FIELD EVALUATION OF WOODY PLANT MATERIALS FOR CONSERVATION USE

This station continued to cooperate with the Soil Conservation Service Plant Materials Center, Bismarck, ND in their project number 381316K. The objective of this project is to assemble and evaluate woody plant materials for conservation use. New and/or replacement plantings have been made each year since 1978. Field evaluation of material included in this planting is made annually and reported biennially in even number years in the SCS Plant Materials Center Technical Report. The 1984 Annual Report of the Dickinson Station included a summary of evaluation of material included in the Dickinson planting. The 1986 station report includes an update of these evaluations.

FIELD EVALUATION PLANTING: TECHNICAL REPORT – 1985

Project 38I316K North Dakota State University, Dickinson Branch Experiment Station
Dickinson, North Dakota

Project Title: Field Evaluation of Woody Plant Materials

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas were located in the three states served by the center. These sites provide planting locations under long term land tenure, for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are then made with previously released cultivars and area of adaptation delineated.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The Soil Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the North Dakota State University, Dickinson Branch Experiment Station, Dickinson, North Dakota.

Location: This project is located one mile west of Dickinson, North Dakota, on the NDSU Dickinson Branch Experiment Station.

Legal description: NE ¼ 5, T139N., R96W., Stark County, North Dakota

Major Land Resource Area: The site is located in Major Land Resource Area 054, Rolling Soft Shale Plain. This moderately dissected rolling plain is underlain by calcareous shales and sandstones. Strongly dissected areas of sharp local relief or badland topography border major streams and valleys in some areas. Elevation is 1,800 to 3,100 feet. Sixty percent of the area is rangeland.

Soils: The soil type is a Parshall fine sandy loam. The Parshall series consists of deep, well drained soils formed in fine sandy loam alluvium on terraces and outwash plains and in upland swales. The surface layer and subsoil is dark grayish-brown fine sandy loam. The underlying material is dark grayish-brown fine sandy loam and loamy fine sand. Permeability is moderately rapid. The available water capacity is moderate. Organic matter is high and fertility is medium.

This soil is in North Dakota windbreak suitability Group 5. Included in this group are nearly level to hilly soils of the Flaxton, Lihen, Livonia, Parshall and Vebar series among others. These are well-drained, loamy and sandy soils. They are suited to windbreak and other plantings, but selection of species is limited. Erosion hazard is serious. The moderate available water capacity is the main limitation.

Climate: For MLRA 054 the average annual precipitation is 13 to 19 inches; increasing from west to east for this semiarid area. Rainfall is highest from late spring to midsummer and very low during the rest of the year. Winter precipitation is snow. Average annual temperature is 40° to 45°F. Average freeze-free period is 110 to 135 days. The plant hardiness zone is 4a, with an average annual minimum temperature of -30 to -20°F.

Methods and Materials

Assembly: Refer to Table 10 for a list of woody species planted from 1978 through 1985.

Planting Plan: Plots are not randomized or replicated but systematically arranged for ease of evaluation and demonstration purposes. The planting site is approximately 500 feet long and 200 feet wide. The area is divided into four blocks. Each block consists of single row, non-replicated plots. Each plot contains a minimum of 5 plants. Row length is 100 feet and spacing between rows is 20 feet. Block 1 contains conifers spaced 5 feet within row. Block 2 contains shrubs and small trees spaced 5 feet within row. Block 3 contains medium sized trees, spaced 10 feet within row. Block 4 contains tall trees spaced 10 feet within row. All rows run from west to east. Like species and standards of comparison are established in adjacent plots whenever possible.

Plot Preparation: A clean, firm planting site is prepared annually by disking and harrowing.

Planting Method: All tree and shrubs were hand planted using approved forestry methods.

Planting Date: Refer to Table 10 for a list of woody species planted from 1978 through 1985. Replacement stock is planted the year after establishment if available.

Fertilization: No fertilizer has been applied to planting area.

Weed Control: No herbicide has been applied to any plot during year of establishment or in succeeding years. Weeds were controlled by clean cultivating between rows, within row, and in fallow areas. Four to six tillage operations were performed each year in the months of May through August. A minimal of hand hoeing was done to control weeds in rows.

Pest Control: Previous years: No animal repellent or insecticide was applied in 1978. In the fall of 1979, an animal repellent, Arasan 50, was sprayed on fruit trees to discourage rodent damage.

1980 – 1981: On November 6, 1980 and October 29, 1981, Arasan 50 was applied to the trunks and lower limbs of fruit trees to deter rodents from damaging bark and cambium. Conifers also received this spray treatment to discourage animal browse. No insecticides were applied.

1982 – 1985: No animal repellents or insecticides have been applied.

Irrigation: Each year, newly planted materials were watered with a portable tank. No water was added following year of establishment.

Crop Residue Management: No cover crop has been established.

Silvicultural Practices: Extensive pruning was done in 1979 – 1980 to reshape trees damaged by animals. Dead trees and broken branches were cut and removed each year for sanitation. Replacements were used when available.

Evaluations and Measurements: Previous years: Records of planting date, survival, vigor, canopy width, height, cold hardiness, animal damage, insect damage, disease symptoms and unusual or outstanding features have been maintained since 1978.

1985: Climatic data recorded at Dickinson Branch Experiment Station, Dickinson, North Dakota is shown in Table 9.

Plant performance data was reported in September 1985. Survival, vigor, canopy cover and height, and special remarks were recorded for all hardwoods and remaining conifers. Not all data appears in this report.

Results

Plant Performance: Currently 61 accessions of 35 species are under evaluation. This site is fairly well maintained by the Dickinson Experiment Station. Some weed competition has occurred within row because hand hoeing has been minimal. A favorable microclimate is provided by surrounding shelterbelts. This undoubtly reduces exposure to hostile temperatures and brisk winds deminishing the opportunity for dessication and winter injury. Annual rainfall amounts are similar to Bismarck. Like most of the region, spring temperatures were well above normal but late summer and fall temperatures were far below average in 1985. The most significant feature the past 6 years was the extensive girdling of apricot, crabapple and other fruit trees by rabbits in 1980 which killed or severely set back many plants. Deer continue to rub many of the conifers, resulting in broken stems and leaders. Mean data for individual accessions of trees and shrubs is shown in Table 10. The following accessions exhibit potential for further evaluation:

Accession Number	Genus/Species Origin/Source	Plot Location	Remarks
ND-1765 5980T	Siberian larch Larix sibirica USDA, FS, Shelterbelt Lab., Bottineau, ND	1/03/1-10	
ND-628 5887T	Silverberry Elaeagnus commutata Wells, Co., ND	2/02/1-10	
'Midwest' PI-478000	Manchurian crabapple Malus baccata mandshurica Echo Manchuria Res. Sta. Morden, Manitoba, Canada	3/01/1-5	
'Bighorn' WY-843 PI-483445	Skunkbush sumac Rhus trilobata Basin, WY USDA, SCS, PMC, Bismarck, ND	2/02/11-20 2/04/1-10	
'Red Splendor' 6004T	Flowering crabapple Malus sp. x Lee Nursery, Fertile, MN	3/01/6-10	
ND-14 PI-478004	Harbin pear Pyrus ussuriensis Res. Sta. Morden, MB, Canada SCS, PMC, Bismarck, ND	3/02/6-10	
ND-1336 6088T	Chokecherry Prunus virginiana Mercer Co., Stanton, ND	3/06/6-10	
ND-629 5645T	Amur maple Acer ginnala Res. Sta., Morden, MB, Canada	3/08/6-10	

Accession Number	Genus/Species Origin/Source	Plot Location	Remarks
ND-1873 5648T	Amur maple Acer ginnala Lincoln-Oakes Nursery, Bismarck, ND	3/09/1-5	
SD-156 5890T	Green ash Fraxinus pennsylvanica Deuel Co., Clear Lake, SD	4/01/1-5	
'Cardan' MDN-12002 PI-469226	Green ash Fraxinus pennsylvanica USDA, ARS, Mandan, ND Carlyle, MT	4/02/1-5	
ND-1759 5893T	Green ash SD-156 x MDN-12002 Fraxinus pennsylvanica USDA, SCS, PMC, Bismarck, ND	4/02/6-10	
ND-647 5887T	Black ash Fraxinus nigra Res. Sta., Morden, MB, Canada	4/03/1-5	
ND-1879 11850T	Honeylocust Gleditsia triacanthos ARS Field Station, Woodward, OK	4/04/1-5	
ND-283	Russian almond Prunus tenella ND Game and Fish Dept.	2/04/11-20	

Project No.: 38I316K

Table 9: 1985 Weather Summary – Official Station, North Dakota State University Dickinson Branch Experiment Station, Dickinson, North Dakota

Month	Temp. HI	Temp. LO	Temp. (Mean)	Normal* Temp. (Mean)	Deviation From Norm.	Total Precip.	Normal* Precip.	Deviation From Norm.
January	40	-29	8.7°F	9.3°F	- 0.6°F	0.08 in.	0.34 in.	-0.26 in.
February	53	-30	13.5	16.2	- 2.7	0.06	0.40	-0.34
March	63	-10	29.2	25.4	3.8	0.68	0.57	0.11
April	82	12	44.5	40.5	4.0	0.87	1.73	-0.86
May	92	26	56.5	53.0	3.5	4.31	2.53	1.78
June	93	26	56.4	62.2	- 5.8	2.13	3.69	-1.56
July	102	40	68.4	68.6	- 0.2	1.91	2.08	-0.17
August	90	33	60.9	67.4	- 6.5	1.75	1.86	-0.11
September	85	19	51.3	55.9	- 4.6	1.61	1.51	0.10
October	77	11	42.0	45.0	- 3.0	2.05	0.85	1.20
November	70	-29	14.5	28.3	-13.8	0.85	0.45	0.40
December	40	-31	11.2	15.6	- 5.9	0.68	0.41	0.34
Annual			38.09	40.6	- 2.51	16.98	16.42	0.56

Last Frost – September 23 (27°)

First Frost – June 4 (26°)

Frost Free Period – 112 days

USDA, SCS, PMC, Bismarck, North Dakota
210 – Project NO.: 38I316K
Project Title: Field Evaluation of Woody Plant Materials (FEP)
Location: North Dakota State University, Dickinson Branch Experiment Station, Dickinson, North Dakota
Major Land Resource Area: 054
202 – Soil Series Texture: Parshall fine sandy loam
201 – Year of Record: 1985

211-PLOT LOCATION		304-MATL-PLTD	(Establishment, material planted)
23, 1-ACC-NO	(Prime-PMC-control number,	306-AGE	(Age of stock)
02-PLANT-SYMBOL	PI number)	305-NO-PLTS	(Number of plants)
12-COMMON-NAME		310-NO-PLT-SRV	(Number of plants surviving)
04-GENUS-NAME		363-PCT-SRV	(Percent survival)
05-SPECIES-NAME		337-VI	(Vigor, plant)
29, 30-COLL-SITE-STATE, COUNTY	(Origin/source)	347-CO	(Resistance to cold)
209-TRANS-DATE	(Transplant date)	358-BSL-ARA	(Basal area, cm)
201-YR-REC	(Year of record)	359-CAN-COV	(Canopy cover, cm)
212-YR-PLT	(Year planted)	360-PLT-HT	(Plant height, cm)
		-AD	(Animal damage)
		364-REMARKS	

Evaluation Rating System

Vigor	**Amount of Injury**
1 = Excellent	1=None
3 = Good	3=Slight
5 = Fair	5=Moderate
7 = Poor	7=Severe
9 = Very Poor	9=Very Severe

Table 10. 38I316K Field Evaluation of Woody Plant Materials – Dickinson, ND – 1985

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
1/01/1-10	ND-1729	LASI*	Siberian larch	05/16	78	78	PLBR	1-0	10	9	90	3	---	21	62	replt-plt #9
	5979T		Larix sibirica			79				10	100	---	---	22	44	
			NDFS State Nursery			80				10	100	4	1	33	55	
			Towner, ND			82				8	80	8	---	29	46	
						83				6	60	7	3	33	74	#1 mowed off,
						84				6	60	4	---	39	91	mod. rodent dam.
1/02/1-10	SL-383-T	LASI*	Siberian larch	05/16	78	78	PLBR	1-0	10	10	100	3	---	17	68	
	Pallet No.		Larix sibirica			79				10	100	---	---	24	49	
	2392		USDA, FS,			80				10	100	4	1	43	62	
	5976T		Shelterbelt Lab.,			82				9	90	6	---	47	69	
			Bottineau, ND			83				9	90	6	3	61	119	#1 mowed off,
			Denbigh Ex. Forest			84				8	80	2	---	78	170	mod. rodent dam.
1/03/1-10	ND-1765	LASI*	Siberian larch	05/17	78	78	PLBR	2-0	10	10	100	3	---	17	44	
	5980T		Larix sibirica			79				10	100	---	---	33	48	
			USDA, FS,			80				10	100	4	1	55	81	
			Shelterbelt Lab.,			82				10	100	5	---	63	122	
			Bottineau, ND			83				10	100	5	2	79	148	mod. rodent
						84				10	100	4	---	110	187	dam., Best accession of larch
1/04/1-5	ND-1763	PIPO*	Ponderosa pine	05/16	78	78	CONT	1-1	5	5	100	1	---	14	53	
	6043T		Pinus ponderosa			79				4	80	---	---	14	34	
			USDA, FS,			80				5	100	4	5	46	61	replt-plt #3
			Shelterbelt Lab.,			82				4	80	7	---	74	134	
			Bottineau, ND			83				4	80	5	3	88	111	animal damage
			757-5 Todd Co., SD			84				4	80	3	---	116	149	

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
1/04/6-10	ND-1565 6036T	PIAR	Bristle cone pine Pinus aristata USDA, FS, Shelterbelt Lab., Bottineau, ND	05/16	78	78 79 80 82 83 84	CONT	1-1	5	5 5 5 1 4 2	100 100 100 20 80 40	3 --- 5 5 8 3	--- --- 3 --- 4 ---	14 20 32 65 29 58	17 19 23 90 24 55	 mower damage on plt #3
1/05/1-5	Mich-1468 5059T	THOC	Northern white cedar Thuja occidentalis USDA, SCS, PMC, East Lansing, MI	06/01	83	83 84 85	PLBR	---	5	--- 3 0	--- 60 0	--- 7 ---	--- --- ---	--- 7 ---	--- 5 ---	
1/05/6-10	Mich-1841 5969T	---	Northern white cedar Thuja occidentalis USDA, SCS, PMC, East Lansing, MI	06/01	83	83 84 85	PLBR	---	5	--- 1 0	--- 20 0	--- 5 ---	--- --- ---	--- 18 ---	--- 18 ---	
1/06/1-10	ND-1863 5909T	GLTR	Honeylocust Gleditsia triacanthos Brown Co., SD USDA, SCS, PMC, Bismarck, ND	05/12	82	82 83 84	PLBR	2-0	10	9 9 9	90 90 90	5 4 6	--- 4 ---	33 64 44	46 91 79	 slight-moderate winter injury
1/08/1-5	ND-3825 34904T	ACSA2	Silver maple Acer saccharinum Bismarck, ND	06/01	83	83 84 85	PLBR	---	5	--- 5 0	--- 100 0	--- 5 ---	--- --- ---	--- 8 ---	--- 39 ---	
1/08/6-10	ND-3886 3519T	ACSA2	Silver maple Acer saccharinum Bismarck, ND	06/01	83	83 84 85	CONT	---	5	--- 4 3	--- 80 60	--- 4 6	--- --- ---	--- 43 43	--- 101 82	

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2/01/1-10	ND-313 5996T PI-477999	LOTAS*	Red tatarian honeysuckle Lonicera tatarica sibirica USDA, ARS, Cheyenne, WY USDA, SCS, PMC, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	10	9 9 10 10 10 10	90 90 100 100 100 100	1 --- 3 4 3 4	--- --- --- --- 3 ---	47 62 98 162 181 225	48 72 73 136 166 167	 Replt-plt #9 good fruit mod-sev insect defoliation, honeysuckle aphid
2/01/11-20	ND-1730 5994T	LOTAS*	Red tatarian honeysuckle Lonicera tatarica sibirica Lincoln-Oakes Nursery, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	10	10 10 10 10 10 10	100 100 100 100 100 100	1 --- 1 4 3 5	--- --- --- --- 3 ---	48 66 104 181 204 234	51 84 90 160 197 200	 good vigor slt. insect def. good fruit prod. snow damage 12, 13, 15, 18, 19- APHID Damage
2/02/1-10	ND-628 5877T	ELCO*	Silverberry Elaeagnus commutata Wells Co., ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	10	10 10 10 10 10 10	100 100 100 100 100 100	1 --- 1 5 5 4	--- --- 1 --- 2 ---	29 83 124 151 192 217	52 94 97 145 170 159	 suckering snow damage 8,9,10

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
2/02/11-20	WY-843 'Bighorn' 4646T PI-483445	RHTR	Skunkbush sumac Rhus trilobata USDA, SCS, PMC, Bismarck, ND Bighorn Co., WY	05/17	78	78	PLBR	2-0	10	7	70	2	---	52	43	replt-plts #16,17,18
						79				10	100	---	---	107	78	
						80				10	100	3	---	152	82	
						82				10	100	3	---	232	153	
						83				10	100	3	3	272	193	leaf spot, snow
						84				10	100	3	---	350	185	damage 1,2,3
2/03/1-10	ND-26 11852T	LONIC	Honeysuckle Lonicera sp. USDA, ARS Mandan, ND	05/2	79	79	PLBR	2-0	10	10	100	---	---	35	42	
						80				10	100	5	---	60	51	
						81				10	100	---	---	79	87	
						83				10	100	4	3	136	145	leaf spot
						84				10	100	4	---	149	164	witches broom on plts #3, 5, 8 mod. ins. defol. grasshoppers aphid damage
2/03/11-15	ND-452 19978T	LOXYM*	Honeysuckle Lonicera xylosteum mollis USDA, ARS, Cheyenne, WY USDA, SCS, PMC, Bismarck, ND	05/2	79	79	PLBR	2-0	5	5	100	---	---	37	39	
						80				5	100	3	---	71	47	
						81				5	100	---	---	99	88	
						83				5	100	4	3	169	168	witches broom
						84				5	100	3	---	198	168	(1, 2, 3) slight leaf spot, leaf blight, aphid damage
2/04/1-10	WY-843 'Bighorn' 4646T PI-483445	RHTR	Skunkbush sumac Rhus trilobata USDA, SCS, PMC, Bismarck, ND Bighorn Co., WY	05/2	79	79	PLBR	2-0	10	10	100	---	---	30	34	
						80				10	100	5	---	73	43	
						81				10	100	---	---	78	64	
						83				10	100	3	3	181	137	few pests
						84				10	100	3	---	215	140	

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
2/04/11-20	PM-ND-283 6079T	PRTE*	Russian almond Prunus tenella ND Game & Fish Dept. USDA, SCS, PMC, Bismarck, ND	05/08	80	80 81 82 83 84	PLBR	2-0	10	10 7 10 8 10	100 70 100 80 100	5 --- 4 4 4	--- --- --- 2 ---	23 28 54 119 115	68 44 69 108 112	 replt-plt #11,15,20 few pests
2/05/1-10	ND-11 5993T PI-477998	LOMA6	Amur honeysuckle Lonicera maackii Res. Sta. Morden, MB, Canada	05/07	81	81 82 83 84	CONT	0-1	10	10 10 6 10	100 100 60 100	--- 4 6 4	--- --- 3 ---	20 42 50 64	19 44 54 56	 slight insect defol. (grasshoppers)
2/06/1-5	ND-995 PI-303584	SAHU	Prairie willow Salix humilis USDA, PI Sta., Ames, IA	05/12	82	82 83 84	PLBR- CONT	1-2	5	4 4 5	80 80 100	4 4 4	--- 3 ---	58 155 192	66 125 124	 mod. grasshopper damage. Replt. plt. #4
2/06/6-10	PI-370126	SALIX	Willow Salix sp. USDA, PI Sta, Ames, IA	05/12	82	82 83 84	PLBR- CONT	0-1	5	5 4 5	100 80 100	4 3 3	--- 3 ---	33 106 184	48 133 170	 good growth, few pests Replt-plt#5
2/07/1-10	ND-624 6094T	PTTR	Common hoptree Ptelea trifoliata Ramsey Co., ND USDA, SCS, PMC, Bismarck, ND	05/12	82	82 83 84	PLBR	2-0	10	9 9 10	90 90 100	5 3 3	--- 4 ---	24 37 50	33 64 79	 good growth Replt.-plt. #7

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
2/08/1-5	'Indigo' Mich-765 PI-468117	COAM2	Silky dogwood Cornus amomum USDA, SCS, PMC, East Lansing, MI	06/01	83	83 84 85	PLBR	---	5	--- 4 3	--- 80 60	--- 2 8.3	--- --- ---	--- 55 65	--- 56 52	
2/08/6-10	'Roselow' Mich-1339 5026T	MASA*	Sargent crabapple Malus sargentii USDA, SCS, PMC, East Lansing, MI	06/01	83	83 84 85	PLBR	---	5	--- 5 4	--- 100 80	--- 4 6.8	--- --- ---	--- 27 31	--- 40 36	
3/01/1-5	'Midwest' 6003T PI-478000	MABAM*	Manchurian crabapple Malus baccata mandshurica Echo Manchuria/Res. Sta. Morden, MB, Canada USDA, SCS, PMC, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	3 5 5 5 5 5	60 100 100 100 100 100	2 --- 3 3 2 4	--- --- --- --- 2 ---	16 27 58 144 183 236	60 64 85 169 211 260	Replt-plts #2,5 fall webworm plt #1, few pests, good vigor snow damage-1,2,3
3/01/6-10	'Red Splendor' 6004T	MABA*	Flowering crabapple Malus sp. x Lee Nursery, Fertile, MN	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	2 --- 2 3 3 3	--- --- --- --- 3 ---	48 76 108 181 214 262	66 117 143 256 278 333	 good growth good fruit prod. few pests snow damage 1,2 fall webworm 3,5

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
3/02/1-5	ND-1731 6001T	MABA*	Siberian crabapple Malus baccata Lincoln-Oakes Nursery, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	4 5 5 5 5 5	80 100 100 100 100 100	2 --- 3 3 2 2	--- --- --- --- 3 ---	58 84 125 178 228 309	68 95 125 249 321 329	replt-plt #3 good growth & vigor, few pests fall webworm 1,4
3/02/6-10	ND-14 1095T PI-478004	PYUS*	Harbin pear Pyrus ussuriensis Harbin, Manchuria/Res. Sta. Morden, MB, Canada USDA, SCS, PMC, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	6 --- 1 3 1 2	--- --- --- --- 2 ---	27 56 91 195 243 282	76 111 139 272 335 377	 good growth & vigor snow damage #4
3/03/1-5	SD-132 6064T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Brookings Co., SD	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	2 5 5 5 5 5	40 100 100 100 100 100	1 --- 3 5 3 3	--- --- --- --- 2 ---	57 98 165 159 256 270	111 135 147 183 313 340	replt-plts #2,3,4 good recovery from rodent injury, multi- stemmed
3/03/6-10	SD-133 6065T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Brookings Co., SD	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	1 3 3 3 3 3	20 60 60 60 60 60	5 --- 4 6 5 5	--- --- --- --- 2 ---	66 78 163 185 280 197	79 67 152 185 275 210	replt-plts #6,7, 8,10 good recovery multi-stemmed

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
3/04/1-5	SD-134 6066T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Brookings Co., SD	05/17	78	78	PLBR	2-0	5	5	100	2	---	67	104	
						79				5	100	---	---	158	204	
						80				5	100	1	---	230	258	
						82				5	100	7	---	124	146	
						83				4	80	5	3	235	239	resprouts-
						84				3	60	5	---	170	192	multi-stemmed
3/04/6-10	'Mantoy' 6069T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND USDA, ARS, Mandan, ND	05/17	78	78	PLBR	2-0	5	3	60	2	---	57	68	replt-plts #6,10
						79				5	100	---	---	151	150	
						80				5	100	4	---	195	185	
						82				5	100	6	---	195	212	
						83				5	100	4	3	283	267	resprouts-multi-
						84				5	100	5	---	185	221	stemmed, good recovery except plts #3, 4
3/05/1-5	ND-1178 6070T	PRAR*	Apricot Prunus armeniaca Walsh Co., ND	05/17	78	78	PLBR	2-0	5	4	80	2	---	55	99	replt-plt #2
						79				5	100	---	---	165	165	
						80				5	100	3	---	198	207	
						82				4	80	7	---	168	161	
						83				4	80	5	3	278	249	multi-stemmed
						84				4	80	5	---	248	259	
3/05/6-10	ND-416 6067T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Burleigh Co., ND	05/17	78	78	PLBR	2-0	5	5	100	1	---	62	103	
						79				5	100	---	---	149	192	
						80				5	100	1	---	232	225	
						82				5	100	7	---	142	137	
						83				3	60	5	3	257	273	rodent damage
						84				2	40	5	---	238	248	multi-stemmed

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
3/06/1-5	ND-423 6068T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Stark Co., ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	3 5 5 5 5 4	60 100 100 100 100 80	5 --- 5 7 6 4	--- --- --- --- --- ---	25 69 132 155 163 146	58 116 163 190 240 224	replt-plts #4,5 plts #2-4 are multi-stemmed (are all resprouts) wind dam. on plt #1.
3/06/6-10	ND-1336 6088T	PRVI	Chokecherry Prunus virginiana Mercer Co., ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	2 --- 2 3 2 2	--- --- --- --- 2 ---	28 98 181 259 327 352	74 154 196 313 349 368	 slight powdery mildew, good vigor. webworm 1,2,4,5
3/07/1-5	ND-1732 6090T	PRVI	Chokecherry Prunus virginiana Lincoln-Oakes Nursery, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	2 --- 3 4 4 3	--- --- --- --- 2 ---	18 77 112 247 317 344	67 141 169 293 331 352	 fall webworm slight aphid dam. shothole, leaf blight webworm 1,2,3,4

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
3/07/6-10	'Schubert'	PRVI	Chokecherry	05/17	78	78	PLBR	2-0	3	2	66	5	---	22	39	
	12608T		Prunus virginiana			79			---	2	66	---	---	20	30	replt-plts #8,9
			USDA, ARS,			80			---	2	66	7	---	53	75	replt-plts #8,9,10
			Mandan, ND			82			5	5	100	6	---	116	169	
			USDA, SCS, PMC,			83			---	5	100	5	2	145	198	slight fall
			Bismarck, ND			84			---	5	100	4	---	171	275	webworm, elm
																cont. on plt #4
																webworm 6,9,10
3/08/6-10	ND-629	ACGI	Amur maple	05/2	79	79	PLBR	2-0	5	5	100	---	---	31	47	
	5645T		Acer ginnala			80				0	---	---	---	---	---	
	PI-477992		Res. Sta. Morden,			81				4	80	---	---	39	58	
			MB, Canada			83				4	80	3	1	184	183	
						84				4	80	4	---	301	229	
3/09/1-5	ND-1873	ACGI	Amur maple	05/2	79	79	PLBR	2-0	5	5	100	---	---	49	66	
	5648T		Acer ginnala			80				5	100	3	---	86	91	
			Lincoln-Oakes			81				5	100	---	---	128	132	
			Nursery,			83				5	100	2	1	220	227	good seed prod.
			Bismarck, ND			84				5	100	3	---	305	267	
3/09/6-10	ND-686	SYAMJ*	Japanese tree lilac	05/2	79	79	PLBR	2-0	5	5	100	---	---	22	71	
	6225T		Syringa amurensis			80				2	40	7	---	45	81	replt-plt #4
	PI-478008		japonica			81				2	40	---	---	47	85	
			ND Game & Fish			83				3	60	5	3	102	117	
			Dept.			84				5	100	5	---	93	87	
3/10/1-5	ND-3773	SALIX	Willow	05/12	82	82	PLBR	0-1	5	3	60	7	---	11	22	
	21576T		Salix sp.			83				2	40	8	3	13	33	
			Norman Co., MN			84				3	60	4	---	28	45	replt-plt #2
			USDA, SCS, PMC,			85				4	80	6.5	---	30	45	
			Bismarck, ND													

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
3/10/6-10	Mich-433 5049T	SAPE	Laurel willow Salix pentandra USDA, SCS, Rose Lake PMC, East Lansing, MI	05/12	82	82 83 84	PLBR	0-1	5	5 5 5	100 100 100	5 5 4	--- 3 ---	13 32 65	38 62 78	
4/01/1-5	SD-156 5890T	FRPE	Green ash Fraxinus pennsylvanica Deuel Co., SD	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	1 --- 2 3 3 3	--- --- --- --- 2 ---	16 39 68 171 221 245	79 111 134 232 296 328	 slight leaf scorch snow damage #1
4/01/6-10	ND-1734 5891T	FRPE	Green ash Fraxinus pennsylvanica Lincoln-Oakes Nursery, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	2 --- 4 4 4 4	--- --- --- --- 2 ---	11 31 57 143 173 195	63 95 113 222 268 313	 Competition from shelterbelt at N-end.
4/02/1-5	'Cardan' MDN-12002 5895T PI-469226	FRPE	Green ash Fraxinus pennsylvanica USDA, ARS, Mandan, ND Wibaux Co., MT	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	2 --- 3 3 2 3	--- --- --- --- 2 ---	9 52 91 228 255 295	71 105 154 308 348 420	 good vigor

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
4/02/6-10	ND-1759 5893T	FRPE	Green ash Fraxinus pennsylvanica SD-156 x MDN- 12002 USDA, SCS, PMC, Bismarck, ND	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	1 --- 3 4 3 3	--- --- --- --- 2 ---	12 48 93 176 242 271	77 124 158 246 326 408	competition from shelterbelt at N-end.
4/03/1-5	ND-647 5887T	FRNI	Black ash Fraxinus nigra Res. Sta. Morden, MB, Canada	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	5 5 5 5 5 5	100 100 100 100 100 100	1 --- 6 4 4 4	--- --- --- --- 3 ---	4 13 37 126 147 127	28 58 83 243 319 347	 heat stress leaf scorch
4/03/6-10	ND-1432 5658T	AEGL	Ohio buckeye Aesculus glabra Res. Sta. Morden, MB, Canada	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	3 3 3 1 1 1	60 60 60 20 20 20	8 --- 9 6 6 6	--- --- --- --- 4 ---	1 4 14 45 50 100	7 14 12 65 70 100	replt-plt #7
4/04/1-5	ND-1879 11850T	GLSI	Honeylocust Gleditsia triacanthos Woodward, OK USDA, ARS, Mandan, ND	05/08	80	80 81 82 83 84	PLBR- CONT	2-1	5	1 2 5 5 5	20 40 100 100 100	9 --- 4 2 3	--- --- --- 2 ---	10 4 43 75 98	15 25 68 118 174	 replt-plts #1,3,5 good vigor
4/04/6-10	ND-548 5969T	JUMA*	Manchurian walnut Juglans mandshurica Res. Sta. Morden, MB, Canada	05/17	78	78 79 80 82 83 84	PLBR	2-0	5	4 3 3 3 3 3	80 60 60 60 60 60	3 --- 8 6 7 5	--- --- --- --- 6 ---	4 24 43 168 202 150	19 40 46 110 133 117	 leaf scorch low vigor girdling

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
4/05/1-5	ND-1170 6009T	MOAL	Mulberry Morus alba Burleigh Co., ND	05/17	78	78	PLBR	2-0	5	5	100	1	---	89	119	
						79				5	100	---	---	178	182	
						80				5	100	7	---	241	236	
						82				5	100	3	---	420	325	
						83				5	100	3	5	482	404	mod. frost injury
						84				5	100	7	---	448	396	winter injury
4/05/6-10	ND-363 5866T	ELAN	Russian olive Elaeagnus angustifolia Burleigh Co., ND	05/17	78	78	PLBR	2-0	5	5	100	2	---	70	68	
						79				5	100	---	---	150	147	
						80				5	100	3	---	179	158	
						82				5	100	4	---	240	296	
						83				5	100	4	2	332	343	shelterbelt comp.
						84				5	100	4	---	387	400	on S-end
4/06/1-5	ND-364 5867T	ELAN	Russian olive Elaeagnus angustifolia Burleigh Co., ND	05/17	78	78	PLBR	2-0	5	5	100	1	---	89	88	
						79				5	100	---	---	211	180	
						80				5	100	1	---	291	255	
						82				5	100	2	---	375	400	
						83				5	100	2	2	477	477	good vigor
						84				5	100	3	---	560	515	
4/06/6-10	ND-1735 5874T	ELAN	Russian olive Elaeagnus angustifolia Lincoln-Oakes Nursery, Bismarck, ND	05/17	78	78	PLBR	2-0	5	5	100	2	---	79	80	
						79				5	100	---	---	172	172	
						80				5	100	4	---	226	217	
						82				5	100	4	---	335	441	
						83				5	100	3	2	386	396	shelterbelt
						84				5	100	4	---	432	440	compet. on S-end
4/07/1-5	ND-541 5868T	ELAN	Russian olive Elaeagnus angustifolia Haakon Co., SD	05/17	78	78	PLBR	2-0	5	5	100	1	---	88	80	
						79				5	100	---	---	185	166	
						80				5	100	4	---	251	236	
						82				5	100	3	---	390	360	
						83				5	100	3	2	479	476	good vigor and
						84				5	100	3	---	522	522	growth

211 Plot Location	23 Accession Number	02 Plant Symbol	04 05 Genus/Species Origin/Source	209 Trans Date	212 Yr Plt	201 Yr Rec	304 Matl Pltd	306 Age	305 No Plts	310 No Plt Srv	363 Pct Srv	337 V I	347 C O	359 Can Cov	360 Plt Ht	364 Remarks
04/07/6-10	PM-ND-1843 11840T	ELAN	Russian olive Elaeagnus angustifolia Res. Sta. Morden, MB, Canada	05/08	80	80 81 82 83 84	PLBR	2-0	5	5 5 5 5 5	100 100 100 100 100	5 --- 4 4 4	--- --- --- 2 ---	45 45 144 230 317	47 68 153 214 254	 shelterbelt comp. on S-end
4/09/1-10	'Oahe' MDN-12003 T05725 PI-476981	CEOC	Hackberry Celtis occidentalis USDA, ARS, Mandan, ND	05/08	80	80 81 82 83 84	PLBR	2-0	10	10 9 8 8 7	100 90 80 80 70	--- --- 6 6 4	--- --- --- --- ---	15 2 40 57 89	61 14 48 92 139	
4/10/1-10	PM-SD-75 5713T	CEOC	Hackberry Celtis occidentalis Potter Co., SD	05/07	81	81 82 83 84 85	PLBR	2-0	10	10 7 6 7 6	100 70 60 70 60	--- 6 3 5 4	--- --- 2 --- ---	2 28 87 106 204	37 44 92 124 181	 replt plt. #1
4/11/1-5	ND-3890 35200T	ELAN	Russian olive Elaeagnus angustifolia Lawyer Nursery, Plains, MT	06/01	83	83 84 85	PLBR	---	5	--- 5 4	--- 100 80	--- 4 3	--- --- ---	--- 73 130	--- 91 145	

COOPERATION WITH NORTHERN GREAT PLAINS RESEARCH LABORATORY

The Station continues a long history of cooperation with the Northern Great Plains Research Center, Mandan, ND. Present research with several wheat and barley cultivars by Dr. Armand Bauer is summarized on the following tables.

Northern Great Plains Research Laboratory
Mandan, ND
1986 Agronomic Data

	Measurement							
Cultivar	**Seedling population**	**Heads**	**Grain yield†**	**1000 kernel weight†**	**Kernel/ head**	**Straw yield†**	**Height**	**Test weight**
	no/m²‡	**no/m²**	**bu/ac**	**grams℈**	**no.**	**lbs./ac**	**inches**	**lbs./bu**
Alex	151	478	41.5	27.29	23.4	4149	35	54.3
Butte	147	456	37.2	26.14	25.3	3930	31	53.1
Coteau	123	410	41.1	26.33	25.4	4015	35	54.1
Cutless	181	510	33.2	23.42	20.7	3498	27	51.9
Len	146	462	36.4	26.05	19.8	3435	28	51.6
Marshall	142	483	49.7	28.90	27.3	3709	29	51.8
Stoa	169	420	50.5	26.89	32.5	4561	36	53.3
Wheaton	150	413	54.5	30.73	31.4	3912	27	52.2
Zhong	190	406	45.5	34.81	25.8	3900	30	54.0
Sinton	149	354	33.9	29.42	26.8	4476	39	52.1
LSD	23	64	3.9	1.16	3.6	364	2	0.6
Azure	135	396	88.8	37.96	33.7	3460	28	44.9
Bowman§	172	688	57.2	46.22	14.5	3372	25	45.6
Hazen	151	353	73.5	37.37	36.4	3241	27	44.1
Hector§	123	571	56.5	32.73	19.0	3375	25	40.2
Morex	148	317	56.6	33.63	38.5	2667	28	42.2
Robust	155	346	70.2	36.42	39.6	3078	27	44.4
LSD	15	67	5.1	0.74	4.3	544	1	1.0

† All units of mass (weight) are expressed on a dry basis. (Drying temperature is 69°C or 156°F).

‡ To convert to no/yard², multiply by 0.836.

§ Two-row barley; others are six-rowed.

℈ An ounce is equivalent to 28.35 grams.

Northern Great Plains Research Laboratory
Mandan, ND

1985 Grain N Concentration

Cultivar	%N	% Protein (14% water)
Alex	3.09	15.1
Butte	3.21	15.7
Coteau	3.41	16.7
Glenman	2.83	13.9
Sinton	3.36	16.5
Stoa	3.43	16.8
Wheaton	2.74	13.4
Zhong	2.96	14.5
Azure	2.37	12.7
Bowman	2.48	13.3
Hazen	2.51	13.5
Hector	2.56	13.8
Robust	2.74	14.7
LSD	0.18	

NE69 PHENOLOGY PROJECT:

Phenological observations on Red Rothamagensis lilac in the NE69 Phenology project were completed for the 24th consecutive year and results forwarded to the project leader at Purdue University.

NC7 REGIONAL ORNAMENTAL PLANT TRIALS:

Re-evaluation of NC7 Regional ornamental trials is underway following a change in project leadership at the Regional Plant Introduction Station, Ames, Iowa. Inventory of all previously planted materials was completed with the assistance of personnel from the Department of Horticulture, NDSU. Plantings in 1986, which included 10 new species, were completed for the 31st consecutive year of cooperation.

WEATHER OBSERVATION:

While not a formal project, the Station continued to serve the National Weather Service as a bench mark station at Dickinson and as a weather observation station at Ranch headquarters. The Dickinson Branch Station weather station may be the only remaining bench mark location in North Dakota. Observations from this location have been continuous since 1897.

PURE SEED DISTRIBUTION:

The Station continues to serve as the distribution center for southwestern North Dakota, for foundation seed produced at all other branch stations and the Agronomy Seed Farm. Pindak, Nodak, and Othello bean seed, and Cutless, Stoa and Butte 86 wheat seed were the principal varieties distributed in 1986.