RELEASE NOTICE
OF
"MAYBELL SOURCE" ANTELOPE BITTERBRUSH, PURSHIA TRIDENTATA
AS

Unique low-growing ecotype
for Wildlife and Rangeland Use

by the
UPPER COLORADO ENVIRONMENTAL PLANT CENTER (UCEPC)
and the
USDA - NATURAL RESOURCES CONSERVATION SERVICE
and the
USDA - FOREST SERVICE, INTERMOUNTAIN RESEARCH STATION
and the
USDI - BUREAU OF LAND MANAGEMENT
and the
UTAH DIVISION OF WILDLIFE RESOURCES
and the
COLORADO STATE AGRICULTURAL EXPERIMENT STATION

This announces the release of The "Maybell Source" antelope bitterbrush as a "SELECT CLASS" for identification of commercial collections, seed orchards, and the marketing of seeds and plants.

Antelope bitterbrush (Purshia tridentata (Pursh) DC.) is one of the most important native browse shrubs in the western United States. It is also known by quininebrush, buckbrush, and antelopebrush. Antelope bitterbrush has a wide ecotypic variation and hybridizes with Desert bitterbrush (Purshia glandulosa), and Stansbury cliffrose (Cowania mexicana var. stansburiana).

Antelope bitterbrush contains resins and maintains a heavy canopy that burns readily and may contribute to range fires. Much (30,000 acres) of the original stand of 'Maybell' (estimated roughly at 40,000 acres) has been destroyed by a series of range fires. This emphasizes the need to maintain seed supplies of this low-growing, layering accession. It is also important to maintain commercial and agency documentation of seed collections, so long-term results of range seedings can be followed. In a bitterbrush comparison project at the Plant Center, 'Maybell' tublings had a survival of 47% with good vigor after 11 years. However, in this study 'Maybell' exhibited almost no ability to sprout after fire. (The data for Project 08A073J is presented in Appendix I.)

ORIGIN:

'Maybell' is found in Northwest portion of Moffat County, Colorado. The area is 40 miles west of Craig, Colorado in Major Land Resources Area 34B. The collection site is located on both public and private land. Seed collection on private land will require permission, while public land will require a permit. It is found on deep Maybell sand soils at 6,000 to 7,000 feet elevation. The moderately coarse textured soils are associated with the Sandhills range site. It is found on nearly all aspects and is associated with basin big sagebrush, silver sagebrush, rubber rabbitbrush, pricklypear cactus, Louisiana sage, silver lupine, western wheatgrass, indian ricegrass, and needle-and-thread.

'Maybell' has been evaluated at the UCEPC using accession numbers 9024373 and EPC - 1395.

DESCRIPTION:

The "Maybell Source" is a creeping or decumbent ecotype having propensity for layering; that is, a decumbent branch may root from adventitious buds where it contacts the ground. Low-growing, layering ecotypes are common on sandy loam soils in southeastern Idaho, and in silt and clay soils in central Utah.

The "Maybell Source" is 24 to 40 inches in height and generally 36 to 52 inches wide. Leaves are persistent with the small, young, winter leaves turning purplish red but remaining over winter. The leaves are small (6 to 19mm), wedge shaped, and three-lobed. Leaves vary in color from gray green to bright green. It flowers profusely with mostly yellow blossoms.

DEVELOPMENT:

Early trials by the U. S. Forest Service Shrub Sciences Laboratory utilized seed collected from the Maybell population by commercial collectors. Materials tested by the UCEPC were collected primarily from a key site north of Cedar Springs in Moffat County, Colorado. Seed collected August 5, 1982 was used to establish three projects on the UCEPC and one at the Colowyo Coal Company site north of Meeker, Colorado. Survival has generally ranged from 83 to over 95 per cent. (The data for Project 08S077Z is presented in Appendix II.)

The "Maybell Source" was direct seeded on two sites in the Colony Shale Oil Project in 1989. The mine site is located north of Parachute, Colorado. In 1993 The "Maybell Source" plants had good vigor and ranged from 0.7 to 1.4 plants per foot of row on the two sites. (The data for the Colony Shale Oil project is presented in Appendix III.)

In a planting near Pinedale, Wyoming, The "Maybell Source" performance ranged from slightly better to slightly worse than other accessions. The "Maybell Source" performance in a planting in Western Duchesne County, Utah was equal to or slightly poorer than Fountain Green. (The data for the Pinedale, Wyoming planting is presented in Appendix IV.) (The data for the Utah planting is presented in Appendix V.)

Nine shrub species were seeded at Colowyo Coal Company and The "Maybell Source" was one of the most successful shrubs. In a UCEPC project transplanted tubling plants expressed the layering trait in the second year. (The data for the Colowyo planting is presented in Appendix VI.)

The "Maybell Source" in UCEPC orchards, produced about 0.5 pounds of clean seed per plant. The Maybell, Colorado area has been the site for commercial collections in past years. However, UCEPC orchards have been used for additional collections.

Two other selections of antelope bitterbrush are 'Lassen' and 'Fountain Green'. 'Lassen' is an upright tall growing ecotype originating from Lassen County, California. Released as a named variety in 1984, it is more adapted to the granitic soils of California and Idaho. It has not shown good performance in Colorado.

'Fountain Green' a source identified germplasm, originated from San Pete County, Utah. It has a robust upright growth form but is not as tall as 'Lassen'. It was released in 1989 and is recommended for use in the Intermountain region on sedimentary soils.

USES:

The "Maybell Source" is recommended for rangeland and reclamation seedings. It is useful for spring and winter browse for domestic livestock, antelope, deer, elk, and small mammals. It is suitable for erosion control on light textured soils where wildlife presence is acceptable. The low-growth and attractive appearance makes it promising as a low maintenance landscaping species for xeriscape.

AREA OF ADAPTATION:

The "Maybell Source" is recommended on moderately coarse textured, well drained soils where annual precipitation is 10 to 24 inches and at 5,000 to 8,000 feet elevation. While the entire area of adaptation is not known, it should perform well in ecological zones similar to the collection site.

Antelope bitterbrush often shows good adaptation to sterile soils. A beneficial organism (Frankia spp.), a nitrogen fixing endophyte, is associated with antelope bitterbrush.

MAINTENANCE AND VARIETY:

Colorado Seed Growers Association will certify The "Maybell Source" "Selected Class Seed" as harvested from designated sources as follows: (1) seed collected from native stands with the area described below (Generation 0), or (2) seed collected from certified seed orchards located at the UCEPC (Generation 1). Plant materials (seed or plants) for establishing seed orchards to produce "Selected Seed" must be obtained from the UCEPC and maintained according to appropriate standards for the state where grown.

The "Maybell Source" for "Selected Seed" certification will be defined as low-growing antelope bitterbrush within four miles of the south side of Highway 40 from Maybell, Colorado, southwest to Mud Spring Creek. A major portion of the natural range of this ecotype is found in Township 6 North, Range 96 West, (see attached map).

SEED PRODUCTION:

The "Maybell" Source has been one of the better seed producing antelope bitterbrush accessions at the UCEPC. Estimated yields based on plot work is about 350 bulk pounds per acre. One individual plant produced 1.2 bulk pounds. It takes four to five years for new transplants to produce quantities of seed.

The "Maybell Source" antelope bitterbrush has approximately 13,900 seeds per pound. Average seed weight is 3.62 grams per 100 seeds.

COMMERCIAL SOURCES:

Contact the Upper Colorado Environmental Plant Center, Meeker, Colorado; Colorado Seed Growers Association, Fort Collins, Colorado; or Little Snake River, Bureau of Land Management Office in Craig, Colorado for information about seed collection and available planting stock.

Plant materials for commercial "Select Seed" class orchards can be purchased from the Upper Colorado Environmental Plant Center.

Approved By:

Charles D. Sloan — 12-24-96
Charles D. Sloan — **Date**
President Administrative Board
Upper Colorado Environmental Plant Center

Duane Johnson — 1-6-97
Duane Johnson — **Date**
USDA, NRCS
Lakewood Colorado State Office

W. Dean Knighton — 1/22/97
Denver P. Burns — **Date**
Acting Station Director
Provo Shrub Lab, Provo Utah

Richard Stevens — 1-31-97
Richard Stevens — **Date**
Utah Division of Wildlife
Ephriam Utah

Lee E Sommers — 2-6-97
Dr. Lee Sommers — **Date**
Director of Colorado State Ag.,
Experimental Station

John Husband — 2/24/97
John Husband — **Date**
BLM
Little Snake Resource Area

Marc Sayley (acting) — 3/6/97
Gary Nordstrom — **Date**
Director of Ecological Sciences Division, NRCS
Washington

APPENDIX I.

Project 08A073J

Advanced Evaluations of Antelope Bitterbrush

In a bitterbrush comparison project on the plant center The "Maybell Source" tublings after 11 years had a survival of 47% and a good vigor. However, The "Maybell Source" in this project exhibited almost no ability to produce sprouts after fire. The layering characteristic of The "Maybell Source" was first noted in 1985 (two years after planting), and was also noted for accessions 9038521 and 9038527. Project evaluation information is included for 1983 through 1994 (Tables 1 through 5).

17 Accession - Tublings Planted 1983

			Survival	Vigor
1990	1.	"Maybell Source"	87%	5
1992	2.	"Maybell Source"	87%	5
1993	3.	"Maybell Source"	43%	3.75
		One resprout out of 11 for 1993 & 1994		
1994	4.	"Maybell Source"	47%	3.25
		One resprout out of 11 for 1993 & 1994		

Table 1. Bitterbrush evaluation data 1983 - 1988.

Accession Number	% Survival						Height (cm)						Width (cm)					Vigor[1]					
	1983	84	85	86	87	88	1983	84	85	86	87	88	1984	85	86	87	88	1983	84	85	86	87	88
9031619	94	87	77	73	73	73	13	11	38	63	57	67	14	79	127	133	136	5	4	5	4	6	4
9038520	89	89	89	89	89	89	12	10	48	59	59	66	15	86	127	141	157	5	3	5	4	5	4
9038523	96	96	90	90	90	90	12	12	36	58	65	69	14	77	124	129	138	5	3	6	4	5	4
9007977	100	100	87	77	77	77	17	14	50	79	81	82	16	108	148	165	153	4	3	5	3	2	3
9038530	86	86	86	86	86	86	12	15	52	77	76	80	19	136	160	186	181	5	3	4	3	3	4
9024026	100	74	54	54	50	50	16	9	46	72	75	79	8	46	72	75	146	4	4	5	4	4	5
9038527	100	100	100	100	96	96	15	12	43	--	73	75	14	106	--	148	155	4	3	4	4	3	2
9038526	100	100	93	930	93	93	14	8	40	57	56	65	15	100	160	169	172	3	3	5	4	4	3
9024373*	94	94	90	90	90	87	15	13	48	65	69	79	14	109	125	158	156	5	3	4	4	5	4
9038521	100	100	93	93	93	93	12	12	36	51	64	64	32	100	133	167	147	4	3	5	4	5	3
9038522	100	90	87	87	80	80	14	9	38	57	58	71	16	110	137	147	158	3	3	4	4	3	4
9038531	100	100	70	70	63	57	18	9	44	68	71	79	12	90	137	154	164	2	3	5	4	4	5
9024377	97	80	67	63	63	60	14	11	44	69	69	80	12	108	142	146	167	5	4	5	4	5	5
9038524	97	97	70	63	63	63	14	8	49	73	91	97	20	123	161	162	181	1	3	4	2	3	4
9038525	100	100	93	93	93	93	14	13	42	62	77	105	13	78	112	146	144	4	3	5	4	4	4
9030795	100	100	100	100	100	100	14	13	52	87	95	104	12	76	114	148	135	6	3	5	3	4	2
9009355	97	84	70	70	70	70	12	9	28	55	48	69	7	44	87	87	110	6	4	6	5	6	5

[1]Numerical scale of 1 to 9 with a value of 1 being most vigorous.

* 9024373 - Maybell Source

Table 2. Antelope bitterbrush evaluation data for 1988 - 1989.

Accession Number	Survival(%) 1988	Survival(%) 1989	Height (cm) 1988	Height (cm) 1989	Width (cm) 1988	Width (cm) 1989	Vigor * 1988	Vigor * 1989
9031619	73	73	67	82	136	158	4	5
9038520	89	89	66	72	157	157	4	4
9038523	90	90	69	83	138	154	4	4
9007977	77	67	82	95	153	198	3	4
9038530	86	86	80	92	181	200	4	3
9024076	50	47	79	94	146	168	5	4
9038527	96	96	75	80	155	178	2	4
9038526	93	87	65	71	172	168	3	3
9024373**	87	87	79	85	156	176	4	4
9038521	93	87	64	69	147	177	3	5
9038522	80	77	71	77	158	181	4	4
9038531	57	60	79	80	164	168	5	4
9024377	60	60	80	86	167	176	5	4
9038524	63	60	97	105	181	215	4	4
9038525	93	93	105	96	144	164	4	4
9030795	100	100	104	127	135	165	2	2
9009355	70	70	69	81	110	134	5	5

* Rated on a scale from 1 to 9 where 1 is best.

** 9024373 - Maybell Source

Table 3. Antelope bitterbrush evaluation data for 1989 - 1990.

Accession Number	Survival (%)		Height (cm)		Width (cm)		Vigor*	
	1989	1990	1989	1990	1989	1990	1989	1990
9031619	73	73	82	91	158	175	5	5
9038520	89	89	72	80	157	167	4	4
9038523	90	93	83	98	154	166	4	4
9007977	67	64	95	108	198	209	4	3
9038530	86	86	92	102	200	213	3	3
9024076	47	44	94	105	168	180	4	3
9038527	96	96	80	88	178	190	4	3
9038526	87	87	71	80	168	177	3	4
9024373**	87	87	85	92	176	186	4	5
9038521	87	87	69	77	177	184	5	5
9038522	77	77	77	87	181	191	4	4
9038531	60	60	80	93	168	182	4	4
9024377	60	60	86	96	176	183	4	5
9038524	60	53	105	119	215	229	4	4
9038525	93	93	96	106	164	174	4	4
9030795	100	100	127	136	165	174	2	2
9009355	70	70	81	92	134	148	5	5

* Rated on a scale from 1 to 9 where 1 is best.

** 9024373 - Maybell Source

Table 4. Antelope bitterbrush evaluation data for 1990 and 1992.

Accession Number	Survival (%)		Height (cm)		Width (cm)		Vigor*	
	1990	1992	1990	1992	1990	1992	1990	1992
9031619	73	–	91	–	175	–	5	–
9038520	89	78	80	112	167	193	4	4.5
9038523	93	83	98	105	166	168	4	5
9007977	64	–	108	–	209	–	4	–
9038530	86	86	102	114	213	196	3	4
9024076	44	–	105	–	180	–	3	–
9038527	96	96	88	105	190	178	3	4
9038526	87	93	80	90	177	174	4	5
9024373**	87	87	92	106	186	192	5	5
9038521	87	90	77	92	184	178	5	4.5
9038522	77	–	87	–	191	–	4	–
9038531	60	–	93	–	182	–	4	–
9024377	60	–	96	–	183	–	5	–
9038524	53	–	119	–	229	–	4	–
9038525	93	93	106	127	174	188	4	3.5
9030795	100	100	136	180	174	215	2	2
9009355	70	–	92	–	148	–	5	–

* Rated on a scale from 1 to 9 where 1 is best.

** 9024373 - Maybell Source

Table 5. Antelope bitterbrush evaluation data for 1993 and 1994.

Accn.	Surv. (%) 1993	Surv. (%) 1994	Ht.(cm) 1993	Ht.(cm) 1994	Wd (cm) 1993	Wd (cm) 1994	Vig. 1993	Vig. 1994	# burn.	# rspt 93	# rspt 94
9031619	33	37	123	91	201	135	4.25	5.75	7	0	1
9038520	44	44	123	97	247	191	3.5	4.5	3	1	0
9038523	47	47	124	123	227	191	4.5	6.5	10	1	0
9007977	37	37	134	143	210	202	4	3.75	10	0	0
9038530	50	50	132	139	239	156	3.5	3	6	2	2
9024076	23	23	120	119	218	209	4.25	4.25	8	3	2
9038527	54	50	115	137	220	190	3.75	4	10	1	0
9038526	47	60	122	134	222	137	3.5	4	5	1	2
9024373**	43	47	122	133	224	194	3.75	3.25	11	1	1
9038521	47	77	111	101	223	179	3.75	3	14	9	9
9038522	27	27	134	133	220	156	3.5	3.5	8	0	0
9038531	13	27	107	108	207	180	6	3.5	2	0	1
9024377	20	20	108	134	227	178	3.5	4.25	7	1	0
9038524	30	30	98	103	219	167	4.5	4	4	0	3
9038525	47	47	142	164	240	213	3.5	3.5	14	0	1
9030795	57	57	219	200	228	196	2.5	3	3	0	0
9009355	3	3	115	130	203	168	6	7	0	0	0

** 9024373 - Maybell Source

APPENDIX II.

Project 08S077Z

Initial increase of Purshia tridentata (Maybell strain).

1. In a planting at the plant center of The "Maybell Source" tublings, survival ranged from 83 to 99 percent (Table 1). This seed production project had only one accession, The "Maybell Source".

Table 1. Evaluation of antelope bitterbrush ("Maybell Source").

Date	Survival (%) 1	Height (cm) 1	Width (cm) 1	Vigor 2	Flower Abund. 2	Seed Prod.	Wildlife Use 3
9/29/83	96	16	14	4			L
5/09/84	80	10	8	5			M
7/29/85	83	35	68	5			VL
8/04/86	83	47	107	3			L
6/04/87	99	51	121	5	5	87 lb/ac	M
7/06/87	97	73	151	3	5	85 lb/ac	
7/14/89	95	78	154	4	4	107 lb/ac	VL
6/22/90	95	84	160	3	4	0 lb/ac	VL

1 Means value of 20 random observations.

2 Numerical scale of 1 to 9 with a value of 1 being the best.

3 Categorized as being very light (VL), light (L), moderate (M).

APPENDIX III.

Project 08A194

Plant Materials Studies at the Colony Shale Oil Project

The "Maybell Source" was direct seeded in this project in 1989 on both north and east facing slopes. In 1993 the north slope had 0.7 plants per ft. of row with a good vigor, while the east slope had 1.4 plants per ft. of row also with a good vigor. Vigor, in general, is an estimation (1 to 9 where 1 is high) of the quality and quantity of growth.

				# of Plants per 10 ft.	Vigor
1990	1.	North Slope	"Maybell Source"	8	5
		East Slope	"Maybell Source"	29	4
1991	2.	North Slope	"Maybell Source"	7	5
		East Slope	"Maybell Source"	20	4
1992	3.	North Slope	"Maybell Source"	7	5
		East Slope	"Maybell Source"	16	4
1993	4.	North Slope	"Maybell Source"	7	4
		East Slope	"Maybell Source"	14	4

APPENDIX IV.

Project 08A137

Soda Lake - Pinedale, Wyoming
Field Evaluation Planting (FEP)

The following (number 1 and 2) is a brief summary of the project for 1993. Evaluation information of bitterbrush accessions in the project are listed by years (1990, 1991, 1992, and 1993). Vigor, in general, is an estimation (1 to 9 where 1 is high) of the quality and quantity of growth.

1. Transplants were planted in 1987 - but The "Maybell Source" was planted in 1988 (5 plants).

   One of 5 plants of The "Maybell Source" was still alive in 1993 and had poor vigor. Based on percent stand and vigor, 'Walden' material and 'Fountain Green' had better performance.

2. Block 2 (Direct seeded) 1986

   The planting of The "Maybell Source" in 1993 had a 10% stand and good vigor. The bitterbrush from Walden had a 3% stand and only average to poor vigor.

Project 08A137
Soda Lake - Pindale, Wyoming Field Evaluation Planting (FEP)

			% Stand	Vigor	Ht./Cm.
1990	Block 2 (direct seeded)	Maybell	3	5	6
		Walden	1	6	4

			Plants Alive	Vigor	Ht./Cm.
	Transplants	Maybell	1	8	14 cm
		Walden	1	7	9 cm
		Lassen	0	-	-
		Fountain Green	0	-	-

			% Stand	Vigor	Ht./Cm.
1991	Block 2	Maybell	3	5	19
		Walden	1	6	12

			Plants Alive	Vigor	Ht./Cm.
	Transplants	Maybell	1	5	9
		Walden	3	3	10
		Lassen	0	-	-
		Fountain Green	2	4	6

Project 08A137
Soda Lake - Pindale, Wyoming Field Evaluation Planting (FEP) - Continued

			% Stand	Vigor	Ht./Cm.
1992	Block 2	Maybell	10	3	-
		Walden	3	5	-
			Plants Alive	Vigor	Ht./Cm.
	Transplants	Maybell	1	4	8
		Walden	3	2	16
		Lassen	0	-	-
		Fountain Green	2	3	8
			% Stand	Vigor	Ht./Cm.
1993	Block 2	Maybell	10	3	
		Walden	3	5	
			Plants Alive	Vigor	Ht./Cm.
	Transplants	Maybell	1	7	7 - 5
		Walden	3	4	20 - 23
		Lassen	0	-	-
		Fountain Green	2	7	8 - 9

APPENDIX V.

Project 08A172

Coyote Draw Field Evaluation Planting

The project was planted in 1988. The following (number 1 and 2) is a brief summary of the project for 1993. Evaluation information recorded in 1993 for the bitterbrush accessions in the project is listed on the following page (number 1, 2, and 3). The "Maybell Source" and accession 9038528 were not planted in the 1991 planting in 1991, but at a later date. The project reports for 1990, 1991, and 1992 had no information on The "Maybell Source".

1. 17 spp Mix -

   The "Maybell Source" had less than 1% cover in an unmulched planting and was not found in a planting that was mulched.

2. 1988 Planting -

   In 3 replications, The "Maybell Source" ranged from an average of 1.7% to 3.3% cover on mulched and unmulched sites, respectively, and had moderate vigor.

   In 2 replications, Fountain Green ranged from an average of 5% to 2.5% cover on mulched and unmulched sites, respectively, and had moderate vigor.

Project 08A172 - Coyote Draw

1. 17 spp. Mix (1993)

	Mulched % Cover	Unmulched % Cover
Maybell	0	< 1

2. 1988 Planting (1993)

		Mulched % Stand	Mulched Vigor	Unmulched % Stand	Unmulched Vigor
Rep I	Maybell	0	-	0	-
Rep II	Maybell	5	4	< 5	5
Rep III	Maybell	0	-	< 5	6
	Total -	5		Total - 10	
	Avg.	1.7		Avg. 3.3	
Rep I	Fountain Green	< 5	5	0	-
Rep II	Fountain Green	< 5	5	5	5
	Total -	10		Total - 5	
	Avg.	5		Avg. 2.5	

3. 1991 Planting (1993)

		Mulched % Stand	Unmulched % Stand
Rep I	Maybell	0	0
Rep II	Maybell	0	0
Rep I	Bitterbrush 9038528	0	0
Rep II	Bitterbrush 9038528	0	0

APPENDIX VI.

Project 08A121

Direct Seeded Forbs and Shrubs at Colowyo Coal Company

1. Nine shrub species were seeded at Colowyo Coal Company and The "Maybell Source" was one of the most successful shrubs.

Table 1. A list of species overseeded with the rate of pure live seed (PLS) in pounds per acre.

Species	Cultivar	PLS lbs. per acre
Intermediate wheatgrass Elytrigia intermedium Agropyron intermedium	Oahe	4
Western wheatgrass Pascopyron smithii Agropyron smithii	Arriba	4
Mountain brome Bromus marginatus	Bromar	4
Cicer milkvetch Astragalus cicer	Monarch	2
	Total	14

Table 2. A listing of the nine forbs and nine shrubs in the sequence seeded at the Colowyo site. Light seeded forb and shrubs are noted (*).

Forbs	Shrubs
Utah sweetvetch Hedysarum boreale 9024375	Apache plume EPC 580 * Fallugia paradoxa 9024141
Louisiana sage * Artemisia ludoviciana Summit	Mountain big sagebrush Hobble Cr. Artemisia tridentata 9024374 *
Arrowleaf balsamroot Balsamorhiza sagittata 9038022	Antelope bitterbrush from Maybell Purshia tridentata 9024373
Rocky mountain penstemon * Penstemon strictus Bandera	Serviceberry EPC 154 Amelanchier alnifolia 9021438
Lewis flax * Linum lewisii Appar	Mountain mahogany Cercocarpus montanus Montane
Louisiana sage EPC 451 * Artemisia ludoviciana 9021475	Fourwing saltbush Atriplex canescens Rincon
Western yarrow * Achillea lanulosa 9024570	Fringed sage EPC 883 Artemisia frigida 9021471 *
Palmer penstemon * Penstemon palmeri Cedar	Golden currant EPC 337 Ribes aureum 9030913
Small burnet Sanquisorba minor Delar	Woods rose Rosa woodsii 9024569

Table 3. A listing of the number of plants for seeded shrubs by treatment and year. The information for each treatment is an average for all four replications. Each replication had two ten-foot rows seeded. Seed production in 1992 is listed (0 = none, VL = very light, L = light, M = moderate, and H = heavy).

Treatment - 0 = overseeded; N = not overseeded

		Number of Plants							
Shrub	Treatment	6/86	9/86	1987	1988	1989	1990	1992	Seed Production 1992
Fallugia paradoxa	0	0	0	0	0	0	0	0	0
	N	0	0	0	0	0	0	0	0
Artemisia tridentata vas.	0	0.3	0.3	0.3	0.3	0.3	0	0	0
	N	1.3	2.3	3.0	2.5	2.8	2.3	1.5	M
Purshia tridentata	0	3.5	5.3	3.8	3.5	3.0	2.8	0.8	0
	N	0.8	1.8	1.0	1.8	1.8	1.5	1.3	0
Amelanchier alnifolia	0	1.5	0.3	0.5	1.0	1.0	0	0	0
	N	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0
Cercocarpus montanus	0	0	0	0	0	0	0	0	0
	N	0	0	0	0	0	0	0	0
Atriplex canescens	0	0	0	0	0	0	0	0	0
	N	0	0	0	0	0	0	0	0
Artemisia frigida	0	6.3	8.3	8.8	5.8	4.3	4.5	3.5	M
	N	12.0	18.8	23.5	7.3*	11.8	10.8	10.0	H
Ribes aureum	0	0	0	0	0	0	0	0	0
	N	1.0	0.8	0	0	0	0	0	0
Rosa woodsii	0	2.3	2.0	24.0	14.5	6.0	2.0	0.3	0
	N	3.0	1.3	32.8	21.0	10.3	5.5	2.3	0

* 7.3 represents three replications. One replication had so many plants that a 60% stand was estimated instead of counting plants.