

Snakeweed

Gutierrezia sarothrae - >3 floretes/head (Broom snakeweed)

G. microcephala - 1 florete/head (Threadleaf snakeweed)

Other common names: tuprentine weed, slinkweed, matchweed, rubberweed, yellowtop, broomweed



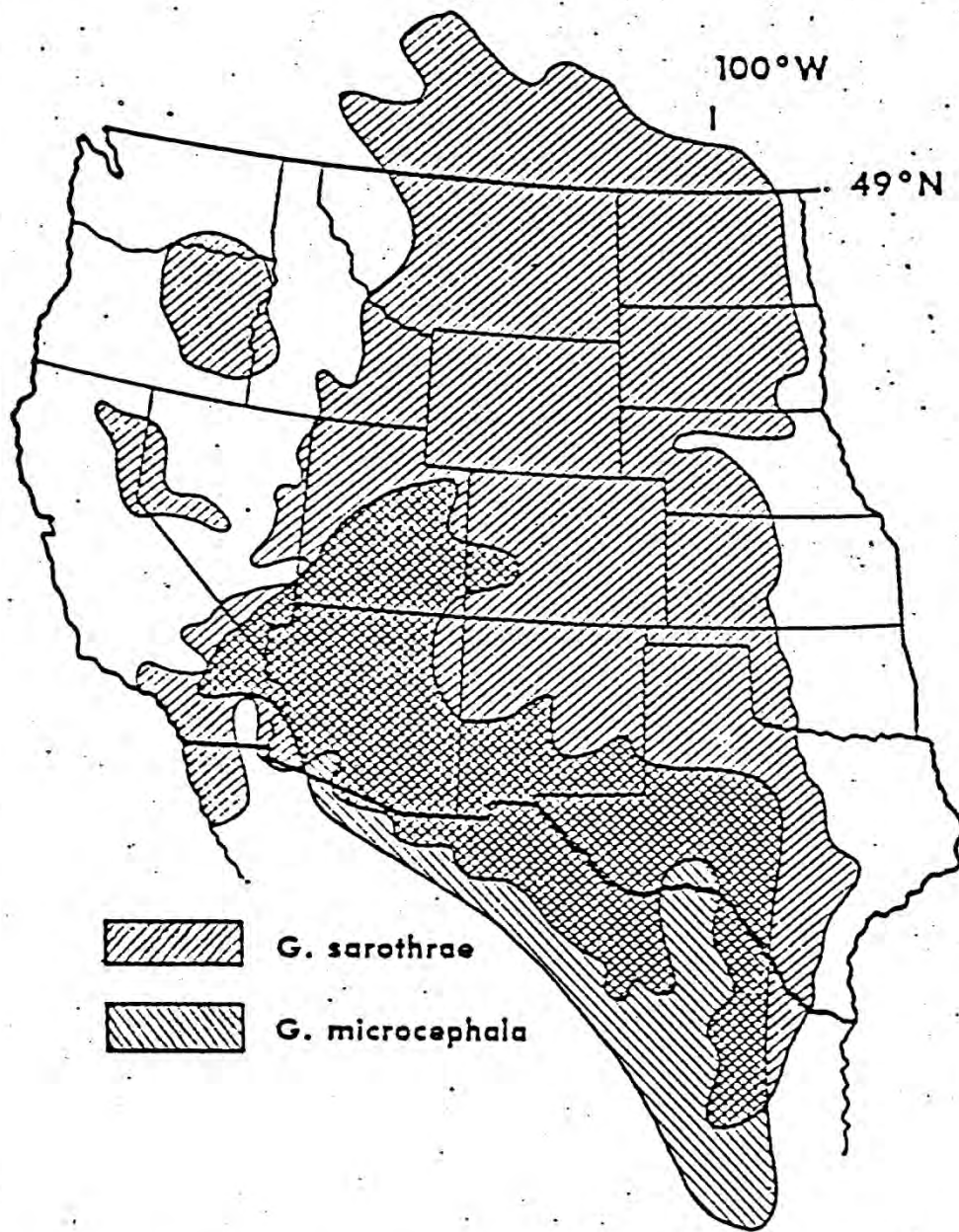


FIG. 8.2 Distribution of *Gutierrezia sarothrae* and *G. microcephala* in North America (adapted from Lane 1985).

Snakeweed History of Poisoning

- Ranchers in southern Great Plains suspected broomweed poisoning
- West Texas – abortions 10-60%
- Research
 - Schmidt 1931 – no toxicity
 - Matthews 1936 – toxic to cattle sheep goats
 - Dollahite 1957 – low dose cause abortions, high dose toxic
- Chemistry
 - Shaver 1964 – Saponin caused abortions
 - Roitman 1985 – flavonoids likely estrogenic
 - Roitman 1994 – Diterpene acids, similar to ICA in pines
 - Gardner 1994 – Diterpene acids
 - Relative amount of individual acids toxic or abortifacient



Clinical signs of Poisoning

- Abortions
 - Small weak calves
 - Retained placenta
 - Infection causing death
- Toxic syndrome
 - Anorexia
 - Mucopurulent nasal discharge
 - Listlessness
 - Loss of appetite
 - Diarrhea
 - Constipation
 - Rumen stasis
 - death

Relationship of Snakeweed Poisoning to Nutrition NMSU

Smith 1991 – snakeweed in rat diets reduced fertility and increased fetal mortality.

Edrington 1993 – snakeweed reduced intake, impaired hormone balance, disrupted blood flow to uterus leading to fetal death.

Oetting 1991 – snakeweed in low quality diets reduced intake and ewes didn't show estrus.

Williams 1993 – snakeweed in balanced diet didn't affect estrus, conception, or cause abortions in heifers.

Poisoning = starved animals forced to graze snakeweed







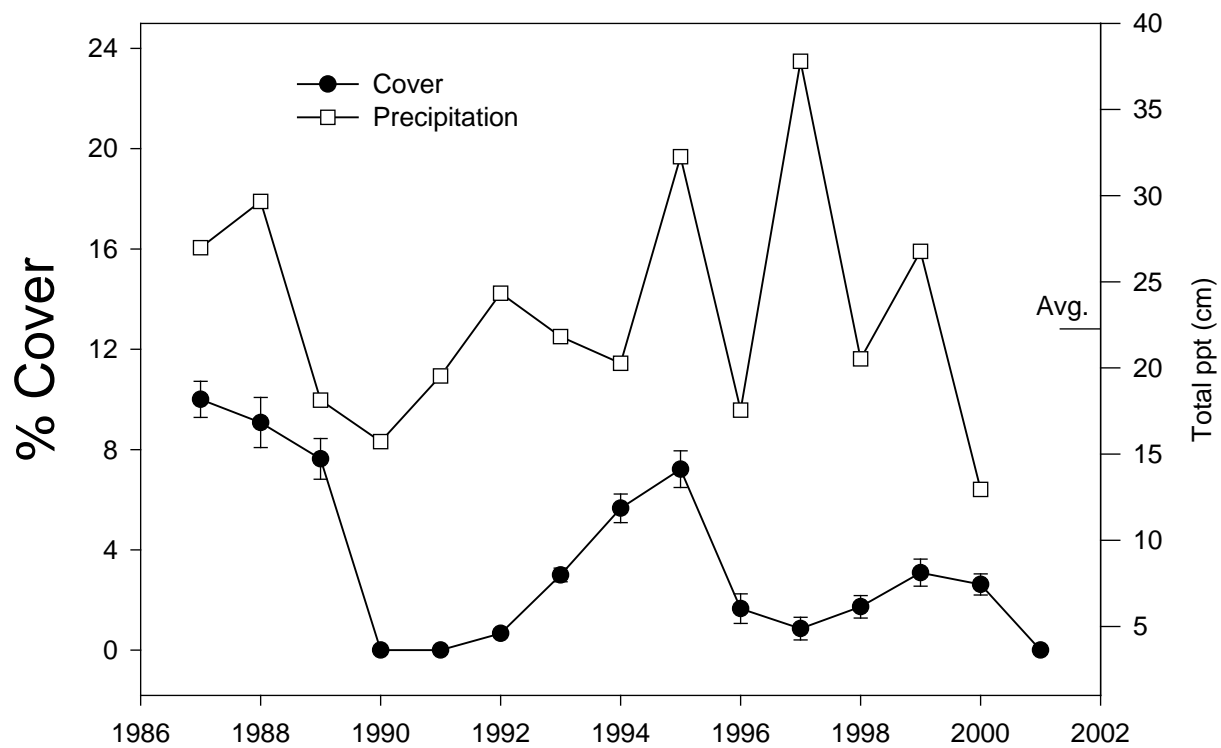


Snakeweed Competition

1. Prolific seed producer 1200-22,000 seeds/plant
2. Seed germination
 - a. Seeds on surface - 70% germination - establish when conditions favorable
 - b. Buried seeds - low germination - reserve for long-term survival
3. 2-tier root system
 - a. Deep tap root
 - b. Extensive adventitious rootsExhaust soil moisture from entire soil profile
4. Leaves - little stomatal control - luxuriant use of water
 - a. Shed leaves in drought
 - b. Stem photosynthesis to maintain plant
5. Allelopathy - saponins and flavonoids
suppress grass root growth
6. Even-aged stands - near total dominance
 - a. Cataclysmic event - population dies (drought, fire, insects)
 - b. 1st to germinate and establish when adequate moisture
 - c. Intraspecific competition - 70% seedlings die in first year
 - d. Interspecific competition - crowd out grass
 1. Soil moisture depletion
 2. Allelopathy

Snakeweed Cover

Ferron Utah



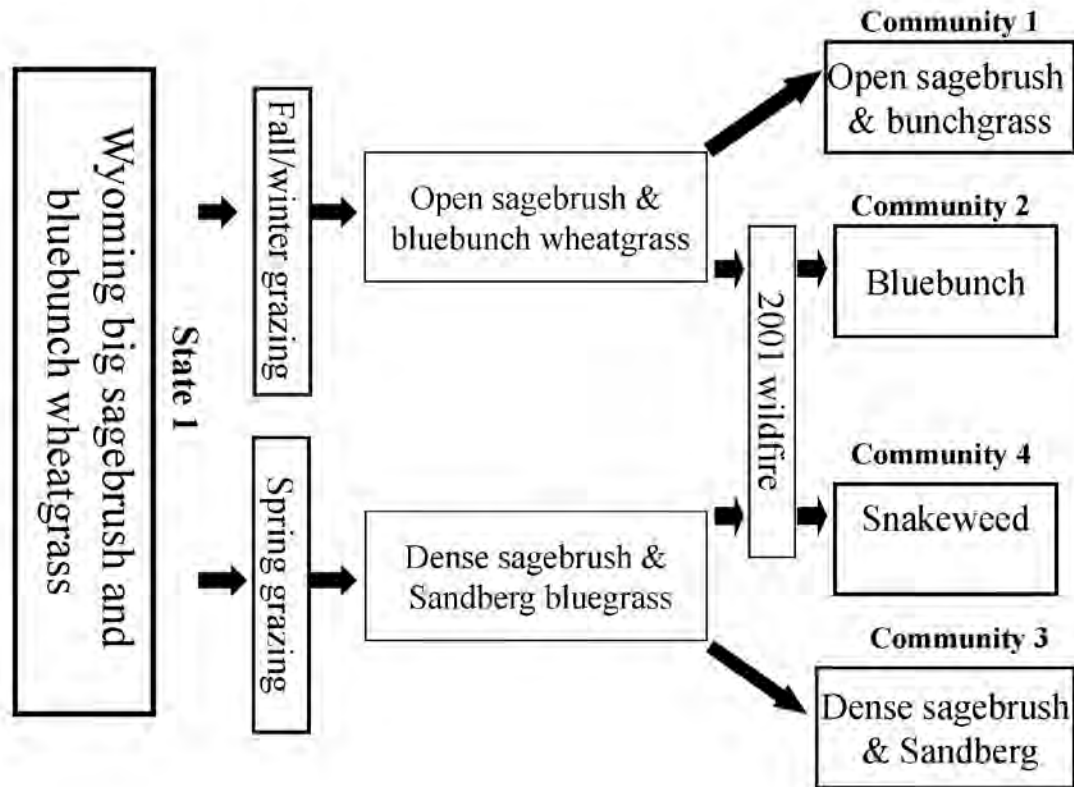
Snakeweed Dominate Plant Communities

Grass Production	<u>no snakeweed</u>	<u>with snakeweed</u>
Shortgrass prairies	800 lb/ac	80 lb/ac

Snakeweed Cover	<u>Climax / PNC</u>	<u>Current</u>
Salt-desert shrub		
Henry Mt	5%	13%
Ferron UT	3%	10%
Sagebrush steppe	5%	14%
Pinyon / Juniper	0%	4-5%

(total foliar cover = 20%)

State and Transition Model



Disturbance drivers
Over grazing
Fire

Conditions of Poisoning

Snakeweed is not palatable

High levels of saponins, flavonoids,
terpenes (crude resins 13%)

Grazed only when desirable forage depleted

Winter and early spring –

warm season grasses dormant,
snakeweed 1st to grow.

Overgrazed ranges.

Magnitude of Losses (Torell 1988)

Eastern New Mexico, West Texas - \$44.3 million

- Reduced forage production
 - Biggest impact, 72% of total loss
- Death and abortions
 - Abortions 2.9% of calf crop
 - Death rate – 1% annually
- Decreased gains

Management to reduce poisoning

- Ensure adequate feed.
- Control
 - Mechanical – plow and seed to adapted grass
 - Prescribed burning
 - Herbicide

<u>Herbicide</u>	<u>Rate</u>	<u>Spring</u>	<u>Fall</u>	<u>\$/ac</u>
2,4-D	2lb/ac	25%	0	4
Tordon	.5 lb/ac	98	99	23
Grazon PC	1.25 lb/ac	75	90	9.40
Escort	1 oz/ac	9	83	
Milestone	7 oz/ac	42	93	



Cool-season grass competition with snakeweed



Establish weed-resistant plant community

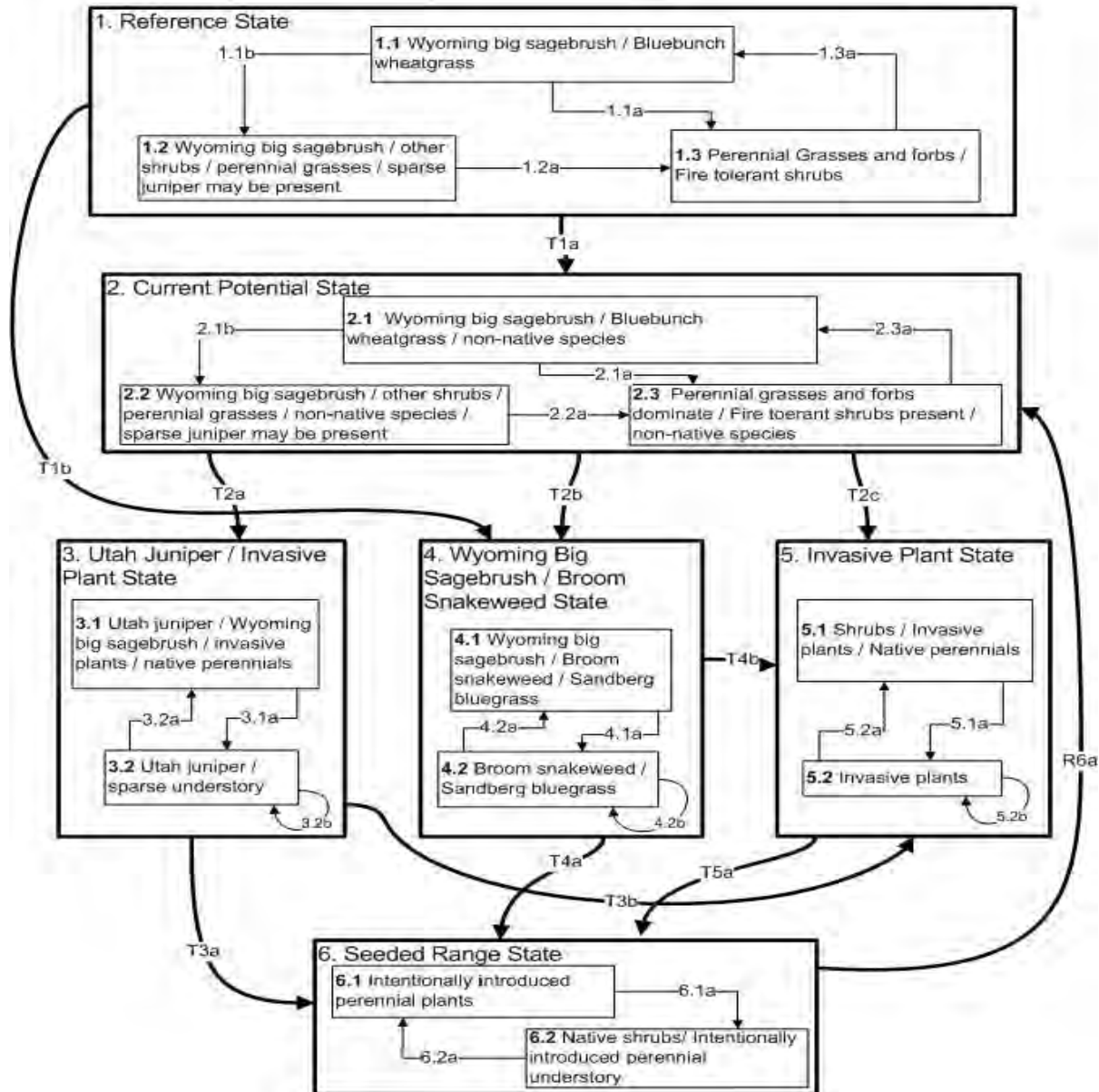
- Snakeweed seedlings sensitive to competition from established plants.
- Once established, it is competitive with other plants.
- Seed cool-season grasses following control or disturbance.
 - HyCrest crested wheatgrass most reliable to establish.
 - Squirrel tail establishes quickly, but declines.
 - Western and bluebunch wheatgrass slow to establish, allowing cheatgrass to establish.

Upland Gravelly Loam (Wyoming big sagebrush)

See attached descriptions

10/3/2007

R028AY307UT



















3/6/97 Worms

Plant Number	Co.	N	Chart	Feet	Soils	Leaves
157	117	200	24	14		
158	150	6	12	2		
159	150	11		23		
160	141	10	34	8		
161	144		14	16		
162	150	5	5	4		
163	150	9	156	7		
164	150	11	166	2	11	
165	150	11	130	17	3	
166	150	10	153	2		
167	144	14	147	3		
168	150	19	113	2	4	



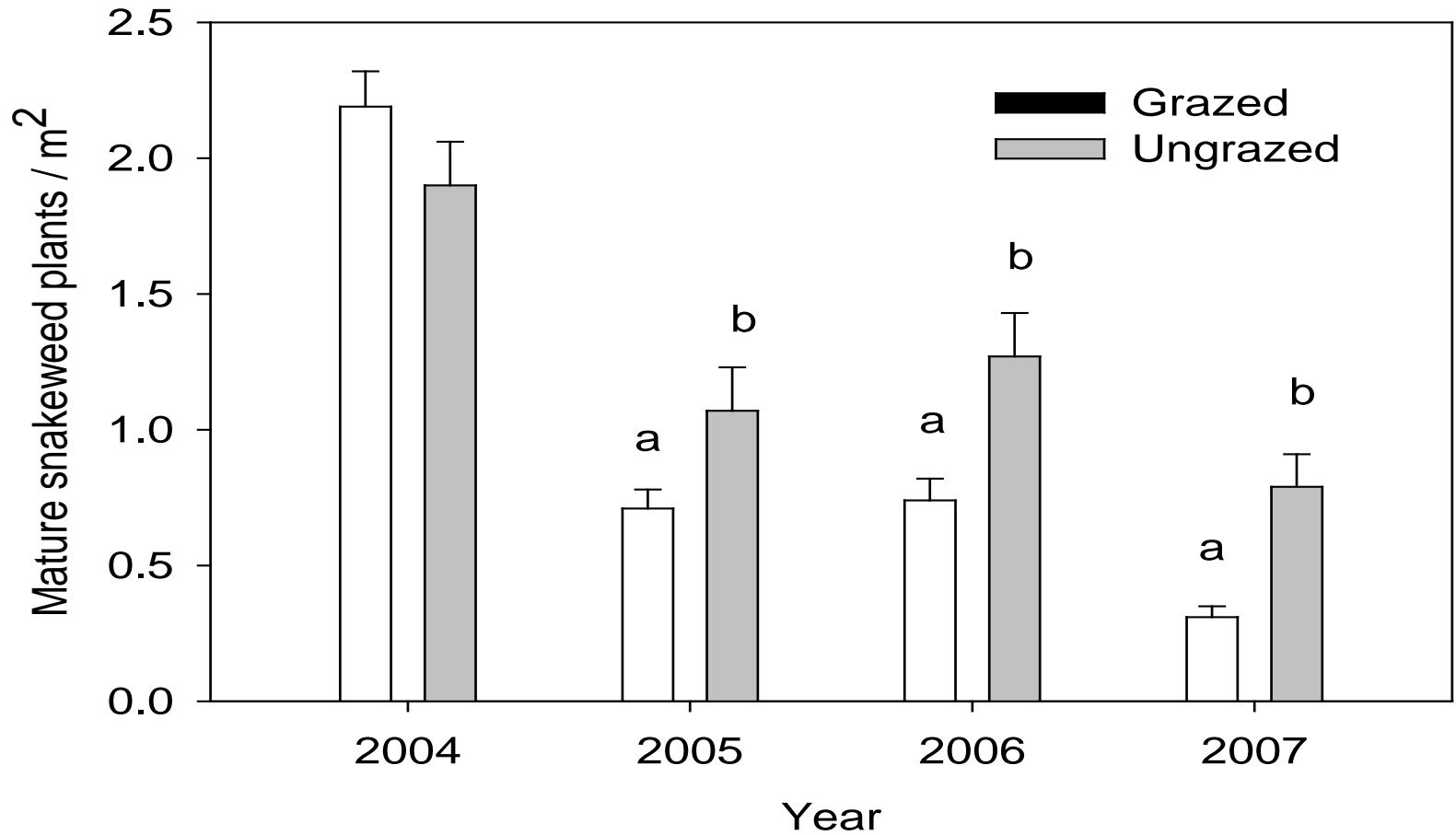


Results of intensive grazing trial:

- 62-95% snakeweed plants grazed
- 50-85% snakeweed biomass removed
- Density of mature snakeweed declined 85%
- Crested wheatgrass cover increased

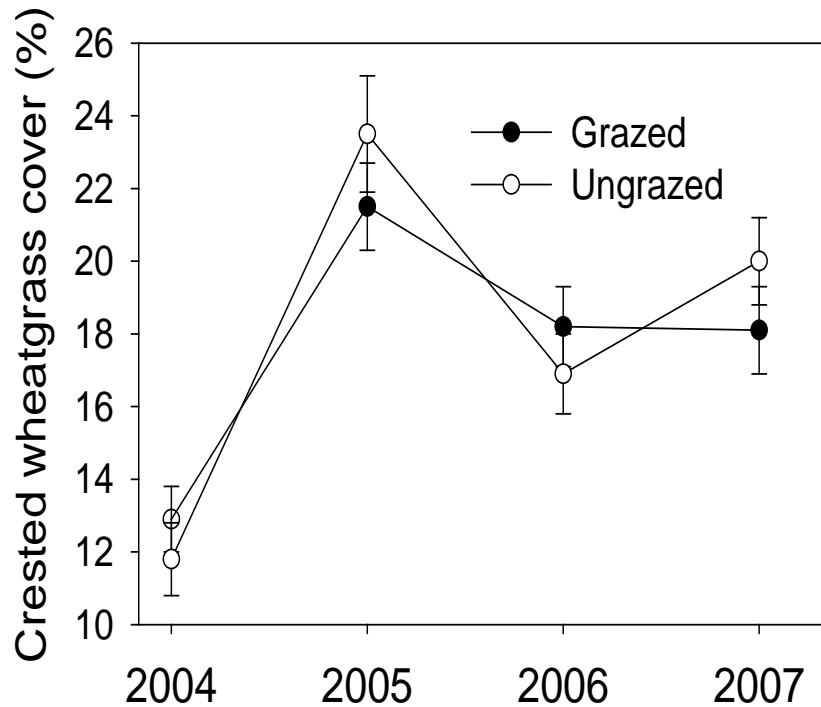


Density of existing mature snakeweed plants



Cover of associated vegetation did not decline

Spring grazing



Summer grazing

