

STAG CANYON - TREND STUDY NO. 6-12-11

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Summer (Fawning habitat), Crucial Elk Summer (Calving habitat)

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XA308UT](#)

Land Ownership: Private

Elevation: 6,610 ft (2,015 m)

Aspect: East

Slope: 15%

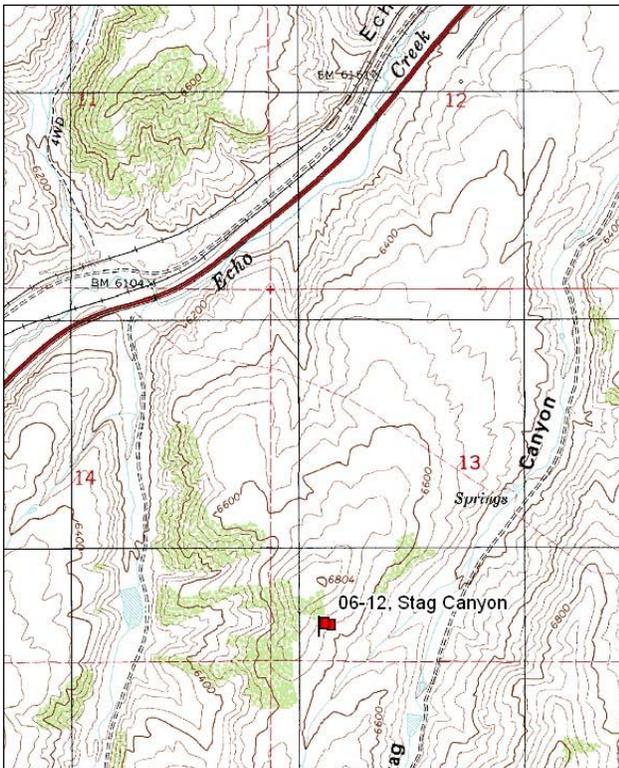
Transect bearing: 177° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft)

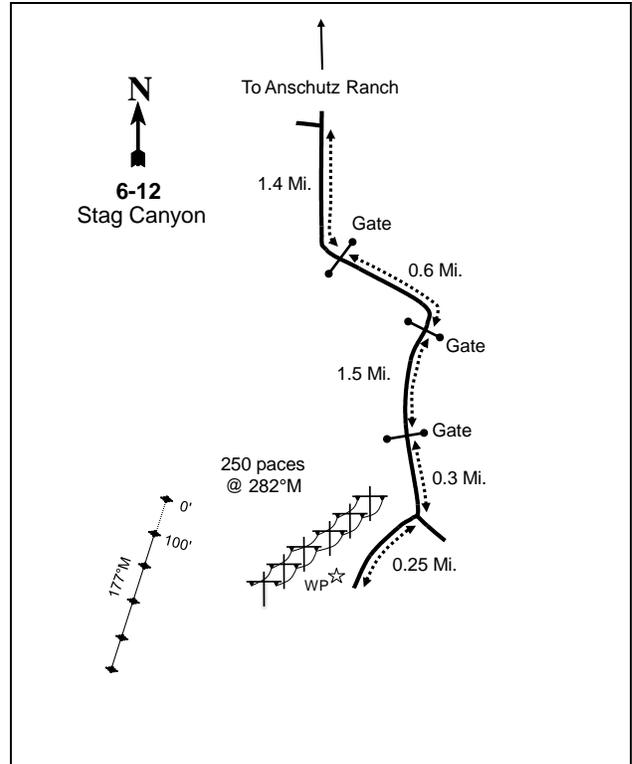
Directions:

Take exit # 185 on I-80, up Echo Canyon and turn right on the frontage road (west). Drive 1.4 miles, turn left, and go through the locked Aspen Meadows Ranch gate. Go 0.6 miles and turn off to the right through the gate next to the corral. Go 1.5 miles to a gate and proceed 0.3 miles from the gate to a fork. Turn right and drive 0.25 miles to a witness post on the right hand (west) side of the road. From the witness post walk 90 paces at 282 degrees magnetic to the 0-foot baseline stake, marked by browse tag #53. The baseline runs 177 degrees magnetic.

Map Name: Castle Rock



Diagrammatic Sketch:



Township: 4N Range: 6E Section: 13

GPS: NAD 83, UTM 12S 481026 E 4546813 N

## STAG CANYON - TREND STUDY NO. 6-12

### Site Information

Site Description: The study is located on private land that is part of the Ensign Ranches Cooperative Wildlife Management Unit (CWMU) up Echo canyon. The area is an old burn that is again dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), with adequate Utah juniper (*Juniperus osteosperma*) located a short distance up the ridge that provides thermal cover. The study was established in 1996 because of concerns about heavy elk presence. Elk pellet groups were sampled in high abundance in 2001, but moderate in abundance since 2006. Deer pellet groups have been low to moderate in abundance since 2001. Sampled cattle sign has been low since 2001 (Table - Pellet Group Data).

Browse: The browse composition consists primarily of mountain big sagebrush and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). Mountain big sagebrush provides the majority of the browse cover on the site, and cover has steadily increased since 1996 (Table - Browse Trends). Despite the increase in cover, density of mountain big sagebrush has steadily decreased since 2001. Most of the decrease in density of sagebrush is in conjunction with a decrease in the recruitment of young plants over the same period. There was an infestation by the sagebrush defoliator moth (*Aroga websteri*) between the 2001 and 2006 study years, similar to other studies in the region. There were 20% of the sagebrush plants that were classified as insect infested in 2006, though poor vigor and decadence have remained low throughout the study years. Utilization of sagebrush has been mostly light, but was more moderate in 2011. Increaser species make up the remainder of the browse; these species include stickyleaf low rabbitbrush, broom snakeweed (*Gutierrezia sarothrae*), and prickly pear (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory is marginal and weedy. Grasses are dominated by the annual species cheatgrass (*Bromus tectorum*), which has steadily increased in nested frequency and cover since 2001. Perennial grasses are diverse, but are not very abundant. The most prevalent perennial grass species include thickspike wheatgrass (*Agropyron dasystachyum*) and Indian ricegrass (*Oryzopsis hymenoides*). Perennial forbs are diverse, but are not very abundant. Wavyleaf thistle (*Cirsium undulatum*) and flannel mullein (*Verbascum thapsus*) were prevalent at the outset of the study, but both decreased significantly in 2001 and are now rare on the site. Annual forb species have increased in frequency and cover since the outset of the study, and the annual species pale alyssum (*Alyssum alyssoides*) is the dominant forb species on the site (Table - Herbaceous Trends). The noxious weed musk thistle (*Carduus nutans*) was very thick on the road and surrounding meadows in 2001 and 2006, but has not been sampled on the site.

Soil: The soil is in the Richsum-Heiners complex, which occurs on mountain slopes. Parent material consists of slope alluvium or colluvium derived from sandstone, conglomerate, and shale (Soil Survey Staff 2011). The soil texture is a sandy clay loam with a slightly alkaline soil reaction (pH 7.4) (Table - Soil Analysis Data). There is little surface rock, but there is considerable rock throughout the profile. Bare ground cover is high. Most of the vegetation cover is provided by sagebrush, with little vegetation in the interspaces (Table - Basic Cover). The soil erosion condition was classified as stable in 2001 and 2011, but was slight in 2006.

### Trend Assessments

#### Browse:

- **1996 to 2001 - slightly up (+1):** The density of mountain big sagebrush increased 12% from 5,120 plants/acre to 5,720 plants/acre, and cover increased from 10% to 12%. Decadence and poor vigor remained low. Recruitment of young sagebrush plants decreased from 71% to 29%, but recruitment is still considered to be very good.
- **2001 to 2006 - down (-2):** Mountain big sagebrush density decreased by 32% to 3,880 plants/acre, but cover increased to 17%. The average height/crown of sagebrush also increased. The population may be going through a period of self-thinning and stabilization. Recruitment of young plants decreased to

21%. The sagebrush defoliator moth was also identified on 780 plants/acre in 2006, but did not appear to have affected the vigor of the plants.

- **2006 to 2011 - down (-2):** The density of mountain big sagebrush decreased by 26% to 2,860 plants/acre, but cover remained similar. Much of the decrease in density is due to a decrease in the recruitment of young sagebrush plants, which decreased to 8% of the population.

Grass:

- **1996 to 2001 - up (+2):** The sum of nested frequency of perennial grasses increased 21%, though cover remained similar at 6%. Cheatgrass decreased significantly in nested frequency, and cover decreased from 4% to 2%.
- **2001 to 2006 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased 13%, but cover remained similar at 6%. Cheatgrass increased significantly in nested frequency, and cover increased to 4%.
- **2006 to 2011 - down (-2):** There was a 23% decrease in the sum of nested frequency of perennial grasses, and cover decreased to 5%. Cheatgrass increased significantly in nested frequency, and cover increased to 11%.

Forb:

- **1996 to 2001 - down (-2):** The sum of nested frequency of perennial forbs decreased by 68%, and cover decreased from 8% to 1%. There was a significant decrease in many of the desirable forbs including scarlet globemallow (*Sphaeralcea coccinea*). Annual forb sum of nested frequency increased substantially, and cover increased from less than 1% to 4%.
- **2001 to 2006 - slightly up (+1):** There was a 49% increase in the sum of nested frequency of perennial forbs, but most of this increase was in low growing species. Cover of perennial forbs increased slightly to 2%. Annual forb sum of nested frequency again increased substantially, but cover remained similar at 5%.
- **2006 to 2011 - up (+2):** The perennial forb sum of nested frequency increased 81%, and cover increased to 5%. The sum of nested frequency of annual forbs remained similar, but cover increased to 18%. Most of the increase in annual forbs was due to a significant increase in the nested frequency of pale alyssum and burr buttercup (*Ranunculus testiculatus*).

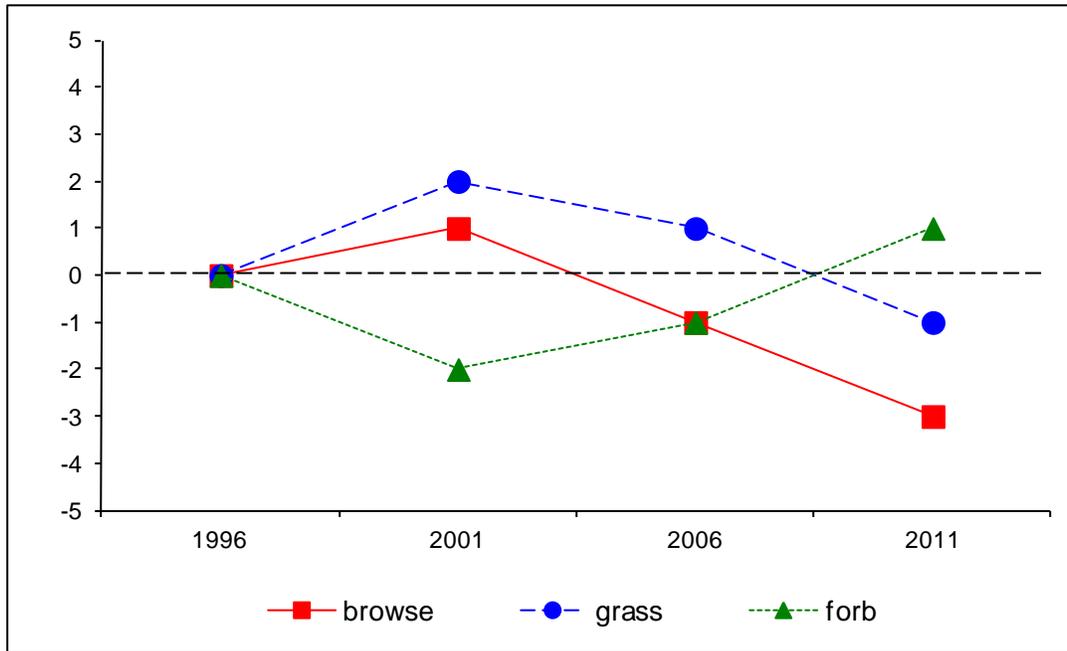
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --

Management unit 6, study no: 12

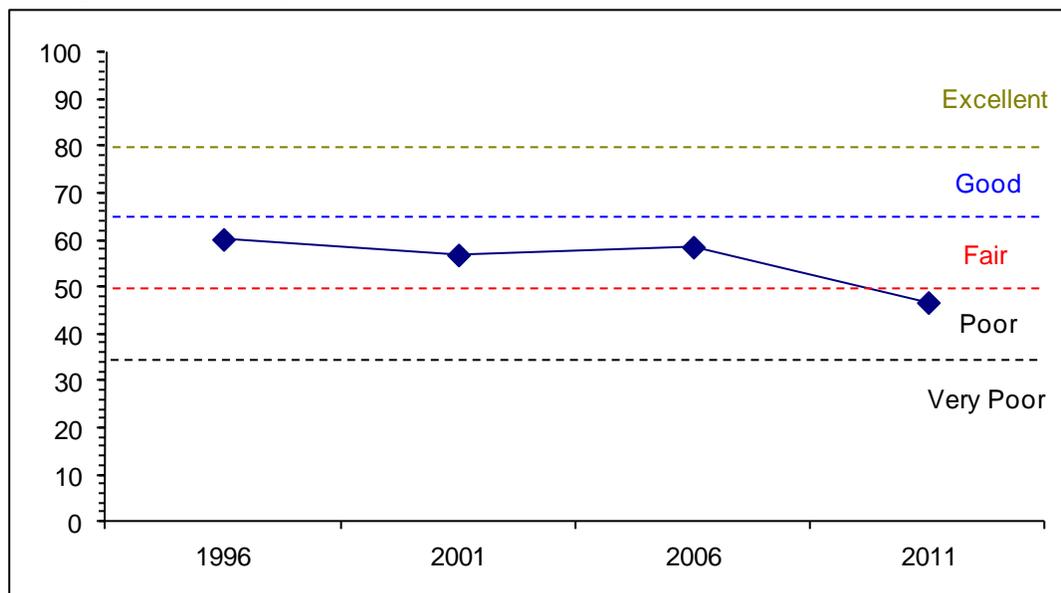
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
96	12.0	15.0	15.0	11.5	-3.3	10.0	0.0	<b>60.2</b>	Fair
01	14.6	14.4	14.5	12.0	-1.4	2.7	0.0	<b>56.8</b>	Fair
06	20.8	13.2	10.5	12.5	-3.0	4.5	0.0	<b>58.5</b>	Fair
11	20.6	11.7	4.0	9.9	-8.3	8.9	0.0	<b>46.7</b>	Poor

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
Management unit 6 Study no: 12



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--  
Management unit 6, Study no: 12



HERBACEOUS TRENDS--  
Management unit 06, Study no: 12

Type	Species	Nested Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
G	Agropyron dasystachyum	78	91	57	63	2.58	2.12	1.14	1.29
G	Agropyron spicatum	11	11	11	6	.18	.19	.52	.21
G	Bromus tectorum (a)	b272	a154	b273	c349	4.43	1.85	3.98	11.13
G	Elymus cinereus	5	5	5	1	.03	.41	.15	.03
G	Oryzopsis hymenoides	ab57	ab64	b66	a37	2.05	1.42	3.57	1.41
G	Poa fendleriana	-	2	3	5	-	.00	.03	.30
G	Poa pratensis	a14	b34	ab23	a2	.45	1.35	.08	.06
G	Poa secunda	a10	a8	ab17	b32	.12	.05	.42	1.01
G	Stipa comata	ab15	a14	b18	ab8	.34	.42	.34	.59
Total for Annual Grasses		272	154	273	349	4.43	1.85	3.98	11.13
Total for Perennial Grasses		190	229	200	154	5.77	5.99	6.27	4.93
Total for Grasses		462	383	473	503	10.21	7.84	10.26	16.06
F	Agoseris glauca	-	-	-	3	-	-	-	.03
F	Allium sp.	a-	a2	b13	c35	-	.00	.10	.11
F	Alyssum alyssoides (a)	a103	b342	b355	c420	.27	3.48	1.23	13.89
F	Arabis sp.	2	-	-	-	.00	-	-	-
F	Aster sp.	-	-	-	8	-	-	-	.41
F	Astragalus beckwithii	a-	a1	b28	c48	-	.15	.61	1.35
F	Astragalus convallarius	a3	ab9	b16	ab4	.00	.07	.28	.06
F	Astragalus sp.	-	-	-	-	-	-	.00	-
F	Astragalus utahensis	2	-	2	7	.03	-	.03	.33
F	Calochortus nuttallii	a-	a-	a9	b23	-	-	.03	.13
F	Cirsium undulatum	b144	a32	a8	a24	4.98	.51	.07	.79
F	Collinsia parviflora (a)	a18	a6	c167	b110	.07	.01	.53	.49
F	Collomia linearis (a)	-	4	-	-	-	.00	-	-
F	Cordylanthus ramosus (a)	a1	ab19	b51	bc29	.03	.58	1.51	.29
F	Cordylanthus sp. (a)	-	-	-	10	-	-	-	.07
F	Crepis acuminata	a-	a-	a1	b19	-	-	.00	.07
F	Delphinium nuttallianum	a-	a-	a-	b9	-	-	-	.05
F	Draba sp. (a)	-	-	10	3	-	-	.02	.01
F	Epilobium brachycarpum (a)	1	-	9	3	.00	-	.04	.00
F	Erigeron pumilus	3	2	-	4	.00	.00	-	.01
F	Gayophytum ramosissimum(a)	-	2	3	-	-	.01	.00	-
F	Gilia sp. (a)	-	4	-	-	-	.00	-	-
F	Holosteum umbellatum (a)	5	-	7	4	.01	-	.01	.01
F	Lithospermum ruderales	-	-	4	2	-	.00	.07	.15
F	Machaeranthera spp	-	1	-	-	-	.15	-	-
F	Microsteris gracilis (a)	a-	a4	c91	b40	-	.00	.24	.15
F	Phlox longifolia	b42	a19	b49	b40	.19	.09	.62	.33
F	Polygonum douglasii (a)	b26	a-	a-	a4	.05	-	-	.00
F	Ranunculus testiculatus (a)	a5	a3	b178	b213	.01	.00	1.08	3.13
F	Sisymbrium altissimum (a)	1	-	-	-	.00	-	-	-
F	Sphaeralcea coccinea	b26	a9	a7	ab12	.28	.05	.39	.51

Type	Species	Nested Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
F	Tragopogon dubius (a)	6	-	-	6	.01	.00	.00	.01
F	Unknown forb-perennial	2	-	-	-	.03	-	-	-
F	Verbascum thapsus	<sub>c</sub> 59	<sub>b</sub> 17	<sub>a</sub> -	<sub>a</sub> -	2.33	.32	-	-
F	Viola sp.	-	-	-	10	-	-	-	.09
Total for Annual Forbs		166	384	871	842	0.47	4.11	4.70	18.08
Total for Perennial Forbs		283	92	137	248	7.87	1.37	2.23	4.46
Total for Forbs		449	476	1008	1090	8.34	5.48	6.93	22.54

Values with different subscript letters are significantly different at alpha = 0.10

#### BROWSE TRENDS--

Management unit 06, Study no: 12

Type	Species	Strip Frequency				Average Cover %			
		'96	'01	'06	'11	'96	'01	'06	'11
B	Artemisia tridentata vaseyana	66	74	77	75	9.56	11.69	16.64	16.47
B	Chrysothamnus viscidiflorus viscidiflorus	59	61	48	49	5.48	5.69	5.32	4.92
B	Gutierrezia sarothrae	35	27	9	9	1.61	.86	.09	.03
B	Opuntia sp.	3	3	4	2	.15	.03	.03	.15
Total for Browse		163	165	138	135	16.80	18.27	22.09	21.57

#### CANOPY COVER, LINE INTERCEPT--

Management unit 06, Study no: 12

Species	Percent Cover	
	'06	'11
Artemisia tridentata vaseyana	25.86	29.86
Chrysothamnus viscidiflorus viscidiflorus	6.66	5.73
Gutierrezia sarothrae	-	.03

#### KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 06, Study no: 12

Species	Average leader growth (in)		
	'01	'06	'11
Artemisia tridentata vaseyana	1.9	1.6	1.8

#### BASIC COVER--

Management unit 06, Study no: 12

Cover Type	Average Cover %			
	'96	'01	'06	'11
Vegetation	33.05	32.68	34.59	49.90
Rock	1.72	1.37	1.80	.62
Pavement	2.63	5.55	5.02	5.72
Litter	40.31	36.14	26.92	23.44
Cryptogams	.04	.24	.57	1.15
Bare Ground	34.56	45.35	45.02	30.00

SOIL ANALYSIS DATA --

Management unit 06, Study no: 12, Study Name: Stag Canyon

Effective rooting depth (in)	pH	Sandy-Clay-Loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
11.8	7.4	47.3	26.7	26.0	2.9	11.9	169.6	0.7

PELLET GROUP DATA--

Management unit 06, Study no: 12

Type	Quadrat Frequency				Days use per acre (ha)		
	'96	'01	'06	'11	'01	'06	'11
Rabbit	3	5	22	2	-	-	-
Horse	-	-	2	-	-	1 (3)	-
Elk	47	9	6	18	60 (149)	35 (86)	27 (68)
Deer	10	13	10	7	15 (36)	21 (51)	25 (63)
Cattle	6	4	1	-	11 (27)	-	-

BROWSE CHARACTERISTICS--

Management unit 06, Study no: 12

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata vaseyana</i>									
96	<b>5120</b>	71	29	0	1960	2	.78	.39	33/40
01	<b>5720</b>	29	68	2	20	2	0	.34	30/35
06	<b>3880</b>	21	73	6	400	13	0	6	33/41
11	<b>2860</b>	8	80	11	-	43	0	10	28/37
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
96	<b>2660</b>	3	92	5	40	5	.75	0	11/23
01	<b>3480</b>	1	87	12	40	0	0	4	9/21
06	<b>2280</b>	7	84	9	-	2	0	4	10/22
11	<b>2060</b>	16	84	0	20	0	0	0	9/21
<i>Gutierrezia sarothrae</i>									
96	<b>3120</b>	18	81	1	-	0	0	0	7/10
01	<b>1840</b>	0	97	3	-	0	0	3	7/11
06	<b>240</b>	8	83	8	-	0	0	8	5/6
11	<b>320</b>	6	94	0	-	0	0	0	4/6
<i>Juniperus osteosperma</i>									
96	<b>0</b>	0	0	-	-	0	0	0	-/-
01	<b>0</b>	0	0	-	-	0	0	0	-/-
06	<b>0</b>	0	0	-	20	0	0	0	-/-
11	<b>0</b>	0	0	-	-	0	0	0	-/-
<i>Opuntia sp.</i>									
96	<b>100</b>	0	100	-	-	0	0	0	5/8
01	<b>140</b>	0	100	-	-	0	0	0	4/10
06	<b>100</b>	0	100	-	-	0	0	0	5/7
11	<b>40</b>	0	100	-	-	0	0	0	4/8

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Purshia tridentata</i>										
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	10/63	
06	0	0	0	-	-	0	0	0	10/78	
11	0	0	0	-	-	0	0	0	-/-	
<i>Tetradymia canescens</i>										
96	0	0	0	-	-	0	0	0	-/-	
01	0	0	0	-	-	0	0	0	-/-	
06	0	0	0	-	-	0	0	0	6/26	
11	0	0	0	-	-	0	0	0	8/22	