

FIELD EVALUATION PLANTING: TECHNICAL REPORT

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 PMC. 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 determined.

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 Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the NDSU, 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 1/4 sec. 5, T. 139 N., R. 96 W., 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 shales. 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 degrees 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 degrees F.

METHODS AND MATERIALS

Assembly

Refer to Table DI-2 for a list of woody species planted from 1978 to 1995.

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 five 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 1A contains primarily poplar accessions. Block 1B contains conifers. Block 2 contains shrubs and small trees. Block 3 contains medium sized trees. Block 4 contains tall trees. All trees are spaced ten feet within row and shrubs are spaced five

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 trees and shrubs were hand planted using approved forestry methods.

Planting Date

Refer to Table DI-2 for a list of woody species planted from 1978 through 1995. Replacement stock is planted after establishment year 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 minimum 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 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.

1982-1995: 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. During the drought years of 1988-1991 the trees were watered in the summer.

Crop Residue Management

During 1990 and 1991 a cover crop was maintained to prevent soil erosion.

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. In 1988, some Russian olive accessions were treated with Tordon, using a hypo-hatchet, with unsuccessful results. In 1989, those treated accessions were cut down.

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 and are listed in Table DI-2.

RESULTS

Plant Performance

Plant performance data was recorded in September 1994 and 1995. Not all data appears in this report.

Currently, 84 accessions of 51 species are under evaluation. This site is fairly well maintained by the Dickinson Experiment Station. Very little weed competition has occurred within row. A favorable microclimate is provided by surrounding shelter belts. This undoubtedly reduces exposure to extreme temperatures and winds and desiccation and winter injury. Annual rainfall amounts are similar to Bismarck. The drought years of 1988 and 1989 have severely hampered establishment and performance. With the continued dry weather in 1990 and 1991, the original windbreak of spruce planted on the border are dying. A number of planted accessions are also dying. The following accessions exhibit potential for further evaluation and use:

Accession Number	Genus/Species	Origin/Source	Plot Location
ND-1765 9005980	Siberian larch, <i>Laris sibirica</i>	USDA, FS, Shelterbelt Lab., Bottineau, ND	1/03/1-10
ND-628 9005887	Silverberry, <i>Elaeagnus cummutata</i>	Wells Co., ND	2/02/1-10
'Red Splendor' 9006004	Flowering crabapple, <i>Malus X</i>	Lee Nursery, Fertile MN	3/01/6-10
ND-1336 9006088	Chokecherry, <i>Prunus virginiana</i>	Mercer Co., Stanton ND	3/06/6-10
ND-629 9005645 PI- 477992	Amur Maple, <i>Acer ginnala</i>	Res. Sta., Morden, MB, Canada	3/08/6-10
ND-1873 9005648	Amur Maple, <i>Acer ginnala</i>	Lincoln-Oakes Nursery, Bismarck ND	3/09/1-5
SD-156 9005890	Green ash, <i>Fraxinus pennsylvanica</i>	Deuel Co., Clear Lake, SD	4/01/1-5
ND-1759 9005893	Green ash, <i>Fraxinus pennsylvanica</i>	SD-156 x MDN-12002 USDA, SCS, PMC, Bismarck ND	4/02/6-10
ND-1879 9011850 PI- 503531	Honey locust, <i>Gleditsia triacanthos</i>	ARS Field Station, Woodward OK	4/04/1-5
ND-283 9006079 PI- 540442	Russian Almond, <i>Prunus tenella</i>	ND Game and Fish Dept.	2/04/11-20
'Bighorn' PI- 483445	Skunkbush sumac, <i>Rhus trilobata</i>	Bighorn Co., WY	2/02/11-20 2/04/1-10
ND-11 PI-	Amur honeysuckle, <i>Lonicera</i>	Res. Sta., Morden, Manitoba,	2/05/1-10

477998	<i>maackii</i>	Canada	
9008041	False Indigo, <i>Amorpha fruticosa</i>	USDA, SCS, PMC, Aberdeen, ID	3/3/11-15
SD-75 9005713	Hackberry, <i>Celtis Occidentalis</i>	Potter Co., SD	4/9/1-10

USDA, NRCS, PMC, Bismarck, North Dakota

Project No.: 381316K

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

Soil Series Texture: Parshall fine sandy loam

Year of Record: 1994-1995

PLOT LOCATION	
ACCESSION NUMBER	
PLANT SYMBOL	
COMMON NAME	
GENUS/SPECIES	
ORIGIN/SOURCE	
TRANS DATE	TRANSPLANT DATE
YR PLT	YEAR PLANTED
YR REC	YEAR OF RECORD
MTL PLTD	MATERIAL PLANTED

AGE	AGE OF STOCK
NO PLTS	NUMBER OF PLANTS
NO SRV	NUMBER OF PLANTS SURVIVING
PCT SRV	PERCENT SURVIVAL
VI	VIGOR
CAN COV	CANOPY COVER, CM
PLT HT	PLANT HEIGHT, CM
REMARKS	
EVALUATION RATING SYSTEM	
VIGOR	
1 = EXCELLENT	
3 = GOOD	
5 = FAIR	
7 = POOR	
9 = VERY POOR	

Table DI-2.
Project NO.: 381316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota
Year of Record: 1994-1995

PLOT LOCATION	ACCESSION NUMBER	PLANT SYMBOL	GENUS/SPECIES	TRANS DATE	YR PLT	YR REC	MTL PLTD	AGE	NO PLTS	NO SRV	PCT SRV	VI	CAN COV	PLT HT	REMARK
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			ORGIN/ SOURCE												
IA/1/1-5	9058870	PODE X	poplar	05/09	90	90	PLBR		5	5	100	1	47	102	
	14272	PONI	Populus deltoides x P. nigra			91				5	100	3	69	124	
			USDA, ARS, Mandan, ND			92				5	100	5	110	153	
			Lincoln-Oakes Nursery, Bismarck, ND			94				5	100	2	220	447	
IA/1/6-10	9058869	PODE X	poplar	05/09	90	90	PLBR		5	5	100	3	35	95	
	14271	PONI	Populus deltoides x P. nigra			91				1	20	6	10	55	
			USDA, ARS, Mandan, ND			92				5	20	4	51	106	
			Lincoln-Oakes Nursery, Bismarck, ND			94				5	100	3	171	324	
IA/2/1-5	9058872	PODE X	poplar	05/09	90	90	PLBR		5	5	100	2	50	99	
	14274	PONI	Populus deltoides x P. nigra			91				4	80	3	59	129	
			USDA, ARS, Mandan, ND			92				5	100	4	54	119	
			Lincoln-Oakes Nursery,			94				5	100	2	288	461	

Bismarck, ND

IA/2/6-10	9058871	PODE X	poplar	05/09	90	90	PLBR		5	5	100	4	27	99	
	14273	PONI	Populus deltoides x P. nigra			91				1	20		75	115	
	Manitou		USDA, ARS, Mandan, ND			92				5	100	3	147	189	Leaf rust
			Lincoln-Oakes Nursery, Bismarck, ND			94				5	100	3	180	334	

IA/3/1-5	9058874	POPUL	poplar	05/09	90	90	PLBR		5	5	100	2	53	92	
	14392		Populus			91				5	100	4	76	126	
			USDA, ARS, Mandan, ND			92				5	100	4	49	98	
			Lincoln-Oakes Nuresery, Bismarck, ND			94				5	100	2	290	495	

IA/3/6-10	9058873	POPUL	poplar	05/09	90	90	PLBR		5	5	100	3	37	113	
	14390		Populus			91				1	20	5	30	60	
			USDA, ARS, Mandan, ND			92				5	100	4	49	98	
			Lincoln-Oakes Nursery, Bismarck, ND			94				5	100	3	180	334	

IA/4/1-5	9030611	POAL	w hite poplar	05/15	92	92	CONT (P)		5	4	80	4	48	50	
	ND-3796		Populus alba			93				5	100	2	116	113	
			Turner Co., SD			94				4	80	3	191	179	
			USDA, SCS, PMC, Bismarck, ND												

IA/4/6-10	Raverdeau	POPUL	hybrid poplar	05/10	93	93	PLBR		5	5	100	3	36	69	
	9069085		Populus			94				5	100	3	119	191	
			Lee Nursery, Fertile, MN			95				5	100	2	243	385	

IA/5/1-5	Theves	POPUL	hybrid poplar	05/10	93	93	PLBR		5	5	100	4	39	82	
	9069086		Populus			94				1	20	3	60	150	
			Lee Nursery, Fertile, MN			95				1	20	5	150	260	

IA/5/6-10	9069090	POTR	quaking aspen	05/15	93	93	PLBR		5	4	80	5	24	51	
			Populus tremuloideas			94				5	100	3	52	125	
			Lee Nursery, Fertile, MN			95									

IA/6/1-5	9063146	POPUL	hybrid poplar	05/10	93	93	PLBR		5	5	100	6	7	33	
			Populus			94				5	100	4	69	142	
			PFRA, Indianhead, Saskatchewan			95				5	100	2	183	329	
IA/6/6-10	Assiniboine	POPUL	hybrid poplar	05/10	93	93	PLBR		5	5	100	4	15	54	
	9063147		populus			94				5	100	3	113	187	
			PFRA, Indianhead, Saskatchewan			95				5	100	3	241	347	
IA/7/1-5	9063141	PODE	eastern cottonwood	05/10	93	93	PLBR		5	5	100	3	49	104	
			Populus deltoides			94				5	100	2	172	273	
			Lincoln-Oakes Nursery, Bismarck, ND			95				5	100	3	246	417	severe leaf rust
IA/7/6-10	9069102	ULPU	Siberian elm	06/10	93	93	CONT		5	5	100	2	45	107	
	clone 009		Ulmus pumila			94				0	0				not winter hardy
			USDA, ARS, Mandan, ND												

IA/8/1-5	9016318	ULPU	Siberian elm	05/04	95	95	PLBR		5	5	100	3	77	92	
			Ulmus pumila												
			USDA, NRCS, Bridger, MT												
IA/8/1-10	9063104	ULPU	Siberian elm	5/08	91	91	CONT		10	2	20	5	15	53	
	clone 039		Ulmus pumila			92				2	20	4	82	105	
			Sargent Co., ND			93				2	20	6	172	152	
			USDA, ARS, Mandan, ND			94				0	0				not w inter hardy
IA/9/1-5	9069103	ULPU	Siberian elm	06/10	93	93	CONT (P)		5	4	80	4	38	69	w eed fabric squares on each tree
	clone 012		Ulmus pumila			94				0	0				not w inter hardy
			USDA, NRCS, PMC, Bridger, MT												
IA/9/1-5	9054820	ULPU	Siberian elm	05/04	95	95	PLBR		5	5	100	3	101	123	
			Ulmus pumila												
			USDA, ARS, PMC, Bridger,												

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IA/9/6-10	9069104	ULPU	Siberian elm	06/10	93	93	CONT (P)		5	5	100	4	33	70	
	clone 027		Ulmus pumila			94				5	100	4	67	87	
			USDA, ARS, Mandan, ND			95				5	100	3	160	179	

IA/10/1-5	9058899		supertree	05/08	91	91	CONT		5	5	100	5	35	123	
			Salix matsudana X alba			92				2	40	6	55	123	
			Austree, Inc., Pescadero, CA			93				2	40	5	85	152	
						94				0	0				not w inter hardy

IA/10/6-10	'Homestead'	ULPU	Siberian elm	06/10	93	93	CONT (P)		5	4	100	4	31	85	
	9069108		Ulmus pumila			94				3	60	4	25	58	
	14444		USDA, ARS, mandan, ND			95				3	60	4	70	127	

IB/01/1-10	ND-1729	LAS*	Siberian larch	5/16	78	78	PLBR	1-0	10	9	90	3	21	62	
	9005979		Larix sibirica			79				10	100		22	44	

			NDFS State Nursery, Towner, ND			80				10	100	4	33	55	
						82				8	80	8	29	46	
						83				6	60	7	33	74	1 mow ed off, moderate rodent damage
						84				6	60	4	39	91	
						87				6	60	6	90	197	
						92				5	50	4	234	348	

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IB/02/1-10	SL-383-T	LAS*	Siberian larch	5/17	78	78	PLBR	1-0	10	10	100	3	17	68	
	Pallet No.		Larix sibirica			79				10	100		24	49	
	2392		Denbigh Exp. Forest			80				10	100	4	43	62	
	9005976		USDA, FS, Shelterbelt Lab.,			82				9	90	6	47	69	
			Bottineau, ND			83				9	90	6	61	119	1 mow ed off, moderate rodent damage
						84				8	80	2	78	170	
						87				8	80	2	181	306	
						92				8	80	8	301	499	

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IB/03/1-10	ND-1765	LASI*	Siberian larch	05/17	78	78	PLBR	2-0	10	10	100	3	17	44	
	9005980		Larix sibirica			79				10	100		33	48	
			USDA, FS, Shelterbelt Lab.,			80				10	100	4	55	81	
			Bottineau, ND			82				10	100	5	63	122	
						83				10	100	5	79	148	moderate rodent damage, best
						84				10	100	4	110	187	accession of larch
						87				9	90	2	214	334	
						92				9	90	2	316	534	

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IB/04/1-5	ND-1763	PIPO*	ponderosa pine	05/16	78	78	CONT	1-1	5	5	100	1	14	53	
	9006043		Pinus ponderosa			79				4	80		14	34	
			757-5 Todd Co., SD			80				5	100	4	46	61	
			USDA, FS, Shelterbelt Lab.,			82				4	80	7	74	134	
			Bottineau, ND			83				4	80	5	88	111	animal damage
						84				4	80	3	116	149	
						87				3	60	3	158	228	

						92				3	60	3	277	427	
IB/04/6-10	ND-1565	PIAR	bristle cone pine	05/16	78	78	CONT	1-1	5	5	100	3	14	17	
	9006036		Pinus aristata			79				5	100		20	19	
			USDA, FS, Shelterbelt, Lab			80				5	100	5	32	23	
			Bottineau, ND			82				1	20	5	65	90	
						83				4	80	8	29	24	mow er damage on plt 3
						84				2	40	3	58	55	
						87				2	40	6	70	62	
						92				1	20	5	165	120	
IB/05/1-5	9057413	PIPO	ponderosa pine	05/11	88	88	CONT		5	2	40	4	10	33	
			Pinus ponderosa			89				2	40	4	20	42	
			Gelndive, MT			90				4	80	4	24	45	
			NDFS			92				4	80	4	38	66	
						94				4	80	4	92	129	
IB/05/6-10	9063127	FRAM	w hite ash	05/15	92	92	PLBR		5	5	100	3	21	56	

			Fraxinus americana			93				5	100	4	33	73	
			Wisconsin			94				5	100	4	36	74	
			Lincoln-Oakes Nursery, Bismarck, ND												
IB/06/1-5	9069105	ULPU	Siberian elm	06/10	93	93	CONT(P)		5	5	100	3	56	110	
	427		Ulmus pumila			94				4	80	4	38	76	
			USDA, ARS, NGPRL, Mandan, ND			95				4	80	4	131	150	
IB/06/6-10	9069106	ULPU	Siberian elm	06/10	93	93	CONT (P)		5	5	100	4	30	56	
	11737		Ulmus pumila			94				5	100	3	45	69	
			Harbin, China			95				5	100	3	114	123	
			USDA, ARS, NGPRL, Mandan, ND												
IB/07/1-5	9069107	ULPU	Siberian elm	06/10	93	93	CONT(P)		5	4	80	4	35	55	
	408		Ulmus pumila			94				3	60	3	55	68	
			USDA, ARS, NGPRL, Mandan, ND			95				3	60	3	175	163	

IB/07/6-10	9063098	JUNI	black w lanut	05/08	91	91	PLBR		5	4	80	5	8	36	
			Juglans nigra			92				2	40	5	20	48	
			Big Sioux Nursery, Watertwon, SD			93				2	40	4	45	75	
						94				0	0				not hardy

IB/07/6-10	ND-3803	POAL	w hite poplar	05/24	94	94	CONT		5	5	100	3	62	96	
	9030612		Populus alba			95				4	80	2	189	199	
			USDA, PMC, Bismarck, ND												

IB/08/1-5	ND-3825	ACSA2	silver maple	05/01	83	83	PLBR		5						
	9034904		Acer saccharinum			84				5	100	5	8	39	
			Bismarck, ND			85				0					
						86				5	100	3			
						87				5	100	4	75	121	
						89				5	100	4	163	193	
						92				5	100	6	147	134	
						94				0	0				not w inter hardy

IB/08/6-10	ND-3886	ACSA2	silver maple	06/01	83	83	CONT		5						
	9003519		Acer saccharinum			84				4	80	4	43	101	
			Bismarck, ND			85				3	60	6	43	82	
						87				3	60	3	200	222	
						89				3	60	3	268	353	
						92				2	40	7	138	145	
						94				0	0				not w inter hardy
IB/09/1-5	ND-3925	PRPE3	hardy peach	05/07	86	86	PLBR	2-0	5	2	40	3	70	68	
	9039998		Prunus persica			87				2	40		180	118	
			Meade Co., SD			88				2	40	5	140	145	
			USDA, SCS, PMC, Bismarck, ND			90				2	40		170	165	new sprouts
						92				2	40	7	152	160	
						94				0	0				not hardy
IB/9/1-5	9063148	PHSA	corktree	05/04	95	95	CONT		5	5	100	4	22	40	
			Phellodendron												

			sachalinense													
			Clay Co., MN													
IB/09/6-10	ND-21	VILE	nannyberry	05/07	86	86	PLBR	2-0	5	5	100	3	15	46		
	9034900		Viburnum lentago			87				5	100	3	21	58		
			USDA, ARS, Mandan, ND			88				5	100	3	45	82		
			USDA, SCS, PMC, Bismarck, ND			90				5	100	3	82	115		
						92				5	100	3	129	144		
						95				5	100	2	198	225	fruit on 1,2,4,5	
IB/10/1-5	9069081	TICO	littleleaf linden	05/10	93	93	CONT (P)		5	5	100	5	21	39	WEEDY	
			Tilia cordata			94				5	100	4	18	37		
			Lee Nursery, Fertile, Mn			95				5	100	4	65	86		
IB/10/6-10	9063123	ULJA80	Japanese elm	05/15	92	92	CONT(P)		5	3	60	4	53	52		
			Ulmus japonica			94				3	60	3	127	137		
			Manchuria													
			PFRA,													

Indianhead,
Saskatchewan

W01/1-10	ND-313	LOTAS*	red tatarian honeysuckle	05/17	78	78	PLBR	2-0	10	9	90	1	47	48	
	9005996		Lonicera tatarica sibirica			79				9	90		62	72	
	PI-477999		USDA, ARS, Cheyenne, WY			80				10	100	3	98	73	
			USDA, SCS, PMC, Bismarck, ND			82				10	100	4	162	136	
						83				10	100	3	181	166	good fruit
						84				10	100	4	225	167	moderate-severe insect
						87				10	100	3	172	204	defoliation, honeysuckle aphid
						92				10	100	5	206	224	

W01/11-20	ND-1730	LOTAS*	red tatarian honeysuckle	05/17	78	78	PLBR	2-0	10	10	100	1	48	51	
	9005994		Lonicera tatarica sibirica			79				10	100		66	84	
			Lincoln-Oakes Nursery, Bismarck, ND			80				10	100	1	104	90	
						82				10	100	4	181	160	
						83				10	100	3	204	197	good vigor

						84				10	100	5	234	200	slight insect defoliation
						87				10	100	3	198	218	good fruit production,
						92				9	90	6	194	216	snow damage, aphid damage

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W/02/1-10	ND-628	ELCO*	silverberry	05/17	78	78	PLBR	2-0	10	10	100	1	29	52	
	9005877		Elaeagnus commutata			79				10	100		83	94	
			Wells Co., ND			80				10	100	1	124	97	
						82				10	100	5	151	145	
						83				10	100	5	192	170	suckering
						84				10	100	4	217	159	snow damage
						87				10	100	4	177	182	
						92				7	70	6	134	180	

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W/02/11-20	'Bighorn'	RHTR	skunkbush sumac	05/17	78	78	PBLR	2-0	10	7	70	2	52	43	
	WY-843		Rhus trilobata			79				10	100		107	78	
	9004646		Bighorn Co., WY			80				10	100	3	152	82	
	PI-483445		USDA, SCS, PMC, Bismarck, ND			82				10	100	3	232	153	

						83				10	100	3	272	193	leaf spot, snow damage on 1,2,3
						84				10	100	3	350	185	
						87				10	100	2	360	224	
						92				10	100		260	240	

II/03/1-10	ND-26	LONIC	honeysuckle	05/02	79	79	PLBR	2-0	10	10	100		35	42	
	9011852		Lonicera			80				10	100	5	60	51	
			USDA, ARS, Mandan, ND			81				10	100		79	87	
						83				10	100	4	136	145	leaf spot
						84				10	100	4	149	164	witches broom on pits 3,5,8
						88				10	100	4	230	213	moderate insect defoliation,
						93				10	100	5	320	274	grasshoppers, aphid damage

II/03/11-15	ND-452	LOXYM*	honeysuckle	05/02	79	79	PLBR	2-0	5	5	100		37	39	
	9019978		Lonicera xylosteum mollis			80				5	100	3	71	47	
			USDA, ARS, Cheyenne, WY			81				5	100		99	88	

			USDA, SCS, PMC, Bismarck, ND			83				5	100	4	169	168	w itches broom on 1,2,3
						84				5	100	3	198	168	slight leaf spot, leaf
						88				5	100	5	230	203	blight, aphid damage
						93				5	100	6	282	232	

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II/03/16-20	ND-170	COIN	cotoneaster	05/09	90	90	CONT		5						
	9005728		Cotoneaster integerrima			91				4	80	6	24	46	
			USDA, SCS, PMC, Bismarck, ND			92				4	80	6	46	42	
						94				4	80	4	126	90	

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II/04/1-10	'Bighorn'	RHTR	skunkbush sumac	05/02	79	79	PLBR	2-0	10	10	100		30	34	
	WY-843		Rhus trilobata			80				10	100	5	73	43	
	9004646		Bighorn Co., WY			81				10	100		78	64	
	PI-483445		USDA, SCS, PMC, Bismarck, ND			83				10	100	3	181	137	few pests
						84				10	100	3	215	140	
						88				10	100	4	330	191	

						93				10	100	4	420	254	
II/04/11-20	PM-ND-283	PRTE80	Russian almond	05/08	80	80	PLBR	2-0	10	10	100	5	23	68	
	9006079		Prunus tenella			81				7	70		28	44	
	PI-540442		ND Game & Fish Dept.			82				10	100	4	54	69	
			USDA, SCS, PMC, Bismarck, ND			83				8	80	4	119	108	few pests
						84				10	100	4	115	112	
						86				9	90	4	159	136	
						88				9	90	3	182	142	
						89				9	90	4	127	146	
						94				9	90	4	200	130	

II/05/1-10	ND-11	LOMA6	amur honeysuckle	05/07	81	81	CONT	0-1	10	10	100		20	19	
	9005993		Lonicera maackii			82				10	100	4	42	44	
	PI-477998		Res. Sta., Morden, MB, Canada			83				6	60	6	50	54	slight insect
						84				10	100	4	64	56	defoliation (grasshoppers)
						86				10	100	4	127	139	

						87				10	100	3	260	170	
						88				10	100	4	225	172	
						90				10	100	4	173	174	
						95				10	100	4	217	258	

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I/05/11-20	'Centennial	'COIN	cotoneaster	05/08	85	85	PLBR	2-0	10						no data
	ND-177		Cotoneaster integerrima			86				8	80	4	69	68	
	9005729		Lincoln-Oakes Nursery, Bismarck, ND			87				7	70	3	121	100	
	PI-113095					88				10	100	4	99	90	
						89				8	80	4	137	106	
						91				7	70	5	161	130	
						94				7	70	4	230	233	

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I/06/1-5	ND-995	SAHU	prairie w willow	05/12	82	82	PLBR	1-2	5	4	80	4	58	66	
	PI-303584		Salix humilis			83	CONT			4	80	4	155	125	moderate grasshopper damage
			P.I. Station, Ames, IA			84				5	100	4	192	124	
						86				5	100	3	315	245	

						88				5	100	4	390	285	
						91				3	60	8	187	183	
						94				0	0				not drought hardy
W/06/1-10	9069128	LOTA	tatarian honeysuckle	05/11	94	94	PLBR		10	10	100	3	30	36	
			Lonicera tatarica			95				10	100	4	75	76	
			Big Sioux Nursery, Watertown, SD												
W/06/6-10	PI-370126	SAFR	crack willow	05/12	82	82	PLBR-	0-1	5	5	100	4	33	48	
			Salix fragilis			83	CONT			4	80	3	106	133	good growth, few pests
			P.I. Station, Glenn Dale, MD			84				5	100	3	184	170	
						86				5	100		410	319	
						88				5	100	3	416	357	
						91				4	80	8	171	224	
						94				0	0				not drought hardy
W/07/1-10	ND-624	PTTR	common hoptree	05/12	82	82	PLBR	2-0	10	9	90	5	24	33	

	9006094		Ptelea trifoliata Ramsey Co., ND			83				9	90	3	37	64	good grow th
			USDA, SCS, PMC, Bismarck, ND			84				10	100	3	50	79	
						86				10	100	4	174	148	
						88				10	100	5	234	175	
						91				10	100	5	188	189	
						94				0	0				not drought hardy
W/08/1-5	9063142	PRUNU	Japanese cherry	05/10	93	93	PLBR		5	5	100	4	37	62	
			Prunus			94				5	100	4	52	79	
			Bottineau FEP, ND			95				4	80	4	78	90	
			Lincoln-Oakes Nursery, Bismarck, ND												
W/09/1-10	'Homestead'	CRAR	Arnold haw thorn	05/09	84	84	CONT	0-2	10	10	100	4	20	10	
	ND-20		Crataegus arnoldiana			86				10	100	4	52	82	
	9005731		USDA, SCS, PMC, Bismarck, ND			88				10	100	3	117	146	

	PI-503530					90				10	100	4	122	182	
						93				9	90	3	190	270	
II/10/1-10	SD-131	PRPA5	mayday	05/08	85	85	PLBR	2-0	10						no data
	9006073		Prunus padus			86				10	100	3	46	85	
	PI-536048		Brookings Co., SD			87				10	100	3	70	142	
			USDA, SCS, PMC, Bismarck, ND			89				10	100	4	184	233	
						91				3	30	5	170	265	
						94				3	30	4	335	430	
II/10/6-10	9057438	HAHA	Siberian salt tree	05/11	94	94	CONT		5	1	20	3	10	35	
			Halimodendron halidendron			95				4	80	4	19	40	
			PFRA, Indian head, Saskatchewan												
II/01/1-5	'Midwest'	MABAM8	Manchurian crabapple	05/17	78	78	PLBR	2-0	5	3	60	2	16	60	
	9006003		Malus baccata mandshurica			79				5	100		27	64	
	PI-478000		Echo			80				5	100	3	58	85	

			Manchuria/Res. Sta.												
			Morden, MB, Canada			82				5	100	3	144	169	
			USDA, SCS, PMC, Bismarck, ND			83				5	100	2	183	211	fall webworm on 1, few
						84				5	100	4	236	260	pests, good vigor,
						87				5	100	3	288	347	snow damage on 1,2,3
						92				2	40	8	182	222	

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III/01/6-10	'Red	MABA*	flowering crabapple	05/17	78	78	PLBR	2-0	5	5	100	2	48	66	
	Splendor'		Malus X			79				5	100		76	117	
	9006004		Lee Nursery, Fertile, MN			80				5	100	2	108	143	
						82				5	100	3	181	256	
						83				5	100	3	214	278	good growth, good
						84				5	100	3	262	333	fruit production, few
						87				5	100	2	314	373	pests, snow damage on 1,2;
						92				5	100	6	283	341	fall webworm on 3,5

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III/02/1-5	ND-1731	MABA*	Siberian crabapple	05/17	78	78	PLBR	2-0	5	4	80	2	58	68	
	9006001		Malus baccata			79				5	100		84	95	
			Lincoln-Oakes Nursery, Bismarck, ND			80				5	100	3	125	125	
						82				5	100	3	178	249	
						83				5	100	2	228	321	good growth & vigor, few pests, fall webworm on 1,4,5
						84				5	100	2	309	329	
						87				5	100	3	323	424	
						92				5	100	6	281	417	

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III/02/6-10	'McDermid'	PYUS*	Ussurian pear	05/17	78	78	PLBR	2-0	5	5	100	6	27	76	
	ND-14		Pyrus ussuriensis			79				5	100		56	111	
	9006095		Harbin, Manchuria/Res. Sta. Morden, MB, Canada			80				5	100	1	91	139	
	PI-478004					82				5	100	3	195	272	
			USDA, SCS, PMC, Bismarck, ND			83				5	100	1	243	335	
						84				5	100	2	282	377	good growth & vigor
						87				5	100		377	482	
						92				5	100	6	331	402	snow damage on 4

II/03/1-5	'Freedom'	LOKO	honeysuckle	05/09	90	90	PLBR		5	5	100	5	32	34	
	9057424		Lonicera korolkow ii			91				5	100	4	44	50	
			Univ. of MN			92				5	100	3	101	94	
						94				5	100	3	200	186	

II/03/6-10	9063143	LOTA	tatarian honeysuckle	05/10	93	93	PLBR		5	5	100	4	33	43	
			Lonicera tatarica			94				5	100	3	33	54	
			low a			95				5	100	4	66	85	
			Lincoln-Oakes Nursery, Bismarck, ND												

II/03/11-15	9008041	AMFR	false indigo	05/06	87	87	PLBR		5	4	80		41	51	
			Amorpha fruticosa			88				5	100	5	84	64	
			USDA, SCS, PMC Aberdeen, ID			89				5	100	5	94	81	
						91				5	100	4	161	102	
						93				5	100	3	212	132	

II/03/16-20	9069080	LOTA	red tatarian honeysuckle	05/10	93	93	PLBR		5	5	100	4	26	35	
	Arnolds Red		Lonicera tatarica			94				5	100	4	39	59	
			Lee Nursery, Fertile, MN			95				5	100	3	69	95	
II/04/1-5	'Konza'	RHAR	aromatic sumac	05/06	87	87	PLBR		5	4	80		51	77	
	PI-477981		Rhus aromatica			88				4	80	3	105	95	
			USDA, SCS, PMC, Manhattan, KS			89				4	80	4	116	114	
						91				4	80	3	175	134	
						93				4	80	2	292	192	
II/04/6-15	'Scarlet'	PRFR	Mongolian cherry	05/09	90	90	PLBR		10	9	90	3	19	49	
	PI-478003		Prunus fruticosa			91				9	90	5	25	41	
			USDA, SCS, PMC, Bismarck, ND			92				9	90	4	40	52	
						94				9	90	4	68	71	
II/04/16-20	ND-83	SYVI	late lilac	05/11	88	88	PLBR	2-0	5	2	40	6	30	53	

	9006228		Syringa villosa			89				2	40	6	13	33	
	PI-540443		USDA, SCS, PMC, Bismarck, ND			90				5	100	5	21	34	
			Lincoln-oakes Nursery, Bismarck, ND			92				3	60	4	57	58	
						94				3	60	3	128	135	

III/05/1-10	'Sakakaw ea'	SHAR	silver buffalberry	05/09	90	90	PLBR		10	3	30	3	22	68	
	ND-10		Shepherdia argentea			91				4	40	4	16	59	
	PI-478005		USDA, SCS, PMC, Bismarck, ND			92				8	80	4	28	53	
						94				8	80	3	91	112	

III/05/11-15	'Magenta'	MALUS	crabapple	05/15	92	92	PLBR		5	5	100	5	16	34	
	PI-514275		Malus			93				4	80	3	50	92	
			USDA, SCS, PMC, E Langsing, MI			94				5	100	3	68	111	

III/06/6-10	ND-1336	PRVI	chokecherry	05/17	78	78	PLBR	2-0	5	5	100	2	28	74	
	9006088		Prunus virginiana			79				5	100		98	154	

			Mercer Co., ND			80				5	100	2	181	196	
						82				5	100	3	259	313	
						83				5	100	2	327	349	
						84				5	100	2	252	368	slight powdery mildew, good vigor
						87				5	100	2	401	441	webworm 1,2,4,5
						92				5	100	3	500	532	

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III/07/1-5	ND-1732	PRVI	chokecherry	05/17	78	78	PLBR	2-0	5	5	100	2	18	67	
	9006090		Prunus virginiana			79				5	100		77	141	
			Lincoln-Oakes Nursery, Bismarck, ND			80				5	100	3	112	169	
						82				5	100	4	247	293	
						83				5	100	4	317	331	fall webworm
						84				5	100	3	344	352	slight aphid damage
						87				5	100	4	514	405	shot-hole, leaf blight
						92				4	80	4	322	480	

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III/07/6-10	'Schubert'	PRVI	chokecherry	05/17	78	78	PLBR	2-0	3	2	66	5	22	39	
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	9012608		Prunus virginiana			79				2	66		20	30	
			USDA, ARS, Mandan, ND			80				2	66	7	53	75	
			Lincoln-Oakes Nursery, Bismarck, ND			82			5	5	100	6	116	169	
						83				5	100	5	145	198	slight fall w ebw orm, w ebw orm on 6,9,10
						84				5	100	4	171	275	
						87				5	100	4	237	358	
						92				5	100	5	264	378	

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III/08/1-5	ND-1134	PRAM	plum	05/08	85	85	PLBR	2-0	5						no data
	9047203		Prunus americana			86				5	100	8	14	40	
			miller, SD			87				3	60	4	57	90	
			USDA, SCS, PMC, Bismarck, ND			89				3	60	5	107	125	
						91				2	40	4	200	173	
						94				2	40	4	260	242	

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III/08/6-10	ND-629	ACGI	amur maple	05/02	79	79	PLBR	2-0	5	5	100		31	47	
	9005645		Acer ginnala			80				0					

	PI-477992		Res. Sta., Morden, MB, Canada			81				4	80		39	58	
						83				4	80	3	184	183	
						84				4	80	4	301	229	
						88				4	80	4	395	328	
						93				3	60	5	400	367	

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III/09/1-5	ND-1873	ACGI	amur maple	05/02	79	79	PLBR	2-0	5	5	100		49	66	
	9005648		Acer ginnala			80				5	100	3	86	91	
			Lincoln-oakes Nursery, Bismarck, ND			81				5	100		128	132	
						83				5	100	2	220	227	good seed production
						84				5	100	3	305	267	
						88				5	100	4	402	358	
						93				5	100	4	306	302	

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III/09/6-10	ND-686	SYAMJ*	perkin lilac	05/02	79	79	PLBR	2-0	5	5	100		22	71	
	9006225		Syringa pekinensis			80				2	40	7	45	81	
	PI-478008		ND Game & Fish Dept.			81				2	40		47	85	

						83					3	60	5	102	117	
						84					5	100	5	93	87	
						88					3	60	4	252	253	
						93					3	60	4	307	303	
III/10/1-5	9069129	PRMA	Amur chokecherry	05/11	94	94	PLBR		5	5	100	4	20	66		
			Prunus maackii													
			Big Sioux Nursery, Watertown, SD													
N/01/1-5	SD-156	FRPE	green ash	05/17	78	78	PLBR	2-0	5	5	100	1	16	79		
	9005890		Fraxinus pennsylvanica			79					5	100		39	111	
			Deuel Co., SD			80					5	100	2	68	134	
						82					5	100	3	171	232	
						83					5	100	3	221	296	slight leaf scorch
						84					5	100	3	245	328	
						87					5	100	3	262	432	snow damage on 1
						92					5	100	4	270	482	

N/01/6-10	ND-1734	FRPE	green ash	05/17	78	78	PLBR	2-0	5	5	100	2	11	63	
	9005891		Fraxinus pennsylvanica			79				5	100		31	95	
			Lincoln-Oakes Nursery, Bismarck, ND			80				5	100	4	57	113	
						82				5	100	4	143	222	
						83				5	100	4	173	268	competition from shelterbelt at north end
						84				5	100	4	195	313	
						87				5	100	4	217	421	
						92				5	100	5	252	427	

N/02/1-5	'Cardan'	FRPE	green ash	05/17	78	78	PLBR	2-0	5	5	100	2	9	71	
	MDN-12002		Fraxinus pennsylvanica			79				5	100		52	105	
	9005895		Wibaux Co., MT			80				5	100	3	91	154	
	PI-469226		USDA, ARS, Mandan, ND			82				5	100	3	228	308	
						83				5	100	2	255	348	good vigor
						84				5	100	3	298	420	
						87				5	100	3	289	552	
						92				5	100	3	332	685	

N/02/6-10	ND-1759	FRPE	green ash	05/17	78	78	PLBR	2-0	5	5	100	1	12	77	
	9005893		Fraxinus pennsylvanica			79				5	100		48	124	
			SD-156 X MDN-12002			80				5	100	3	93	158	
			USDA, SCS, PMC, Bismarck, ND			82				5	100	4	176	246	
						83				5	100	3	242	326	competition from shelterbelt at north end
						84				5	100	3	271	408	
						87				5	100	3	275	481	
						92				5	100	3	312	580	

N/03/1-5	ND-647	FRNI	black ash	05/17	78	78	PLBR	2-0	5	5	100	1	4	28	
	9005887		Fraxinus nigra			79				5	100		13	58	
			Res. Sta., Morden, MB, Canada			80				5	100	6	37	83	
						82				5	100	4	126	243	
						83				5	100	4	147	319	heat stress
						84				5	100	4	127	347	leaf scorch
						87				5	100	3	171	562	sun scald

						92				5	100	7	170	463	
N/03/6-10	ND-1432	AEGL	Ohio buckeye	05/17	78	78	PLBR 2-0		5	3	60	8	1	7	
	9005658		Aesculus glabra			79				3	60		4	14	
			Res. Sta., Morden, MB, Canada			80				3	60	9	14	12	
						82				1	20	6	45	65	
						83				1	20	6	50	70	
						84				1	20	6	100	100	
						87				1	20	6	190	165	
						92				1	20	5	240	220	
N/04/1-5	ND-1879	GLSI	honeylocust	05/08	80	80	PLBR-	2-1	5	1	20	9	10	15	
	9011850		Glenditsia triacanthos			81	CONT			2	40		40	25	
	PI-503531		Woodward, OK			82				5	100	4	43	68	
			USDA, ARS, Mandan, ND			83				5	100	2	75	118	good vigor
						84				5	100	3	98	174	
						86				5	100	3	229	276	

						89				4	80	4	248	391	
						95				5	100	4	499	530	
N/05/1-5	9063116	FRNI	black ash	05/11	94	94	CONT		5	5	100	4	8	38	
			Fraxinus nigra			95				5	100	4	27	44	
			Itasca State Park, MN												
N/06/1-5	9063115	FRPE	green ash	05/11	94	94	CONT		5	5	100	3	22	53	
			Fraxinus pennsylvanica			95				5	100	3	45	100	
			Itasca State Park, MN												
N/07/1-5	ND-541	ELAN	Russian olive	05/17	78	78	PLBR	2-0	5	5	100	1	88	80	
	9005868		Elaeagnus angustifolia			79				5	100		185	166	
			Haakon Co., SD			80				5	100	4	251	236	
						82				5	100	3	390	360	
						83				5	100	3	479	476	good vigor and growth
						84				5	100	3	522	522	
						87				5	100	3	395	575	

					94					0	0				
N/07/1-5	9019624	ULJA80	Japanese elm	05/11	94	94	CONT		5	4	80	4	30	42	
	ND-989		Ulmus japonica			95				5	100	3	84	111	
			USDA, ARS, Mandan, ND												
N/07/6-10	ND-1843	ELAN	Russian olive	05/08	80	80	PLBR	2-0	5	5	100	5	45	47	
	9011840		Elaeagnus angustifolia			81				5	100		45	68	
			Res. Sta., Morden, MB, Canada			82				5	100	4	144	153	
						83				5	100	4	230	214	shelterbelt competition on south end
						84				5	100	4	317	254	
						86				5	100	3	374	334	
						94				0	0				
N/08/1-10	'Oahe'	CEOC	hackberry	05/08	80	80	PLBR	2-0	10	10	100		15	61	
	MDN-12003		Celtis occidentalis			81				9	90		2	14	
	9005725		USDA, ARS, Mandan, ND			82				8	80	6	40	48	

	PI-476982					83				8	80	6	57	92	
						84				7	70	4	89	139	
						86				4	40	3	279	313	
						89				5	50	4	264	357	
						95				5	50	4	435	580	

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N/09/1-10	SD-75	CEOC	hackberry	05/07	81	81	PLBR	2-0	10	10	100		2	37	
	9005713		Celtis occidentalis			82				7	70	6	28	44	
			Potter Co., SD			83				6	60	3	87	92	
						84				7	70	5	106	124	
						85				6	60	4	204	181	
						87				7	70	4	247	317	
						90				7	70	4	280	374	
						95				7	70	3	386	601	

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N/10/1-5	ND-3890	ELAN	Russian olive	06/01	83	83	PLBR		5						
	9035200		Elaeagnus angustifolia			84				5	100	4	73	91	
			Law yer Nursery, Plains, MT			85				4	80	3	130	145	

						87				4	80	4	276	300	
N/10/6-10	9057410	CEOC	hackberry	05/11	88	88	CONT		5	2	40	8	5	5	
			Celtis occidentalis			89				1	20	8	5	15	
			Bottineau Co., ND			90				3	60	8	5	20	
			NDFS			92				4	80	7	14	15	

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