E	<i>Minuartia obtusiloba</i>	M.P. 354.5 Dalton Highway	9/17/90	15.5	0.80	0.780	0.062	744	1192.3	0.231	
48W	<i>Minuartia obtusiloba</i>	M.P. 365 Dalton Highway	8/6/90	15.5	0.70	0.137	0.087	744	7758.1	2.109	0.550
49E	<i>Oxytropis borealis</i>	M.P. 405 Dalton Highway	8/8/90	15.0	0.95	0.187	0.350	720	4052.9	4.433	
49W	<i>Oxytropis borealis</i>	M.P. 405 Dalton Highway	8/16/90	15.0	0.98	0.240	0.469	720	3061.2	4.487	
50	<i>Oxytropis nigrescens</i>	Mix from Dunes near E-2	8/9/90	30.0	1.00	0.225	0.927	1440	6400.0	18.540	

\*1 PLS = Pure Live Seed reflects the percentage of pure seed that has the ability to germinate = % Germination x % Purity

\*2 Attempted to apply seed at rate of 1 PLS per 1/4" of row (48 PLS/Ft.), when less seed was available, this amount was used.

\*3 Seed lot mechanically scarified to try improving germination.

Table D-2. (Cont.) Species planted at the BP Put River No. 1 gravel pad botanical garden on 27 June 1991

Row No.	Species	Location	Collection Date	Length (Feet)	Purity	Germ.	Wt. 320 Seeds	Required Number PLS *1	Required Number Seeds	Required G Seed	G Seed Used *2
FORBS (Cont.):											
51	<i>Pedicularis capitata</i>	M.P. 405 Dalton Highway	8/5/90	30.0	0.85	0.000	0.181	1440			0.366
52	<i>Pedicularis labradorica</i>	M.P. 405 Dalton Highway	8/5/90	30.0	0.85	0.007	0.113	1440	242016.8	85.462	1.000
53	<i>Pedicularis lanata</i>	M.P. 405 Dalton Highway	8/5/90	30.0	0.90	0.113	0.130	1440	14159.3	5.752	2.250
54	<i>Polymonium boreale</i>	East Dock Dunes	9/8/90	30.0	0.98	0.513	0.486	1440	2864.3	4.350	3.000
55	<i>Potentilla Hookeriana</i>	Big Skookum	9/13/90	30.0	0.99	0.217	0.041	1440	6703.0	0.859	0.300
56	<i>Saxifraga tricuspidata</i>	M.P. 354.5 Dalton Highway	9/17/90	30.0	0.95	0.000	0.011	1440			1.600
57	<i>Silene acaulis</i>	Arco State No 1	9/15/90	30.0	0.85	0.080	0.096	1440	21176.5	6.353	3.000
58	<i>Silene Wahlbergella</i>	1972 Haul Road	8/26/90	30.0	0.95	0.610	0.105	1440	2484.9	0.815	0.150
59	<i>Wilhelmsia physoides</i>	M.P. 401 & 405 Dalton Highway	8/5/90	30.0	0.95	0.623	0.147	1440	2433.0	1.118	0.400
SHRUBS:											
60E	<i>Dryas integrifolia</i>	East Dock Dunes	9/9/90	15.0	0.60	0.340	0.082	720	3529.4	0.904	
60W	<i>Dryas integrifolia</i>	Endicott Rd-mid Caribou Ramp	9/13/90	15.0	0.60	0.137	0.065	720	8759.1	1.779	
61	<i>Dryas octopetala</i>	M.P. 354.5 Dalton Highway	9/17/90	30.0	1.00	0.000	0.011	1440			1.300
62E	<i>Salix arctica</i>	1972 Haul Road	9/10/90	15.0	0.65	0.980	0.061	720	1130.3	0.215	0.208
62W	<i>Salix arctica</i>	Endicott Rd-W Caribou Ramp	9/13/90	15.0	0.95	0.956	0.064	720	792.8	0.159	
63E	<i>Salix ovalifolia</i>	Dunes West of E-2 Pond	8/22/90	15.0	0.65	0.617	0.059	720	1795.3	0.331	
63W	<i>Salix ovalifolia</i>	East Dock Dunes	9/8/90	15.0	0.55	0.923	0.069	720	1418.3	0.306	

\*1 PLS = Pure Live Seed reflects the percentage of pure seed that has the ability to germinate = % Germination x % Purity

\*2 Attempted to apply seed at rate of 1 PLS per 1/4" of row (48 PLS/Ft.), when less seed was available, this amount was used.

Summary of seeds planted in the botanical garden on 27 June 1991

Graminoids	=	4 species in 6 seedlots
Forbs	=	22 species in 26 seedlots
Shrubs	=	3 species in 7 seedlots
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Totals	=	29 species in 39 seedlots