

Tree & Shrub Survival in Shelterbelt Renovation at the Dickinson Research Extension Center Fall 1997

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The data presented in this report is survival of the various coniferous and deciduous trees observed. Average height of the various trees is given in the Data Charts section (height data includes the height of replants).

The shrubs, American Cranberry, Juneberry and Nannyberry, were an understory planting between a row of Ponderosa Pine and various mature deciduous tree species. One-half of the row of shrubs were prepared by tillage while the second one-half of shrubs were planted directly into kill down smooth brome grass or into a no-till situation. The shrubs were planted in alternating pairs: 2 American Cranberrybush plants, 2 Juneberry plants and 2 Nannyberry (Viburnum) plants. Tables 1, 2 and 3.

The survival of shrubs planted in the non-tilled pretreatment site were Juneberry and Nannyberry at 100% and American Cranberry at 95%.

Overall performance of the three species were American Cranberry at 96.9%, Juneberry at 97.6% and Nannyberry at 97.5%. The three species of shrubs were slightly better in the tilled pretreatment (98.3%) than the non-tilled (95.7%). However, replants may have confounded these results.

In Tables 4, 5, and 6, we report survival of Ponderosa Pine, Scotch Pine, Colorado Blue Spruce, and Black Hills Spruce in two different planting pretreatment sites in an open plot with no shade. All trees were planted in two

different pretreated situations: one row mulched and one row non-mulched for each species.

The survival of trees in the mulched pretreatment was slightly higher than those in the non-mulched area. The survival in mulched pretreatment site was Ponderosa Pine, Colorado Blue Spruce, and Black Hills Spruce at 100%, followed by Scotch Pine at 97.6%. The survival in non-mulched pretreatment site was Ponderosa Pine at 97.6%, Black Hills Spruce and Colorado Blue Spruce at 97.5%, and Scotch Pine at 97.3%.

It appears the mulched pretreatment is more successful, but it is difficult to say because we were unaware of the number of replants.

In Table 7, we determined the survival of Ponderosa Pine, Colorado Blue Spruce and Siberian Larch in an open plot with no shade, planted in a weed barrier fabric. Of the three, Colorado Blue Spruce had the better survival with 100% followed by Siberian Larch at 93.%% and Ponderosa Pine with 66.7%.

In Table 8, we determined survival of Rocky Mountain Juniper and Eastern Red Cedar in a tree shelter area with a weed barrier. Eastern Red Cedar had a survival rate of 100% compared to Rocky Mountain Juniper at 95.5%.

We took measurements on the Black Walnut and Ohio Buckeye, but we were unable to distinguish species due to the time of year. For that reason, we omitted the data.

Table 1. Non-Tilled Shrubs				
Shrub	Survival #	Percent	Dead #	Percent
Nannyberry	13	92.9%	1	7.1%
American Cranberry	13	100%	0	0%
Juneberry	16	94.2%	1	5.8%
Totals	42	91.3%	2	8.7%

Table 2. Tilled Shrubs				
Shrub	Survival #	Percent	Dead #	Percent
Nannyberry	26	100%	0	0%
American Cranberry	19	95%	1	5%
Juneberry	24	100%	0	0%
Totals	69	98.6%	1	1.4%

Table 3. Totals				
Shrub	Survival#	Percent	Dead#	Percent
Nannyberry	39	97.5%	1	2.5%
American Cranberry	32	96.9%	1	3.1%
Juneberry	40	97.6%	1	2.4%
Totals	111	97.4%	3	2.6%

Table 4. Mulched Pines				
Pines	Survival#	Percent	Dead#	Percent

Ponderosa	41	100%	0	0%
Scotch	40	97.6%	1	2.4%
Colorado Blue Spruce	42	100%	0	0%
Black Hills Spruce	34	100%	0	0%
Totals	157	99.4%	1	0.6%

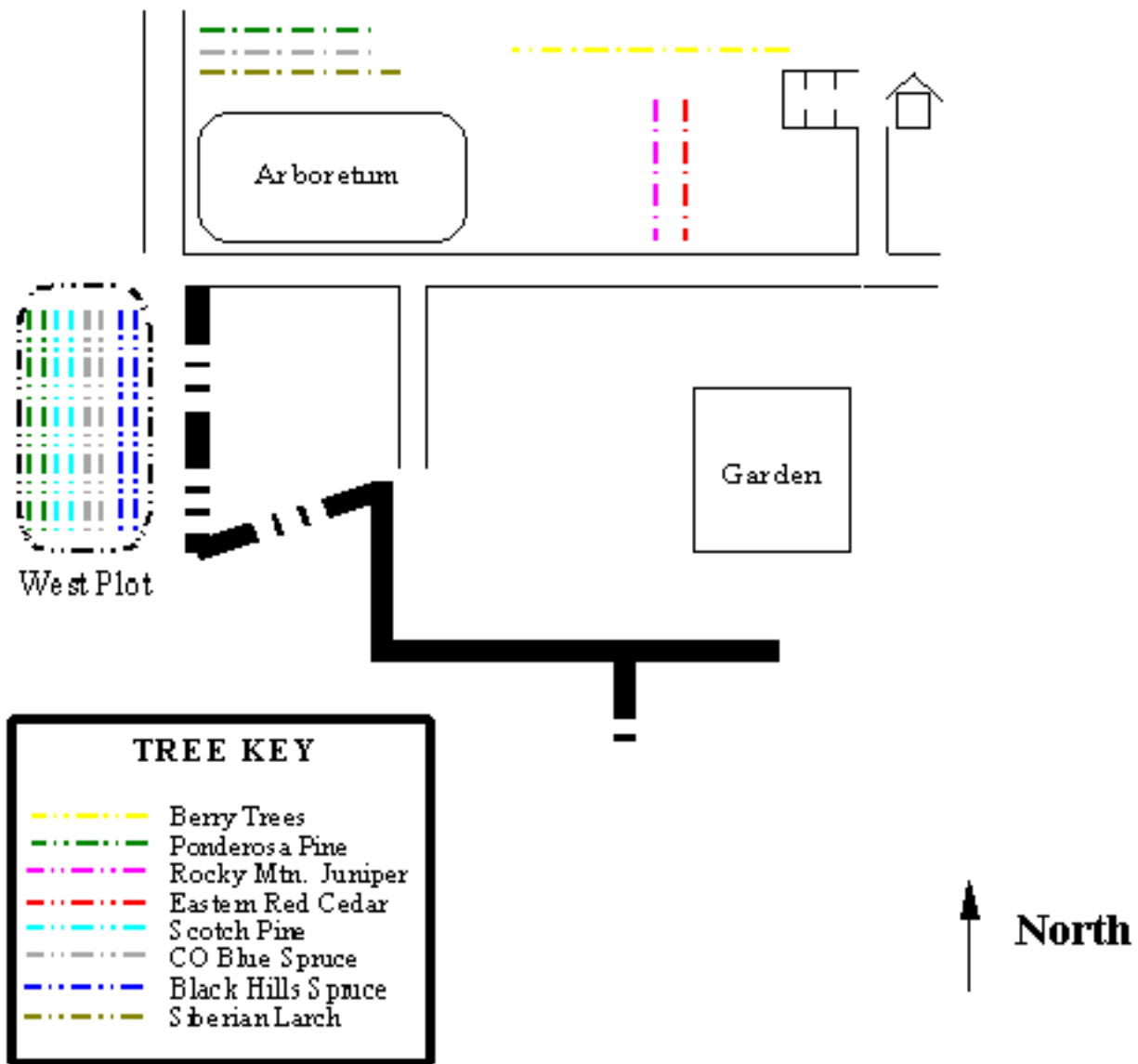
Table 5. Non-mulched Pines				
Pines	Survival#	Percent	Dead#	Percent
Ponderosa	40	97.6%	1	2.4%
Scotch	36	97.3%	1	2.7%
Colorado Blue Spruce	39	97.5%	1	2.5%
Black Hills Spruce	39	97.5%	1	2.5%
Totals	154	97.5%	4	2.5%

Table 6. Totals (Pines)				
Pines	Survival#	Percent	Dead#	Percent
Ponderosa	81	98.7%	1	1.3%
Scotch	76	97.4%	2	2.6%

Colorado Blue Spruce	81	98.7%	1	1.3%
Black Hills Spruce	73	98.6%	1	1.4%
Totals	311	98.4%	5	1.6%

Table 7.				
Tree	Survival #	Percent	Dead#	Percent
Ponderosa	16	66.7%	8	33.4
Colorado Blue Spruce	25	100%	0	0%
Siberian Larch	29	93.5%	2	6.5%

Table 8. Survival rate of Rocky Mountain Juniper and Eastern Red Cedar in a tree shelter area with a weed barrier.				
Tree	Survival #	Percent	Dead#	Percent
Rocky Mountain Juniper	21	95.5%	1	4.5%
Eastern Red Cedar	23	100%	0	0%



American Cranberrybush (Non-tilled)					
# E to W	Mortality	Height (in)	Diameter (in)	Fall Color	Observations

1	Alive	15.5	7	Red/Green	Insects
2	Alive	20.5	7	Green	Insects
3	Alive	26	6.5	Green	Cedar apple rust
4	Alive	22	10.5	Red/Green	
5	Alive	15.5	6.5	Red/Green	Insects
6	Alive	13.5	5	Red/Green	Insects
7	Alive	20	5	Red/Green	Insects
8	Alive	17	3	Red/Green	Insects
9	Alive	24	6.5	Red/Green	Insects
10	Alive	19	9.5	Green	Insects
11	Alive	33	10	Green	Insects
12	Alive	32	19	Green	Insects
13	Alive	13.5	3	Green	
Averages	100%	20.9	7.6		
Date	9/29/97				

American Cranberry Bush (Tilled)

<u># E to W</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Fall Color</u>	<u>Observations</u>
1	Alive	25	17	Green	Insects
2	Alive	40	21	Green	
3	Alive	32.5	13.5	Green	Cedar apple rust
4	Alive	29	13	Green	Cedar apple rust
5	Alive	25	6	Yellow/Red/Green	Insects
6	Alive	24	8.5	Yellow/Green	Insects
7	Alive	27	24.5	Yellow/Green	Insects
8	Alive	23	17.5	Yellow/Red/Green	Insects
9	Alive	18.5	8	Yellow/Green	Small, 10 ft. from culvert; insects
10	Alive	7	6	Yellow/Red/Green	Small, 10 ft. from culvert; insects
11	Alive	16	8	Yellow/Red/Green	Single stem; insects
12	Alive	26	12.5	Yellow/Red/Green	Single stem; insects
13	Alive	14	9	Yellow/Green	Insects
14	Alive	15	11.5	Yellow/Green	Insects
					Single stem;

15	Alive	12	8	Yellow/Green	Single stem, insects
16	Alive	13	7	Red/Green	Insects
17	Dead				
18	Alive	31	12	Red	Most leaves had fallen; insects
19	Alive	27	11.5	Red/Green	Insects
20	Alive	29	15	Red/Green	Insects
Averages	95%	22.8	12.1		
Date	10/3/97				

Juneberry (Non-tilled)					
<u># E to W</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Fall Color</u>	<u>Observations</u>
1	Alive	15	11.5	Yellow/Red	Insects
2	Alive	22	18	Yellow/Green	Cedar apple rust; insects
3	Alive	20	10.5	Yellow/Red/Green	Cedar apple rust; insects
4	Alive	19.5	12.5	Yellow/Red/Green	Insects

5	Alive	13	8	Yellow/Red/Green	Insects
6	Alive	23	11.5	Red/Green	Insects
7	Alive	11	8	Yellow/Red/Green	Cedar apple rust; insects
8	Alive	4	3	Yellow/Green	Insects
9	Alive	19	20	Yellow/Red/Green	Cedar apple rust; insects
10	Alive	16.5	10.5	Yellow/Red/Green	Cedar apple rust; insects
11	Alive	4	1.5	Green	Replant
12	Alive	17	10	Yellow/Red/Green	Spiders; insects
13	Alive	12.5	10	Yellow/Red/Green	Cedar apple rust; insects
14	Alive	16.5	12.5	Yellow/Green	Cedar apple rust; insects
15	Alive	16	15	Yellow/Green	Insects
16	Alive	14.5	7	Yellow/Red	Insects
17	Dead				
Averages	94.2%	15.2	10.6		
Date	9/29/97				

Juneberry (Tilled)					
<u># E to W</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Fall color</u>	<u>Observations</u>
1	Alive	28	32.5	Yellow/Green	Insects
2	Alive	22	24	Yellow/Green	Insects
3	Alive	24	24.5	Yellow/Green	Insects
4	Alive	18	15	Yellow/Green	Insects
5	Alive	33	15	Yellow/Green	Insects
6	Alive	27	21	Yellow/Green	Insects
7	Alive	23	15.5	Yellow/Green	Insects
8	Alive	31	19	Yellow/Green	Insects
9	Alive	25	17	Yellow/Green	Insects
10	Alive	24	17	Yellow/Green	Insects
11	Alive	24	18	Yellow/Green	Insects
12	Alive	25	16	Yellow/Green	Insects
13	Alive	14	8.5	Green	Insects
14	Alive	16	15.5	Yellow/Green	Insects
15	Alive	14	13.5	Yellow/Red/Green	Insects
16	Alive	19	10.5	Yellow/Green	Single stem; insects

17	Alive	15	5	Green	Insects
18	Alive	24	25	Yellow/Green	Insects
19	Alive	17	19	Yellow/Green	Insects
20	Alive	23	16	Yellow/Brown/Green	Insects
21	Alive	24	18.5	Yellow/Brown/Green	Insects
22	Alive	1.5	2	Green	Replant
23	Alive	26	15	Yellow/Green	Insects
24	Alive	21	11.5	Yellow/Green	Insects
Averages	100%	21.6	16.4		
Date	10/3/97				

Nannyberry (Non-tilled)					
<u># E to W</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Fall Color</u>	<u>Observations</u>
1	Alive	18.5	18.5	Green	
2	Alive	16	8.5	Green	
3	Alive	12	9	Green	
4	Alive	11	9.5	Green	
5	Alive	4.5	3	Green	Replant

6	Alive	10.5	12.5	Green	Insects
7	Alive	14.5	4.5	Green	Insects
8	Alive	14	5	Orange/Green	Insects
9	Alive	12	12	Green	
10	Alive	18	19	Green	Insects
11	Alive	18	25	Green	Insects
12	Dead				
13	Alive	15	11.5	Green	Insects
14	Alive	9	2.5	Green	
Averages	92.9%	13.3	10.8		
Date	9/29/97				

Nannyberry (Tilled)					
<u># E to W</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Fall Color</u>	<u>Observations</u>
1	Alive	14.5	27	Green	Insects
2	Alive	24.5	25	Green	Insects
3	Alive	45	27	Green	Insects

4	Alive	38	32	Green	Insects
5	Alive	26	32	Green	Insects
6	Alive	30	32.5	Green	Insects
7	Alive	23	19.5	Green	Insects
8	Alive	47	30	Green	Insects
9	Alive	42	27	Green	Insects
10	Alive	33	30.5	Green	Insects
11	Alive	12	14	Green	Insects
12	Alive	20	29	Green	Insects
13	Alive	21	29.5	Green	Between a Juneberry & Cranberry; insects
14	Alive	14	14	Green	Insects
15	Alive	29	24	Green	Insects
16	Alive	22	30	Green	Insects
17	Alive	23	21	Green	Insects
18	Alive	6	6	Green	Replant; insects
19	Alive	4	5	Green	Replant; insects
20	Alive	2.5	2.5	Green	Replant; insects

21	Alive	25	23	Green	Insects
22	Alive	19	16	Green	Insects
23	Alive	25	16	Green	Insects
24	Alive	24	25.5	Green	Insects
25	Alive	25	23	Green	Insects
26	Alive	21	20	Green	Insects
Averages	100%	23.7	22.3		
Date	10/3/97				

Ponderosa Pine (Mulched)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	13.5	8.5	
2	Alive	7.5	5	
3	Alive	12.5	8	Weedy and grassy
4	Alive	11	7	Weedy and grassy
5	Alive	11.5	6	Weedy and grassy
6	Alive	15	9.5	Weedy and grassy

7	Alive	15	15	Weedy and grassy
8	Alive	17	9.5	Weedy and grassy
9	Alive	20	13.5	
10	Alive	13.5	8	Spiders
11	Alive	18.5	18	
12	Alive	10	5.5	Replant
13	Alive	23	18.5	
14	Alive	15.5	7	Grassy
15	Alive	15	9	
16	Alive	7.5	5	Weedy; Replant
17	Alive	20.5	13	
18	Alive	16	11	
19	Alive	12	6	Grassy
20	Alive	12	7	
21	Alive	15	12	
22	Alive	13	5	
23	Alive	21	15	
24	Alive	11.5	10	
25	Alive	9.5	7	Weedy
26	Alive	15	6.5	Ants

27	Alive	25.5	21	
28	Alive	13	7	
29	Alive	14	10	
30	Alive	12.5	9	Weedy and grassy
31	Alive	16.5	11	
32	Alive	12.5	10	Weedy and grassy
33	Alive	24	13	Ants
34	Alive	15	10	
35	Alive	13	10	
36	Alive	17.5	9	
37	Alive	15	9	Weedy
38	Alive	10	11	Weedy and grassy
39	Alive	15.5	9	
40	Alive	11.5	10	
41	Alive	17	9	Weedy
Averages	100%	14.7	9.8	
Date	10/9/97			

Ponderosa Pine (Non-mulch)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	13	10	
2	Alive	13	11	Needles yellow; moles
3	Alive	13.5	8	Deer
4	Alive	19.5	11	
5	Alive	11.5	10	Moles
6	Alive	9	8.5	Moles
7	Alive	9	8	Moles
8	Alive	10	8	Moles
9	Alive	11.5	8	Needles yellow
10	Alive	12	9	Needles yellow; moles
11	Alive	18	10	
12	Alive	11	10	Needles yellow; moles
13	Alive	12	11	
14	Alive	11	9	
15	Alive	9.5	8	
16	Alive	8.5	10	Moles

17	Alive	10.5	7.5	
18	Alive	14.5	11	
19	Alive	9	8.5	
20	Dead			
21	Alive	8	7	
22	Alive	10	8	
23	Alive	13	10	
24	Alive	10	9.5	
25	Alive	8	5	
26	Alive	10	9.5	
27	Alive	11.5	9	
28	Alive	13.5	9	
29	Alive	6	6	Struggling
30	Alive	13	6	
31	Alive	10	7	
32	Alive	15	11.5	
33	Alive	5	7	
34	Alive	16	15	Moles
35	Alive	9	6.5	Moles

36	Alive	5.5	5	Struggling; moles
37	Alive	7	8.5	
38	Alive	16.5	11.5	
39	Alive	9	11.5	Moles
40	Alive	13.5	7	
41	Alive	10.5	10	Moles
Averages	97.6%	11.2	8.9	
Date	10/16/97			

Scotch Pine (Mulched)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	25	20	
2	Alive	19	9	Grassy
3	Alive	21	13	Grassy
4	Alive	16	10.5	Grassy
5	Alive	17	10	Grassy
6	Alive	28	21.5	
7	Alive	12.5	10	

8	Alive	19	10.5	
9	Alive	15	10.5	Grassy
10	Alive	17	9.5	Grassy
11	Alive	19	11.5	
12	Alive	27.5	27.5	
13	Alive	22	23.5	
14	Alive	31.5	17.5	
15	Alive	15	8.5	
16	Alive	15	10.5	Replant
17	Alive	30	23.5	
18	Alive	18	11	Grassy
19	Alive	19	9.5	
20	Alive	7.5	6.5	Grassy
21	Alive	19	14	Grassy and weedy
22	Alive	33.5	23.5	
23	Alive	24.5	23	
24	Alive	16	12	
25	Alive	22	21	Needles yellow
26	Alive	16.5	6	Replant; deer

27	Alive	14	7	Replant
28	Alive	17	11	Needles yellow
29	Alive	25	20	
30	Alive	26	17.5	
31	Alive	13	10.5	
32	Alive	15	10	
33	Alive	20	17.5	Needles yellow
34	Alive	31	22.5	
35	Alive	16	6.5	Replant
36	Alive	17	8.5	
37	Alive	16	8.5	Replant
38	Alive	28	30	Needles yellow
39	Alive	16.5	13	
40	Alive	21	19	
41	Dead			Broke off
Averages	97.6%	20.0	14.4	
Date	10/9/97			

Scotch Pine (Non-mulch)

<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	16	7.5	
2	Alive	16	7	
3	Alive	16	8.5	
4	Alive	11	7	
5	Alive	16.5	8	
6	Alive	21	17	
7	Alive	17	9	
8	Alive	19	11	
9	Alive	10	6	
10	Alive	20.5	19	
11	Alive	14	10	
12	Alive	10	6	
13	Alive	14	7	
14	Alive	22	20	
15	Alive	12	9	
16	Alive	15	7	Got stepped on
17	Alive	5.5	8	
18	Alive	13.5	8	

19	Alive	17.5	9	
20	Alive	7	4	Struggling
21	Alive	21.5	12	
22	Alive	13	9	
23	Alive	22	10	
24	Alive	17	18	
25	Alive	13	9	
26	Alive	19.5	8	Replant
27	Alive	7	4	
28	Alive	19	15	
29	Alive	27	24	
30	Alive	16	5	
31	Alive	13	6.5	
32	Alive	10	5.5	
33	Alive	12	7	
34	Alive	9	5	
35	Alive	26	19.5	
36	Alive	27	18	
37	Dead			

Averages	97.3%	15.7	10.1	
Date	10/16/97			

Colorado Blue Spruce (Mulched)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	17	16	
2	Alive	19.5	19	
3	Alive	16	16	Deer
4	Alive	16.5	14.5	
5	Alive	13.5	14	
6	Alive	15	12	
7	Alive	17.5	15	
8	Alive	18	15	
9	Alive	11.5	12	
10	Alive	17	16	
11	Alive	14	9.5	
12	Alive	9.5	10	Deer
13	Alive	14	13	

14	Alive	16	15	
15	Alive	12	11.5	
16	Alive	16.5	14.5	
17	Alive	22	20	
18	Alive	14.5	10	
19	Alive	13.5	9.5	
20	Alive	17	13.5	
21	Alive	18	14	
22	Alive	12.5	12	
23	Alive	12.5	8	
24	Alive	16.5	14.5	
25	Alive	11.5	8	
26	Alive	15	13.5	
27	Alive	15	10.5	
28	Alive	12.5	7.5	
29	Alive	17	13.5	
30	Alive	17	14	
31	Alive	14.5	17.5	
32	Alive	16.5	16	
33	Alive	16	11.5	

34	Alive	13.5	12.5	
35	Alive	17	14	
36	Alive	18.5	17	
37	Alive	18	16	
38	Alive	18	17	
39	Alive	19	18	
40	Alive	14.5	14.5	
41	Alive	10	8.5	
42	Alive	11	10.5	
Averages	100%	15.4	13.4	
Date	11/5/97			

Colorado Blue Spruce (Non-mulched)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	13	11.5	
2	Alive	9.5	8	
3	Alive	11.5	9.5	
4	Alive	13.5	12	

5	Alive	12	9.5	
6	Alive	12.5	13	
7	Dead			
8	Alive	15	15	
9	Alive	16.5	16	
10	Alive	11	12.5	
11	Alive	12	12	
12	Alive	14	12.5	
13	Alive	15.5	13	
14	Alive	12	12	
15	Alive	12	11.5	
16	Alive	11	11	
17	Alive	13	12	
18	Alive	16	14	
19	Alive	8	12	
20	Alive	14.5	17.5	
21	Alive	9	10	
22	Alive	12	11	
23	Alive	11	9.5	
24	Alive	12.5	12	

25	Alive	12	12	
26	Alive	15	14	
27	Alive	11	10	
28	Alive	12	12	
29	Alive	17	17	
30	Alive	17	15.5	
31	Alive	13.5	12	
32	Alive	16	15.5	
33	Alive	10	10.5	
34	Alive	15	17	
35	Alive	13	8.5	
36	Alive	15.5	15	
37	Alive	15	13.5	
38	Alive	13.5	13	
39	Alive	11	8.5	
40	Alive	11	16.5	
Averages	97.5%	12.9	12.5	
Date	11/5/97			

Black Hills Spruce (Mulched)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	18.5	12	
2	Alive	20	14	
3	Alive	25.5	18	
4	Alive	19	14	
5	Alive	18	11.5	
6	Alive	15	10	
7	Alive	24	21	
8	Alive	20	15.5	
9	Alive	10	9.5	
10	Alive	14	14	
11	Alive	9	6	
12	Alive	22	14.5	
13	Alive	17	13	
14	Alive	24	20	
15	Alive	23	18	
16	Alive	22.5	19	

17	Alive	17.5	15	
18	Alive	23	15.5	
19	Alive	16.5	18	
20	Alive	18	12.5	
21	Alive	20.5	18	
22	Alive	16	12.5	
23	Alive	23	21.5	
24	Alive	24	11.5	
25	Alive	16	15.5	
26	Alive	11	14	
27	Alive	21	17.5	
28	Alive	10	11	
29	Alive	11	10	
30	Alive	11.5	8.5	
31	Alive	15	10	
32	Alive	21	17	
33	Alive	20	17	
34	Alive	13	12	
Averages	100%	17.9	14.3	

Date	10/28/97			
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Black Hills Spruce (Non-mulch)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	32.5	21	
2	Alive	17.5	13	
3	Alive	21	12	Deer
4	Alive	20	13.5	
5	Alive	23.5	16.5	
6	Alive	17	11.5	
7	Alive	16	11.5	
8	Alive	16	11.5	
9	Alive	18	13.5	
10	Alive	20	13.5	
11	Alive	19.5	14	
12	Alive	16	12.5	Deer
13	Alive	17.5	11.5	
14	Alive	21	14	

15	Alive	23	13	Deer
16	Alive	23	14	
17	Alive	23.5	14	
18	Alive	19	11	
19	Alive	21.5	15	
20	Alive	12	7	Moles
21	Alive	21	19	
22	Alive	16.5	11	Moles
23	Alive	16.5	10.5	Moles
24	Alive	14	10	
25	Alive	13	9	
26	Alive	17	15	
27	Alive	14.5	10.5	
28	Alive	14.5	10	Deer
29	Alive	15	9	Deer
30	Alive	16.5	11	
31	Alive	20	15	
32	Alive	16	16	
33	Alive	14	18	
34	Alive	16	14	

35	Alive	13.5	10	No needles
36	Alive	13.5	12	
37	Alive	15	13	
38	Dead			
39	Alive	17	15.5	
40	Alive	9	8.5	No needles
Averages	97.5%	17.7	12.8	
Date	11/5/97			

Ponderosa Pine (North Plot)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Dead			Cut off
2	Alive	29.5	25	
3	Alive	20	20	
4	Alive	10.5	6	Replant; single stem
5	Alive	21	19	
6	Alive	25	22	

7	Alive	26	20	
8	Alive	20	21	
9	Alive	19	22.5	
10	Dead			
11	Alive	15.5	10	
12	Alive	11	8	Replant
13	Alive	16.5	15.5	
14	Alive	14.5	12	
15	Dead			
16	Dead			
17	Dead			
18	Alive	11	7	Replant
19	Dead			
20	Dead			
21	Dead			
22	Alive	17	15	
23	Alive	8	8	Replant; single stem
24	Alive	5	4	Replant

Averages	66.7%	16.8	14.7	
Date	11/17/97			

Siberian Larch				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	4.5	8.5	Cut off
2	Alive	10.5	10	
3	Alive	12.5	12	
4	Alive	12.5	13	
5	Alive	13	8.5	
6	Alive	13	4	
7	Alive	17	3	
8	Alive	13.5	6.5	
9	Alive	13	6	
10	Alive	15.5	7.5	
11	Alive	12.5	4	
12	Alive	12.5	7	
13	Alive	13	5.5	
14	Alive	18	5	

15	Alive	18	2	
16	Alive	10	5	
17	Alive	15	5	
18	Alive	14.5	4	
19	Alive	17.5	5	
20	Alive	20	10.5	
21	Alive	16.5	4	
22	Alive	21	16	
23	Alive	10.5	2	
24	Alive	1.5	1.0	
25	Alive	11.5	5	
26	Alive	15.5	2	
27	Dead			
28	Alive	16.5	4	
29	Alive	17	4	
30	Dead			
31	Alive	10.5	2.5	
Averages	93.5%	10.5	2.5	

Date	12/8/97		
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Colorado Blue Spruce (North Plot)				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	25	20.5	
2	Alive	12.5	14	
3	Alive	21	22	
4	Alive	15	14	
5	Alive	14.5	11.5	
6	Alive	13	14	Replant
7	Alive	21	18.5	
8	Alive	25.5	20	
9	Alive	23.5	24.5	
10	Alive	23	21	
11	Alive	17	15	
12	Alive	13	13.5	Replant
13	Alive	20	17	
14	Alive	17	21	
15	Alive	19.5	16.5	

16	Alive	17	16	
17	Alive	13.5	11.5	Replant
18	Alive	21	23	
19	Alive	22	16.5	
20	Alive	8.5	14	Replant
21	Alive	11	12	Replant
22	Alive	12	15	Replant
23	Alive	17	15.5	
24	Alive	6.5	9	Replant
25	Alive	11	9	Terminal bud taken off
Averages	100%	16.8	16.2	
Date	11/17/97			

Rocky Mountain Juniper				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	18	14	
2	Alive	12	14.5	

3	Alive	15	15.5	
4	Alive	24	16	
5	Alive	22	12	
6	Alive	14.5	15.5	
7	Alive	21	10	
8	Alive	23	16	
9	Alive	20	15	
10	Alive	23	20	
11	Alive	24	20	
12	Alive	16.5	13	
13	Alive	16	12.5	
14	Alive	13.5	9	
15	Dead			
16	Alive	25	15.5	
17	Alive	16	8.5	
18	Alive	17.5	14.5	
19	Alive	13.5	15	
20	Alive	15	12	
21	Alive	14.5	6	Single stem
22	Alive	19	14	

Averages	95.5%	18.2	13.7	
Date	11/19/97			

Eastern Red Cedar				
<u># N to S</u>	<u>Mortality</u>	<u>Height (in)</u>	<u>Diameter (in)</u>	<u>Observations</u>
1	Alive	23	17	
2	Alive	20	13.5	
3	Alive	16	10	
4	Alive	21	13	
5	Alive	23	14	
6	Alive	27	16	
7	Alive	13.5	10	
8	Alive	15	14	
9	Alive	20	13	
10	Alive	24	11	
11	Alive	23	15	
12	Alive	25	14	
13	Alive	24.5	18.5	

14	Alive	24	16	
15	Alive	23	16	
16	Alive	33	18.5	
17	Alive	24	18.5	
18	Alive	16.5	13	
19	Alive	26	17	
20	Alive	25	18.5	
21	Alive	18	12	
22	Alive	30.5	17	
23	Alive	23.5	14	
Averages	100%	22.5	14.8	
Date	11/19/97			

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