

Fugle's Mill Demonstration Site 1985-2006



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Helping People Help the Land

Cover photo: Ken Luttner, Mike Knudson, and Dave Breitbach

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Fugle's Mill Demonstration Site (1985-2006)

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Introduction

Since the formation of the USDA Soil Conservation Service (SCS) in 1935, the agency has been actively involved in plant development. A number of regional nurseries were operated by SCS employees to produce grass seed and trees and shrubs for all types of conservation practices. Nationally, more than 425 million pounds of seed were harvested by SCS nurseries and Soil Conservation Districts in 1950. These SCS nurseries continued to produce large scale quantities of plants and seed until 1953. At that time many of the nurseries were converted to Plant Materials Centers (PMC). The mission of the Plant Materials Program is to provide plant solutions and technology to a wide range of conservation needs.

Objective

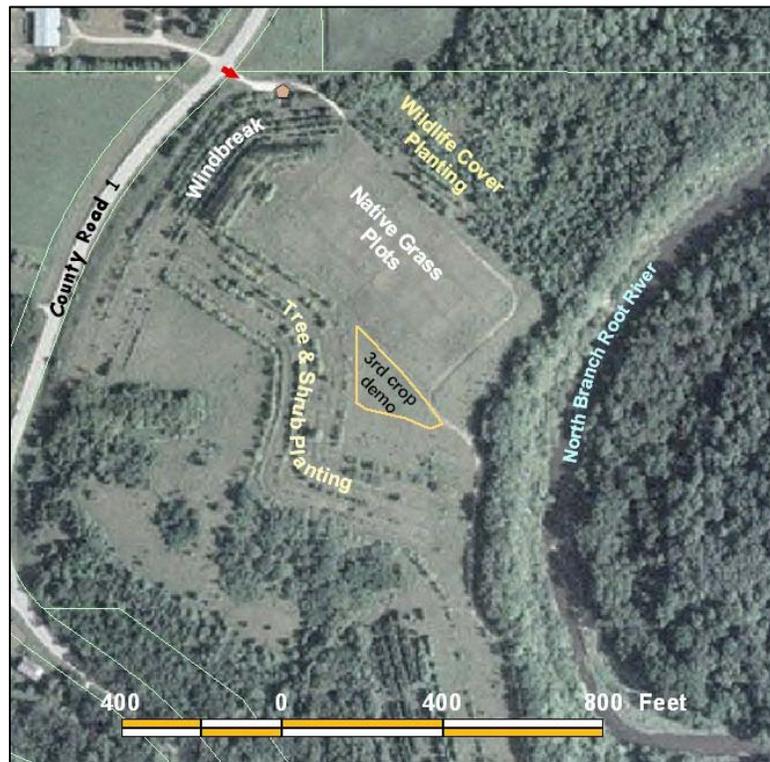
The objective is to assemble and evaluate woody plant materials for conservation use in the Northern Great Plains. The goal of this field evaluation planting is to provide, under culture and management, a diversity of long-term testing locations for the comparative field evaluation of new cultivars.

Cooperators

In 1985, the USDA Natural Resources Conservation Service, formerly the Soil Conservation Service, signed a project agreement with the Minnesota Department of Natural Resources, the Olmsted Soil and Water Conservation District, the Hiawatha Valley Resource Conservation and Development Area, and the Southeastern Minnesota Association of Soil and Water Conservation Districts.

Site Description

The Fugle's Mill Demonstration Site is located in the rolling hills southeast of Rochester, Minnesota. Fugle's Mill was built by Mathew Fugle and was in operation from 1850-1874. The demonstration site is across the road from the mill, situated between County Road 1 and the Root River. The legal description is Section 17, Township 105 N., Range 13 W., in Pleasant Grove Township. It is included in Major Land Resource Area 105, the Northern



Mississippi Valley Loess Hills. The elevation is about 1,280 feet above sea level.

Soils

The Mount Carroll series consists of deep, well-drained silt loams. The top 7 inches range from two to three percent organic matter, while the pH is 5.6-7.3. The subsoil pH is 5.1-6.0. Internal drainage is medium. Slopes on the site range from 2 to 18 percent. The soils are in Conservation Tree and Shrub Group 3.

Climate

Climate data is from the official weather station in Rochester, Minnesota. The mean annual precipitation is slightly less than 30 inches. In the period from 1985-1999, the annual precipitation varied from 21.4 inches in 1988 to 43.94 inches in 1990. Seventy-five percent of the annual precipitation falls during the growing season. The mean annual temperature is 43.6 degrees F. This site is in Plant Hardiness Zone 4a.

Warm-Season Grasses

The first phase of plantings made at the Fugle's Mill Demonstration Site was a study of nine species of warm-season grasses. These are grasses that complete most of their growth during the warm part of the year, generally late in the spring and in the summer. They have a different leaf anatomy and use the C₄ photosynthetic pathway to fix carbon. Photosynthesis is the process of combining carbon dioxide from the air with water from the soil to produce sugars and oxygen. C₄ plants are generally able to photosynthesize more productively under high temperatures and high light intensities, with greater water use efficiency. These conditions are typical of much of the tall-grass prairie region.

The nine species included 37 different seed sources (accessions) or cultivars which were planted



in a randomized complete block with three replications, plus an array (see photo on page 3). In the array, the entries were grouped by species. Within each species group, the entries were arranged by maturity, with the earliest maturing accession planted first and the latest maturing accession being last. Each plot was 12 feet wide by 60 feet long. The grasses were planted on June 4-5, 1985. In December

1985, the weather turned quite cold. The average mean temperature for that month was 6.3 degrees F. The normal December mean is 18.5 degrees F. A number of the accessions with southern origins suffered some winter injury. The plots were burned in the spring of 1990 and 1991. The border around each block was mowed annually. Each of the three randomized replications was evaluated from 1985-1991. The data collected included stand rating, vigor, weed contamination, and height. Forage production was calculated for the years 1987-1991. During this period, the precipitation was substantially above normal for 1990 (+14.36) and 1991 (+7.33). The precipitation was below normal for 1987 (-2.63), 1988 (-8.19), and 1989 (-6.85). A number of the entries showed great potential for biomass production. Forage quality was not evaluated at that time. On September 7, 2005, the array of grasses was evaluated for stand and vigor. It is likely that some of the selections had moved to different plots, filling in gaps left by poorly performing entries.

Big Bluestem

Seven entries of big bluestem were compared. The varieties (with origin) were ‘Bison’ (NDG-4), from central North Dakota; ‘Bonilla’ (SD-27), from east-central South Dakota; ‘Sunnyview’ (SD-43), from southeastern South Dakota; ‘Champ’, from Nebraska; ‘Pawnee’, from south-central Nebraska; ‘Kaw’, from east-central Kansas; and ‘Rountree’, from west-central Iowa.

Sunnyview and Pawnee had the highest average forage yields for the 5-year period, at 1.7 tons per acre. Stand ratings were good to excellent during the 5-year period, except for Kaw, which had winter injury. All entries generally had mature seed at the end of the growing season, except Pawnee, Rountree, and Kaw. At the end of the 2005 growing season, Sunnyview and Rountree had the best vigor.



Sand Bluestem

The varieties ‘Garden’ and ‘Goldstrike’ were compared. Both are from Nebraska. Garden was taller and more vigorous over the study period. The forage yield for Garden was twice that of Goldstrike. Garden averaged 1.7 tons per acre. Both entries had poor vigor after the 2005 growing season.

Indiangrass

Five entries of Indiangrass were evaluated. The varieties included 'Tomahawk' (ND-444), from south-central North Dakota and north-central South Dakota; 'Holt', from northeastern Nebraska; 'Oto', from Kansas-Nebraska; 'Osage', from Kansas-Oklahoma; and 'Rumsey', from Illinois. Oto, Osage, and Rumsey had winter injury following the year of establishment. Tomahawk and Holt were the only entries to make mature seed each year that phenology data was collected. Tomahawk and Holt had the highest 5-year average stand ratings. Holt produced 1.2 tons per acre and had the best stand at the end of the 2005 growing season.

Prairie Sandreed

Three entries of prairie sandreed were compared. These selections included PI-477007, from Michigan; ND-95 (Bowman), from southwestern North Dakota; and 'Goshen', from eastern Wyoming. The best performer in all categories was the selection from Michigan. All three entries appeared similar in plant phenology, and had mature seed at the end of the growing season. Forage production for the Michigan entry, with 0.6 tons per acre, was approximately twice that of the other two western selections. The Michigan selection had the best stand after the 2005 growing season.

Switchgrass

Ten entries of switchgrass were evaluated. The accessions included 'Dacotah' (NDG-965-98), from central North Dakota; 'Sunburst', from southeast South Dakota; 'Forestburg' (SD-149), from east-central South Dakota; Neb-28, from north-central Nebraska; 'Summer', from southeast Nebraska; 'Pathfinder', from Nebraska; 'Trailblazer', from Nebraska; 'Cave-in-Rock', from southern Illinois; 'Blackwell', from north-central Oklahoma; and NJ-50, from New Jersey. Summer had the highest average forage production in 1990 and 1991, and also for the 5-year period, at 2.2 tons per acre. Sunburst was the next highest forage producer, with 1.8 tons per acre for these same years. Dacotah had the earliest maturity with mature seed as early as August 29 in 1991. NJ-50 had the poorest 5-year average stand rating. After the 2005 growing season, there was very little difference in vigor between all the switchgrass entries.

Little Bluestem

Four cultivars of little bluestem were compared. The entries included 'Blaze', from Nebraska; 'Camper', from Nebraska; 'Aldous', from Kansas; and 'Cimmaron', a composite from a collection made in Kansas, Colorado, New Mexico and Oklahoma. The average forage yields (1.4 tons per acre) for the 5-year period were comparable, as were stand and vigor ratings. All four entries were late in maturity, due to their southern origin. None of the entries made mature seed during the 4-year period that plant phenology data were collected. Aldous and Cimmaron both showed winter injury the year after establishment. At the end of 2005, Cimmaron had the poorest stand.

Sideoats Grama

Four cultivars of sideoats grama were evaluated. The four entries included 'Killdeer', from western North Dakota; 'Pierre', from central South Dakota; 'Trailway', from northeast Nebraska; and 'Butte', from northeast Nebraska. Trailway had the highest average forage production for the 5-year period. Trailway also had some winter injury the year after establishment. Forage yields for all entries were low, i.e., less than 0.5 tons per acre, except in

1987. All cultivars had mature seed by the end of the growing season. Trailway had the best stand after the 2005 growing season.

Eastern Gamagrass

One entry of eastern gamagrass, K-24, from Kansas, was evaluated. Stand density averaged one plant per square foot, although all plots had large open areas between plants. Forage production was not good, averaging less than 0.5 tons per acre in 1990 and 1991. Some dead crowns were also identified in the plots in 1991. Limited seed culms were produced in the plots, though maturity was early and mature seed was documented in late August.

Caucasian Bluestem

One entry of Caucasian bluestem, PI-78758, from central Asia, was evaluated. Severe winter injury was documented the first year after establishment. The remaining plants did recover and the 5-year average forage yield was close to 1.5 tons per acre. More than 2.5 tons per acre were harvested in 1988. Mature seed was recorded at the end of the growing season during all years evaluated, except 1990. By 2005, this entry had died out.

Trees and Shrubs

One of the principal tasks of the Plant Materials Center has always been tree improvement. This has involved seed source studies, selection of superior plants, progeny testing, and the establishment of seed orchards. Some of the new tree and shrub species that the PMC began evaluating in the 1950s were grown from seed collected at the Agriculture and Agri-Food Canada Arboretum in Morden, Manitoba. Many new plants were made available to soil conservation districts for windbreaks from these Canadian collections.

In the spring of 1986, a selection of these promising woody plants was established in the Off-Center Evaluation Planting at Fugle's Mill. The PMC staff, with the assistance of the NRCS Area Office and State Office staff, as well as the Olmsted County Soil and Water Conservation District personnel annually added new plants until 1995. A complete list of all species and accessions that were planted is recorded in **Table 2**.

The trees and shrubs planted were provided by private nurseries and other USDA agencies. A number of the accessions came from other countries, often by way of the Plant Introduction Stations operated by the USDA Agricultural Research Service. In the period from 1986-1995, a total of 137 different accessions of 96 different species were planted. There were often great differences in performance between different accessions within a species. Only by observing these plants over a number of years at several locations, is it possible to find the best plants for conservation use.

Planting Plan

The plots were not randomized or replicated but systematically arranged for ease of evaluation and demonstration purposes. In Block I, the woody plants were planted on the contour in long rows. Block II consisted of shrubs; Block III poplars; while Block IV consisted of willows. Black walnut was planted as a border around Block I. Due to the sloping terrain, the land between the rows was left in the previous cover of grass and alfalfa.

Plot Maintenance

The grass strips between the tree rows have been mowed. For several years, a mechanical cultivator was used to control the grass growing around the trees. Starting in 1988, the herbicide Casaron® was applied each fall for several years. Damaged plants have been removed. Since the trees were first planted, conservationists' perceptions of what are desirable plants has changed. The use of the term 'invasive' has become very common, though not



all agree on the definition. Some of the woody plants established in the 1980s have spread by birds using the fruit. In May 2006, a work crew removed the autumn olive. The autumn olive plants were cut to the ground and treated with the herbicide, Garlon® and/or glyphosate.

Evaluations and Results

Information on planting date, survival, vigor, canopy width, and plant height were recorded starting in 1986. In the fall, measurements were taken on selected plants. The plants were evaluated annually until 1999. An evaluation schedule, based on year of planting, was followed for each accession. Species have remained the same since 1999. These plants are shown on **Table 3**.

In the 20 years since the planting was established, the extremes of temperature and precipitation, combined with the pressure from the competing grass cover, has had an effect on plant survival. One of the key measures of performance is plant vigor, which is a combination of plant form and plant health. In May 2006, a quick review of the trees was made. Some of the trees and shrubs are doing very well. The accessions that show better than average vigor are listed in **Table 1**.

Table 1: Best Performing Plants	
'Midwest' crabapple	9063143 red Tatarian honeysuckle
'Imperial' poplar	ND-3779 Siberian pea shrub
ND-3803 white poplar	'Meadowlark' forsythia
9063130 river birch	ND-1879 honey locust
ND-1729 Siberian larch	Clone C austree
9057413 ponderosa pine	'Streamco' willow
ND-2502 ponderosa pine	'Flame' Amur maple
9057426 Douglas fir	ND-629 Amur maple
9058862 tamarack	

Since 1973, the Bismarck PMC has released 14 varieties of woody plants. Most of those species were included in the planting. Information gathered from evaluation of these plants was used to help support their release. In recent years, some of the released plants have declined in vigor. The 'McDermant' Ussurian (Harbin) pear, 'Cardan' green ash, and 'Midwest' Manchurian crabapple continue to show average or better vigor.



Table 2. Planting Record of Woody Species at Fugle's Mill Demonstration Site (Study 38I340K Field Evaluation of Woody Plant Materials, Rochester, Minnesota)

<u>Scientific Name</u>	<u>Accession</u>	<u>Common Name</u>	<u>Year Planted</u>	<u>Year Removed</u>	<u>Origin/Source</u>
<i>Acer ginnala</i>	ND-629	Amur maple	1986		Asia/Morden, MB
	'Flame'	Amur maple	1986		Asia/PMC, Elsberry, MO
<i>Acer negundo</i>	9058864	boxelder	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Acer saccharinum</i>	ND-3825	silver maple	1986		Burleigh Co., ND
<i>Acer saccharum</i>	9063131	sugar maple	1993	1997	SD/Smith Nursery, Charles City, IA
<i>Aesculus glabra</i>	9047239	buckeye	1986		Bismarck, ND (Haas)
<i>Amelanchier alnifolia</i>	ND-3767	juneberry	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Amorpha fruticosa</i>	9047236	false indigo	1987		Burleigh Co., ND/Lincoln-Oakes Nursery, Bismarck, ND
	9008041	false indigo	1987		PMC, Aberdeen, ID
<i>Aronia melanocarpa</i>	323957	chokeberry	1988		Russia/ARS, Ames, IA
<i>Berberis koreana</i>	ND-3744	Korean barberry	1988		Asia/NDSU, Fargo, ND
<i>Betula nigra</i>	9063130	river birch	1993		MN Forestry Assn.
<i>Betula papyrifera</i>	9063129	paper birch	1993		MN Forestry Assn.
	9057405	paper birch	1988		Bottineau Co., NDFS Nursery, Towner, ND
<i>Caragana arborescens</i>	ND-3749	caragana	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Caragana pygmaea</i>	ND-2507	pygmy caragana	1988		Asia/Bottineau, ND
<i>Celtis occidentalis</i>	'Oahe'	hackberry	1986		SD/ARS, Mandan, ND
	ND-3756	hackberry	1986		Lincoln-Oakes Nursery, Bismarck, ND
	9057410	hackberry	1988		Denbigh, ND/NDFS, Towner, ND

Scientific Name	Accession	Common Name	Year Planted	Year Removed	Origin/Source
<i>Cornus amomum</i>	'Indigo'	silky dogwood	1986		PMC, Rose Lake, MI
<i>Cornus sericea</i>	ND-3754	redosier dogwood	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Corylus x</i>	9076683	hybrid hazel	1995	1997	Badgersett Nursery, Preston, MN
	9076684	hybrid hazel	1995	1997	Badgersett Nursery, Preston, MN
<i>Corylus americana</i>	9057409	American hazel	1988		Bottineau Co., ND/NDFS, Towner, ND
<i>Cotoneaster acutifolia</i>	ND-3751	Peking cotoneaster	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Cotoneaster integerrimus</i>	ND-177	European cotoneaster	1986		Asia/ARS, Cheyenne, WY
<i>Crataegus sp.</i>	ND-1567	native hawthorn	1988	1995	Wells Co., ND
<i>Crataegus x anomala</i>	'Homestead'	Arnold hawthorn	1988		Morden, MB
<i>Elaeagnus angustifolia</i>	ND-3759	Russian olive	1986	1995	Russia/Lincoln-Oakes Nursery, Bismarck, ND
	'King Red'	Russian olive	1987	1990	Russia/PMC, Tucson, AZ
<i>Elaeagnus umbellata</i>	'Elsberry'	autumn olive	1990	1993	China/PMC, Elsberry, MO
	'Redwing'	autumn olive	1986		China/PMC, Rose Lake, MI
	'Cardinal'	autumn olive	1986		China/PMC, Big Flats, NY
<i>Forsythia europeae x ovata</i>	'Meadowlark'	forsythia	1989		Arnold Arboretum/NDSU, Fargo, ND
<i>Fraxinus americana</i>	9063127	white ash	1992		WI/Lincoln-Oakes Nursery, Bismarck, ND
<i>Fraxinus nigra</i>	9063116	black ash	1995		Itasca State Park, MN
<i>Fraxinus pennsylvanica</i>	ND-3757	green ash	1986		Lincoln-Oakes Nursery, Bismarck, ND
	'Cardan'	green ash	1986		MT/ARS, Mandan, ND
	9063115	green ash	1995		Itasca State Park, MN

<u>Scientific Name</u>	<u>Accession</u>	<u>Common Name</u>	<u>Year Planted</u>	<u>Year Removed</u>	<u>Origin/Source</u>
<i>Gleditsia triacanthos</i>	ND-1879	honeylocust	1986		Woodward, OK
	9063124	honeylocust	1995	1999	Codington Co., SD/Big Sioux Nursery, SD
<i>Juglans nigra</i>	9063098	black walnut	1991		Big Sioux Nursery, Watertown, SD
<i>Larix laricina</i>	9058862	tamarack	1990		Chippewa Farms, MN
<i>Larix sibirica</i>	ND-1729	Siberian larch	1986		Asia/NDFS, Towner, ND
<i>Lonicera maackii</i>	ND-11	Amur honeysuckle	1987		Asia/Morden, MB
	'Cling-Red'	Amur honeysuckle	1987		Asia/PMC, Elsberry, MO
	'Rem-Red'	Amur honeysuckle	1987		Asia/Cape May, NJ
<i>Lonicera tatarica</i>	9069080	Tatarian honeysuckle	1993		Asia/Lee Nursery, Fertile, MN
	9063143	Tatarian honeysuckle	1993		Asia/Schumacher Berry Farm, MN
	9069128	Tatarian honeysuckle	1995		Asia/Big Sioux Nursery, Watertown, SD
	ND-3755	Tatarian honeysuckle	1986		Asia/Lincoln-Oakes Nursery, Bismarck, ND
<i>Lonicera tatarica sibirica</i>	ND-313	Tatarian honeysuckle	1986		Asia/ARS, Cheyenne, WY
<i>Lonicera xylosteoides</i>	'Hedge King'	honeysuckle	1988		Asia/Wedge Nursery, Albert Lea, MN
<i>Malus</i>	'Magenta'	crabapple	1992		PMC, Rose Lake, MI
<i>Malus baccata</i>	ND-3765	Siberian crabapple	1986		Asia/Lincoln-Oakes Nursery, Bismarck, ND
	'Red Splendor'	Siberian crabapple	1988		Lee Nursery, Fertile, MN
<i>Malus mandshurica</i>	'Midwest'	Manchurian crabapple	1986		Asia/Morden, MB
<i>Malus sargentii</i>	'Roselow'	Sargent's crabapple	1986	1992	PMC, Rose Lake, MI
<i>Morus rubra</i>	ND-2105	red mulberry	1988		Big Stone Co., MN
<i>Phellodendron sachalinense</i>	9063148	corktree	1995		Clay Co., MN shelterbelt

Scientific Name	Accession	Common Name	Year Planted	Year Removed	Origin/Source
<i>Picea abies</i>	ND-3791	Norway spruce	1986		Europe/U of M, St. Paul, MN
<i>Picea mariana</i>	9058847	black spruce	1989		U of Minnesota
<i>Pinus ponderosa</i>	9057413	ponderosa pine	1988		MT/NDFS, Bottineau, ND
	9047223	ponderosa pine	1986		NDFS Nursery, Towner, ND
<i>Platanus occidentalis</i>	9069088	sycamore	1993	1999	TEC, Osseo, MN
<i>Populus</i>	14390 (Canam)	hybrid Walker poplar	1991		ARS, Mandan, ND
	14392(Manitou)	hybrid Walker poplar	1991	1997	ARS, Mandan, ND
	'Theves'	hybrid poplar	1993	1999	Lee Nursery, Fertile, MN
	9063146	hybrid Walker poplar	1993	1997	PFRA, Indianhead, SK
	'Raverdeau'	hybrid poplar	1993	1998	Lee Nursery, Fertile, MN
	'Assiniboine'	hybrid poplar	1993	1997	PFRA, Indianhead, SK
<i>Populus alba</i>	ND-3803	white poplar	1986		Turner Co., SD/PMC, Bismarck, ND
<i>Populus canadensis eugenei</i>	'Imperial'	hybrid poplar	1986		PMC, Rose Lake, MI
	ND-3780	hybrid poplar	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Populus deltoides</i>	9063141	native cottonwood	1993	1998	Lincoln-Oakes Nursery, Bismarck, ND
<i>Populus deltoides x balsamifera</i>	Northwest	hybrid poplar	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Populus deltoides x nigra</i>	14271	Walker poplar	1991		ARS, Mandan, ND
	14272	Walker poplar	1991		ARS, Mandan, ND
	14273	Walker poplar	1991		ARS, Mandan, ND
	14274	Walker poplar	1991		ARS, Mandan, ND
<i>Populus deltoides siouxlandii</i>	ND-3761	Siouxland Cottonwood	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Populus robusta</i>	ND-3781	robusta poplar	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Populus tremuloides</i>	9069090	quaking aspen	1993		Lee Nursery, Fertile, MN

Scientific Name	Accession	Common Name	Year Planted	Year Removed	Origin/Source
<i>Prunus</i>	'Prairie Red'	select plum	1986		Hand Co., SD
	9063142	Japanese cherry	1993	1997	Lincoln-Oakes Nursery, Bismarck, ND
<i>Prunus americana</i>	514677	native plum	1990		PMC, Manhattan, KS
	ND-3753	native plum	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Prunus angustifolia</i>	9049970	chickasaw plum	1990		PMC, Manhattan, KS
<i>Prunus armeniaca</i>	ND-2470	apricot	1986		Lincoln-Oakes Nursery, Bismarck, ND
	ND-2102	apricot	1986		Asia/Hand Co., SD
<i>Prunus fruticosa</i>	'Scarlet'	Mongolian cherry	1986		Asia/Morden, MB
<i>Prunus maackii</i>	9069129	Amur chokecherry	1995	1999	Asia/Big Sioux Nursery, Watertown, SD
<i>Prunus padus</i>	SD-131	mayday	1986		Asia/Moody Co., SD
<i>Prunus pumila besseyi</i>	ND-3894	sandcherry	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Prunus tenella</i>	'Regal'	Russian almond	1986		ND Game & Fish/Lincoln-Oakes Nursery, Bismarck, ND
<i>Prunus tomentosa</i>	ND-3760	Nanking cherry	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Prunus virginiana</i>	'Schubert'	chokecherry	1986		ARS, Mandan, ND
	ND-1868	chokecherry	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Pseudotsuga menziesii</i>	9057426	Douglas fir	1986		U of M, St. Paul, MN
<i>Pyrus ussuriensis</i>	'McDermant'	Ussurian (Harbin) pear	1986		Manchuria/Morden, MB
<i>Quercus alba</i>	9069084	white oak	1993		Lee Nursery, Fertile, MN
<i>Quercus ellipsoidalis</i>	9069082	pin oak	1993		Lee Nursery, Fertile, MN

<u>Scientific Name</u>	<u>Accession</u>	<u>Common Name</u>	<u>Year Planted</u>	<u>Year Removed</u>	<u>Origin/Source</u>
<i>Quercus macrocarpa</i>	9057412	bur oak	1988	1995	Foster Co., ND/NDFS, Towner, ND
	K-1407	bur oak	1990	1994	PMC, Manhattan, KS
<i>Quercus robur</i>	9069089	English oak	1993		TEC, Osseo, MN
<i>Quercus rubra</i>	9069083	red oak	1993	1995	Lee Nursery, Fertile, MN
<i>Rhus aromatica</i>	'Konza'	aromatic sumac	1986	1992	PMC, Manhattan, KS
<i>Rhus trilobata</i>	'Bighorn'	skunkbush sumac	1986		Bighorn Co., WY
	'Autumn Amber'	skunkbush sumac	1987		
<i>Ribes odoratum</i>	ND-3763	golden currant	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Salix</i>	ND-3773	willow	1986		Norman Co., MN
<i>Salix acutifolia</i>	9047242	sharpleaf willow	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Salix alba</i>	ND-3772	white willow	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Salix alba</i> var. <i>chermesina</i>	9057447	red stem willow	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Salix alba</i> var. <i>vitellina</i>	ND-3769	golden willow	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Salix cotteti</i>	434285	Bankers dwarf willow	1986	1993	USDA, PMC, Quicksand, KY
<i>Salix matsudana</i> x <i>alba</i>	9058896 (C)	Austree	1990		Austree Inc., Pescadero, CA
	9058899	Austree	1991		Austree Inc., Pescadero, CA
	9058897	Austree	1991	1992	
<i>Salix pentandra</i>	Mich-433	laurel leaf willow	1986		Europe/PMC, Rose Lake, MI
	9057448	laurel willow	1986		
<i>Salix purpurea</i>	'Streamco'	purpleosier willow	1986		Europe/PMC, Big Flats, NY

Scientific Name	Accession	Common Name	Year Planted	Year Removed	Origin/Source
<i>Shepherdia argentea</i>	'Sakakawea'	silver buffaloberry	1986		Morden, MB
	ND-3764	silver buffaloberry	1986		Lincoln-Oakes Nursery, Bismarck, ND
<i>Syringa pekinensis</i>	ND-686	Pekin lilac	1986		Asia/Lincoln-Oakes Nursery, Bismarck, ND
<i>Syringa villosa</i>	'Legacy'	late lilac	1986		China/Morden, MB
<i>Thuja occidentalis</i>	ND-3787	northern white cedar	1986		U of M, St. Paul, MN
<i>Tilia cordata</i>	9069081	littleleaf linden	1993		Europe/Lee Nursery, Fertile, MN
<i>Ulmus japonica</i>	9063126	Japanese elm	1992	1998	Manchuria/PFRA, Indianhead, SK
<i>Ulmus parvifolia</i>	'Elsmo'	Chinese lacebark elm	1990	1992	Asia/PMC, Elsberry, MO
<i>Viburnum lentago</i>	ND-21	nannyberry	1986		ARS, Mandan, ND
<i>Viburnum opulus</i>	399414	European cranberry	1988		Yugoslavia/ARS, Ames, IA
<i>Viburnum trilobum</i>	9031856	American cranberrybush	1986		USDA, PMC, Rose Lake, MI
	9031878	American cranberrybush	1986		WI/USDA, PMC, Rose Lake, MI

Key to Table 3. Evaluation Data of Woody Species at Fugle's Mill Demonstration Site (Study 38I340K Field Evaluation of Woody Plant Materials, Rochester, Minnesota)

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

Table 3.

Project No.: 38I340K Field Evaluation of Woody Plant Materials, Rochester, Minnesota
Year of Record: 1998-1999

<u>PLOT</u>	<u>ACCESSION</u>	<u>PLANT</u>	<u>GENUS/SPECIES</u>	<u>TRANS</u>	<u>YR</u>	<u>YR</u>	<u>MATL</u>	<u>NO</u>	<u>NO</u>	<u>PCT</u>	<u>CAN</u>	<u>PLT</u>	<u>REMARKS</u>							
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>		<u>HT</u>						
I/1/1-20	ND-313 PI-477999	LOTA	red Tatarian honeysuckle	13-May	86	86	PLBR	20	19	95	40	56								
			<i>Lonicera tatarica</i>											87	11	55	7	25	46	
			USDA, NRCS, PMC, Bismarck, ND											88	10	50	6	31	46	
														91	9	45	6	172	173	
														92	9	45	5	158	174	
	95	6	32	4	247	238														
I/1/21-40	ND-3755 9019597	LOTA	red Tatarian honeysuckle	13-May	86	86	PLBR	20	20	100	28	44								
			<i>Lonicera tatarica</i>											87	14	70	6	23	53	
			Lincoln-Oakes Nursery, Bismarck, ND											88	15	75	6	36	58	
														91	11	55	7	110	151	
														92	14	70	6	92	113	
	95	14	70	6	146	173	all have leaf blight													
I/1/41-60	ND-11 PI-477998	LOMA	Amur honeysuckle	11-May	87	87	CONT	20	19	95	3	20	29							
			<i>Lonicera maackii</i>												88	17	85	4	27	39
			USDA, NRCS, PMC, Bismarck, ND												89	19	95	3	80	64
															91	19	95	4	257	249
															92	16	80	2	158	165
	95	16	80	4	180	201														
	96	10	50	4	199	218	lots of fruit on all													
I/1/61-80	'Rem-Red' PI-421135	LOMA	Amur honeysuckle	11-May	87	87	PLBR	20	18	90	4	17	34							
			<i>Lonicera maackii</i>												88	20	100	3	38	53
			USDA, NRCS, PMC, Cape May, NJ												89	20	100	2	106	95
															91	19	95	3	235	202
															93	15	75	2	290	242
	96	19	95	3	249	251	dieback on 2,5,10													
I/1/81-100	'Cling-Red' PI-483450	LOMA	Amur honeysuckle	11-May	87	87	PLBR	20	19	95	3	27	50							
			<i>Lonicera maackii</i>												88	19	95	2	58	77
			USDA, NRCS, PMC, Cape May, NJ												89	19	95	1	144	135
															91	19	95	4	236	217
															93	19	95	3	295	260
	96	19	95	6	268	275	dieback on 6,11,15-19													

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	<u>HT</u>	<u>REMARKS</u>
I/1/101-120	ND-3754 9019580	COST4	redosier dogwood <i>Cornus stolonifera</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	20	20	100		31	64	
						87			20	100	3	57	96	
						88			20	100	2	65	100	
						90			20	100	3	130	145	
						92			20	100	3	164	184	
						95			20	100	4	187	208	
I/1/121-140	'Indigo' PI-468117	COAM2	silky dogwood <i>Cornus amomum</i> USDA, NRCS, PMC, East Lansing, MI	13-May	86	86	PLBR	20	19	95		34	55	
						87			20	100	4	34	57	
						88			18	90	4	43	57	
						90			17	85	3	133	113	
						92			16	80	4	166	155	heavy deer browse on plt 18-20
						95			16	80	3	221	199	
I/1/141-160	'Cardinal' PI-421800	ELUM	autumn olive <i>Elaeagnus umbellata</i> USDA, NRCS, PMC, Big Flats, NY	13-May	86	86	PLBR	20	19	95		14	35	
						87			10	50	5	18	40	
						88			9	45	4	32	48	
						90			20	100	5	68	96	
						92			19	95	6	129	142	herbicide damage,
						95			18	90	5	150	271	90% of plants have dieback
I/1/161-180	'Redwing' PI-477008	ELUM	autumn olive <i>Elaeagnus umbellata</i> USDA, NRCS, PMC, East Lansing, MI	13-May	86	86	PLBR	20	16	80		22	40	
						87			15	75	4	36	59	
						88			19	95	4	56	67	
						90			19	95	3	166	178	
						92			19	95	6	186	202	
						95			17	85	7	248	253	
I/1/181-190	Arnolds Red 9069080	LOTA	red Tatarian honeysuckle <i>Lonicera tatarica</i> Lee Nursery, Fertile, MN	29-Apr	93	93	PLBR	9	9	100	5	27	25	
						94			9	100	3	36	76	
						95			9	100	3	76	142	
						97			9	100	5	90	206	
						99			9	100	4	157	235	
I/1/191-200	9063143	LOTA	red Tatarian honeysuckle <i>Lonicera tatarica</i> Iowa Lincoln-Oakes Nursery, Bismarck, ND	29-Apr	93	93	PLBR	10	9	90	4	29	42	
						94			8	80	5	32	61	heavy bromegrass competition
						95			10	100	2	54	90	
						97			10	100	4	76	126	
						99			10	100	5	108	157	

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	<u>HT</u>	<u>REMARKS</u>
I/1/201-220	ND-3751 9019581	COAC*	cotoneaster <i>Cotoneaster acutifolia</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	20	20	100		24	40	
						87			11	55	4	19	42	
						88			19	95	4	22	42	
						90			18	90	3	117	124	
						92			16	80	5	124	156	
						95			14	70	2	160	213	
I/2/1-20	'Centennial' ND-177 9005729	COIN16	European cotoneaster <i>Cotoneaster integerrimus</i> USDA, ARS, Cheyenne, WY USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	CONT	20	19	95		59	70	
						87			6	30	4	42	74	
						88			18	90	6	29	39	
						90			18	90	3	146	134	
						92			18	90	3	198	168	
						95			18	90	3	231	208	
I/2/21-40	ND-3767 9019576	AMAL2	serviceberry <i>Amelanchier alnifolia</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	20	20	100		22	40	
						87			8	40	5	22	47	
						88			16	80	6	24	44	
						90			17	85	6	42	58	
						92			16	80	6	57	61	deer browse on larger plants
						95			15	75	5	69	82	deer browse on all
I/2/41-50	9063142	PRUNU	Japanese cherry <i>Prunus</i> Bottineau FEP, ND Lincoln-Oakes Nursery, ND	29-Apr	93	93	PLBR	10	9	90	3	26	47	
						94			9	90	5	30	54	
						95			9	90	4	54	67	
						97			4	40	6	50	55	
						99			0	0				
I/2/51-60	9069128	LOTA	red Tatarian honeysuckle <i>Lonicera tatarica</i> Big Sioux Nursery, Watertown, SD	25-Apr	95	95	CONT(P)	10	10	100	4	26	41	
						96			9	90	4	29	71	
						97			8	80	5	43	82	
						99			9	90		48	96	
I/2/61-80	'Bighorn' PI-483445	RHTR	skunkbush sumac <i>Rhus trilobata</i> USDA, NRCS, PMC, Los Lunas, NM	11-Jun	86	86	PLBR	20	18	90		13	34	
						87			7	35	7	9	27	
						88			14	70	6	20	59	
						90			18	90	5	74	100	
						92			18	90	5	102	117	
						95			18	90	5	122	149	

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT	CAN	PLT	REMARKS
LOCATION	NUMBER	SYMBOL	ORIGIN/SOURCE	DATE	PLT	REC	PLTD	PLTS	SRV	SRV	VI	COV	
I/2/81-100	'Autumn Amber'	RHTR	skunkbush sumac <i>Rhus trilobata</i>	12-May	87	87	PLBR	4	2	50	6	15	20
	9009467		USDA, NRCS, PMC, Los Lunas, NM			89			4	100	3	39	60
						90			4	100	5	63	78
						91			4	100	5	80	97
						93			3	75	6	83	113
						96			1	25	8	115	215
													dieback on #3
I/2/101-120	'Scarlet' PI-478003	PRFR2	Mongolian cherry <i>Prunus fruticosa</i>	13-May	86	86	PLBR	20	17	85		15	34
			Res. Sta., Morden, MB, CA			87			5	25	6	17	34
			USDA, NRCS, PMC, Bismarck, ND			88			16	80	6	15	27
						90			13	65	5	43	43
						92			11	55	5	44	47
						95			11	55	6	40	50
													severe rabbit damage, deer
I/2/121-140	ND-3894 9035204	PRPUB	sandcherry <i>Prunus pumila besseyi</i>	13-May	86	86	CONT	20	20	100		18	40
			Lawyer Nursery, Plains, MT			87			10	50	7	20	42
			USDA, NRCS, PMC, Bismarck, ND			88			9	45	3	37	48
						90			17	85	4	74	74
						92			17	85	4	70	79
						95			16	80	6	70	87
													moderate to severe deer browse
I/2/141-160	ND-3760 9019606	PRTO*	nanking cherry <i>Prunus tomentosa</i>	13-May	86	86	PLBR	20	14	70		23	47
			Lincoln-Oakes Nursery, Bismarck, ND			87			10	50	4	22	46
						88			19	95	5	29	58
						90			19	95	3	117	128
						92			18	90	4	117	151
						95			17	85	5	131	168
I/2/161-180	'Regal' ND-283 9006079 PI-540442	PRTE*	Russian almond <i>Prunus tenella</i>	13-May	86	86	CONT	9	9	100		26	51
			USDA, NRCS, PMC, Bismarck, ND			87			1	11	3	25	70
						88		10	8	80	7	13	36
						90			10	100	3	78	94
						92			8	80	4	98	122
						95			8	80	3	91	133
													pocket gopher

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	<u>HT</u>	<u>REMARKS</u>
I/2/181-200	ND-3749 9019579	CAAR18	Siberian pea shrub <i>Caragana arborescens</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	20	20	100		12	51	
						87			18	90	4	21	74	
						88			17	85	5	37	90	
						90			20	100	6	78	150	
						92			19	95	3	112	195	seed production on all
						95			17	85	4	173	251	
I/2/200-220	9031878	VITR8	American cranberrybush <i>Viburnum trilobum</i> USDA, NRCS, PMC, East Lansing, MI	13-May	86	86	PLBR	18	16	89		24	20	
						87			15	83	5	16	26	
						88			15	83	5	26	35	
						90			11	55	3	67	68	
						92			11	55	2	99	114	
						95			12	60	3	108	134	
I/3/1-10	'Magenta' PI-514275	MALUS	crabapple <i>Malus</i> USDA, NRCS, PMC, East Lansing, MI	29-Apr	92	92	PLBR	10	9	90	4	12	34	placed Tubex on all *tree shelter test
						93			8	80	4	*	62	
						94			8	80	3	24	75	
						96			8	80	3	34	81	deer browse on 3-6,8,10 tip die-off on 2
						98			7	70	7	35	86	
I/3/11-20	'Midwest' PI-478000	MAMA37	Manchurian crabapple <i>Malus mandshurica</i> Res. Sta., Morden, MB, CA Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	10	100		34	76	
						87			9	90	3	47	86	
						88			9	90	2	95	113	
						90			9	90	2	156	199	
						92			9	90	2	197	268	moderate deer browse on all
						95			9	90	2	309	390	
I/3/21-30	'Red Splendor' 9006004	MABA	crabapple <i>Malus baccata</i> Lee Nursery, Fertile, MN	3-May	88	88	PLBR	10	10	100	5	12	50	
						89			10	100	3	33	59	
						90			10	100	5	50	79	
						92			10	100	4	66	98	severe deer browse
						95			10	100	5	128	164	severe deer browse on all
						97			7	70	6	130	191	

Year of Record: 1998-1999

PLOT <u>LOCATION</u>	ACCESSION <u>NUMBER</u>	PLANT <u>SYMBOL</u>	GENUS/SPECIES <u>ORIGIN/SOURCE</u>	TRANS <u>DATE</u>	YR <u>PLT</u>	YR <u>REC</u>	MATL <u>PLTD</u>	NO <u>PLTS</u>	NO <u>SRV</u>	PCT <u>SRV</u>	VI	CAN <u>COV</u>	PLT <u>HT</u>	<u>REMARKS</u>		
I/3/31-40	ND-3765 9019598	MASI*	Siberian crabapple <i>Malus baccata</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	10	100		24	59			
											6	60	4		32	77
											7	70	3		37	54
											7	70	4		101	108
											7	70	4		114	166
								7	70	3	158	254	severe deer browse on all			
I/3/41-50	'Flame' PI-483442	ACGI	Amur maple <i>Acer ginnala</i> USDA, NRCS, PMC, Elsberry, MO	13-May	86	86	PLBR	10	1	10		15	35			
											10	100	3		18	50
											10	100	3		37	64
											8	80	4		128	134
											8	80	4		181	190
								8	89	4	237	282				
I/3/51-60	ND-629 PI-477992	ACGI	Amur maple <i>Acer ginnala</i> USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	CONT	10	10	100		32	60			
											10	100	4		27	59
											10	100	3		57	77
											10	100	4		130	151
											10	100	4		176	230
								10	100	3	247	306				
I/3/61-70	ND-1868 9006092	PRVI	chokecherry <i>Prunus virginiana</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	8	80		14	48			
											8	80	5		15	50
											10	100	3		32	60
											10	100	4		95	137
											10	100	4		113	221
								10	100	4	173	252	black knot on all			
I/3/71-80	'Schubert' 9012608	PRVI	chokecherry <i>Prunus virginiana</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	2	20		15	25			
											10	100	4		12	34
											8	80	6		26	52
											10	100	5		55	108
											9	90	5		68	174
								8	80	5	121	226				

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT	CAN	PLT	<u>REMARKS</u>	
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>		<u>HT</u>
I/3/81-90	SD-131	PRPA5	mayday	13-May	86	86	PLBR	10	9	90		22	53	
	9006073		<i>Prunus padus</i>			87			4	40	4	16	55	
	PI-536048		Moody Co., SD			88			6	60	6	29	55	
			USDA, NRCS, PMC, Bismarck, ND			90			9	90	4	68	96	
						92			6	60	6	110	168	
						95			3	27	6	170	225	black knot on all
I/3/91-100	ND-1134	PRAM	hardy plum	13-May	86	86	CONT	5	3	60		25	47	
	9047203		<i>Prunus americana</i>			87			1	20	5	30	60	
			Hand Co., SD			88			1	20	1	60	70	
			USDA, NRCS, PMC, Bismarck, ND			90			2	40	4	103	125	
						92			2	40	6	135	165	
						95			3	60	4	130	138	
I/3/101-110	ND-3753	PRAM	plum	13-May	86	86	PLBR	10	10	100		24	67	
	9019604		<i>Prunus americana</i>			87			6	60	5	22	68	
			Lincoln-Oakes Nursery,			88			10	100	5	33	61	
			Bismarck, ND			90			8	80	3	114	153	
						92			8	80	3	148	221	
						95			10	100	5	150	208	
I/4/1-10	ND-1729	LASI	Siberian larch	13-May	86	86	CONT	10	10	100		12	38	
	9005979		<i>Larix sibirica</i>			87			9	90	3	19	44	
			ND Forest Service, Towner, ND			88			9	90	3	28	60	
						90			9	90	5	37	63	
						92			1	10	5	65	90	pocket gophers
						95			1	10	5	130	160	
I/4/11-20	ND-2502	PIPO	ponderosa pine	13-May	86	86	CONT	10	10	100		20	34	
	9047223		<i>Pinus ponderosa</i>			87			7	70	4	19	35	
			ND Forest Service, Towner, ND			88			7	70	3	35	47	
						90			6	60	2	76	89	
						92			5	50	3	149	156	
						95			5	50	6	247	271	

Year of Record: 1998-1999

PLOT <u>LOCATION</u>	ACCESSION <u>NUMBER</u>	PLANT <u>SYMBOL</u>	GENUS/SPECIES <u>ORIGIN/SOURCE</u>	TRANS <u>DATE</u>	YR <u>PLT</u>	YR <u>REC</u>	MATL <u>PLTD</u>	NO <u>PLTS</u>	NO <u>SRV</u>	PCT <u>SRV</u>	VI	CAN <u>COV</u>	PLT <u>HT</u>	<u>REMARKS</u>	
I/4/21-30	ND-3791 9030302	PIAB	Norway spruce <i>Picea abies</i> U of MN, St. Paul, MN	13-May	86	86	CONT	10	10	100		15	32		
											4	40	8	5	18
											10	100	5	16	29
											9	90	6	27	41
											8	80	5	45	52
								8	80	4	96	131			
I/4/31-40	9057426	PSME	douglas fir <i>Pseudotsuga menziesii</i> U of MN, St. Paul, MN	13-May	86	86	CONT	10	9	90		13	21		
											4	40	3	15	22
											9	90	3	18	26
											3	30	3	42	52
											2	20	3	62	88
								2	20	3	112	178			
I/4/41-50	9057426	PSME	douglas fir <i>Pseudotsuga menziesii</i> U of MN, St. Paul, MN	13-May	86	86	CONT	10	9	90		16	16		
											9	90	3	14	19
											10	100	3	20	25
											7	70	5	35	41
											4	40	4	58	76
								4	40	4	91	156	#3,5 Siberian fir		
I/4/51-60	ND-1729 9005979	LASI*	Siberian larch <i>Larix sibirica</i> U of MN, St. Paul, MN	13-May	86	86	CONT	10	10	100		17	38		
											7	70	5	16	38
											8	80	4	18	51
											8	80	6	25	51
											5	50	3	60	101
								4	40	3	108	200			
I/4/61-70	ND-3787 9030295	THOC2	northern white cedar <i>Thuja occidentalis</i> U of MN, St. Paul, MN	13-May	86	86	CONT	10	9	90		18	30		
											3	30	2	12	18
											9	90	3	16	31
											9	90	3	29	53
											9	90	4	60	88
								9	90	3	113	197			

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	<u>REMARKS</u>
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	<u>HT</u>	
I/4/71-80	9057413	PIPO	ponderosa pine <i>Pinus ponderosa</i> Glendive, MT NDFS	3-May	88	88	CONT	10	8	80	3	11	23	
						89			7	70	2	29	40	
						90			5	50	4	42	50	
						92			5	50	3	86	102	
						94			5	50	3	122	172	
						97			5	50	2	181	253	
I/4/91-100	9058862	LALA	tamarack <i>Larix laricina</i> Itasca Co., MN	3-May	90	90		10	10	100	3	33	72	
						91			7	70	4	53	101	
						92			9	90	3	76	133	
						94			8	80	3	123	248	
						96			8	80	4	183	323	lots of cones on 7-9
						99			8	80	3	264	590	
I/4/101-106	9058847	PIMA	black spruce <i>Picea mariana</i> U of MN Cloquet Ctr., Cloquet, MN	27-Apr	89	89	CONT	6	4	67	8	5	18	
						90			3	50	5	23	35	
						91			3	50	5	20	37	
						93			3	50	6	40	53	
						95			2	33	5	45	88	
						98			2	33	6	65	112	
I/4/107-111	9058862	LALA	tamarack <i>Larix laricina</i>	1-Sep	89	90		5	4	80	2	40	94	
						93			1	20		115	175	
						95			1	20	3	120	170	
						98			1	20	7	100	170	
I/5/1-10	'Oahe' PI-476982	CEOC	hackberry <i>Celtis occidentalis</i> USDA, ARS, Mandan, ND USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	PLBR	10	10	100		13	55	
						87			10	100	4	23	68	
						88			10	100	4	33	80	
						90			10	100	5	48	95	
						92			10	100	4	62	101	deer browse on all trees
						95			9	90	7	80	122	

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT	CAN	PLT	REMARKS
<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	
I/5/11-20	ND-3756 9019578	CEOC	hackberry <i>Celtis occidentalis</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	9	90	16	38	
						87			9	90	3	64	
						88			10	100	4	75	
						90			9	90	5	84	
						92			9	90	4	88	deer browse on all trees
						95			8	80	2	109	deer browse
I/5/21-30	'Cardan' PI-469226	FRPE	green ash <i>Fraxinus pennsylvanica</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	10	100	16	98	
						87			9	90	4	89	
						88			10	100	5	89	
						90			9	90	5	159	
						92			9	90	4	234	
						95			9	90	5	323	
I/5/31-40	ND-3757 9019586	FRPE	green ash <i>Fraxinus pennsylvanica</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	10	100	34	86	
						87			9	90	7	68	
						88			8	80	9	40	
						90			4	40	6	93	
						92			4	40	5	155	
						95			4	40	5	285	
I/5/41-50	ND-3825 9034904	ACSA2	silver maple <i>Acer saccharinum</i> Burleigh Co., ND USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	PLBR	10	10	100	26	80	
						87			10	100	4	97	
						88			9	90	5	111	
						89			9	90	6	129	
						90			9	90	5	202	
						92			9	90	4	286	
						95			9	90	4	333	
I/5/51-60	9063127	FRAM	white ash <i>Fraxinus americana</i> Wisconsin Lincoln-Oakes Nursery, Bismarck, ND	29-Apr	92	92	PLBR	10	10	100	5	59	
						93			7	70	4	80	
						94			6	60	4	82	
						96			2	20	7	105	browse, winter kill, gopher
						98			2	20	5	115	

Year of Record: 1998-1999

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<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	<u>HT</u>	<u>REMARKS</u>
I/5/61-70	ND-1879	GLTR	honeylocust	13-May	86	86	CONT	10	10	100		10	31	
	9011850		<i>Gleditsia triacanthos</i>			87			6	60	3	17	39	
	PI-503531		USDA, ARS, Mandan, ND			88			6	60	4	18	51	
			USDA, NRCS, PMC, Bismarck, ND			90			7	70	5	60	128	
						92			6	60	4	122	234	
						95			6	60	4	238	384	
I/5/86-90	9069089	QURO	English oak	29-Apr	93	93	PLBR	5	5	100	4	15	64	
			<i>Quercus robur</i>			94			4	80	4	20	90	
			TEC, Osseo, MN			95			4	80	4	40	119	
						97			4	80	3	26	101	
						99			4	80		51	150	
I/5/91-100	9063126	ULJA	Japanese elm	29-Apr	92	92	CONT	10	10	100	6	22	54	
			<i>Ulmus japonica</i>			93			8	80	5	28	53	
			Manchuria			94			8	80	6	21	58	
			PFRA, Indianhead, Sask.			96			7	70	7	47	55	all have heavy browse damage
						97			6	60	7	46	58	
						98			0	0				mowed off
I/6/1-5	9047239	AEGL	Ohio buckeye	13-May	86	86	PLBR	10	9	90		5	17	
			<i>Aesculus glabra</i>			87			7	70	5	5	20	
			Burleigh Co., ND			88			8	80	4	6	24	
			USDA, NRCS, PMC, Bismarck, ND			90			6	60	5	28	50	
						92			4	40	6	41	88	
						95			5	100	7	65	137	
I/6/6-10	9069084	QUAL	white oak	29-Apr	93	93	PLBR	5	5	100	3	*	54	*tree shelter test
			<i>Quercus alba</i>			94			4	80	6	32	64	
			Lee Nursery, Fertile, MN			95			4	80	5	26	84	
						97			2	40	6	45	85	
						99			2	40	8	15	65	
I/6/11-20	9058864	ACNE2	boxelder	13-May	86	86	PLBR	10	10	100		22	65	
			<i>Acer negundo</i>			87			9	90	3	60	131	
			Lincoln-Oakes Nursery,			88			9	90	3	88	181	
			Bismarck, ND			90			9	90	4	139	276	
						92			9	90	2	212	359	
						95			9	90	5	342	451	

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	
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I/6/21-30	ND-2105 9047150	MORU	red mulberry <i>Morus rubra</i> Big Stone Co., MN USDA, NRCS, PMC, Bismarck, ND	3-May	88	88	CONT	10	10	100	3	12	37	
						89			10	100	4	33	52	
						90			10	100	3	83	87	
						92			10	100	4	70	82	
						94			10	100	5	130	116	
						97			10	100	4	243	267	
I/6/31-40	9057410	CEOC	hackberry <i>Celtis occidentalis</i> Bottineau Co., ND NDFS	3-May	88	88	CONT	10	7	70	6	7	18	
						89			5	50	4	13	28	
						90			9	90	5	28	41	
						92			8	80	6	23	42	
						94			5	50	5	41	76	
						97			1	10	8	35	70	
I/6/41-45	9069082	QUEL	pin oak <i>Quercus ellipsoidalis</i> Lee Nursery, Fertile, MN	29-Apr	93	93	PLBR	5	4	80	3	*	66	*tree shelter test
						94			5	100	3	24	68	
						95			4	80	4	40	75	
						97			4	80	3	45	80	
						99			4	80	5	56	80	
I/6/46-50	9063116	FRNI	black ash <i>Fraxinus nigra</i> Itasca State Park, MN	25-Apr	95	95	CONT(P)	5	4	80	5	5	46	
						96			5	100	5	11	48	all leaf off
						97			4	80	8	10	50	
						99			4	80	6	16	52	
I/6/51-52	9057405	BEPA	paper birch <i>Betula papyrifera</i> Turtle Mtns., Bottineau, ND NDFS	3-May	88	88	CONT	10	8	80	4	6	60	
						89			6	60	3	24	63	
						90			2	20	2	48	95	
						92			2	20	4	98	180	
						94			1	10		180	400	
						97			1	10	3	280	600	
I/6/53-58	9063129	BEPA	paper birch <i>Betula papyrifera</i> MN Forestry Association	29-Apr	93	93	PLBR	5	3	60	5	22	30	
						94			3	60	4	20	52	
						95			3	60	4	30	90	
						97			3	60	4	50	123	
						99			3	60	4	98	185	

Year of Record: 1998-1999

PLOT <u>LOCATION</u>	ACCESSION <u>NUMBER</u>	PLANT <u>SYMBOL</u>	GENUS/SPECIES <u>ORIGIN/SOURCE</u>	TRANS <u>DATE</u>	YR <u>PLT</u>	YR <u>REC</u>	MATL <u>PLTD</u>	NO <u>PLTS</u>	NO <u>SRV</u>	PCT <u>SRV</u>	<u>VI</u>	CAN <u>COV</u>	PLT <u>HT</u>	<u>REMARKS</u>
I/6/59-64	9063124	GLTR	honeylocust <i>Gleditsia triacanthos</i> Big Sioux Nursery, Watertown, SD	25-Apr	95	95	CONT(P)	5	2	40	5	5	22	
						96			2	40	6	20	40	
						97			1	20	7	30	45	
						99			0	0				
I/6/61-65	Clone C 9058896	SAMA	Austree <i>Salix matsudana x alba</i> Austree, Inc., Pescadero, CA	3-May	90	90	PLBR	5	5	100	2	40	114	
						91			4	80	4	64	114	
						92			4	80	6	88	122	
						94			4	80	6	131	225	
						96			1	20		550	780	estimated height
						99			1	20	3	820	910	
I/6/71-80	9069081	TICO	littleleaf linden <i>Tilia cordata</i> Lee Nursery, Fertile, MN	29-Apr	93	93	PLBR	5	5	100	5	*	53	*tree shelter test
						94			5	100	4	19	64	
						95			5	100	6	18	78	
						97			4	40	4	39	105	
						99			1	10	7	40	80	
I/6/81-90	PI-514677	PRAM	American plum <i>Prunus americana</i> USDA, NRCS, PMC, Manhattan, KS	3-May	90	90	PLBR	10	9	90	4	23	56	
						91			8	80	5	16	55	
						92			7	70	6	36	60	
						94			6	60	6	52	70	
						96			6	60	7	54	75	gopher on 1, black knot on 6,7,10
						99			4	40	5	60	86	
I/6/91-100	9049970	PRAN	chickasaw plum <i>Prunus angustifolia</i> USDA, NRCS, PMC, Manhattan, KS	3-May	90	90	PLBR	10	8	80	5	28	52	
						91			4	40	3	46	55	
						92			4	40	4	82	68	
						94			4	40	4	89	120	
						96			5	50	5	99	139	resprout on 1
						99			5	50	5	150	160	
I/6/95-100	9063130	BENI	river birch <i>Betula nigra</i> MN Forestry Association	29-Apr	93	93	PLBR	5	5	100	6	34	56	
						94			4	80	4	70	96	
						95			2	40	7	108	142	
						97			2	40	3	205	290	
						99			2	40	4	342	435	

Year of Record: 1998-1999

PLOT <u>LOCATION</u>	ACCESSION <u>NUMBER</u>	PLANT <u>SYMBOL</u>	GENUS/SPECIES <u>ORIGIN/SOURCE</u>	TRANS <u>DATE</u>	YR <u>PLT</u>	YR <u>REC</u>	MATL <u>PLTD</u>	NO <u>PLTS</u>	NO <u>SRV</u>	PCT <u>SRV</u>	VI	CAN <u>COV</u>	PLT <u>HT</u>	<u>REMARKS</u>
I/7/1-10	ND-2470 9047206	PRAR3	apricot <i>Prunus armeniaca</i> Lincoln-Oakes Nursery, Bismarck, ND	13-May	86	86	PLBR	10	10	100		27	64	
						87			10	100	5	38	85	
						88			9	90	3	53	153	
						90			10	100	2	147	267	
						92			9	90	2	260	347	
						95			9	90	5	291	379	
I/7/11-20	ND-2102 9036029	PRAR3	apricot <i>Prunus armeniaca</i> Hand Co., SD USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	PLBR	10	10	100		30	58	
						87			10	100	6	32	77	
						88			9	90	4	53	130	
						90			9	90	3	163	264	
						92			9	90	2	247	328	
						95			8	80	4	306	378	
I/7/21-25	9063131	ACSA	sugar maple <i>Acer saccharum</i> Sieche Hollow, SD Smith Nursery, Charles City, IA	29-Apr	93	93	PLBR	5	3	60	4	7	32	
						94			2	40	8	10	28	
						95			1	20	5	5	30	
						97			0	0				
I/7/26-30	9063148	PHAM	corktree <i>Phellodendron amurense</i> Clay Co., MN	25-Apr	95	95	CONT(P)	5	4	80	5	5	34	
						96			3	60	7	25	55	
						97			3	60	6	52	78	
						99			2	40	6	80	110	1 browsed
I/7/31-40	'McDermant' ND-14 PI-478004	PYUS80	Ussurian pear <i>Pyrus ussuriensis</i> Res. Sta., Morden, MB, CA USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	PLBR	10	6	60		20	56	
						87			10	100	4	20	58	
						88			10	100	5	28	83	
						90			7	70	4	76	132	
						92			7	70	4	107	150	
						95			6	60	6	182	280	
I/7/41-45	ND-686 PI-478008	SYPE	pekin lilac <i>Syringa pekinensis</i> USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	PLBR	10	7	70		14	34	
						87			3	30	6	17	35	
						88			3	30	7	27	43	
						90			2	20	4	83	83	
						92			2	20	4	145	140	
						95			2	20	6	92	122	

Year of Record: 1998-1999

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I/7/46-50	9063115	FRNI	green ash <i>Fraxinus pennsylvanica</i> Itasca State Park, MN	25-Apr	95	95	CONT(S)	5	2	40	5	32	
						96			4	80	9	40	
						97			5	100	6	43	
I/7/51-60	ND-21 9034900 PI-560908	VILE	nannyberry <i>Viburnum lentago</i> USDA, ARS, Mandan, ND USDA, NRCS, PMC, Bismarck, ND	13-May	86	86	PLBR	10	8	80		34	
						87			10	100	3	34	
						88			10	100	5	49	
						90			7	70	3	78	
						92			7	70	4	118	
						95			6	60	5	162	
I/7/61-70	'Homestead' ND-20 9005731 PI-503530	CRATA	Arnold hawthorn <i>Crataegus X anomala</i> Lincoln-Oakes Nursery, Bismarck, ND	3-May	88	88	PLBR	10	0	0			
						89			7	70	4	36	
						90			10	100	5	44	
						92			5	50	7	25	browse
						94			5	50	6	39	
						97			0	0			
I/7/76-80	9069088	PLOC	American sycamore <i>Platanus occidentalis</i> TEC, Osseo, MN	29-Apr	93	93	PLBR	5	5	100	3	77	tree shelter test
						94			4	80	4	129	
						95			4	80	4	174	
						97			2	40	5	140	insect problem on 5
						99			0	0			
I/7/81-90	'Streamco' PI-434309	SAPU2	purpleosier willow <i>Salix purpurea</i> USDA, NRCS, PMC, Big Flats, NY	13-May	86	86	PLBR	10	8	80		52	
						87			5	50	4	70	
						88			3	30	4	87	
						90			10	100	3	115	
						92			7	70	4	187	
						95			6	60	5	271	
II/1/1-20	9031856	VITR8	American cranberrybush <i>Viburnum trilobum</i> USDA, NRCS, PMC, East Lansing, MI	14-May	86	86	PLBR	20	20	100		19	
						87			7	35	3	28	
						88			11	55	5	30	
						90			10	50	2	47	
						92			9	45	6	69	
						95			9	45	6	93	

Year of Record: 1998-1999

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<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	
II/2/1-20	'Sakakawea'	SHAR	silver buffaloberry	14-May	86	86	PLBR	20	17	85		36	
	PI-478005		<i>Shepherdia argentea</i>			87			16	80	4	56	
			Res. Sta., Morden, MB, CA			88			18	90	5	66	
			USDA, NRCS, PMC, Bismarck, ND			90			11	55	4	112	
						92			7	35	4	138	
						95			7	35	4	256	
II/3/11-20	Survivor	AMFR	false indigo	11-May	87	87	PLBR	10	8	80	4	36	
	Germplasm		<i>Amorpha fruticosa</i>			88			9	90	4	58	
	9047236		Lincoln-Oakes Nursery,			89			10	100	4	87	
			Bismarck, ND			91			10	100	4	130	
						93			9	90	3	146	
						96			9	100	4	177	
II/3/21-30	Silver Sands	AMFR	false indigo	11-May	87	87	PLBR	10	10	100	3	50	
	Germplasm		<i>Amorpha fruticosa</i>			88			10	100	3	79	
	9008041		USDA, NRCS, PMC, Aberdeen, ID			89			10	100	1	114	
						91			10	100	3	156	
						93			10	100	2	170	
						96			10	100	2	204	
II/3/31-50	ND-3764	SHAR	silver buffaloberry	14-May	86	86	PLBR	20	19	95		46	
	9019619		<i>Shepherdia argentea</i>			87			11	55	3	69	
			Lincoln-Oakes Nursery,			88			11	55	3	90	
			Bismarck, ND			90			14	70	5	94	
						92			12	60	4	158	
						95			12	60	6	229	
II/4/1-20	'Legacy'	SYVI80	late lilac	14-May	86	86	PLBR	20	20	100		30	
	ND-83		<i>Syringa villosa</i>			87			19	95	5	27	
	9006228		Lincoln-Oakes Nursery,			88			20	100	5	46	
	PI-540443		Bismarck, ND			90			19	95	3	75	
						92			19	95	4	113	
						95			17	85	4	133	

Year of Record: 1998-1999

PLOT <u>LOCATION</u>	ACCESSION <u>NUMBER</u>	PLANT <u>SYMBOL</u>	GENUS/SPECIES <u>ORIGIN/SOURCE</u>	TRANS <u>DATE</u>	YR <u>PLT</u>	YR <u>REC</u>	MATL <u>PLTD</u>	NO <u>PLTS</u>	NO <u>SRV</u>	PCT <u>SRV</u>	VI	CAN <u>COV</u>	PLT <u>HT</u>	<u>REMARKS</u>
II/4/21-40	ND-3763 9019611	RIOD	golden currant	14-May	86	86	PLBR	20	20	100		11	38	
			<i>Ribes odoratum</i>		87			17	85	5	18	44		
			Lincoln-Oakes Nursery, Bismarck, ND		88			20	100	6	35	57		
					90			20	100	4	83	90		
					92			20	100	5	99	101		
				95			20	100	6	79	110			
II/4/41-60	ND-3744 9019577	BEKO	Korean barberry	3-May	88	88	CONT	20	9	45	5	8	18	
			<i>Berberis koreana</i>		89			12	60	4	12	25		
			NDSU		90			11	55	4	17	31		
			McKenzie FEP, ND		92			12	60	5	27	48		
					94			12	60	3	21	52		
				97			12	60	4	18	60	grass competition		
II/5/1-8	ND-2507 9047228	CAPY	pigmy caragana	3-May	88	88	CONT	8	4	50	6	5	21	
			<i>Caragana pygmaea</i>		89			6	75	4	8	22		
			NDFS, Bottineau, ND		90			3	38	6	13	28		
			USDA, NRCS, PMC, Bismarck, ND		92			1	11	9	25	30		
					94			2	25	2	22	60		
				97			3	30	6	20	55			
II/5/9-20	'Meadowlark' 9005886	FOOV	forsythia	27-Apr	89	89	PLBR	12	11	92	3	11	18	
			<i>Forsythia ovata x europaea</i>		90			12	100	3	30	30		
			NDSU		91			12	100	5	40	50		
			Lee Nursery, Fertile, MN		93			12	100	4	53	80		
					95			12	100	4	65	120		
				98			11	92	4	111	171			
II/5/21-40	ND-2103 PI-399414	VIOP	highbush cranberry	3-May	88	88	CONT	20	7	35	6	14	18	
			<i>Viburnum opulus</i>		89			3	15	6	15	15		
			NDSU Exp. Sta., Dickinson, ND		90			2	10	4	18	15		
					92			2	10	5	40	48		
					94			2	10	3	22	78		
				97			2	10	5	30	90	grass competition		

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	
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II/5/41-60	PI-323957	PHME13	chokeberry <i>Photinia melanocarpa</i> USDA, NRCS, PMC, Bismarck, ND	3-May	88	88	CONT	20	17	85	6	6	15	
						89			18	90	7	11	22	
						90			17	85	4	19	33	
						92			19	95	6	32	44	
						94			19	95	3	30	48	
						97			19	95	6	22	48	heavy grass competition
II/6/1-20	'Hedge King' 9057407	LOXY	honeysuckle <i>Lonicera xylostoides</i> Wedge Nursery, Albert Lea, MN	3-May	88	88	CONT	20	9	45	7	15	11	
						89			18	90	4	19	28	
						90			18	90	5	19	27	
						92			17	85	5	31	39	
						94			15	75	2	39	51	
						97			15	75	6	20	54	
II/6/21-40	9057409	COAM	American hazel <i>Corylus americana</i> Turtle Mtns., Bottineau Co., ND	3-May	88	88	CONT	20	18	90	5	14	40	
						89			20	100	4	24	45	
						90			16	80	4	22	46	
						92			17	85	5	29	46	
						94			11	55	3	43	66	
						97			13	65	6	38	69	
III/1A/16-20	9069086 Theves	POPUL	hybrid poplar <i>Populus</i> PFRA, Indianhead, Sask.	29-Apr	93	93	PLBR	5	4	80	3	8	51	fabric mats
						94			4	80	3	31	88	
						95			4	80	2	34	129	
						97			0	0				
						98			1	20	1	40	65	
III/1A/21-25	9069090	POTR	quaking aspen <i>Populus tremuloides</i> Lee Nursery, Fertile, MN	29-Apr	93	93	PLBR	5	5	100	4	7	38	fabric mats
						94			5	100	4	17	52	
						95			5	100	5	24	77	
						97			0	0				
						98			4	80	6	52	139	
						99			3	60	7	50	147	

Year of Record: 1998-1999

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<u>LOCATION</u>	<u>NUMBER</u>	<u>SYMBOL</u>	<u>ORIGIN/SOURCE</u>	<u>DATE</u>	<u>PLT</u>	<u>REC</u>	<u>PLTD</u>	<u>PLTS</u>	<u>SRV</u>	<u>SRV</u>	<u>VI</u>	<u>COV</u>	<u>HT</u>	
III/1/1-10	'Imperial' PI-432347	POCA19	carolina poplar	14-May	86	86	PLBR	10	10	100		24	78	
			<i>Populus x canadensis</i>		87				10	100	4	44	112	
			USDA, NRCS, PMC, East Lansing, MI		88				10	100	2	65	165	
					90				10	100	1	151	381	
					92				9	90	3	224	614	
					95			9	90	3	249	951		
III/1/11-20	ND-3781 9029136	POPUL	robusta poplar	14-May	86	86	PLBR	10	10	100		26	88	
			<i>Populus robusta</i>		87				10	100	4	36	122	
			Lincoln-Oakes Nursery, Bismarck, ND		88				10	100	3	74	160	
					90				9	90	2	170	408	
					92				9	90	4	227	648	
					95			9	90	3	286	940		
III/1/21-30	'Siouxland' 9016288	PODE3	eastern cottonwood	14-May	86	86	PLBR	10	10	100		29	92	
			<i>Populus deltoides</i>		87				10	100	4	45	132	
			Lincoln-Oakes Nursery, Bismarck, ND		88				9	90	2	88	167	
					90				9	90	2	192	398	
					92				9	90	4	273	683	canker
					95			9	90	3	333	962		
III/1/31-40	ND-3803 90306112	POAL7	white poplar	14-May	86	86	CONT	5	5	100		29	46	
			<i>Populus alba</i>		87				4	80	5	25	60	
			Turner Co., SD		88				4	80	4	63	86	
			USDA, NRCS, PMC, Bismarck, ND		90				4	80	2	200	458	
					92				4	80	4	314	325	
					95			4	80	2	473	600		
III/2/1-10	ND-3780 9029135	POPUL	Norway poplar	14-May	86	86	PLBR	10	10	100		24	75	
			<i>Populus canadensis</i>		87				10	100	5	40	114	
			Lincoln-Oakes Nursery, Bismarck, ND		88				10	100	3	68	147	
					90				10	100	2	167	404	
					92				10	100	2	242	678	canker on 1-4
					95			10	100	2	278	1012		

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT	CAN	PLT	<u>REMARKS</u>
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III/2/11-20	ND-3768 9019603	PDXP8	Northwest poplar	14-May	86	86	PLBR	10	10	100	16	46	
			<i>Populus deltoides X</i>		87			10	100	5	20	56	
			<i>P. balsamifera</i>		88			8	80	4	37	90	
			Lincoln-Oakes Nursery, Bismarck, ND		90			7	70	3	163	246	
					92			7	70	3	199	320	
				95			7	70	2	226	477		
III/2/21-30	ND-3773 9021576	SALIX	willow	14-May	86	86	CONT	10	10	100	41	91	
			<i>Salix</i>		87			10	100	3	46	94	
			Twin Valley, MN		88			10	100	3	69	101	
			USDA, NRCS, PMC, Bismarck, ND		90			10	100	3	164	185	
					92			10	100	3	238	241	
				95			10	100	3	307	407		
III/3/1-5	14271 9058869	PDXP8	poplar	2-May	91	91	PLBR	5	5	100	4	22	95
			<i>Populus deltoides x nigra</i>		92			5	100	4	40	116	
			USDA, ARS, Mandan, ND		93			5	100	3	35	128	
			Lincoln-Oakes Nursery, Bismarck, ND		95			5	100	6	46	156	
					97			4	80	7	41	165	
III/3/6-10	14272 9058870	PDXP8	poplar	2-May	91	91	PLBR	5	5	100	4	18	95
			<i>Populus deltoides x nigra</i>		92			5	100	4	42	125	
			USDA, ARS, Mandan, ND		93			5	100	3	35	148	
			Lincoln-Oakes Nursery, Bismarck, ND		95			5	100	6	65	193	
					97			5	100	5	77	225	
III/3/11-15	14273 9058871	PDXP8	poplar	2-May	91	91	PLBR	5	5	100	4	23	80
			<i>Populus deltoides x nigra</i>		92			5	100	4	54	102	
			USDA, ARS, Mandan, ND		93			5	100	3	63	152	
			Lincoln-Oakes Nursery, Bismarck, ND		95			5	100	3	104	288	
					97			5	100	3	98	358	
III/3/16-20	14274 9058872	PDXP8	poplar	2-May	91	91	PLBR	5	4	80	4	25	101
			<i>Populus deltoides x nigra</i>		92			5	100	4	51	132	
			USDA, ARS, Mandan, ND		93			5	100	3	53	161	
			Lincoln-Oakes Nursery, Bismarck, ND		95			5	100	4	114	271	
					97			5	100	3	149	487	

Year of Record: 1998-1999

PLOT <u>LOCATION</u>	ACCESSION <u>NUMBER</u>	PLANT <u>SYMBOL</u>	GENUS/SPECIES <u>ORIGIN/SOURCE</u>	TRANS <u>DATE</u>	YR <u>PLT</u>	YR <u>REC</u>	MATL <u>PLTD</u>	NO <u>PLTS</u>	NO <u>SRV</u>	PCT <u>SRV</u>	<u>VI</u>	CAN <u>COV</u>	PLT <u>HT</u>	<u>REMARKS</u>
III/3/21-25	14390 9058873 Walker	PDXP8	poplar	2-May	91	91	PLBR	5	3	60	3	22	105	
			<i>Populus</i>		92			5	100	4	55	110		
			USDA, ARS, Mandan, ND		93			5	100	4	68	135		
			Lincoln-Oakes Nursery, Bismarck, ND		95			5	100	5	123	241		
					97			4	80	3	146	394		
III/4/11-15	9058899		Austree	2-May	91	91	CONT	5	5	100	3	20	119	
			<i>Salix matsudana x alba</i>		92			5	100	5	44	93		
			Austree, Inc., Pescadero, CA		93			5	100	3	73	103	severe deer browse	
					95			5	100	5	127	257		
					97			5	100	4	170	402		
IV/1/1-10	Mich-433 9005049	SAPE4	laurel willow	14-May	86	86	CONT	10	10	100		38	72	
			<i>Salix pentandra</i>		87			9	90	3	34	78		
			USDA, NRCS, PMC, East Lansing, MI		88			8	80	4	39	80		
			USDA, NRCS, PMC, Bismarck, ND		90			8	80	4	114	140		
					92			8	80	8	189	200		
	95			7	70	4	276	351						
IV/1/11-20	9057448	SAPE4	laurel willow	14-May	86	86	PLBR	10	10	100		31	46	
			<i>Salix pentandra</i>		87			10	100	6	30	50		
			Lincoln-Oakes Nursery, Bismarck, ND		88			8	80	5	43	48		
					90			8	80	3	124	142		
					92			7	70	3	214	230		
	95			7	70	3	299	523						
	96								450	corrected height				
IV/1/21-30	ND-3769 9019614	SAALV	golden willow	14-May	86	86	PLBR	10	10	100		33	66	
			<i>Salix alba vitellina</i>		87			10	100	4	30	72		
			Lincoln-Oakes Nursery, Bismarck, ND		88			10	100	5	39	74		
					90			10	100	4	74	113		
					92			9	90	6	118	136	3 have dieback	
	95			8	80	5	155	262						

Year of Record: 1998-1999

PLOT	ACCESSION	PLANT	GENUS/SPECIES	TRANS	YR	YR	MATL	NO	NO	PCT		CAN	PLT	
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IV/2/1-10	9057447	SAALC	red stem willow	14-May	86	86	PLBR	10	10	100		34	71	
			<i>Salix alba chermesina</i>			87			10	100	4	34	84	
			Lincoln-Oakes Nursery, Bismarck, ND			88			8	80	3	62	118	
						90			5	50	3	116	238	
						92			6	60	5	138	284	
						95			4	40	2	252	635	
IV/2/11-20	ND-3772 9019613	SAAL2	white willow	14-May	86	86	PLBR	10	8	80		41	51	
			<i>Salix alba</i>			87			10	100	5	46	67	
			Lincoln-Oakes Nursery, Bismarck, ND			88			10	100	4	83	82	
						90			10	100	4	143	188	
						92			10	100	4	202	244	
						95			9	90	4	261	445	
IV/3/1-10	9047242	SAAC*	sharpleaf willow	14-May	86	86	PLBR	10	8	80		41	51	
			<i>Salix acutifolia</i>			87			10	100	6	32	61	
			Lincoln-Oakes Nursery, Bismarck, ND			88			8	80	5	44	61	
						90			8	80	4	117	115	
						92			8	80	4	141	144	
						95			7	70	4	236	285	