SUMMARY: 1983 COOPERATIVE CUTWORM PHEROMONE PROJECT

Department of Entomology

North Dakota State University

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OBS	SITE	DATE	EM	EO	ET	EA	PS	ST	AO	LC	PU	FJ	HE
1	BISMARCK	508	0	0	0	0	0	0	0	1	0	0	.
2	BISMARCK	515	0	0	0	0	0	0	0	3	0	0	.
3	BISMARCK	522	5	0	1	0	4	5	1	10	1	0	.
4	BISMARCK	529	10	0	1	1	15	6	0	10	3	0	.
5	BISMARCK	605	0	0	0	0	5	5	0	20	4	0	.
6	BISMARCK	612	1	0	1	1	3	4	0	20	1	0	.
7	BISMARCK	619	0	0	0	1	2	4	1	35	0	0	.
8	BISMARCK	626	0	0	8	0	6	1	1	67	0	0	.
9	BISMARCK	703	0	0	7	0	7	3	0	56	0	0	.
10	BISMARCK	710	0	0	5	0	8	0	0	60	0	0	.
11	BISMARCK	717	0	2	9	0	0	2	0	40	0	0	.
12	BISMARCK	724	0	6	7	1	0	5	0	20	0	0	.
13	BISMARCK	731	0	3	8	0	0	1	0	20	0	0	.
14	BISMARCK	807	0	1	6	0	0	2	0	14	0	0	.
15	BISMARCK	814	0	0	1	0	0	1	0	10	0	0	.
16	BISMARCK	821	0	1	0	0	0	2	0	5	0	0	.
17	BISMARCK	828	0	0	0	0	0	0	0	1	0	0	.
18	BISMARCK	904	0	0	0	0	0	0	0	2	0	0	.
19	BISMARCK	911	0	0	.	0	0	0	0	0	1	0	0
20	CARRINGTON	515	0	0	0	0	100	0	0	35	0	0	.
21	CARRINGTON	609	0	0	0	0	15	26	0	0	2	2	.
22	CARRINGTON	620	0	0	0	0	7	53	0	5	2	0	.
23	CARRINGTON	701	1	0	0	0	19	66	1	17	6	0	.
24	CARRINGTON	715	8	1	23	0	6	16	1	4	3	4	.
25	CARRINGTON	729	1	25	20	0	10	25	0	76	0	1	.
26	CARRINGTON	805	3	43	2	0	0	10	0	7	0	1	.
27	CARRINGTON	1006	487	54	0	2	42	112	0	103	0	10	.
28	COGSWELL	503	0	0	0	0	8	2	0	3	13	2	.
29	COGSWELL	509	0	0	0	0	15	0	0	9	4	1	.
30	COGSWELL	516	1	0	0	0	14	0	0	5	1	0	.
31	COGSWELL	523	0	0	0	0	2	0	0	3	0	1	.

Cutworm Project Continued:

OBS	SITE	DATE	EM	EO	ET	EA	PS	ST	AO	LC	PU	FJ	HE
32	COGSWELL	601	0	0	0	0	2	3	0	2	0	0	.
33	COGSWELL	606	0	0	0	0	1	1	0	2	0	0	.
34	COGSWELL	613	0	0	0	1	2	15	0	5	1	0	.
35	COGSWELL	620	0	0	0	0	1	2	2	3	0	0	.
36	COGSWELL	627	0	0	0	0	3	8	0	8	0	1	.
37	COGSWELL	705	2	0	9	0	4	7	0	10	0	0	.
38	COGSWELL	715	5	0	0	0	9	10	0	62	2	4	.
39	COGSWELL	718	2	0	41	0	1	2	0	123	0	0	.
40	COGSWELL	725	0	0	9	0	1	1	0	12	0	0	.
41	COGSWELL	801	2	1	9	0	0	3	0	35	0	0	.
42	COGSWELL	808	0	2	1	0	1	15	0	15	0	0	.
43	COGSWELL	817	8	0	0	0	1	7	0	9	0	0	.
44	COGSWELL	822	5	0	0	2	1	4	0	5	0	1	.
45	COGSWELL	829	18	0	0	1	2	4	0	3	1	2	.
46	COGSWELL	907	11	0	0	0	4	3	0	2	0	0	.
47	COGSWELL	911	2	0	0	1	1	0	0	8	1	0	.
48	COGSWELL	918	0	0	0	0	4	0	0	4	0	0	.
49	COGSWELL	1003	13	0	1	12	8	0	0	14	1	0	.
50	DICKINSON	509	0	0	0	0	5	0	0	7	0	0	0
51	DICKINSON	516	0	0	0	0	0	0	0	0	0	0	0
52	DICKINSON	523	0	0	0	0	0	0	0	5	0	1	0
53	DICKINSON	531	0	0	0	0	0	29	0	8	0	0	0
54	DICKINSON	606	2	0	0	0	0	27	0	3	0	0	0
55	DICKINSON	613	2	0	0	0	0	7	1	3	1	2	0
56	DICKINSON	620	11	1	0	0	0	17	0	17	0	27	0
57	DICKINSON	627	17	2	0	0	2	21	3	26	7	29	2
58	DICKINSON	705	15	2	37	0	3	47	12	115	13	16	6
59	DICKINSON	711	0	0	18	0	0	0	0	111	18	0	1
60	DICKINSON	718	0	0	66	0	0	41	0	357	4	0	2
61	DICKINSON	725	2	3	42	2	0	45	0	281	2	0	2
62	DICKINSON	801	0	3	36	0	1	8	0	122	0	0	0
63	DICKINSON	808	9	0	14	0	0	1	0	47	0	0	0
64	DICKINSON	815	45	0	0	0	0	27	0	3	0	0	2
65	DICKINSON	822	48	0	0	0	0	38	0	3	1	2	2
66	DICKINSON	830	39	0	0	0	1	25	2	6	0	2	3
67	DICKINSON	906	51	0	0	0	1	13	2	4	3	2	0
68	DICKINSON	913	20	2	0	0	1	10	0	3	12	0	1
69	DICKINSON	922	23	0	0	0	0	3	1	1	10	0	0
70	HETTINGER	602	0	0	0	0	23	5	0	14	0	0	.
71	HETTINGER	613	0	0	0	0	5	1	0	3	1	0	.

Cutworm Project Continued:

OBS	SITE	DATE	EM	EO	ET	EA	PS	ST	AO	LC	PU	FJ	HE
72	HETTINGER	620	1	0	0	0	7	5	0	4	4	0	.
73	HETTINGER	627	4	0	0	0	3	2	0	1	6	9	.
74	HETTINGER	705	13	0	0	0	4	7	0	2	10	4	.
75	HETTINGER	711	2	0	2	0	5	1	3	7	7	3	.
76	HETTINGER	718	4	0	3	0	8	3	5	7	6	5	.
77	HETTINGER	725	4	0	15	0	10	3	2	13	3	3	.
78	HETTINGER	801	3	7	13	0	3	0	0	9	0	0	.
79	HETTINGER	807	1	7	8	0	4	0	0	5	0	1	.
80	HETTINGER	906	25	3	0	2	4	8	0	6	1	2	.
81	HETTINGER	913	1	0	0	1	2	1	2	2	0	0	.
82	HETTINGER	921	0	0	0	3	0	0	0	1	0	0	.
83	HETTINGER	927	0	0	1	9	0	0	0	0	0	0	.
84	LANGDON	509	0	0	0	0	0	0	0	0	0	0	0
85	LANGDON	516	2	0	0	0	1	0	0	0	0	0	0
86	LANGDON	523	3	0	0	0	3	0	0	0	0	0	0
87	LANGDON	531	0	0	0	0	5	0	0	5	0	0	0
88	LANGDON	606	0	0	0	0	5	3	0	2	0	0	0
89	LANGDON	614	2	0	0	0	3	0	0	3	0	1	0
90	LANGDON	621	0	0	0	0	2	7	0	3	0	4	0
91	LANGDON	627	7	1	0	0	7	2	0	1	0	0	0
92	LANGDON	705	11	0	1	0	0	0	0	0	8	10	0
93	LANGDON	711	5	0	13	0	4	9	0	0	0	0	0
94	LANGDON	718	0	0	28	0	0	2	0	0	0	0	0
95	LANGDON	725	0	4	3	0	0	2	0	0	0	0	0
96	LANGDON	801	0	30	72	0	0	8	0	0	0	0	0
97	LANGDON	808	11	126	47	0	0	111	0	0	0	0	0
98	LANGDON	815	29	32	33	0	0	35	0	0	0	0	0
99	LANGDON	822	24	25	3	0	0	8	0	0	0	0	0
100	LANGDON	829	30	58	0	0	2	0	0	0	0	0	0
101	LANGDON	906	23	39	0	0	3	14	0	0	0	0	0
102	LANGDON	912	3	7	0	0	0	0	0	0	0	0	0
103	LANGDON	919	0	0	0	0	2	0	0	0	0	0	0
104	LANGDON	926	1	0	0	0	5	0	0	0	0	0	0
105	LANGDON	1003	0	0	0	0	0	1	0	0	0	0	0
106	MINOT	527	1	0	0	0	16	0	0	12	1	0	.
107	MINOT	602	0	0	0	0	2	2	0	6	0	0	.
108	MINOT	608	0	1	0	0	6	0	0	2	0	0	.
109	MINOT	615	0	1	0	0	.3	3	0	4	0	0	.
110	MINOT	623	3	1	0	0	.2	1	0	11	7	6	.
111	MINOT	630	8	0	2	1	5	1	0	111	1	8	.
112	MINOT	708	13	0	4	0	8	2	0	100	6	8	.

Cutworm Project Continued:

OBS	SITE	DATE	EM	EO	ET	EA	PS	ST	AO	LC	PU	FJ	HE
113	MINOT	713	0	0	10	0	9	1	0	95	2	2	.
114	MINOT	728	1	0	65	0	51	4	0	196	0	4	1
115	MINOT	805	1	0	10	0	0	2	0	96	0	1	1
116	MINOT	819	56	0	6	0	0	14	0	14	0	3	0
117	MINOT	825	4	0	0	0	1	1	0	0	0	0	2
118	MINOT	831	32	0	0	0	0	3	0	0	0	0	0
119	WILLISTON	505	0	0	0	0	2	0	0	0	0	0	0
120	WILLISTON	513	0	0	0	0	3	0	0	1	0	0	0
121	WILLISTON	520	0	0	0	0	1	0	0	0	0	0	0
122	WILLISTON	603	0	0	0	0	4	8	0	4	0	0	0
123	WILLISTON	609	0	0	0	0	2	11	0	3	0	0	0
124	WILLISTON	616	1	0	0	0	1	6	0	1	8	1	0
125	WILLISTON	623	3	0	0	0	0	6	0	0	2	0	0
126	WILLISTON	630	4	0	5	0	6	7	0	20	8	6	0
127	WILLISTON	707	1	1	8	0	2	4	1	49	2	2	0
128	WILLISTON	714	2	1	18	0	6	3	2	46	0	0	0
129	WILLISTON	725	1	6	90	0	2	16	1	49	1	0	0
130	WILLISTON	728	1	3	22	0	0	10	0	11	0	0	0
131	WILLISTON	804	13	4	34	0	1	5	0	30	2	0	0
132	WILLISTON	812	31	5	14	0	0	5	0	2	1	3	1
133	WILLISTON	819	62	1	0	0	0	28	0	1	0	3	0
134	WILLISTON	826	47	3	0	0	2	12	0	3	0	1	2
135	WILLISTON	901	77	1	2	1	2	28	3	4	1	0	0
136	WILLISTON	1003	79	5	0	0	5	21	0	6	12	1	0

Trap	**Species Name**	**Common Name**
Em	Euxoa messoria	darksided cutworm
Eo	Euxoa ochrogaster	redbacked cutworm
Et	Euxoa tessellata	striped cutworm
Ea	Euxoa auxiliaris	army cutworm
Ps	Peridroma saucia	variegated cutworm
Sc	Scotograma trifolii	clover cutworm
Ao	Agrotis orthogonia	pale-western cutworm
Lc	Leucania commoides	
Pu	Pseudaletia unipuncta	armyworm
Fj	Feltia jaculifera	dingy cutworm
He	Homoeosoma electellum	sunflower moth

Annual Trap Catch and Average Trap Catch of Various Moths Attracted to Pheromone Baited Traps in North Dakota

		Em	Eo	Et	Ea	Ps	St	Ao	Lc	Pu	Fj	He
Straubville	82	152	1	12	3	--	41	1	293	34	--	7
	83	77	3	66	5	89	97	6	338	33	12	--
	$\overline{X}$	115	2	39	4	89	69	4	316	34	12	7
Williston	80	768	157	191	164	31	112	9	330	--	--	--
	81	334	72	182	25	90	146	7	235	28	--	--
	82	79	34	144	20	--	103	52	151	72	--	2
	83	322	30	183	1	39	169	6	230	37	17	3
	$\overline{X}$	376	73	175	53	53	133	19	236	46	17	3
Dickinson	80	723	123	331	232	65	195	4	329	--	--	--
	81	244	70	203	100	224	216	36	371	43	--	--
	82	634	24	173	6	--	296	9	384	130	--	1
	83	284	13	213	2	14	359	21	1122	62	81	21
	$\overline{X}$	471	57	230	85	101	267	18	552	78	81	11
Langdon	80	199	613	523	21	117	134	23	501	--	--	--
	81	250	463	436	26	186	55	15	605	144	--	--
	82	165	198	117	0	--	55	5	109	30	--	3
	83	151	322	200	0	42	202	0	14	8	15	0
	$\overline{X}$	191	399	319	12	115	112	11	307	61	15	3
Hettinger	80	831	94	324	287	50	122	17	294	--	--	--
	81	117	27	61	332	243	48	25	356	76	--	--
	82	98	9	101	12	--	56	5	216	96	--	18
	83	58	17	42	15	78	36	12	74	38	27	--
	$\overline{X}$	276	37	132	162	124	66	15	235	70	27	18
Bismarck	80	57	4	56	0	6	27	0	57	--	--	--
	81	151	21	225	10	159	179	7	307	23	--	--
	82	137	20	134	3	--	102	2	432	37	--	3
	83	16	13	54	4	50	41	2	395	9	0	--
	$\overline{X}$	90	15	117	4	72	87	2	298	23	0	3
Carrington	82	834	174	166	8	--	127	1	161	50	--	1
	83	490	123	45	2	199	308	2	247	13	18	--
	$\overline{X}$	662	149	106	5	199	218	2	204	32	18	1
Minot	80	1322	627	710	20	95	241	9	865	--	--	--
	81	303	158	147	3	263	57	14	256	50	--	--
	82	235	49	238	1	--	13	2	237	59	--	0
	83	119	3	97	1	87	34	0	647	17	4	4
	$\overline{X}$	495	212	298	8	148	86	8	501	42	4	2

SUMMER FALLOW PRACTICES DEMONSTRATION

By

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Assoc. Ext. Eg. Eng.

INTRODUCTION:

Summer Fallow Practices Demonstration trials were conducted during the summer of 1983 in cooperation with the Dickinson and Williston Branch Experiment Stations. The objective of the project was to demonstrate different fallowing practices stressing the importance of maintaining a protective residue cover on the soil surface. Individual fields were four acres each allowing for the use of regular sized field equipment. Parameters monitored included fuel and labor requirements, soil moisture, soil fertility, and residue levels.

PRACTICES DEMONSTRATED:

Four practices were demonstrated at each location. These were identified as Conventional Fallow, Stubble Mulch, Reduced Tillage, and Chemical Fallow. The treatments used on each practice are shown in Table 1.

Table 1. Treatments Used in Fallowing Practices

PRACTICES	TREATMENTS	
	WILLISTON	**DICKINSON**
Conventional Fallow	Chisel Plow with sweeps (2x) Rod Weeder (1x)	Field Cultivator (3x)
Stubble Mulch	Undercutter with 30" sweeps (3x) Chisel Plow with sweeps (1x)	Undercutter with 8′ sweeps (3x)
Reduced Tillage	Roundup & Broadleaf Herbicide & Surf. (1x) Chisel Plow with sweeps (2x)	
Chemical Fallow	Roundup & Broadleaf Herbicide & Surf. (3x)	

Spring started out cool causing slow weed growth initially. The first treatments were performed May 26 at Williston and June 8 at Dickinson. High temperatures and adequate moisture contributed to vigorous weed growth throughout the summer. The second treatments were performed the first week of July at both locations with the exception of the Stubble Mulch practice at Williston. Here, due to excessive weed growth, the treatment was performed a week earlier.

The third treatments at Williston involving Tillage were performed the last week of July with the Chemical Fallow being treated a week later. The Stubble Mulch practice at Williston required a fourth treatment on September 6.

At Dickinson, the third and final treatments on all four practices were performed on August 8. At this time, the Stubble Mulch and Reduced Tillage practices were very heavily infested with pigeon grass from 10-12 inches tall and heading. Treating these two practices a week to ten days earlier would have been desirable.

RESIDUE LEVELS:

Residue levels were measured at both locations in the spring prior to any treatment and again in the fall after all treatments were completed by collecting the residue from a given area and weighing it. Percent surface cover was estimated at several locations on each practice by walking 100 steps and counting the number of times a designated point struck residue.

The Dickinson site was cropped with oats the previous year and had the straw baled off. This left about 750 lbs. of residue per acre in the spring prior to fallowing treatments, which was about a 60% surface cover.

The Williston site was cropped with spring wheat the previous year with the straw spread after harvest. This left about 2,000 lbs. of residue per acre in the spring, which was a 90-95% surface cover.

Residue levels were again measured in the individual practices at the end of the season (Table 2). In some cases due to additional weed growth, residue levels were actually higher at the end of the season than they were at the start.

Table 2. Residue Levels on Fallow Practices

	Williston		**Dickinson**	
	Lbs/Ac.	**% Cover**	**Lbs/Ac.**	**% Cover**
Spring – Before Treatment	2,000	90-95	750	60
Fall – After Treatment:				
Conventional Fallow	750	50	140	8
Stubble Mulch	1,200	60	800	45
Reduced Tillage	1,000	58	600	30
Chemical Fallow	2,500	90	1,100	65

SOIL FERTILITY:

Soil samples were taken at both locations in the spring and again in the fall after treatments were completed. The samples were fertility tested by the NDSU Soil Testing Lab. The results indicate that Nitrogen levels on all the fallow sites increased substantially from last spring and are also considerably higher than that on adjacent cropped ground (Table 3). Among the individual fallow sites at both locations the Conventional Fallow had the highest Nitrogen level, possibly due to better organic matter breakdown as a result of tillage burying the residue. The Stubble Mulch practice had the lowest Nitrogen levels at both locations, possibly due mainly to the excessive weed growth that existed.

Table 3. Soil Fertility Levels

	Williston			**Dickinson**		
	N Lb/Ac 0-2′	**P Lb/Ac 0-6"**	**K Lb/Ac 0-6"**	**N Lb/Ac 0-2′**	**P Lb/Ac 0-6"**	**K Lb/Ac 0-6"**
May 25	26	14	550	24	17	375
Sept. 28:						
Conventional Fallow	114	11	470	102	13	380
Stubble Mulch	65	11	520	56	10	235
Reduced Tillage	110	8	570	78	11	270
Chemical Fallow	83	15	710	72	12	340
Cropped Ground	25	16	630	17	9	350

SUMMARY:

This demonstration shows several positive aspects for using Conventional Fallowing Systems – less cost, higher Nitrogen levels, and similar moisture retention to other fallowing practices. However, the thing it doesn’t show is the high erosion hazard that exists with this method.

At the Dickinson location where a small amount of residue existed at the start, the land was rolling and several hard rainstorms hit the area throughout the summer, there’s no doubt that Chemical Fallow was worth the expense. A high level of soil loss was observed on all treatments using tillage, especially the Conventional Fallow.

At the Williston location, it was a different story. A large amount of residue existed at the start, the land was only gently rolling, and the rainfall through the summer was moderate. Here, even after three passes with a chisel plow (Conventional Fallow), enough residue was retained on the surface to provide adequate erosion protection. No erosion was observed on any of the practices. Consequently, the best fallow system to use in this situation was the one that had the lowest cost.

For a farmer, the decision on which fallowing system to use depends mostly on the residue level available at the start and the erodibility of the land being fallowed.

FUEL AND LABOR REQUIREMENTS:

As stated earlier, fields were four acres in size so that full sized equipment could be used enabling records to be kept on fuel and labor requirements. The Experiment Station's equipment normally used for field work was used here except for the Chemical Fallow at Dickinson. Here, an 18′ sprayer normally used for plot work was used. Fuel and labor requirements for the entire fallow season are shown in Table 4.

Table 4. Fuel and Labor Requirements for Fallowing Practices

	Williston		Dickinson	
	Fuel Gal/Ac	**Labor Hrs/Ac**	**Fuel Gal/Ac**	**Labor Hrs/Ac**
Conventional Fallow	2.37	.38	1.77	.40
Stubble Mulch	3.49	.53	2.17	.55
Reduced Tillage	1.78	.31	1.88	.50
Chemical Fallow	.52	.15	.48	.50

The tillage equipment used at both locations was basically the same size. However, a larger tractor was used at Williston allowing for faster field yields and lower labor requirements. The sprayer used at Dickinson was smaller than that normally used for field work, which is the reason for the higher than expected labor requirements for the Chemical Fallow. The Fuel and Labor Requirements for the Stubble Mulch practice at Williston were considerably higher than the others mainly due to the additional treatment required. The Conventional Fallow at Dickinson had lower requirements than the Reduced Tillage Fallow because a field cultivator was used for all three treatments compared to using a chisel plow twice on the Reduced Tillage.

SOIL MOISTURE:

Soil samples were taken to the four foot depth the week of May 23, before treatment, and again the week of September 26, after all treatments. Cropped ground adjacent to the fallow site was also sampled in the fall. The results are shown in Figure 1.

PLEASE INSERT SOIL MOISTURE LEVEL ON FALLOW PRACTICES FIGURE.

Soil bulk density readings were not taken so results are shown in percent soil moisture on a dry basis. The soil type within each field was extremely variable, especially at the Dickinson site. This allowed making general comparisons only between practices at each location. At both locations, the fallowed ground was considerably wetter than adjacent cropped fields. Soil moisture on the fallow sites to the 2′ depth was actually higher in the spring prior to any fallowing treatments. Moisture from 2 to 4 feet went basically unchanged. Little soil moisture difference was observed between individual fallowing practices.

COSTS:

A cost analysis was performed between the different fallowing practices. The treatments used on each practice at both locations are shown in Table 1. Herbicide rates were adjusted slightly depending on the weed situation. For the most part, a tank mix of ⅓ to ¾ pts. Roundup plus ¼ to ⅓ pts. Banvel or 2-4D plus .5% surfactant was used.

Two cost analyses were generated (Figure 2). The first shows strictly the variable costs: the cost of fuel, labor, and herbicides. This obviously has the greatest affect on a farmer's cash flow.

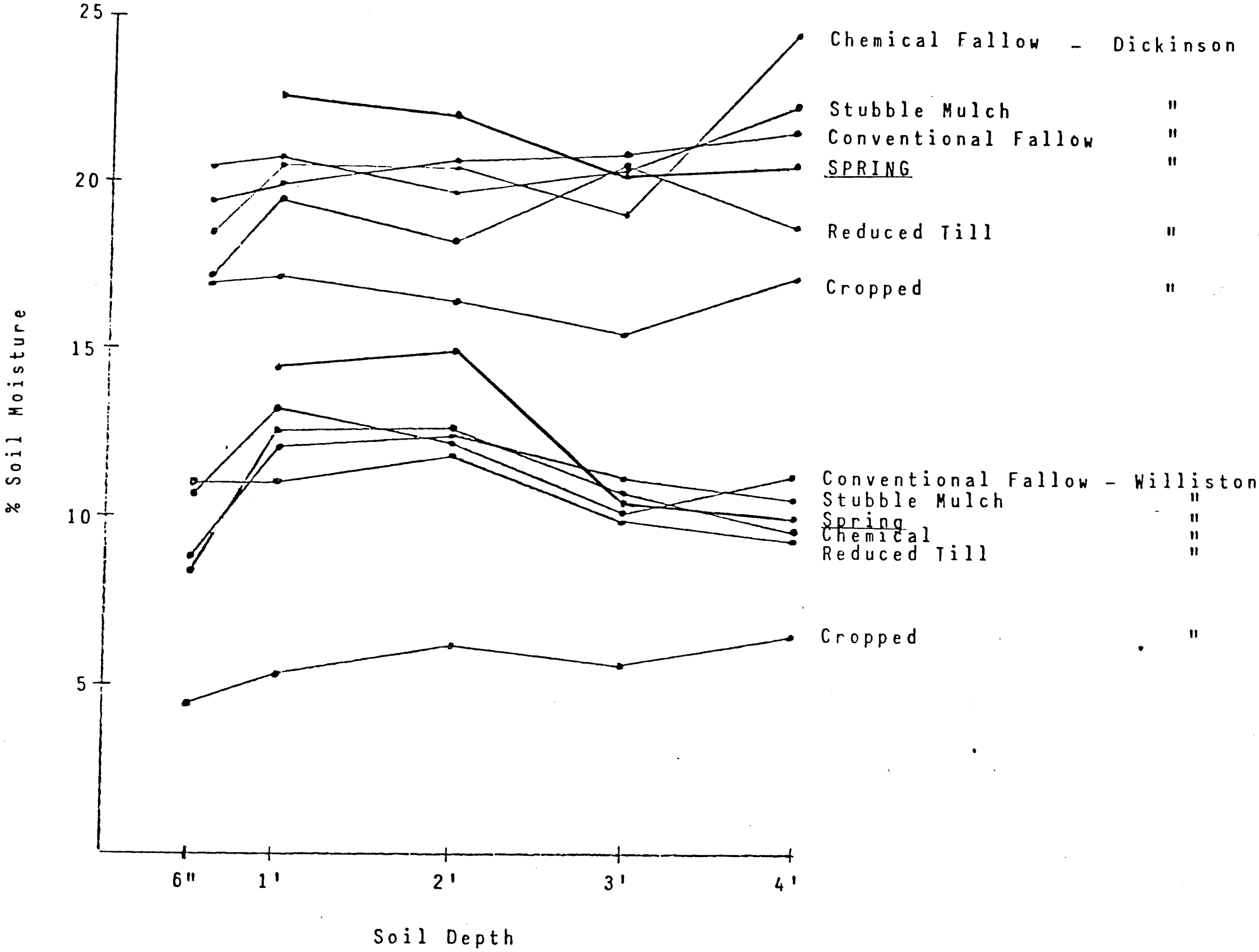
The second analysis included both Variable and Fixed Cost. Data here was obtained from Minnesota Extension Folder 589, "Minnesota Farm Machinery Economic Cost Estimates for 1983". This information uses new machinery prices and is given for several machine sizes. Information for a wide sweep machine and a rod weeder were not given so data for a similar sized chisel plow and field cultivator were used instead.

In the Variable Cost Analysis, fallowing practices utilizing herbicide treatment are considerably higher priced. The gap is narrowed considerably when Fixed Costs are figured in however; Chemical Fallow still has the highest cost.

Figure 2. Cost Per Acre for the Entire Season

Practice	Variable Costs (Fuel, Labor, Chemical)	Fixed and Variable Costs
	$/Acre	$/Acre
Dickinson:		
Conventional Fallow	4.59	12.75
Stubble Mulch	5.99	18.48
Reduced Tillage	12.55	21.50
Chemical Fallow	27.21	29.79
Williston:		
Conventional Fallow	5.28	16.57
Stubble Mulch	7.54	24.64
Reduced Tillage	8.42	18.71
Chemical Fallow	22.56	27.17
Fuel @ $1.25/gal.		
Labor @ $6.00/hr.		

FIGURE 1: SOIL MOISTURE LEVEL ON FALLOW PRACTICES



% Soil Moisture - Avg. to 4'

	Williston	Dickinson
SPRING	13.5	21.2
Conventional Fallow	11.6	20.5
Chemical Fallow	10.8	20.6
Reduced Till Fallow	10.9	18.9
Stubble Mulch	11.1	20.8
Cropped	6.0	16.7

FIELD EVALUATION PLANTING: TECHNICAL REPORT – 1982

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

Project Title: Field Evaluation of Woody Plant Materials

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas were located in the three states served by the center. These sites provide planting locations for assemblies of trees and shrubs to be evaluated under uniform culture and management.

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

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

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

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

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

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

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

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

Methods and Materials

Assembly: Refer to Table 31 for a list of woody species planted from 1978 through 1982.

Planting Plan: The planting site is approximately 500 feet long and 200 feet wide. The area is divided into four blocks. Each block consists of single row, non-replicated plots. Each plot contains a minimum of 5 plants. Row length is 100 feet and spacing between rows is 20 feet. Block 1 contains conifers spaced 5 feet within row. Block 2 contains shrubs and small trees spaced 5 feet within row. Block 3 contains medium sized trees, spaced 10 feet within row. Block 4 contains tall trees spaced 10 feet within row. All rows run from west to east.

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

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

Planting Date: Refer to Table 31 for a list of woody species planted from 1978 through 1982.

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. Six to seven tillage operations were performed each year in the months of May through August. Hand hoeing was done as needed to control weeds in rows.

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

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

1982: No rodent repellent was applied.

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

Crop Residue Management: No cover crop has been established.

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

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

1982: Climatic data recorded at Dickinson Branch Experiment Station, Dickinson, North Dakota is shown in Table 30.

Plant performance data was reported on SCS-ECS-58 Woody Plant Initial Evaluation sheets. Survival, vigor, canopy cover and height, and special remarks were recorded for all hardwoods and remaining conifers on May 5 and September 16, 1982.

Results

Plant Performance: Mean data for individual accessions of trees and shrubs is shown in Table 31. The following accessions exhibit potential for further evaluation:

Accession Number	**Genus/Species Origin/Source**	**Plot Location**	**Remarks**
ND-1765 5980T	Siberian larch Larix sibirica USDA, FS, Shelterbelt Lab., Bottineau, ND	1/03/1-10	
ND-313	Red tatarian honeysuckle Lonicera tatarica sibirica USDA, ARS, Cheyenne, WY USDA, SCS, PMC, Bismarck, ND	2/01/1-10	
ND-1730 5994T	Red tatarian honeysuckle Lonicera tatarica sibirica Lincoln-Oakes Nursery, Bismarck, ND	2/01/11-20	
ND-628 5887T	Silverberry Elaeagnus commutata Wells, Co., ND	2/02/1-10	
‘Midwest’	Manchurian crabapple Malus baccata mandshurica Echo Manchuria Res. Sta. Morden, Manitoba, Canada	3/01/1-5	
WY-843 ‘Bighorn’ 4646T	Skunkbush sumac Rhus trilobata Basin, WY USDA, SCS, PMC, Bismarck, ND	2/02/11-20 2/04/1-10	
‘Red Splendor’ 6004T	Flowering crabapple Malus sp. x Lee Nursery, Fertile, MN	3/01/6-10	

Accession Number	Genus/Species Origin/Source	Plot Location	Remarks
ND-14	Harbin pear Pyrus ussuriensis Res. Sta. Morden, MB, Canada SCS, PMC, Bismarck, ND	3/02/6-10	
SD-134 6066T	Apricot Prunus armeniaca Brookings Co., Brookings, SD	3/04/1-5	
ND-416 6067T	Apricot Prunus armeniaca Burleigh Co., Bismarck, ND	3/05/6-10	
ND-1336 6088T	Chokecherry Prunus virginiana Mercer Co., Stanton, ND	3/06/6-10	
ND-1873 5648T	Amur maple Acer ginnala Lincoln-Oakes Nursery, Bismarck, ND	3/09/1-5	
SD-156 5890T	Green ash Fraxinus pennsylvanica Deuel Co., Clear Lake, SD	4/01/1-5	
'Cardan' MDN-12002 5895T	Green ash Fraxinus pennsylvanica USDA, ARS, Mandan, ND Carlyle, MT	4/02/1-5	
ND-1759 5893T	Green ash SD-156 x MDN-12002 Fraxinus pennsylvanica USDA, SCS, PMC, Bismarck, ND	4/02/6-10	
ND-364 5867T	Russian olive Elaeagnus angustifolia Burleigh Co., Menoken, ND	4/06/1-5	

The following accessions failed to survive:

Accession Number	Genus/Species Origin/Source	Plot Location	Remarks
ND-1717 6045T	Scotch pine Pinus sylvestris USDA, FS, For. Sci. Lab., Lincoln, NE Pieria, Greece	1/10/1-5	Failed to Establish
ND-1760 6035T	Engelman spruce Picea engelmanii Coeur D' alene, ID USDA, FS, Shelterbelt Lab., Bottineau, ND	1/05/1-5	Failed to Establish
ND-1719 6047T	Scotch pine Pinus sylvestris USDA, FS, For. Sci. Lab., Lincoln, NE Prague, Czechoslovakia	I/05/6-10	Failed to Establish
ND-1710 4364T	Pinus nigra USDA, FS, For. Sci. Lab. Lincoln, NE Turkey	1/06/1-5	Failed to Establish
ND-1712 6040T	Pinus nigra USDA, FS, For. Sci. Lab. Lincoln, NE Turkey	1/06/6-10	Failed to Establish
ND-1714 6039T	Pinus nigra USDA, FS, For. Sci. Lab. Lincoln, NE Turkey	1/07/1-5	Failed to Establish
ND-1716 6041T	Pinus nigra USDA, FS, For. Sci. Lab. Lincoln, NE Kellog Forest, Michigan	1/08/1-5	Failed to Establish

Accessions which failed to survive (Continued):

Accession Number	**Genus/Species Origin/Source**	**Plot Location**	**Remarks**
ND-1720 6037T	Pinus densiflora USDA, FS, For. Sci. Lab. Lincoln, NE Tono, Japan	1/08/6-10	Failed to Establish
ND-1722 6093T	Pseudotsuga menzeisii USDA, For. Sci. Lab. Lincoln, NE Douglas Co., Colorado	1/09/6-10	Failed to Establish
ND-1723 6232T	Northern white cedar Thuja occidentalis USDA, FS, For. Sci. Lab. Lincoln, NE Quebec, Canada		Failed to Establish
ND-3805	Amur corktree Phellodendron amurense UM, Dept. of Hort. Arboretum Chaska, MN SDSU, Brookings, SD		Failed to Establish
ND-81 6078T	Sloe Prunus spinosa Res. Sta. Morden, MB, Canada USDA, SCS, PMC, Bismarck, ND	3/08/1-5	Winter Killed
ND-573 5967T	Cathay walnut Juglans cinerea Res. Sta. Morden, MB, Canada	4/04/1-5	Failed to Establish

Rabbit damage was severe the winter of 1981-1982. Nearly all species showed some signs of rabbit damage. The following accessions of Apricot were completely girdled and were pruned back to the ground May 12, 1982, to stimulate regrowth.

Accession Number	**Genus/Species Origin/Source**	**Plot Location**
SD-132 6064T	Apricot Prunus armeniaca Brookings Co., Brookings, SD USDA, SCS, PMC, Bismarck, ND	3/03/1-5
SD-133 6065T	Apricot Prunus armeniaca Brookings Co., Brookings, SD USDA, SCS, PMC, Bismarck, ND	3/03/6-10
SD-134 6066T	Apricot Prunus armeniaca Brookings Co., Brookings, SD USDA, SCS, PMC, Bismarck, ND	3/04/1-5
Mantoy 6069T	Apricot Prunus armeniaca USDA, ARS, Mandan, ND USDA, SCS, PMC, Bismarck, ND	3/04/6-10
ND-1178 6070T	Apricot Prunus armeniaca Walsh Co., Park River, ND USDA, SCS, PMC, Bismarck, ND	3/05/1-5
ND-416 6067T	Apricot Prunus armeniaca Burleigh Co., Bismarck, ND USDA, SCS, PMC, Bismarck, ND	3/05/6-10
ND-423 6068T	Apricot Prunus armeniaca Stark Co., Dickinson, ND USDA, SCS, PMC, Bismarck, ND	3/06/1-5

Project No: 38I316K

Table 30. 1982 Weather Summary – Official Station, North Dakota State University Dickinson Branch Experiment Station, Dickinson, North Dakota

Month	Temp. (Mean)	Normal Temp. (Mean)	Deviation From Norm.	Total Precip.	Normal Precip.	Deviation From Norm.
January		10.6˚F		0.85 in.	0.43 in.	+0.42 in.
February		15.5		0.40	0.41	-0.01
March		24.3		1.68	0.72	+0.96
April		40.5		1.85	1.42	+0.43
May		52.2		4.32	2.36	+1.96
June		61.3		3.48	3.56	-0.13
July		68.4		2.02	2.15	-0.13
August		67.5		2.63	1.78	+0.85
September		55.8		1.77	1.32	+0.45
October		45.2		6.51	0.91	+5.60
November		28.4		0.63	0.52	+0.11
December		15.6		0.49	0.41	+0.08
Annual		40.4		26.58	15.99	+10.59

	Last Killing Frost	**First Killing Frost**	**Frost Free Days**
1982	May 7	September 15	131

Total Seasonal Precipitation (Average): 11.27 inches

Total Seasonal Precipitation (April-August) 1982: 14.25 inches

USDA, SCS, PMC, Bismarck, North Dakota

210 – Project No: 38I316K

Project Title: Field Evaluation of Woody Plant Materials (FEP)

Location: North Dakota State University, Dickinson Branch Experiment Station, Dickinson, North Dakota

Major Land Resource Area: 054

202 – Soil Series Texture: Parshall fine sandy loam

201 – Year of Record: 1982

211-PLOT-LOCATION		304-MATL-PLTD	(Establishment, material planted)
23,1-ACC-NO	(Prime-PMC-control number,	306-AGE	(Age of stock)
2-PLANT SYMBOL	PI number)	305-NO-PLTS	(Number of plants)
12-COMMON-NAME		310-NO-PLT-SRV	(Number of plants surviving)
4-GENUS-NAME		363-PCT-SRV	(Percent survival)
5-SPECIES-NAME		337-VI	(Vigor, plant)
29,30-COLL-SITE-STATE, COUNTY	(Origin/Source)	347-R-CO	(Resistance to cold)
212-YR-PLT	(Year planted)	359-CAN-COV	(Canopy cover, cm)
209-TRANS-DATE	(Transplant date)	360-PLNT-HT	(Plant height, cm)

Table 31. 38I316K Field Evaluation of Woody Plant Materials – Dickinson, ND – 1982

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
1/01/1-10	ND-1729 5979T	LASI*	Siberian larch Larix sibirica NDFS State Nursery Towner, ND	78	05/16	PLBR	1-0	10	8	80	8		29	46	
1/02/1-10	SL-383-T Pallet No. 2392 5976T	LASI*	Siberian larch Larix sibirica USDA, FS, Shelterbelt Lab., Bottineau, ND Denbigh Ex. Forest	78	05/16	PLBR	1-0	10	9	90	6		47	69	
1/03/1-10	ND-1765 5980T	LASI*	Siberian larch Larix sibirica USDA, FS, Shelterbelt Lab., Bottineau, ND	78	05/17	PLBR	2-0	10	10	100	5		63	122	
1/04/1-5	ND-1763 6043T	PIPO*	Ponderosa pine Pinus ponderosa var. ponderosa USDA, FS, Shelterbelt Lab., Bottineau, ND 757-5 Todd Co., SD	78	05/16	CONT	1-1	5	4	80	7		74	134	Winter Injury
1/04/6-10	ND-1565 6036T	PIAR	Bristle cone pine Pinus aristata USDA, FS, Shelterbelt Lab., Bottineau, ND	78	05/16	CONT	1-1	5	1	20			65	90	
1/06/1-10	ND-1863 5909T	GLTR	Honey locust Gleditsia triacanthos Brown Co., SD USDA, SCS, PMC, Bismarck, ND	82	05/12	PLBR	2-0	10	9	90	5		33	46	

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
1/07/1-10	ND-3804	ROPS	Black locust Robinia pseudoacacia Darby, MT ND Forest Service State Nursery, Towner, ND	82	05/12	CONT	1-0	10	7	70	5		53	76	
2/01/1-10	ND-313 5996T	LOTAS*	Red tatarian honeysuckle Lonicera tatarica sibirica USDA, ARS, Cheyenne, WY USDA, SCS, PMC, Bismarck, ND	78	05/17	PLBR	2-0	10	10	100	4		162	136	Moderate grasshopper damage, leaf spot
2/01/11-20	ND-1730 5994T	LOTAS*	Red tatarian honeysuckle Lonicera tatarica sibirica Lincoln-Oakes Nursery, Bismarck, ND	78	05/17	PLBR	2-0	10	10	100	4		181	160	Leaf spot, and mildew
2/02/1-10	ND-628 5877T	ELCO*	Silverberry Elaeagnus commutata Wells Co., ND	78	05/17	PLBR	2-0	10	10	100	5		151	145	
2/02/11-20	WY-843 ‘Bighorn’ 4646T	RHTR	Skunkbush sumac Rhus trilobata USDA, SCS, PMC, Bismarck, ND Bighorn Co., WY	78	05/17	PLBR	2-0	10	10	100	3		232	153	
2/03/1-10	ND-26 11852T	*	Honeysuckle Lonicera sp. USDA, ARS Mandan, ND	79	05/2	PLBR	2-0	10	10	100	6		104	118	Many grasshoppers
2/03/11-15	ND-452 19978T	LOXYM*	Honeysuckle Lonicera xylosteum mollis USDA, ARS, Cheyenne, WY USDA,SCS, PMC, Bismarck, ND	79	05/2	PLBR	2-0	5	5	100	4		133	137	Leaf mildew, grasshoppers

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
2/04/1-10	WY-843 'Bighorn' 4646T	RHTR	Skunkbush sumac <u>Rhus</u> <u>trilobata</u> USDA, SCS, PMC, Bismarck, ND Bighorn Co., WY	79	05/2	PLBR	2-0	10	10	100	5		126	93	Leaf spots
2/04/11-20	PM-ND-283 6079T	PRTE*	Russian almond <u>Prunus</u> <u>tenella</u> ND Fish & Game Dept. USDA, SCS, PMC, Bismarck, ND	80	05/08	PLBR	2-0	10	10	100	4		54	60	Leaf spots
2/05/1-10	ND-11 5993T	LOMA6	Amur honeysuckle <u>Lonicera</u> <u>maackii</u> Res. Sta. Morden, MB, Canada	81	05/07	CONT	0-1	10	10	100	4		42	44	
2/06/1-5	ND-995 PI-303584	SAHU	Prairie willow <u>Salix</u> <u>humilis</u> USDA, PI Sta., Ames, IA	82	05/12	PLBR-CONT	1-2	5	4	80	4		58	66	
2/06/6-10	PI-370126	SALIX	Willow <u>Salix</u> <u>sp.</u>	82	05/12	PLBR-CONT	0-1	5	5	100	4		33	48	
2/07/1-10	ND-624 6094T	PTTR	Common hop tree <u>Ptelea</u> <u>trifoliata</u> Ramsey Co., ND USDA, SCS, PMC, Bismarck, ND	82	05/12	PLBR	2-0	10	9	90	5		24	33	
3/01/1-5	'Midwest' 6003T	MABAM*	Manchurian crabapple <u>Malus</u> <u>baccata</u> <u>mandshurica</u> Echo Manchuria/Res. Sta. Morden, MB, Canada USDA, SCS, PMC, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	3		144	169	Deer browse, rodent damage

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
3/01/6-10	‘Red Splendor’ 6004T	*	Flowering crabapple Malus sp. x Lee Nursery, Fertile, MN	78	05/17	PLBR	2-0	5	5	100	3		181	256	
3/02/1-5	ND-1731 6001T	MABA*	Siberian crabapple Malus baccata Lincoln-Oakes Nursery, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	3		178	249	2 replacements
3/02/6-10	ND-14 1095T	PYUS*	Harbin pear Pyrus ussuriensis Harbin, Manchuria/Res. Sta. Morden, MB, Canada USDA, SCS, PMC, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	3		195	272	Good growth
3/03/1-5	SD-132 6064T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Brookings Co., SD	78	05/17	PLBR	2-0	5	5	100	5		159	183	2 replacements
3/03/6-10	SD-133 6065T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Brookings Co., SD	78	05/17	PLBR	2-0	5	3	60	6		185	185	
3/04/1-5	SD-134 6066T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Brookings Co., SD	78	05/17	PLBR	2-0	5	5	100	7		124	146	
3/04/6-10	‘Mantoy’ 6069T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND USDA, ARS, Mandan, ND	78	05/17	PLBR	2-0	5	5	100	6		195	212	

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
3/05/1-5	ND-1178 6070T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Walsh Co., ND	78	05/17	PLBR	2-0	5	4	80	7		168	161	
3/05/6-10	ND-416 6067T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Burleigh Co., ND	78	05/17	PLBR	2-0	5	5	100	7		142	137	
3/06/1-5	ND-423 6068T	PRAR*	Apricot Prunus armeniaca USDA, SCS, PMC, Bismarck, ND Stark Co., ND	78	05/17	PLBR	2-0	5	5	100	7		155	190	
3/06/6-10	ND-1336 6088T	PRVI	Chokecherry Prunus virginiana Mercer Co., ND	78	05/17	PLBR	2-0	5	5	100	3		259	313	Slight leaf spot
3/07/1-5	ND-1732 6090T	PRVI	Chokecherry Prunus virginiana Lincoln-Oakes Nursery, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	4		247	293	Moderate mildew, slight leaf spot
3/07/6-10	'Schubert' 12608T	PRVI	Chokecherry Prunus virginiana USDA, ARS, Mandan, ND USDA, SCS, PMC, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	6		116	169	Mildew
3/08/1-5	ND-81 6078T	PRSP	Sloe Prunus spinosa Res. Sta. Morden, MB, Canada USDA, SCS, PMC, Bismarck, ND	78	05/17	PLBR	2-0	5	0	0					

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
3/08/6-10	ND-629 5645T	ACGI	Amur maple Acer ginnala Res. Sta. Morden, MB, Canada	79	05/2	PLBR	2-0	5	4	80	5		121	138	3 replacements
3/09/1-5	ND-1873 5648T	ACGI	Amur maple Acer ginnala Lincoln-Oakes Nursery, Bismarck, ND	79	05/2	PLBR	2-0	5	5	100	5		166	193	2, 4-D damage
3/09/6-10	ND-686 6225T	SYAMJ*	Japanese tree lilac Syringa amurensis japonica ND Game & Fish Dept.	79	05/2	PLBR	2-0	5	3	60	4		62	77	
3/10/1-5	ND-3773 21576T		Willow Salix sp. Norman Co., MN USDA, SCS, PMC, Bismarck, ND	82	05/12	PLBR	0-1	5	3	60	7		11	22	
3/10/6-10	Mich-433	SAPE	Laurel willow Salix pentandea USDA, SCS, Rose Lake PMC, East Lansing, MI	82	05/12	PLBR	0-1	5	5	100	5		13	38	
4/01/1-5	SD-156 5890T	FRPE	Green ash Fraxinus pennsylvanica Deuel Co., SD	78	05/17	PLBR	2-0	5	5	100	3		171	232	3 replacements
4/01/6-10	ND-1734 5891T	FRPE	Green ash Fraxinus pennsylvanica Lincoln-Oakes Nursery, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	4		143	222	2 replacements

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
4/02/1-5	MDN-12002 5895T	FRPE	Green ash <u>Fraxinus</u> <u>pennsylvanica</u> USDA, ARS, Mandan, ND Wibaux Co., MT	78	05/17	PLBR	2-0	5	5	100	3		228	308	5 replacements
4/02/6-10	ND-1759 5893T	FRPE	Green ash <u>Fraxinus</u> <u>pennsylvanica</u> SD-156 x MDN-12002 USDA, SCS, PMC, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	4		176	246	5 replacements
4/03/1-5	ND-647 5887T	FRNI	Black ash <u>Fraxinus</u> <u>nigra</u> Res. Sta. Morden, MB, Canada	78	05/17	PLBR	2-0	5	5	100	4		126	243	Good growth
4/03/6-10	ND-1432 5658T	AEGL	Ohio buckeye <u>Aesculus</u> <u>glabra</u> Res. Sta. Morden, MB, Canada	78	05/17	PLBR	2-0	5	1	20	6		45	65	
4/04/1-5	ND-1879 11850T	GLSI	Chinese honey locust <u>Gleditsia</u> <u>sinensis</u> Woodward, OK USDA, ARS, Mandan, ND	80	05/08	PLBR-CONT	2-1	5	5	100	4		43	68	
4/04/6-10	ND-548 5969T	JUMA*	Manchurian walnut <u>Juglans</u> <u>mandshurica</u> Res. Sta. Morden, MB, Canada	78	05/17	PLBR	2-0	5	3	60	6		168	110	Winter injury
4/05/1-5	ND-1170 6009T	MOAL	Mulberry <u>Morus</u> <u>alba</u> Burleigh Co., ND	78	05/17	PLBR	2-0	5	5	100	3		420	325	Moderate Winter injury
4/05/6-10	ND-363 5866T	ELAN	Russian olive <u>Elaeagnus</u> <u>angustifolia</u> Burleigh Co., ND	78	05/17	PLBR	2-0	5	5	100	4		240	296	

Plot Location	Accession Number	Plant Symbol	Genus/Species Origin/Source	Yr. Plt.	Trans. Date	Matl. Pltd.	Age	No. Plts.	No. Plt. Srv.	Pct. Srv.	V I	C O	Can. Cov. (cm)	Plnt. Ht. (cm)	Remarks
4/06/1-5	ND-364 5867T	ELAN	Russian olive Elaeagnus angustifolia Burleigh Co., ND	78	05/17	PLBR	2-0	5	5	100	2		375	400	
4/06/6-10	ND-1735 5874T	ELAN	Russian olive Elaeagnus angustifolia Lincoln-Oakes Nursery, Bismarck, ND	78	05/17	PLBR	2-0	5	5	100	4		335	441	
4/07/1-5	ND-541 5868T	ELAN	Russian olive Elaeagnus angustifolia Haakon Co., SD	78	05/17	PLBR	2-0	5	5	100	3		390	360	
04/07/6-10	PM-ND-1843 11840T	ELAN	Russian olive Elaeagnus angustifolia Res. Sta. Morden, MB, Canada	80	05/08	PLBR	2-0	5	5	100	4		144	153	
4/09/1-10	MDN-12003 T05725	CEOC	Hackberry Celtis occidentalis USDA, ARS, Mandan, ND	80	05/08	PLBR	2-0	10	8	80	6		40	48	
4/10/1-10	PM-SD-75 5713T	CEOC	Hackberry Celtis occidentalis Potter Co., SD	81	05/07	PLBR	2-0	10	7	70	6		28	44	